Connecticut Comprehensive Plan for Stroke Prevention and Care 2009-2013

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

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Contents

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- *Carol E. Bower, AA, BSc, Connecticut Department of Public Health Planning Branch*
- *Valerie Fisher, RN, Patricia Trella, MA, and Nancy Prevost, Connecticut Department of Public Health Heart Disease and Stroke Prevention Program*

Note: Members of the work groups and DPH recognize the need to involve as many organizations and programs across the state as possible to ensure the success of the Connecticut Comprehensive Plan for Stroke Prevention and Care. To assist interested individuals, programs, and organizations in locating initiatives with which to partner, the group developed a resource list, which can be found in Appendix D/Planning Process Logic Models. The list includes programs sponsored by DPH and those sponsored by community and private organizations. While the list provides a good sample of programs in Connecticut, it is not a comprehensive list. Omission of a program should not be construed as judgment on the usefulness of the program.

EXECUTIVE SUMMARY

"*It is important to note that this plan should make it possible for every patient to get appropriate [timely] care either at their local hospital or elsewhere."* Stroke Care Committee

The purpose of this statewide plan is to promote an integrated, comprehensive system of care and prevention that includes stroke preventive education, increased screenings, rapid response emergency medical services (EMS), acute care treatment, standardized treatment protocols, and comprehensive rehabilitation assessment and therapies.

"For each minute that passes, an estimated two million brain cells die, and every second diminishes the stroke sufferer's chance to return to normal function."
University of Wisconsin's …Stroke Program
UWhealth.org

Background

The Connecticut Department of Public Health (DPH) began to map a path for improving Connecticut's system of stroke care and prevention after reviewing data from a survey of Connecticut hospitals conducted by DPH. The survey results demonstrated that most hospitals had critical elements for stroke care. The survey indicated that Connecticut needs a more integrated system of care with standardized care protocols to improve services across the continuum of stroke care and prevention.

As an initial step, DPH launched a statewide process to designate Connecticut's acute care hospitals as Primary Stroke Centers (PSC) in November 2007. This voluntary process was developed in partnership with hospitals and other partners and is based upon recommendations from the American Stroke Association and the Brain Attack Coalition.

After implementing the Primary Stroke Center Designation Program, DPH embarked upon a statewide planning process to design an integrated system of stroke care and prevention. This plan is the result of input of over 85 health care and stroke experts in Connecticut during a ten-month planning process.

Plan Development

The Connecticut Department of Public Health brought together a diverse panel of experts to create a plan for developing a coordinated system of stroke care and prevention. Partners included: health care providers, community health centers/clinics, hospitals, hospital associations and health associations, health advocacy groups, home health care agencies, public health representatives, health care professionals, non-profit organizations, insurance groups, state representatives, and community and special interest groups. The panel was divided into four work groups, which discussed current practices, reviewed established policies and existing stroke

resources, and identified gaps in services. Work groups developed the goals, objectives, strategies, and action steps necessary to create a coordinated system of stroke care and prevention. Each work group completed their tasks over a six-month period, and provided ongoing feedback on the draft plan. The full group reconvened in June 2008 to identify and rank priorities, and to determine the first steps necessary to initiate plan implementation.

Major Goals of the Plan

Plan Goal: To create a coordinated system of stroke care and prevention in which it is possible for every Connecticut resident to access appropriate and timely care for optimal post stroke outcomes. A coordinated care system involves EMS, hospital stroke teams, specialized stroke units (where applicable), and standardized care protocols.

***Prevention and Community Education Goal*:** To promote reduction of stroke risk factors and healthy living for all Connecticut residents, particularly high risk individuals, through a coordinated effort with existing plans and community efforts. Healthy living includes proper nutrition, having knowledge of family history, improving physical activity, and the management of high blood pressure, cholesterol, and diabetes, limiting alcohol consumption, and avoiding illicit drug use.

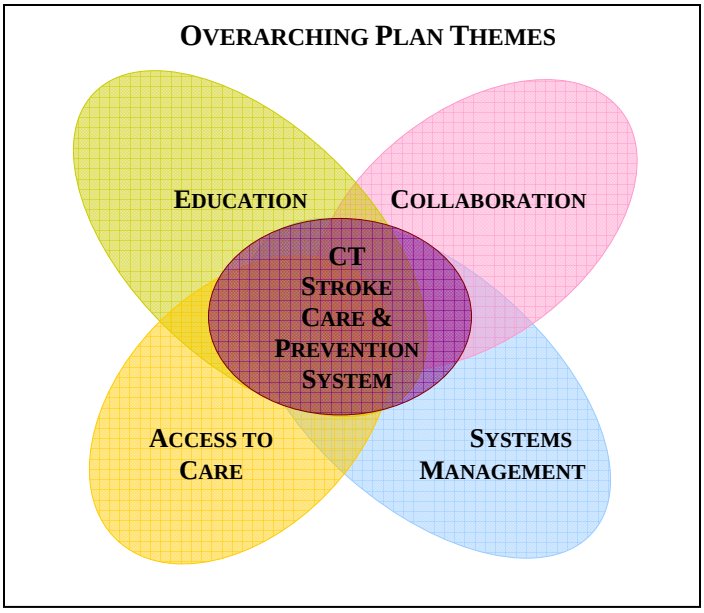
Emergency Medical Services (EMS), Notification and Response: To facilitate timely access to EMS care, enhanced pre-hospital recognition and treatment, and rapid transport to the appropriate health care facility of patients experiencing a stroke event.

Hospital Care Goal:

- During the First Six Hours or Hyper Acute Care: To ensure all Connecticut residents that have experienced a stroke have equal access to high quality acute stroke care services.
- During the period of Acute Care Stay to Discharge: Standardized stroke care protocols are available and are consistently implemented during acute care stay through discharge including post-hospitalization care referrals and rehabilitation services.

***Rehabilitation and Post-Stroke Goal*:** Ensure that all stroke survivors receive an initial hospital evaluation or standardized screening by a rehabilitation professional to determine their individual rehabilitation needs, and receive appropriate care in a timely manner with periodic re-evaluation of rehabilitation needs and resources to achieve optimal outcomes.

As each of the work groups discussed the problems, gaps in services and recommended objectives in Primary Prevention and Community Education, Emergency Medical Services, Hospital Care and Rehabilitation and Post-Stroke, four critical themes emerged across the continuum: collaboration, education, access to care, and systems management. These overarching themes surfaced throughout the planning process as the primary areas of need within our current system and became the focus of the recommendations in this plan.

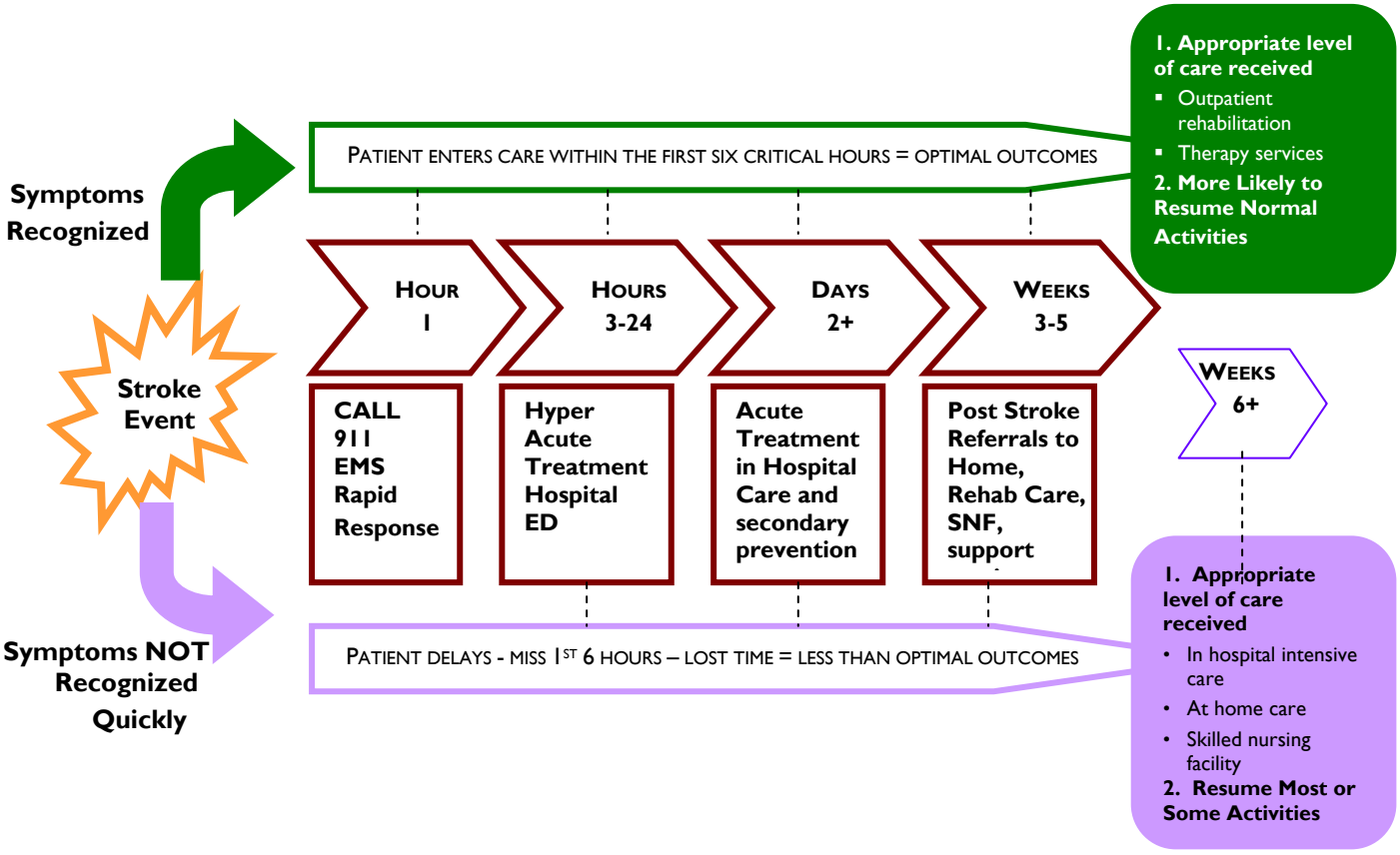


Plan Implementation - Priority Objectives

In June 2008, the work groups reconvened to review their recommendations and to identify initial implementation activities. Participants focused on objectives that address the four identified areas of need: education, collaboration, access to care, and systems management. These priority objectives use existing resources and may be implemented in the short-term. The objectives are:

- Prevention & Community Education – Promote improved hypertension and cholesterol control in primary care settings.
- EMS Notification & Response – Develop a standardized stroke assessment tool and stroke education program for EMS providers.
- Hospital Care – Explore the use of telemedicine in stroke care, foster Primary Stroke Center and non-Primary Stroke Center partnerships, and create a stroke resource listserv and a Web site that includes a statewide EMS inventory of available stroke care services.
- Rehabilitation & Post-Stroke – Establish or adapt existing post-stroke educational materials for survivors and their social networks.

The figure below represents two paths by which an individual experiencing a stroke event might enter the stroke system of care. This plan emphasizes the need to get the individual into the system as quickly as possible to ensure they receive timely, appropriate care to achieve optimal outcomes.



RECOMMENDATIONS

The Advisory/Steering Committee will oversee implementation of the Plan, monitor the effectiveness of the recommended activities, and measure progress toward establishing a coordinated system of stroke care and prevention in Connecticut.

PREVENTION AND COMMUNITY EDUCATION

Prevention and Community Education Goal: By 2013, reduce the prevalence of stroke risk factors among Connecticut residents, reduce the incidence of stroke and stroke complications, and promote healthy living for all Connecticut residents, particularly high risk individuals, through a coordinated effort with existing plans and community efforts.

- Increase the number of Connecticut residents aware of the risk factors for stroke, stroke prevention strategies, signs and symptoms of a stroke, and the importance of calling 9-1-1 through local, regional, and statewide education efforts.
- All stroke care providers, stroke survivors, and persons at risk have access to, and receive, appropriate education and information on stroke prevention and care.
- Promote policy, environmental and systems changes in communities and workplaces to support healthy lifestyles (e.g., safe walking paths, healthy food options, worksite wellness programs, and coverage for persons without insurance).
- Increase the number of stroke screening and education programs statewide.

EMERGENCY MEDICAL SERVICES

Emergency Medical Services Goal: By 2013, facilitate timely access to EMS care, enhanced pre-hospital recognition and treatment, and rapid transport to the appropriate health care facility of patients experiencing a stroke event.

- Create a statewide, standardized EMS stroke protocol with core elements for assessment, transportation, and communication among hospitals and EMS responders that allows for regional differences.
- Develop a stroke assessment tool based upon best practices for EMS responders.
- Provide ongoing training to all EMS responders in stroke assessment, treatment and care.

HOSPITAL CARE / HYPER ACUTE (FIRST 6 HOURS)

Hospital Care / Hyper Acute Goal: By 2013, ensure that all Connecticut residents who have experienced a stroke have equal access to high quality, acute stroke care services.

- All stroke care providers (hospitals and EMS) have a readily accessible statewide inventory of information on the location of designated stroke centers, available services, and bed capacity.
- Increase the number of Connecticut hospitals that achieve Primary Stroke Center designation to ensure individuals experiencing a stroke event receive timely and appropriate treatment.
- Advocate for revisions to current state legislation that currently require a power of attorney to make decisions for clinical trials, and instead, consider next of kin as a sufficient decision maker.

HOSPITAL CARE / ACUTE CARE TO DISCHARGE

Hospital Care / Acute Care to Discharge Goal: By 2013, standardized stroke care protocols are available and are consistently implemented during an acute care stay through discharge including post-hospitalization care, referrals, and rehabilitation services.

- All hospitals will provide the same standard of stroke education that meets Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and DPH stroke education requirements to all professionals providing stroke care, which includes the core elements of a stroke care curriculum.
- All hospitals have practice guidelines and protocols for treatment and care of stroke patients whose condition deteriorates, and identification and treatment for non-stroke patients who may develop stroke-like symptoms during their hospital stay.
- All hospitals have established discharge protocols that include criteria to make appropriate referrals for follow-up care, and to ensure a reciprocal relationship among all stroke care providers and the patient's primary care physician.

REHABILITATION AND POST STROKE

Rehabilitation and Post Stroke Goal: By 2013, all stroke survivors will receive an initial hospital evaluation or standardized screening by a rehabilitation professional to determine their individual needs. All stroke survivors will receive appropriate care in a timely manner with periodic re-evaluation of rehabilitation needs and resources, to achieve optimal outcomes.

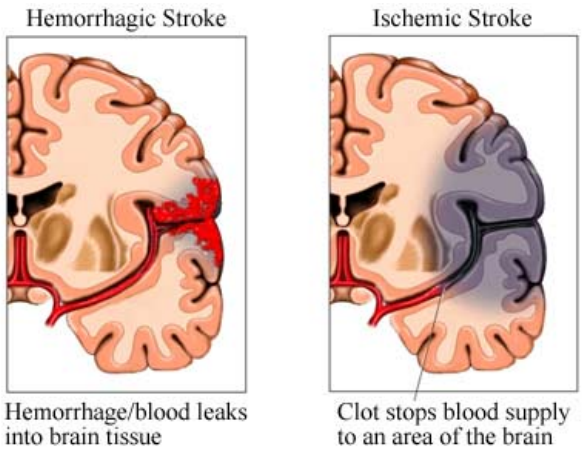
- All stroke survivors receive an individualized assessment and referral to appropriate rehabilitative care necessary to achieve optimal post-stroke outcomes. Patients, acute care and rehabilitation teams, rehabilitation facilities (e.g., skilled nursing facilities, home health agencies), primary care physicians, community agencies, and the patient's social networks should all be actively involved in the development of a stroke recovery plan.
- Establish communication systems to ensure that all stroke survivors have a written plan of care for follow-up services following hospitalization.
- Ensure that preventable complications and secondary prevention issues are addressed, including all modifiable risk factors. Increase awareness of optimal post-acute care by healthcare providers and third party payers.
- Ensure stroke survivors and their social networks receive appropriate post stroke education according to established protocols, and written information on stroke risk factors, warning signs, and the importance of timely use of EMS services.

PART I: INTRODUCTION

A Stroke System of Care and Prevention is "an integrated system of care that coordinates the roles of stroke treatment providers in Connecticut for optimal patient outcomes." Stroke Work Groups

Stroke

Stroke is the most common neurological emergency.[1] It is the third leading cause of death in the United States, as well as in Connecticut, and a leading cause of disability. A stroke occurs when there is an interruption in the blood vessels supplying blood to the brain, resulting in a rapid loss of brain function. There are two causes of stroke: ***ischemia*** (a lack of blood supply) due to blood clots (thrombosis or embolism), and ***hemorrhage*** (excessive bleeding).[2] Ischemic strokes account for an estimated 80% of strokes each year. "For each minute that passes, an estimated two million brain cells die, and every second diminishes the stroke sufferer's chance to return to normal function."[3] Among survivors, stroke may cause significant disability including paralysis, as well as speech and cognitive problems. Readily accessible, high quality, coordinated, timely stroke care, and knowing when to access that care, is essential to minimize the damaging effects of stroke.



The most prominent risk factors for stroke include advanced age, high blood pressure (typically defined as a measurement greater than or equal to 140 mm/Hg systolic pressure over 90 mm/Hg diastolic pressure), high cholesterol, and prior history of stroke, diabetes, and smoking.

Many people will suffer from one or more Transient Ischemic Attacks (TIAs), or "mini-strokes", before having an acute stroke event. The risk factors for TIAs are the same as those for acute stroke (see Table 5). While TIAs occur suddenly with the same symptoms of acute strokes, TIA symptoms usually disappear within twenty-four hours. The National Institute of Neurological Disorders and Stroke (NINDS) estimates that more than 30% of those who have had a TIA will have an acute stroke in the future, emphasizing the importance for individuals to seek immediate medical care.

Stroke treatment is dependent upon the type of stroke an individual suffers. New treatments for ischemic strokes may be very effective but must be administered within hours of the stroke's onset, emphasizing the need for rapid response. The signs and symptoms of stroke are often subtle and easily ignored. Common symptoms include face drooping, arm (and/or leg) weakness/numbness, slurred or confused speech, obscured vision, severe headache, and sudden dizziness. Educating the public to recognize these symptoms and to activate the EMS system immediately is an important step to improving outcomes for individuals experiencing a stroke.

Barriers to Stroke Prevention & Care

In Connecticut, the Department of Public Health (DPH) is leading a statewide collaborative effort across each point of access and service delivery that will result in the highest standard of stroke care and prevention. Several barriers exist in Connecticut for patients accessing stroke care in a timely manner. These factors include, but may not be limited to, the following issues:

- Lack of community awareness of when to call 9-1-1;
- Lack of EMS stroke specific training;
- Geographic barriers to timely emergent care;
- Different stroke protocols among hospitals statewide;
- Lack of coordination, integration, and communication among healthcare providers on stroke response, care, and prevention efforts;
- Inconsistent secondary stroke prevention and response; and
- Inadequate referral and tracking systems for stroke patients following discharge from the hospital.

This plan outlines how DPH, hospitals, emergency medical services, and other partners are working together to address these barriers and elevate the level of stroke care and prevention in Connecticut.

Connecticut's Approach

Connecticut's approach to improving outcomes for stroke related mortalities and morbidities incorporates the American Stroke Association's six essential elements of a stroke system of care and prevention, "from primordial and primary prevention through rehabilitation and recovery," and a chronic care model endorsed by the Robert Wood Johnson Foundation. The approach embraces the importance of community as a change agent in creating and sustaining a stroke system of care and prevention. Components of quality are inherent in both client-level and population-based services. Stroke interventions are delivered through integrated, interdisciplinary teams for optimal health outcomes. These elements have been adapted to align with the specific needs of Connecticut, and the objectives outlined in this Plan.

1. Overarching Systems Coordination: DPH will continue to convene Connecticut Stroke Partners to coordinate a state level stroke system of care that collaborates with and engages key stakeholders, to evaluate the system's efficacy and areas for continuous quality improvement.

2. Primary Prevention and Community Education: The system will support communities and health care providers to educate the general population on stroke prevention and assist in long-term adherence to primordial and primary preventive treatment regimens. These programs will also target high-risk populations and their families.[4]

3. Notification/Response of EMS for Stroke: The system will facilitate rapid access to Emergency Medical Services (EMS) for individuals experiencing stroke symptoms through integrated, coordinated system using the most current treatment recommendations. EMS will be able to transport stroke patients to the nearest primary stroke center and perform accurate assessments to facilitate hyper-acute treatment interventions. The system will involve emergency physicians with stroke expertise in the development of EMS stroke protocols and stroke specific training of EMS personnel.

4. Acute Treatment for Stroke: The Collaborative will maintain and make available an inventory of Connecticut hospitals in the state and their acute stroke treatment capabilities, to primary care providers, EMS personnel, and the public. Hospitals that do not intend to seek primary stroke center designation should have policies in place to triage, treat (or transport) stroke patients to ensure timely, quality care.

5. Sub-Acute Stroke Care & Secondary Prevention: Coordinated approaches will ensure all patients receive appropriate sub-acute care, as well as a smooth transition from inpatient to outpatient care. Secondary prevention efforts must address all major modifiable risk factors for patients with a history of stroke. Stroke patients and their families will receive education on stroke risk factors, warning signs and how/when to activate EMS.

6. Rehabilitation of Stroke Patients: All stroke patients with residual deficits will receive an evaluation and initiation of rehabilitation services during initial hospitalization. Stroke survivors must be referred to inpatient, outpatient, or home-care services that meet their needs. Collaborative relationships must be made among hospital providers, case managers, rehabilitation services, and primary care physicians to ensure appropriate follow-up care. Rehabilitation services and resources will be periodically evaluated.

7. Chronic Care Model (CCM):[5] The CCM contains the essential elements of a health care system that encourages high-quality chronic disease care. These elements are the community, the health system, self-management support, delivery system design, decision support, and clinical information systems. Evidence-based change concepts under each element, in combination, foster productive interactions among informed patients who take an active part in their care and providers with resources and expertise. For more information, see Appendix A.

A. THE PLANNING PROCESS

Heart Disease and Stroke

CDC Priorities for Heart Disease and Stroke Prevention

- Control High Blood Pressure
- Control High Cholesterol
- Know Signs & Symptoms; Call 9-1-1
- Improve Emergency Response
- Improve Quality of Care
- Eliminate Disparities

The concept for a stroke-specific plan evolved through a series of directed conversations, regional meetings, surveys, and organizations expressing interest in improving outcomes for persons at risk for, or experiencing, a stroke. In June 2006, DPH engaged hospitals, EMS personnel, and the community by holding regional meetings to determine the general awareness of heart disease and stroke, and availability of services within the community among the meeting participants. These meetings were conducted in three regions within the state and results were reported in three regional meetings held between June and December 2006. Over 85 representatives from local health departments, hospitals, health associations, service providers, community agencies, and city officials attended. Regional meeting survey findings indicated that most participants are generally aware of heart disease and stroke, but that there was a need for greater awareness of available services. The Behavioral Risk Factor Surveillance System telephone survey from 2004 in Connecticut gathered information about heart attack and stroke awareness. The unpublished findings indicate that there is a general lack of awareness among respondents about of heart disease and stroke risk factors:

- **86%** did NOT know all of the warning signs and symptoms of a heart attack.
- 13% were aware of all heart attack questions, and when to call 9-1-1 for help.
- **80%** did NOT know all of the warning signs of stroke.
- 18% were aware of all stroke questions, and when to call 9-1-1 for help.

A more recent survey conducted between 2008 and 2009 of 288 women in Eastern Connecticut revealed that 71% could not name three signs or symptoms of stroke, and 70% did not know a safe blood pressure.[6]

A Focus on Stroke

Stroke remains a major public health problem. [It] is the third leading cause of death and a major source of disability in the United States…and in the United States alone; the estimated direct and indirect cost of stroke in 2006 is almost $58 billion. (Medscape, Cardiology 2006; http://www.medscape.com)

Nationally, there has been increased emphasis on improving the components of stroke prevention and care. This momentum has supported Connecticut's decision to focus on stroke. The following illustrates the events in chronological order.

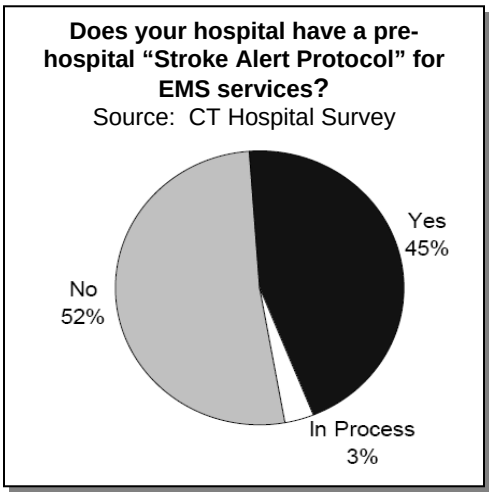
- 2004-2005: The American Stroke Association (ASA, a division of the AHA) convened a multidisciplinary group to make recommendations on the

organization and operation of systems of care for the treatment of stroke patients throughout the United States. The Brain Attack Coalition comprised of a team of experts in the field of stroke prevention and care, emergency medical services, stroke rehabilitation, and public policy, drafted recommendations for the ***Establishment of Stroke Systems of Care*** (ASA, February, 2005). These recommendations provided the foundation for improving the quality of stroke care in the United States.

- The **Joint Commission's Primary Stroke Center Certification Program** is based upon the ASA recommendations. The Joint Commission evaluates and accredits health care organizations and programs in the United States. It is an independent, not-for-profit organization, standards-setting and accrediting body in health care, maintaining standards that focus on improving the quality and safety of care provided by health care organizations since 1951. Although the Joint Commission had established a Primary Stroke Center Certification Program, few Joint Commission certified stroke centers existed in Connecticut. (As of June 2008, ten Connecticut hospitals were certified as Joint Commission Primary Stroke Centers).[7]

- Leslie Wolfson, MD, Department of Neurology, University of Connecticut Health Center met with DPH Commissioner J. Robert Galvin, MD, MPH, MBA to collaborate on initiatives to improve the quality of stroke care in Connecticut. Dr. Wolfson convened a group of neurologists, rehabilitation doctors, emergency doctors, and stroke center coordinators to provide direction on implementing a statewide primary stroke center designation program.

- In 2006, DPH commissioned the University of Connecticut, Department of Public Policy to conduct a survey of Connecticut hospitals. The goals of this survey were to determine what types of stroke care services exist within Connecticut adult care hospitals; the extent of these services; how these hospitals process stroke patients; and what types of educational tools are provided for stroke patients and their families. Survey questions were based upon the recommendations for the establishment of stroke systems of care published by the Brain Attack Coalition and the American Stroke Association. Twenty-nine of Connecticut's 30 adult acute care hospitals responded to the survey. The following summarizes key findings from the 2006 survey:



- Sixty-six percent (66%) of all Connecticut adult acute care hospitals have a formal stroke protocol.
- Forty-one percent (41%) have implemented a quality improvement system related to the monitoring of stroke patients.
- Fifty-two percent (52%) have an acute "stroke team" or multi-disciplinary group; an additional 7% are in the process of creating one.
- Fifty-nine percent (59%) have a pre-hospital stroke assessment tool used by Emergency Department (ED) physicians and EMS providers for suspected stroke patients.
- Thirty-five percent (35%) sponsor public education programs about stroke prevention at their hospitals at least twice annually, as recommended by the Brain Attack Coalition.

- In January 2007, DPH convened a meeting with Connecticut acute care hospitals and other partners including the Office of Rural Health and the American Heart Association. The purpose of the meeting was to present the results of the Connecticut Hospital Stroke Care Survey and introduce the concept of creating a **Primary Stroke Center Designation Program** for Connecticut. Over eighty partners attended the meeting and many agreed to participate in the development of the criteria for Connecticut's Primary Stroke Center Designation Program. The Connecticut-specific primary stroke center criteria were adapted based on the Brain Attack Coalition and the American Stroke Association recommendations (See Primary Stroke Center Criteria in Appendix C).

Current Stroke Care and Prevention in Connecticut

The Connecticut Department of Public Health Primary Stroke Center Designation Program was launched in October 2007. It is a voluntary, non-regulatory program that recognizes Connecticut acute care hospitals that meet criteria based upon the *ASA Recommendations for Primary Stroke Center*. As of January 1, 2009, seventeen Connecticut hospitals have been recognized as primary stroke centers. The designation status is valid for two years, but may be renewed if warranted by the DPH. Please see Appendix C for the Primary Stroke Center Designation

All Hospitals Have

- 24/7 access to tPA
- 24/7 access to diagnostic tools and labs
- 97% of CT Hospitals create long-term discharge plans

System Gaps

- Public education on stroke
- Pre-hospital stroke alert protocol for EMS
- Quality improvement system
- Stroke CEUs for providers/nurses
- Access in rural areas

Program application and evaluation criteria. In conjunction with the Primary Stroke Center Designation Program, Connecticut has several of the essential elements of a comprehensive stroke system of care and prevention in place.

In Connecticut, tissue-type plasminogen activator (tPA), an important treatment for ischemic strokes, can be administered 24-hours a day, 7-days a week at all Connecticut hospitals. In contrast, other elements, such as standardized stroke protocols; use of pre-hospital assessment tools by EMS; and frequent public education forums, need improvement.

Primary Areas of Focus

1. Prevention & Community Education
2. Emergency Medical Services: Notification & Response
3. Hospital Care

In January 2008, DPH convened more than 80 representatives from Connecticut's healthcare community, including physicians, nurses, local health departments, community agencies, rehabilitation services, and EMS providers. Participants were divided into four work groups that focused on the primary areas of Connecticut's comprehensive system of stroke care and prevention. Each work group met an additional two to four times to identify problems and strategies to strengthen existing stroke care and prevention services. Logic models were developed under each area that guided the development of the draft plan (Please see Appendix D for planning process, work group participants, and logic models). Work group members provided ongoing feedback on the draft plan.

In June 2008, planning participants reconvened to comment on the draft plan and prioritize work group recommendations. These initial implementation steps lay the foundation for creating a more coordinated system of stroke care. These suggestions were incorporated into the final plan, adopted by the State of Connecticut for this Comprehensive Plan for Stroke Care and Prevention. DPH partnered with the New Haven-based consulting firm Holt, Wexler and Farnam, LLP for logistical, facilitation, and writing support for the planning process and plan development.

The Stroke Care and Prevention Plan for Connecticut

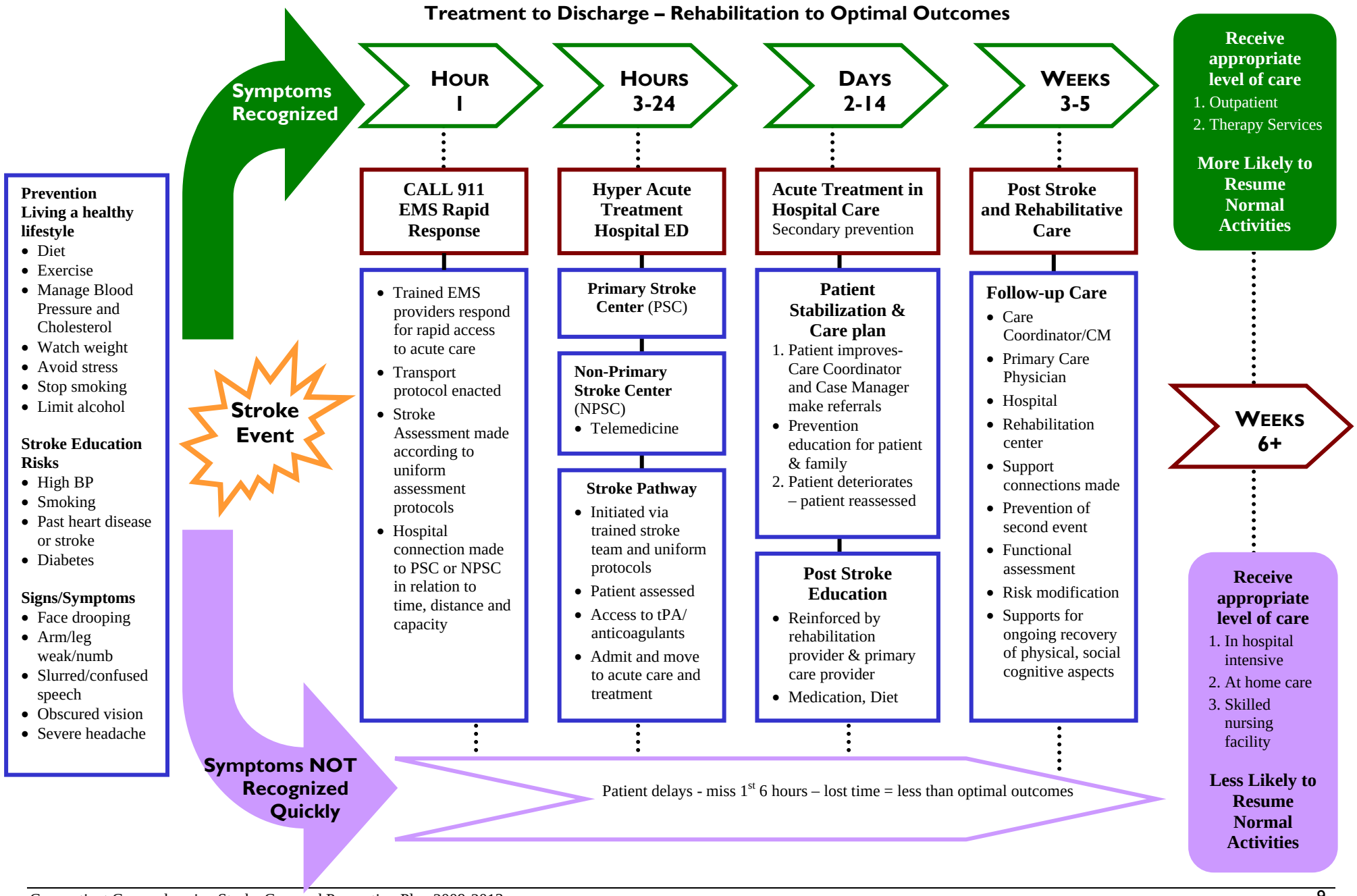
The Connecticut Stroke Care and Prevention Plan focuses on decreasing the incidence of stroke and improving outcomes for stroke survivors. The Plan provides recommendations to achieve this through coordinated prevention education and by decreasing time lost in accessing high quality, multi-disciplinary care from the onset of symptoms through rehabilitation and recovery. These recommendations were created to foster collaboration along the stroke care continuum.

Four critical themes emerged during the plan development process: collaboration, education, access to care, and systems management. These overarching themes surfaced as the primary mechanisms to improve Connecticut's capacity to respond to stroke. Connecticut's plan for

stroke care and prevention builds upon the strengths of existing resources to meet the BAC/ASA criteria for establishment of a comprehensive system of stroke care.

The critical element is time, and the focus is on the patient in Connecticut's plan. A coordinated prevention and education system may reduce the number of individuals who experience a stroke. In the event they do have a stroke, an integrated system of stroke care will provide rapid response to well-coordinated, high-quality care statewide. The following graphic illustrates this new system.

"An integrated system of care that coordinates the roles of stroke treatment providers in Connecticut for optimal patient outcomes"



B. CONNECTICUT DEMOGRAPHICS AND THE BURDEN OF STROKE

One of the smallest, most densely populated states in the country, Connecticut, the Constitution State is situated along the eastern shore west of New York, south of Massachusetts and east of Rhode Island. With high national rankings in several well respected economic and quality of life surveys, Connecticut enjoys a reputation as having one of the most well educated, most productive populations in the nation.[8] At the same time, many of Connecticut's youth are leaving the state in an era of high mobility and frequent job changes. Those most at risk for stroke, particularly elderly and minority residents are among the fastest growing segments of the state's population.

An Aging Population

The median age in Connecticut is well above the national level, and 13% of the state is over age 65.[9] Adults over age 65 represent the fastest growing segment of the state's population.[10] Population projections estimate that in less than 20 years, more than 20% of Connecticut residents will be over 65, making its population the seventh oldest in the country.[11] This trend presents a significant challenge for this Plan to overcome, because advanced age is the single biggest risk factor for suffering a stroke. Unpublished mortality data from DPH show that about 90% of all stroke deaths in Connecticut occur among persons aged 65 and older. In response, Connecticut is actively striving to develop a system that educates the population about stroke risk factors, and on how to quickly recognize stroke symptoms and act appropriately. This system will also ensure access to high quality treatment and follow up care after a stroke event.

Economic Factors of Stroke

Connecticut faces several social, economic, and health policy challenges as its population ages. Chief among these is creating a standardized system of stroke care and prevention across a diverse and unequal distribution of resources. With a median income of $108,800 (179% of the state's median), less than 5% of Greenwich residents live in poverty.[11] Just 12% of Greenwich residents are racial and/or ethnic minorities, and nearly 60% of the town's adults have at least a Bachelor's degree.[10] The median estimated home value in Greenwich is over $1 million. [14]

Located just a few miles north of Greenwich is the city of Bridgeport. Home to nearly 140,000 residents, Bridgeport's estimated median income in 2005 was just $36,976 (61% of the state's median).[12] An estimated 18% of Bridgeport's residents live in poverty, and just 12% have attained at least a baccalaureate degree.[13] In 2005, the median estimated value of a home in Bridgeport was only $218,800.[17] Both towns represent the realities of Connecticut; which is the wealthiest state in the country with large urban pockets of poverty. This plan must enable all communities to address stroke care and prevention to ensure the best possible outcomes for all residents regardless of the differences in their populations.

Racial, Ethnic, and Gender Factors of Stroke

Stroke hospitalizations and mortality rates vary significantly across racial, ethnic, and gender lines. Overall, Connecticut's 3.5 million residents are predominantly white 80%, and only 11% are Hispanic, and 9% are Black. Females comprise 51% of the population. Women suffer more strokes than men, and are more likely to die from their stroke event. Black women "are the group most disproportionately impacted by stroke" in Connecticut.[14] They are three times more likely than white women to die from a stroke before age 75.

Table 1: Projected Population Changes for Connecticut Women, 2000 – 2020

Race	2000 Population	Projected 2020 Population	Projected Percent Change
Whites	1,363,841	1,241,473	-9%
Blacks	155961	180,852	16%
Hispanics	160,998	294,804	84%
Other	76,368	139,608	83%

Racial Categories are mutually exclusive. African American, Other, and White do NOT include Hispanics. Other is mostly Mainland Chinese and South Asian Indian. ***Source****: Statewide Population Projections, Connecticut State Data Center, University of Connecticut.*

Women are at greater risk, depending upon their lifestyle choices. According to the National Stroke Association, smoking may double the risk for stroke; women who smoke, and who also take birth control pills are at even greater risk. In addition, recent studies have shown that pregnant women with the prenatal condition pre-eclampsia are also at higher risk for stroke both during pregnancy and after delivery.[15] In many cases, the only doctor that many women visit with any regularity is their obstetrician/gynecologist (OB-GYN).[16] With risk for stroke interrelated with other women's health issues, it is important that these physicians are well versed in stroke prevention, and that they routinely pass risk reduction information on to their patients.

Other Socioeconomic and Language Factors

Although Connecticut is the most well educated state in the country, 16% of the adult population does not have a high school diploma.[10] According to 2000 Census data, nearly 20% of residents speak a language other than English at home. Research has shown that populations who do not speak English at home tend to earn lower incomes than their higher educated, English-speaking counterparts. The DPH Cardiovascular Disease Surveillance Report indicates that lower-income residents are more likely to have higher rates of high blood pressure, high cholesterol, diabetes, obesity, physical inactivity, and current tobacco use compared with higher-income residents.[17] Traditionally these populations are also the least likely to receive and understand medical information and advice. With Connecticut's populations most at risk for stroke concentrated in the largest, often poorest cities, access to standardized, accessible high quality care is central to a successful stroke care and prevention plan.

The Burden of Stroke

During the 1990s, age-adjusted stroke mortality rates remained steady in Connecticut,[18] and then declined significantly between 1999 and 2004. Since the 1990s, Connecticut stroke death rates have been consistently lower than those of the United States, and between 2002 and 2004, Connecticut death rates were lower than the national *Healthy People 2010* target of 48 per 100,000 population. A close examination of the stroke-related data presented in this section informed the development of the recommendations in this Plan.

Mortality by Gender

Connecticut women suffered approximately 62% of all fatal strokes during 2002-2004. While more females than males die from stroke in Connecticut, male and female age-adjusted death rates are not significantly different (Table 2).[25]

Table 2. Stroke Deaths and Age-adjusted Mortality Rates (AAMR) per 100,000 population Connecticut Residents, 2002 - 2004

Connecticut Residents	Stroke Deaths	AAMR
All	5,311	41.5
Male	1,997	42.7
Female	3,314	40.0

Source: Connecticut Department of Public Health, 2008. Vital Records Mortality Files, 2002 - 2004.

Mortality by Race/Ethnicity and Gender

Age-adjusted stroke death rates differ by race, ethnicity, and gender. Black male and female Connecticut residents have significantly higher stroke death rates than other men and women in the state.

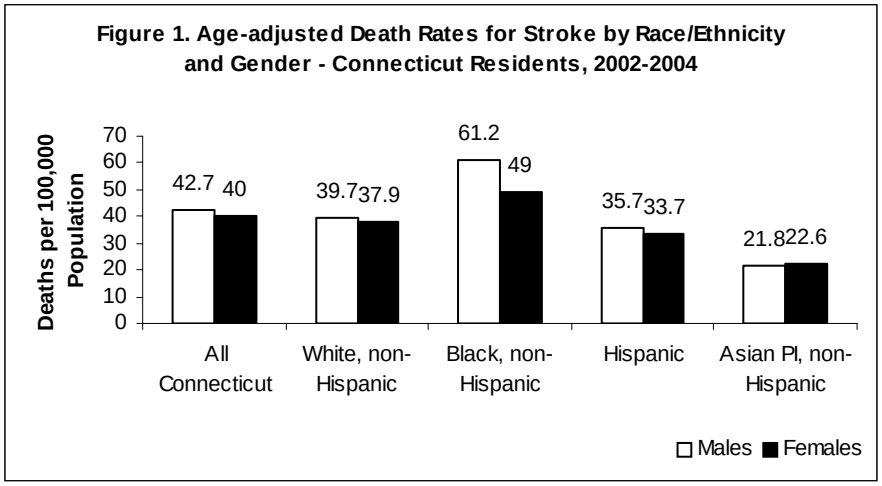


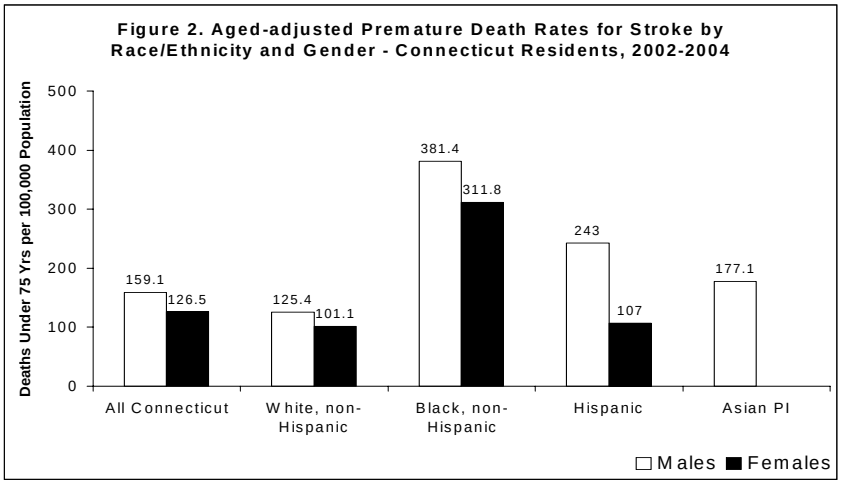
Figure 1. Age-adjusted Death Rates for Stroke by Race/Ethnicity and Gender - Connecticut Residents, 2002-2004

Source: CT DPH, 2008. Vital Records Mortality Files, 2002-2004.

Age-adjusted stroke death rates of Hispanic males and females re not significantly different compared with White males and females. Asian and Pacific Islander male and female stroke death rates are significantly lower than those of White male and female Connecticut residents (Figure 1). [25]

Premature Mortality by Race/Ethnicity and Gender

Premature mortality, defined as the "years of potential life lost before age 75," emphasizes deaths that occur at younger ages. For example, a person who dies at age 45 is considered to have lost 30 years of life, and a person who dies at 70 is considered to have lost 5 years of life.[19] Age-adjusted premature stroke death rates differ somewhat by race, ethnicity, and gender. Black males and females have significantly higher premature death rates due to stroke compared with White males and females, respectively. Hispanic males have significantly lower premature death rates due to stroke compared with White males, while premature stroke death rates for Hispanic and White females are not significantly different. Premature stroke death rates of Asian and Pacific Islander and White males in Connecticut are also not significantly different. There were insufficient numbers of premature deaths (under 75 years) among Asian and Pacific Islander females to calculate reliable rates (Figure 2).[20]



Source: Connecticut Department of Public Health, 2008. Vital Records Mortality Files, 2002-2004.

Morbidity

During 2005, there were 60,188 discharges from Connecticut hospitals for all circulatory diseases, including stroke. This represents 14.8% of all non-pregnancy and childbirth hospital discharges. For the same period, there were 7,354 stroke hospitalizations, which comprised 12.2% of circulatory disease-related hospitalizations. The median length of stay for stroke was four days versus a median stay of three days for circulatory disease-related hospital discharges.[21]

Hospitalization Rates by Gender

Connecticut males have significantly higher rates of hospitalizations for all circulatory diseases compared with Connecticut females. More females than males, however, are hospitalized for stroke (Table 3).[30]

Table 3. Stroke Hospitalizations and Age-adjusted Hospitalizations Rates (AAHR) per 100,000 population – Connecticut Residents by Gender, 2005

Diagnostic Group	All Residents		Male		Female	
	Number	AAHR	Number	AAHR	Number	AAHR
Stroke	7,354	183.3	3,572	216.2	3,782	158.1

Source: CT DPH, 2007. Connecticut Hospital Discharge Abstract and Billing Data Base, 2005.

Hospitalization Rates by Race and Ethnicity

Black residents have about 40% higher rates of hospitalizations due to stroke than do White and Hispanic residents (Table 4).[30]

Table 4. Stroke Hospitalizations and Age-adjusted Hospitalizations Rates (AAHR) per 100,000 population – Connecticut Residents by Race/Ethnicity, 2005

Diagnostic Group	All Residents		White, Non-Hispanic		Black, Non-Hispanic		Hispanic	
	Number	AAHR	Number	AAHR	Number	AAHR	Number	AAHR
Stroke	7,354	183.3	6,127	171.8	662	268.1	294	151.9

Source: CT DPH, 2008. Connecticut Hospital Discharge Abstract and Billing Data Base, 2005.

Economic Costs

The estimated national annual cost for the medical management of stroke is $65.5 billion in 2008. This estimate includes direct medical costs and indirect costs associated with lost productivity from illness and death.[2] Stroke may accrue enormous indirect costs. According to the American Stroke Association, stroke is the leading cause of disability and may severely impact the quality of life for individuals and families. In 2005, stroke hospitalization charges for Connecticut residents amounted to $192 million. The median Connecticut hospital charge for stroke was $15,759.[2]

Risk Factors for Stroke

Risk factors for stroke include non-modifiable and modifiable factors (Table 5).

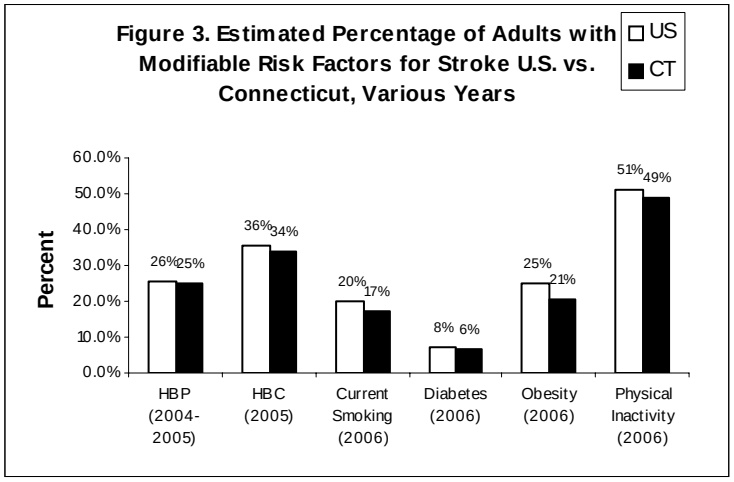
Table 5. Risk Factors For Stroke

Modifiable Factors	Non-Modifiable Factors
• High Blood Pressure	• Increasing Age
• High Cholesterol	• Family History
• Smoking	• Prior Stroke, TIA, or Heart Attack
• Diabetes	
• Obesity	
• Physical Inactivity	
• Poor Diet	
• Heart Disease	

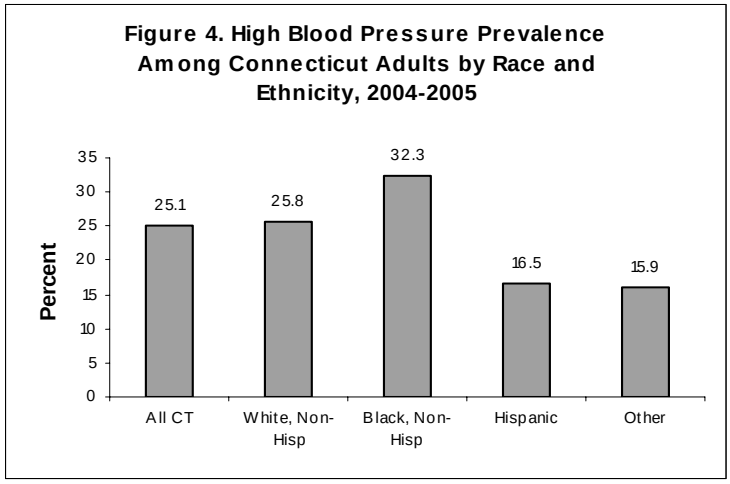
Source: Centers for Disease Control and prevention

Increasing age is a key risk factor for stroke. About 90% of all stroke deaths in Connecticut occur among persons aged 65 and older (2002-2004 unpublished DPH mortality data). A family history of stroke also increases one's risk of developing these diseases. A combination of inherited characteristics and behavioral patterns (e.g., similar dietary, smoking, and activity habits) are thought to explain increased risk within families.[22, 23]

Lower socioeconomic position (SEP) is an important risk marker for stroke. SEP is commonly measured by personal income, household income, or educational attainment level. Persons of lower SEP have higher stroke-related morbidity and mortality than middle or upper-income residents. Behavioral risk factors such as smoking, hypertension, and obesity are more prevalent in lower SEP persons and may explain some of this disparity.[24, 25] Other factors, like neighborhood socioeconomic environment, appear to have effects on an individual's risk for stroke.[36, 26] Low-income neighborhood environments may contribute to increased stroke-related risk and poorer health outcomes because of such factors like poorer air quality, fewer healthy food choices, and lower quality and/or lack of public services.[27] Lower-income persons tend to have less access to, and/or less effectively use, preventive health services that are essential to the early detection and treatment of hypertension, a significant risk factor for stroke.[28]



Source: CDC, BRFSS, 2005; CTDPH, 2007. BRFSS, 2004-2006.



Source: CT DPH, 2007. BRFSS, 2004-2006.

Modifiable Risk Factors

Current Connecticut Behavioral Risk Factor Surveillance (BRFSS) data show that about one out of three Connecticut adults report having one or more modifiable risk factors for stroke. Following are summaries of the five main risk factors for stroke: high blood pressure, high blood cholesterol, tobacco use, diabetes, and obesity (Figure 3).

High Blood Pressure

High blood pressure (HBP), or hypertension, is the most significant modifiable risk factor for stroke.[36] About 26% of all stroke mortality is attributable to high blood pressure.[37] New federal

guidelines classify normal blood pressure as below 120/80 mm Hg and readings from 120/80 Hg up to 140/90 mm Hg as pre-hypertensive.[29]

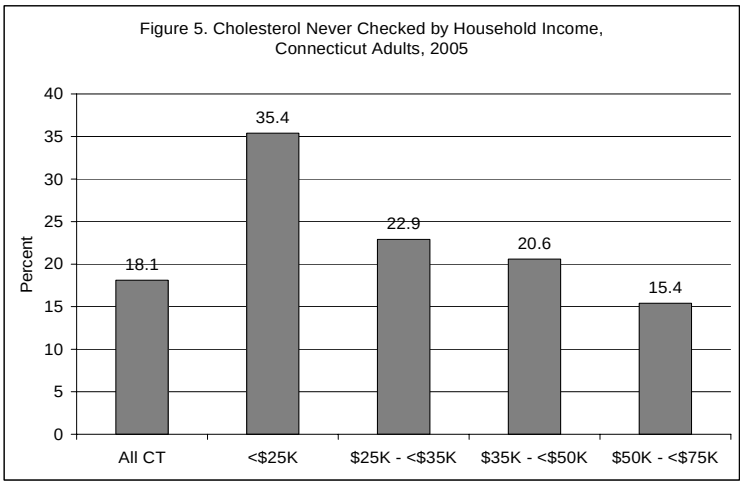
Approximately 25% of Connecticut adults report that they have high blood pressure compared with about 26% of adults nationwide.[30] The risks for hypertension-related cardiovascular disease increase markedly with age, as does the prevalence and drug treatment for high blood pressure.[31] Black Connecticut adults experience high blood pressure more than White and Hispanic adults. About 32.3% of Black Connecticut adults report that they were told that they had hypertension compared with 25.8% of White, 16.5% of Hispanic, and 15.9% of other adults in Connecticut (Figure 4).[32]

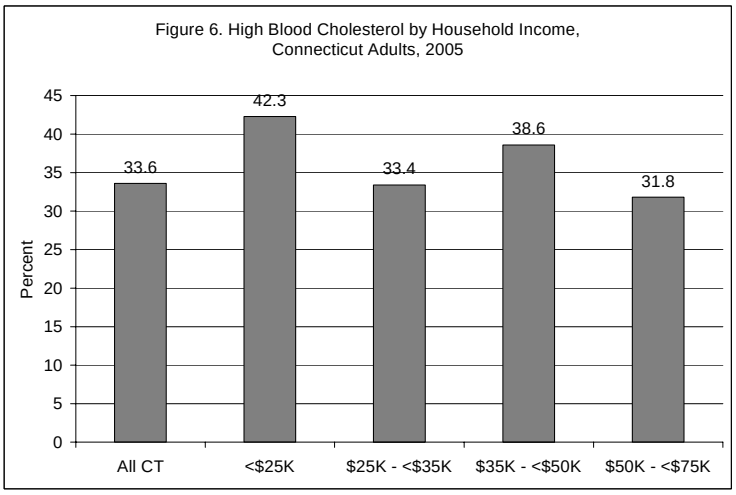
High Blood Cholesterol

High blood cholesterol (HBC) is considered a moderate risk factor for stroke. The Centers for Disease Control and Prevention estimates that more than 80% of people with high blood cholesterol do not have it under control.

Connecticut adults compare favorably to adults nationwide in terms of cholesterol screening and blood cholesterol levels. In 2005, 80% of Connecticut adults reported having had their blood cholesterol screened within the last five years compared with 73% of adults in the U.S.[49] About 34% of Connecticut adults were told that they had HBC, compared with about 36% of adults nationwide.[49]

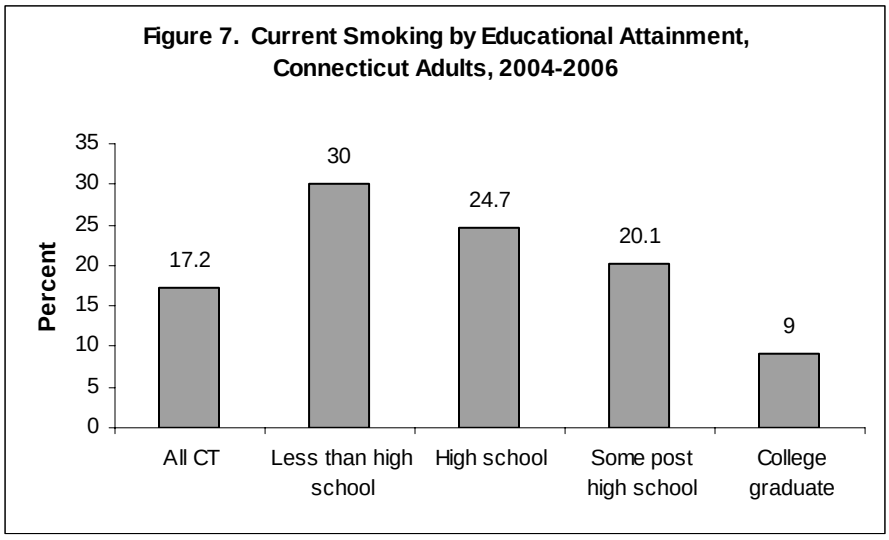
Lower-income Connecticut adults are more likely to report that they have **never** had their blood cholesterol checked compared with higher-income adults (Figure 5). Among Connecticut adults who have had their cholesterol checked, lower-income residents are also more likely to report high blood cholesterol compared with higher income adults in Connecticut (Figure 6).





Source: Figures 5 & 6: CT DPH, 2007, BRFSS, 2005

Smoking



Source: CT Dept of Public Health, 2007. BRFSS, 2004-2006.

Cigarette smoking is a major modifiable risk factor for cardiovascular diseases. Smoking causes reduced blood vessel elasticity by increasing arterial wall stiffness. Smoking increases the risk of heart attack two-fold. Smokers have higher coronary heart disease (CHD) mortality rates than non-smokers and their risk of death increases with greater number of cigarettes smoked. Current smokers have more than twice the risk of stroke compared with those who have never smoked.[36] Approximately 18% of strokes are attributable to current cigarette smoking.[37] People who stop smoking decrease their stroke risk and their risk of CHD mortality.[36]

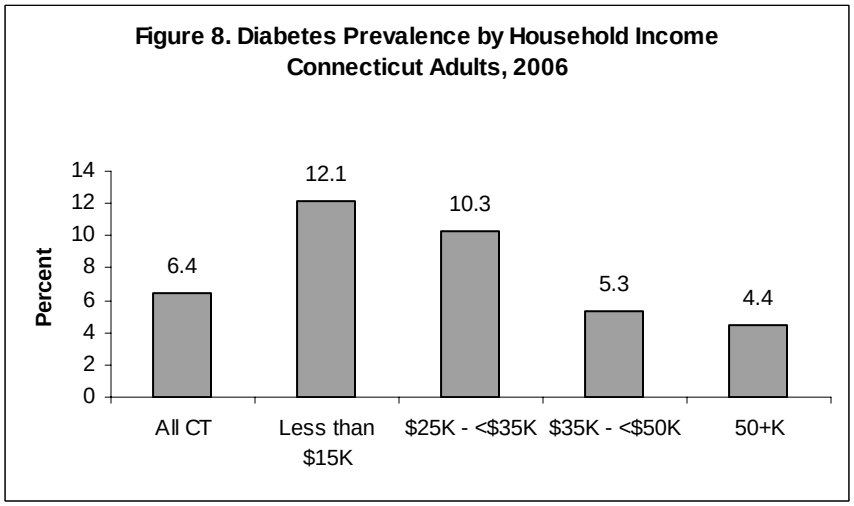
In 2006, about 17% of Connecticut adults reported being current smokers compared with about 20% of adults nationwide. Connecticut adult smokers are more likely to be younger, with lower incomes, and less educated. For example, 24.7% of Connecticut adults 18 to 24 years old smoke, compared with only 19.4% of those aged 45 to 54, and 6.9% of those aged 65 and older. About 23.5% of adults with household incomes under $25,000 smoke, compared with 11.2% of adults with household incomes of $75,000 or more (data not shown). About 30% of adults with less than a high school education smoke, compared with only about 9% of adults who graduated from college (Figure 7).

Diabetes

Diabetic persons are 2 to 4 times more likely to develop coronary heart disease than the rest of the population, and are at much greater risk of having a stroke.[36, 37] People with diabetes often have high blood pressure, and high cholesterol, and are overweight, increasing their risk for stroke even more.[33]

About 6% of Connecticut adults have been diagnosed with diabetes compared with almost 8% of adults nationwide.[49] Lower-income people are at higher risk of diabetes than are higher-income people. For example, approximately 12.1% of Connecticut adults with household incomes under $15,000 report having diabetes compared with 4.4% of Connecticut adults with household

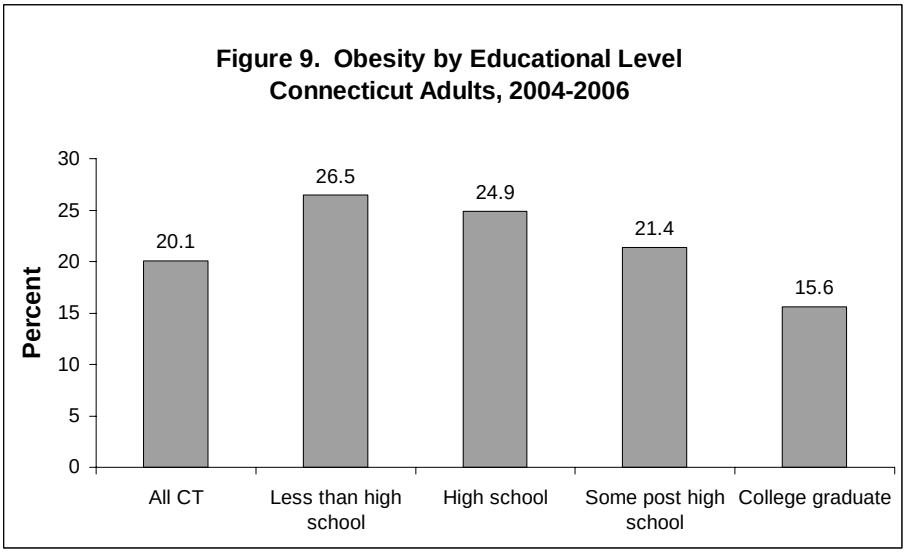
incomes over $50,000 (Figure 8).[49] Diabetes self-management education is essential because improperly controlled diabetes may result in cardiovascular disease, kidney disease, blindness and loss of limb. It is, therefore, a particular concern that 52% of Connecticut adults with diabetes reported in the 2004 BRFSS that they had never taken a course to manage the disease (unpublished data).



Source: CDC, 2007. BRFSS, 2006.

Obesity

Body mass index (BMI), or weight adjusted for height, is a widely used screening method for obesity. Medical guidelines identify normal/desirable weight as a BMI under 25, overweight as a BMI of 25 to 29.9, and obese as a BMI of 30 or more.[34] Increased daily caloric intake and sedentary lifestyles have contributed to society's dramatic increase in obesity since the 1980s.[35, 36] Obesity is considered a metabolic disorder, which may be explained by a combination of hereditary and environmental factors. While co-morbidities relating obesity to coronary heart disease increase as BMI increases, body fat distribution is also an important factor.[64] For example, abdominal obesity places individuals at higher risk for health problems, including high blood pressure, high blood cholesterol, high triglycerides, diabetes, heart disease and stroke.[58] Among females, increasing BMI is associated with increased risk of stroke. Among males, abdominal obesity, rather than BMI, is closely related to stroke risk.[37] An estimated 21% of Connecticut adults are obese compared with about 25% of adults nationwide.[49] Approximately 38% of Connecticut adults are overweight, and 42% are normal or desired weight.[49]

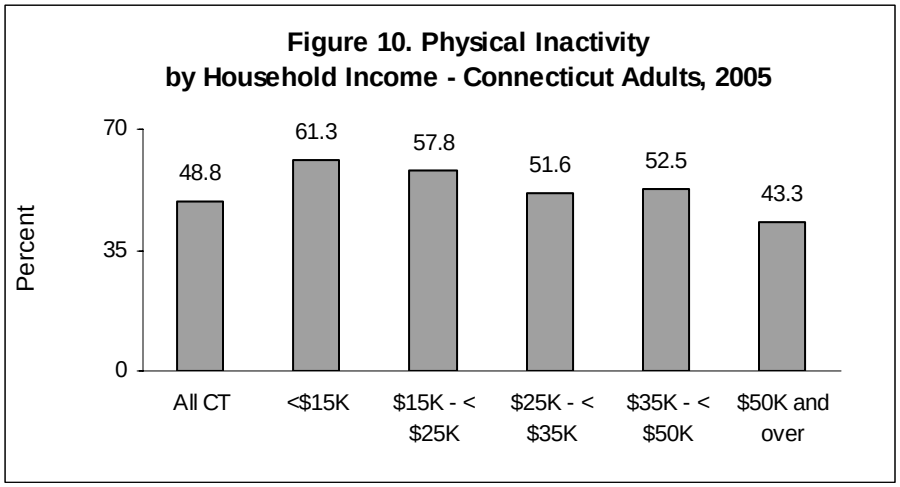


Source: Connecticut of Public Health, 2007. BRFSS, 2004-2006.

Connecticut adults with less education are more likely to be obese than adults with more education. For example, an estimated 26.5% of adults with less than a high school education are obese, compared with only 15.6% of college-educated Connecticut adults (Figure 9). Black adults are significantly more likely to be obese compared with White and Hispanic adults. Connecticut adults who are obese are significantly more likely to report that they are in poorer health compared with non-obese adults. Twenty percent of obese adults reported in the 2004-2006 BRFSS that they are in fair or poor health compared with about 10% of those who are overweight or of healthy weight (unpublished data not shown).

Physical Inactivity

Physical inactivity and poor diet are associated with an increased risk of a number of chronic health conditions including cardiovascular disease, diabetes, some cancers, high blood pressure, overweight and obesity, back problems, and osteoporosis.[37,38] Physical inactivity contributes to the risk of stroke because it is associated with high blood pressure.



Source: Connecticut of Public Health, 2007. BRFSS, 2004-2006.

The Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) recommend that all adults should engage in "at least 30 minutes of moderate intensity physical activity on five or more days of the week."[39] Approximately 49% of Connecticut adults report having less than thirty minutes of moderate physical activity five or more days per week, defined here as "physical inactivity" (Figure 10).

Physical inactivity increases with age. About 59% of Connecticut adults 65 and older do not meet the recommended CDC/ACSM activity levels compared with 34% of Connecticut adults aged 18 to 24 (data not shown). Lower-income adults are also more likely to be physically inactive compared with higher-income adults. About 61.3% of Connecticut adults with incomes of less than $15,000 per year are inactive compared with 43.3% of Connecticut adults earning $50,000 or more per year (Figure 10).

Co-Prevalence of Stroke Risk Factors

A common set of risk factors is usually found among those who develop stroke. For example, research has shown that 84% of those having both diabetes and hypertension were also found to have dyslipidemia (abnormal lipid levels),[40] and that the relative risk of stroke and all-cause mortality increases linearly with the number of metabolic risk factors (overweight, high blood pressure, high fasting glucose, and high total cholesterol).[41] Approximately 52% of Connecticut adults reported having two or more modifiable risk factors for stroke and 25% reported having three or more in the 2005 BRFSS (unpublished data). The co-prevalence of risk factors contributes to the complexity of disease management.

The Signs and Symptoms of Stroke

The *Healthy People 2010* national objectives for stroke include increasing the proportion of persons who are aware of the early warning symptoms and signs of stroke, and the necessity of calling 9-1-1 when persons are suffering from stroke.[42] Early recognition and calling 9-1-1 increase the likelihood of immediate emergency transport to the hospital, and timely medical care that may reduce disability and death.

Table 6. Stroke: Warning Signs

- Severe headache with no known cause
- Trouble seeing in one or both eyes
- Trouble walking, dizziness, or loss of balance
- Confusion, trouble speaking
- Sudden numbness/weakness of face, arm, or leg

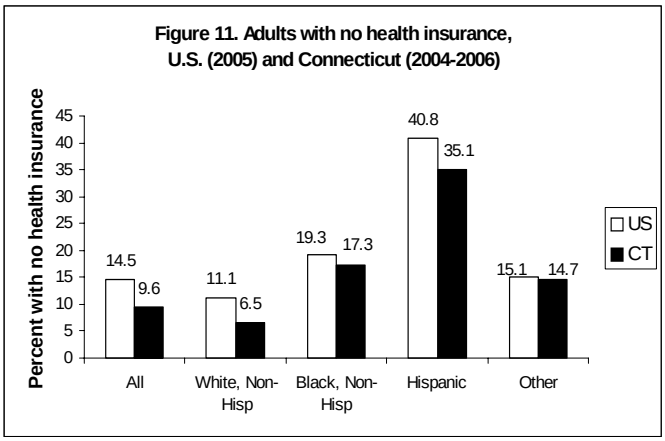
Source: Centers for Disease Control and Prevention, 2007. Behavioral Risk Factor Surveillance System, 2004

The percentage of Connecticut adults who know all the warning signs and symptoms for stroke is very low. About 19% of Connecticut adults know all the proper stroke signs. Women tend to be more knowledgeable than men about signs and symptoms of stroke. About 21% of Connecticut females know all stroke signs compared with about 17% of males ($p < .001$).

Access to Health Care

Access to health care is key to the prevention, treatment, and management of stroke. Individuals without health insurance are less likely than others to have a usual source of care to receive preventive health care services, and appropriate medical management of chronic conditions. About 9.6% of Connecticut adults who are age 18 and over do not have health insurance compared with almost 14.5% of adults nationwide. Hispanic adults in Connecticut are least likely to report having health insurance (about 35.1%), followed by Black adults (17.3%), and White adults (6.5%).

Comparable national figures show that about 40.8% of Hispanic adults, 19.3% of Black adults, and 11.1% of White adults nationwide reported having no health insurance (Figure 11).[49] The health status of the entire Connecticut population is compromised when large numbers of residents are uninsured, and this imposes a significant additional financial burden on the state.



Source: CDC, 2007. BRFSS, 2004 & 2006. CTDPH, 2007.

PART II: THE PLAN

Connecticut's plan of action is aligned with the continuum of stroke prevention and care. This section begins with prevention and community education, moves to emergency medical response, hospital care, and then, to rehabilitation. It concludes with an overview of stroke surveillance and implementation, and funding.

A. PREVENTION AND COMMUNITY EDUCATION

Stroke prevention and community education includes promoting awareness of stroke risk factors, preventing or treating modifiable risk factors, increasing recognition of stroke signs and symptoms, and promoting the appropriate use of 9-1-1 in the event of suspected stroke. The recommendations for prevention and education in this plan relate to the reduction of risk factors that may contribute to the incidence of stroke, such as poor diet, physical inactivity, tobacco use, and alcohol and drug use. Stroke prevention and health/wellness education can increase healthy behaviors in the home, community, workplace, and schools.

Critical Messages for Optimal Outcomes

1. Healthier Lifestyle Choices
2. Know Signs and Symptoms of Stroke
3. Act Quickly – Call 9-1-1

The Stroke Prevention and Community Education Work Group developed goals and strategies to reduce risk factors and promote stroke awareness throughout Connecticut. Please see Appendix D for the Prevention and Community Education Work Group Logic Model.

Identified Problems

- Messages about the benefits of a healthy lifestyle are not being heeded.
- Modifying behaviors to reduce risk factors is impeded by environmental, cost, and time barriers.
- Funding is limited for prevention and community education efforts, including marketing, screening, and access to appropriate medications to control identified risk factors, such as high blood pressure, and/or cholesterol.
- Insurance coverage for preventive services is inconsistent.

Prevention & Community Education Goal: *To promote healthy living for all Connecticut residents, particularly high risk individuals, through a coordinated community effort and to reduce the prevalence of stroke risk factors, incidence of stroke, and stroke complications.*[43]

PREVENTION OBJECTIVE 1: Increase the percentage of Connecticut residents aware of the risk factors for stroke, stroke prevention strategies, signs & symptoms of stroke, and the importance of calling 9-1-1 through a local, regional, and statewide network of communication and dissemination of information.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

1.1 Establish a statewide communication network that provides stroke educators with the necessary tools to deliver consistent messages on how to prevent a stroke, recognize signs and symptoms of stroke, and what to do in a stroke event (call 9-1-1).

Implementation Activities

- Implement statewide programs to assist partnerships between urban and rural communities.
- Enhance collaboration among hospitals, EMS providers, and local health departments to develop stroke prevention and awareness programs.
- Collaborate with other state agencies to promote stroke prevention and awareness strategies.
- Engage partners to highlight successful healthy community programs for replication (e.g., healthy foods at schools, safe walking paths, and work site wellness programs).
- Develop a centralized Web site to provide stroke education and resources.
- Develop partnerships with hospitals to enhance public education efforts to meet DPH Primary Stroke Center Designation aligned with JCAHO Stroke Center requirements.

1.2 Develop consistent stroke prevention and awareness messages tailored to specific populations. Messages should convey a sense of urgency about stroke risk factors, signs and symptoms, and response to a stroke event.

Implementation Activities

- Develop accessible, culturally appropriate, multilingual stroke prevention messages, which consider the health literacy of the target population.
- Use a variety of communication methods employing traditional and non-traditional venues to convey stroke prevention and awareness messages.
- Create standardized press releases for publication in regional and community newspapers.

1.3 Provide stroke-related information to the public on healthy lifestyles, risk factors, and prevention. Topics will include: what to do in the event of a stroke and how to communicate with health care providers about stroke. Marketing will be conducted via flyers and websites to community organizations including health departments and churches.

Implementation Activities

- Collaborate with Infoline (2-1-1) to develop and maintain a state map highlighting stroke resources and programs. Links to additional resources including hospitals and primary stroke centers will be provided.
- Identify and collaborate with local and regional partners involved in promoting healthy lifestyles.
- Examine strategies (e.g., partnering with public broadcasters) to deliver stroke education programming.

PREVENTION OBJECTIVE 2: Increase the percentage of stroke care providers, stroke patients, and persons at risk who have access to, and receive, appropriate education and information on stroke prevention and care.

Outcome Measure*:* Establish baseline, target values to be determined once programs are developed.

Strategies

2.1 For Professionals: Create or promote existing stroke prevention educational programs for healthcare professionals, EMS, and Acute Care Teams.

Implementation Activities

- Train providers on how to educate at-risk patients about stroke risk factors and prevention strategies.
- Promote training to improve the management and treatment of hypertension.
- Educate healthcare professionals on how to prevent a second stroke.
- Increase capacity to conduct stroke risk assessments in other healthcare venues, (e.g., OB/GYN).

2.2 Encourage Healthcare Providers to:

- Partner with local health departments and other venues to educate at-risk and post-TIA individuals, and to make this a priority across all venues and populations.
- Engage stroke and TIA patients to share their experiences to enhance community education efforts.

2.3 For patients and public: Structure education and prevention programs based on best practices.

Implementation Activities

- Replicate evidence-based healthy lifestyle and/or stroke prevention interventions for high-risk and disparate populations and their social networks (e.g., caregivers).

2.4 Collaborate with existing healthy living initiatives, workplace wellness programs, and community-based programs.

Implementation Activities

- Identify elements of a successful and sustainable community stroke screening program and promote their inclusion in education and prevention efforts across all venues.

PREVENTION OBJECTIVE 3: Work with Chronic Disease partners (e.g., Nutrition, Physical Activity and Obesity Prevention Program, Tobacco Use Prevention & Control Program) to promote healthy behaviors (e.g., safe walking paths, physical activity, eating five or more fruits and vegetables a day, and coverage for individuals without insurance) through policy, environmental, and systems changes in communities and workplaces.

Outcome Measure: BRFSS – 2007 baselines

80.3% (n=5764) participated physical activity in the last month
28.5% (n=2191) consumed fruits and vegetables five or more times a day

Strategies

3.1 Work with employers to incorporate wellness activities into the workplace.

Implementation Activities

- Offer health promotion activities including smoking cessation classes, Weight Watchers meetings, exercise classes, and health competitions.
- Publicly recognize employers who support workplace wellness.
- Provide worksite wellness toolkits to employers.

3.2 Increase stroke awareness among legislators and the need for funding for education, equipment, and payment for EMS services for uninsured residents.

Implementation Activities

- Promote funding for safe walking environments.
- Work with AHA, Connecticut Public Health Association (CPHA) and other partners to advocate for stroke prevention funding.
- Educate legislators about EMS payment issues for the uninsured.

PREVENTION OBJECTIVE 4: Increase the number of screenings and stroke education programs statewide.

Outcome Measure: Establish baselines. Data source and target values to be determined**.**

Strategies

4.1 Work with health care providers, insurers/insurance companies, and others to promote reimbursement for prevention services such as risk education to increase participation in comprehensive risk factor screenings and the provision of blood pressure monitoring equipment.

Implementation Activities

- Increase community stroke screenings.
- Establish regularly scheduled screenings at recurring locations.
- Provide screenings in non-traditional locations.
- Provide screenings on evenings and on weekends.
- Work with local health care providers to sponsor screenings and offer a follow-up appointment for patients without a physician.
- Promote recommended age-specific preventive screenings for patients with primary health care providers.

4.2 Seek funding to cover costs for other education efforts.

Implementation Activities

- Promote existing education efforts including videos, awareness campaigns, and outreach programs.
- Secure resources for additional screenings and blood pressure equipment for community programs and local health departments.
- Identify financial assistance options to cover the costs of EMS services.
- Assist community based organizations and DPH to develop incentives for individuals who complete an education program and reduce their blood pressure through lifestyle changes.

B. EMERGENCY MEDICAL SERVICES: NOTIFICATION AND RESPONSE

Emergency Medical Services (EMS) are an essential component of a stroke system of care, providing individuals experiencing a stroke pre-hospital care and rapid transport to appropriate health care facilities. Approximately 380 licensed and certified EMS agencies, staffed by roughly twenty-thousand EMS professionals, serve the out-of-hospital emergency medical needs of Connecticut's one hundred and sixty-nine towns and two tribal nations. Each of the transport service providers routinely interacts with at least one of the state's thirty acute-care hospitals. The Office of Emergency Medical Services (OEMS) within DPH oversees the certification or licensure of both the EMS agencies and the individual EMS professionals.

A variety of factors influence a community's EMS response to an individual experiencing a stroke. Resources available to residents of one area or municipality may differ substantially from another. Standardized dispatch and treatment protocols would promote optimum use of EMS resources and infrastructure in any region of the State to reduce response times, assure appropriate field care, and identify proper transport destinations.

The Notification and Response of EMS for Stroke Work Group used the American Stroke Association's November 2007 Policy Statement "Implementation Strategies for Emergency Medical Services within Stroke Systems of Care" to address stroke-specific gaps in Connecticut's current EMS system. Please see Appendix D for the EMS Work Group Logic Model.

Identified Problems

These challenges revolve around two primary themes, i.e., **consistency** and **training:**

- Lack of consistent use of a single, validated pre-hospital stroke assessment tool to rapidly and accurately identify stroke patients;
- Lack of a statewide, pre-hospital stroke alert protocol for EMS services to notify hospitals prior to arrival;

- Stroke training is not mandated as part of continuing education for EMS professionals;
- Basic EMS training in Connecticut does not include a stroke module because it is not included in the current National Standard Curricula.
    - To add a stroke education module would lengthen training time (possibly increasing cost).
    - EMS professionals, looking to supplement their training online, may find that online stroke training options are inadequate and carry no regulatory weight for certification purposes.
    - The new National EMS Education Standards do contain information on stroke, but the rollout process for these standards will take up to two years; and
- Inconsistent protocols for EMS providers to determine where to transport stroke patients;
- Inconsistent relationships and communication among EMS responders and hospital Emergency Departments may limit collaboration and stroke care efficacy.

Emergency Medical Services Notification & Response Goal: *Facilitate timely access to EMS care, enhance pre-hospital recognition and treatment, and promote rapid transport to the appropriate health care facility of stroke patients.*

EMS OBJECTIVE 1: Create an EMS statewide stroke protocol with core elements for assessment, transportation, and communication among hospitals and EMS responders that allows for regional differences.

Outcome Measure: Completed EMS statewide stroke protocol.

Strategies

1.1 Support consistent dispatcher response regardless of the dispatch protocol being used.

Implementation Activities

- Improve the statewide data collection and analysis of EMS stroke response times.
- Support the development of flexible local/regional EMS protocols appropriate to regional resources and infrastructure.

1.2 Advocate for state regulations to establish a protocol for EMS responders on where to transport stroke patients.

Implementation Activities

- Research stroke transport protocols used in other states.
- Reference state trauma transport protocols to assist in the development of state stroke transport protocol.

- Support the development of inter-facility transport agreements and protocols.

1.3 Encourage ongoing communication among EMS medical directors, pre-hospital providers, emergency department directors, and stroke center directors regarding operational issues and collaborative educational efforts.

Implementation Activities

- Develop and support formal feedback and recognition protocols specific to stroke for EMS responders.
- Encourage hospitals to develop/build upon recognition programs for EMS responders who respond appropriately to stroke emergencies.

1.4 Advocate for use of electronic EMS clinical impressions and track accuracy of EMS responders' impressions.

1.5 Seek federal, state, and local funding and legislation to provide universal wireless capabilities.

EMS OBJECTIVE 2: By 2013, develop a stroke assessment tool based upon best practices for EMS responders.

Outcome Measure: Stroke assessment tool developed.

Strategies

2.1 Develop and implement a modified version of the Los Angeles Pre-Hospital Stroke Screen and mandate its use across the state.

Implementation Activities

- Move stroke screening criteria to the beginning of the tool.
- Enhance the exam portion of the screening criteria.
- Include a clear protocol to describe the circumstances under which a hospital should be contacted.

2.2 Submit the tool for approval to the CT EMS Advisory Board and other necessary governing bodies.

2.3 Monitor the appropriate use of the tool.

2.4 Evaluate the validity and sensitivity of the tool in identifying individuals who may be having a stroke.

EMS OBJECTIVE 3: By 2013, all EMS responders receive initial and ongoing training in stroke assessment, treatment, and care.

Outcome Measure: Data source, baseline, and target values to be determined.

Strategies

3.1 Train all EMS affiliated personnel on the selected stroke assessment tool to ensure seamless implementation across the EMS continuum.

Implementation Activities

- Determine and deliver the initial and continuing education needed to provide optimal patient care.
- Educate EMS responders on statewide transport protocol.
- Increase simultaneous stroke training for EMS responders and hospital staff.
- Promote the inclusion of a stroke module in basic EMT training to EMT training providers.
- Mandate a stroke training component as part of EMT continuing education.

3.2 Identify the core components of an EMS stroke education program, distribute to training providers statewide, and require their inclusion in stroke training programs.

Implementation Activities

- Create a comprehensive, composite stroke curriculum for distribution to all Connecticut EMT training providers as a training program development resource.
- Create a list of approved stroke education programs (e.g., Middlesex Hospital Program, NSA Program) for distribution to all Connecticut EMT training providers).
- Select the preferred training approach (curricula) to be included in stroke education programs (e.g., online options).

C. HOSPITAL CARE

Resources to address stroke vary among Connecticut hospitals. The 2006 Connecticut Hospital Stroke Care Survey revealed that teaching hospitals were more likely to have multi-disciplinary "stroke teams," formal stroke care protocols, and quality improvement systems than hospitals that discharge fewer than 15,000 patients annually. "All teaching hospitals have CT Angiography as a diagnostic service compared to only 58% of non-teaching hospitals."[44]

Acknowledging the variation in resources, the Hospital Work Group recommended the adoption of a two-tiered hospital designation system that would include the current Primary Stroke Center Designation Program and a designation for Comprehensive Stroke Centers. Primary Stroke Centers are equipped to provide basic stroke care (including tPA) to most stroke patients, but those patients requiring more intensive therapy (potentially 20% of stroke patients, according to the Work Group) would be admitted or transported to a Comprehensive Stroke Center. This two-tiered system would provide more opportunities to participate in innovative research protocols, new endovascular therapies, and clinical trials. The Work Group identified several areas for improving hospital stroke care including: 1) increasing stroke care continuing education opportunities for nurses, and multi-disciplinary stroke teams at all Connecticut hospitals to evaluate presumptive stroke patients within 15 minutes of arrival, and 2) the implementation of a telemedicine initiative to expand access to stroke care for patients in rural areas, or areas without primary or comprehensive stroke centers.

The Hospital Work Group separated the critical first six hours of stroke treatment from the remainder of stroke patient's hospital care, referred to as Hyper Acute Treatment. The remaining hospital care time is referred to as Acute Treatment. The Hyper Acute Treatment period (the first six hours) begins with initiating a stroke treatment pathway in the hospital Emergency Department. Acute Treatment focuses on stabilizing the patient and developing a Care Plan that will connect the patient with secondary prevention and rehabilitation services. (Please see Appendix D for the Hospital Work Group Logic Model).

The First Six Hours – Hyper-Acute Care Goal Identified Problems

- Lack of a current, easily accessible hospital stroke capacity inventory for EMS provider use;
- Many stroke patients require transfers out of their community to access appropriate care;
- Lack of coordination among providers to reduce the time from stroke onset and recognition to treatment, especially in rural and underserved areas;[45]
- Inconsistent coordination and collaboration among hospitals;
- Limited access to clinical trials for patients that are not tPA eligible, or who are not improving after tPA has been administered;
- Liability concerns related to stroke care (e.g., tPA administration); and
- Access to tPA is essential; however, not all stroke patients are eligible for this treatment. Factors such as the type of stroke, and the time between symptom onset and hospital arrival affect eligibility.

The First Six Hours – Hyper-Acute Care Goal: *To ensure that Connecticut residents that have experienced a stroke have equal access to high quality, acute stroke care.*

HOSPITAL STROKE CARE OBJECTIVE 1: By 2013, all stroke care providers (hospitals and EMS) have a readily accessible statewide inventory of information on the location of designated stroke centers, available stroke services, and bed capacity.

Outcome Measure: Web-based inventory created. Data source, baseline, target values to be determined.

Strategies

1.1 Create an interactive, Web-based inventory of current acute stroke treatment capacity of all Connecticut hospitals that is readily available to EMS providers.

Implementation Activities

- Examine and include best practices of current diversion protocols when hospitals redirect EMS and patients to other facilities.
- Link this tool to the Web-based education tool in Strategy 2.4 below.
- The system should reflect that not all hospitals might have, or continue to, administer tPA.

HOSPITAL STROKE CARE OBJECTIVE 2: By 2013, increase the number of Connecticut Hospitals that meet the Primary Stroke Center designation criteria.

Outcome Measure: Data source PSC designation program. Baseline = 17 as of January 2009, target values to be determined.

Strategies

2.1 Use telemedicine, teleradiology and other technologies to increase hospitals' 24/7 access to neurology consultations.

Implementation Activities

- Research stroke telemedicine systems in other states including New York and Massachusetts.
- Address reimbursement issues related to telemedicine services.
- Address liability issues related to telemedicine services.
- Identify funding sources to support a telemedicine system.
- Establish telemedicine network to connect Connecticut hospitals.

2.2 Encourage partnerships and mentoring among PSC hospitals and NPSC Hospitals to facilitate capacity building for PSC designation.

Implementation Activities

- Foster communication among hospitals to share assessment tools, stroke care pathways, stroke protocols, and other resources with an initial focus on emergency departments.
- Telemedicine activities as noted in 2.1 above.

2.3 Promulgate awareness of Primary Stroke Center designation requirements.

2.4 Create a listserv and/or Web site for hospitals to post assessment tools, stroke protocols, and to encourage their use for ongoing posting of questions and answers among hospital stroke staff.

Implementation Activities

- Analyze stroke capacity for all Connecticut hospitals (e.g., number of neurosurgeons, staffing, etc.).
- Develop a resource list of all providers in the stroke care system including stroke centers and EMS.

HOSPITAL STROKE CARE OBJECTIVE 3: By 2013, advocate for revisions to state legislation that currently requires a power of attorney to make decisions for clinical trials and to consider next of kin as sufficient decision maker.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

3.1 Promote awareness at the State Legislature on the power of attorney implications for clinical trials related to stroke.

Implementation Activities

- Coordinate efforts with American Heart Association, Connecticut Public Health Association, and others.

Acute Care (Stay to Discharge) Identified Problems

The work group identified three primary barriers in the current stroke care system:

- Inconsistent availability of resources for appropriate acute treatment;
- Lack of consistent guidelines for in-hospital treatment of stroke patients whose condition deteriorates, and non-stroke patients who develop stroke-like symptoms; and
- Lack of communication among hospital staff, primary care physicians, and rehabilitation services.

Acute Care (Stay to Discharge) Goal: *Standardized stroke care protocols are available and consistently implemented during acute care stay through discharge including post-hospitalization care referrals and rehabilitation services.*

HOSPITAL STROKE CARE OBJECTIVE 4: By 2013, all hospitals use the same standard for stroke education that meets Joint Commission and DPH education requirements for all levels of professionals providing stroke care, which includes core elements of a stroke care curriculum.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

4.1 Agree upon a curriculum for stroke education and create a repository of educational resources to be shared with all hospitals and health care providers.

Implementation Activities

- Build capacity for a listserv and/or Web site to post stroke care questions and responses, and include information about successful programs, educational opportunities, and patient specific tools used by hospitals across the state.
- DPH will review these materials, post to, and maintain Web site.

- Use Web site to highlight educational opportunities with and without CMEs.
- Endorse and foster the use of ASA's online resources for education.
- Education strategies should consider any prevention and rehabilitation public education efforts.

4.2 Develop and disseminate a statewide best practice standardized approach for "acute care to discharge" pathway.

4.3 Expand resources for stroke education and increase educational opportunities for nurses, such as online resources, videos, self-directed programs and conferences. Encourage organizational support with financial assistance and time designated for staff to attend trainings.

Implementation Activities

Educational opportunities should contain the following key elements:

- Stroke etiology, cerebrovascular pathophysiology;
- Risk factors, signs and symptoms of stroke, and prevention strategies;
- Initial assessment and monitoring;
- Current treatment options;
- Post acute care and rehabilitation; and
- Discharge planning that includes patient education and secondary prevention strategies.

HOSPITAL STROKE CARE OBJECTIVE 5: By 2013, all hospitals have practice guidelines and protocols for treatment and care of stroke patients whose condition deteriorates, and identification and treatment of non-stroke patients who may develop stroke-like symptoms during their hospital stay.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

5.1 Identify current practice guidelines used in hospitals across the state for the treatment of stroke patients whose condition deteriorates, and identification and treatment of non-stroke patients who may develop symptoms during their hospital stay, (See guidelines on "Administration of tPA" and "Early Management of the Ischemic Stroke") and make the guidelines available to all hospitals.

Implementation Activities

Elements of guidelines should include:

- Signs/symptoms that the bedside care provider should report immediately;
- Who should respond, including target response times, identified roles, and responsibilities;
- Nursing assessments and initial treatments to be done to rule out mimics and initiate care; and
- Treatment options for including administration of tPA and neurovascular interventions.

HOSPITAL STROKE CARE OBJECTIVE 6: By 2013, all hospitals have established protocols that include criteria to make appropriate referrals, for follow-up care and to ensure a reciprocal relationship among all stroke care providers and primary care physicians (PCP).

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

6.1 Identify and create current discharge and referral practices that can be used across all hospital settings.

Implementation Activities

- A discharge summary should be sent to the stroke patient's Primary Care Physician.
- Use standardized discharge protocols for secondary prevention aligned with JCAHO requirements.
- Promote communication among primary stroke centers and tertiary care centers.

6.2 Develop and share an inventory/database of identified stroke services available at each rehabilitation facility.

6.3 Involve case managers, discharge planners, and care coordinators in the development and use of discharge protocols and/or practices to facilitate effective communication with physicians and other providers in and out of the hospital setting.

Implementation Activities

- Ensure primary care physicians and other appropriate providers are informed of patient discharge and/or completion of rehabilitation.
- Rehabilitation and discharge plans consider the patient's social networks. A standard of care is developed for sharing information and resources with family and social networks.
- Consistent messages are disseminated across the continuum of care.

D. REHABILITATION AND POST – STROKE

Many stroke survivors regain normal functioning after a stroke. However, residual impairments often require varying lengths of stroke rehabilitation. The most common rehabilitation services include assistance with self-care skills, (e.g., activities of daily living, mobility skills, communication skills, cognitive skills, socialization skills, vocational training, pain management, emotional and family support, and re-education. Rehabilitation may continue for several weeks or longer periods of time. Rehabilitation services are located in:

- Acute care facilities (in-patient hospital care with access to 24-hour medical care);
- Long term acute care hospitals;
- Intensive rehabilitation facilities that provide daily nursing care (hospital rehabilitation centers, skilled nursing homes);
- Long term care facilities (nursing homes);
- Out patient facilities (e.g., rehabilitation clinics, doctor's offices); and
- Home health agencies (specific rehabilitation services are provided in patients' homes).

Rehabilitation services for stroke survivors usually require coordination among several healthcare professionals. The 2006 Hospital Stroke Care Survey revealed that 83% of acute care hospitals perform physical therapy evaluations within 24 hours of arrival. In addition, 72% of hospitals provide occupational therapy evaluations, and 69% perform speech therapy evaluations within 24 hours of arrival.

The Stroke Rehabilitation and Post-Stroke Work Group developed a goal, objectives, and strategies to improve this component of the proposed stroke system of care and prevention plan. (Please see Appendix D for of the Rehabilitation and Post-Stroke Work Group Logic Model).

Identified Problems

- A coordinated, multi-disciplinary, and integrated system is not in place across the state, limiting the multi-disciplinary approach proven to achieve the best clinical outcomes for stroke survivors. This lack of coordination and collaboration results in service fragmentation at several different levels of care.
- Improved communication along the care continuum is needed.

- Inconsistencies exist among professional care providers and institutions in levels of post-stroke clinical services, expertise, and available resources.
- There is a need for enhancement of post-stroke education and the development of standardized stroke-rehabilitation protocols.

Stroke Rehabilitation and Post Stroke Care Goal: *All stroke survivors will receive an initial hospital evaluation or standardized screening by rehabilitation professional to determine their individual rehabilitation needs. All stroke survivors will receive appropriate care in a timely manner with periodic re-evaluation of rehabilitation needs and resources to achieve optimal outcomes.*

STROKE REHABILITATION AND POST STROKE OBJECTIVE 1: By 2013, all survivors receive individualized assessment, intervention, and referral to appropriate levels of rehabilitation care necessary to achieve optimal post-stroke outcomes. Patients, acute care and rehabilitation teams, rehabilitation facilities (e.g., skilled nursing facilities, home health agencies), primary care physicians, community agencies, community professionals, and the patient's social networks are actively involved in the development of a stroke survivor recovery plan.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

1.1 Work with acute and post-acute care providers on available recommended options for functional assessment of stroke survivors.

Implementation Activities

- Initiate rehabilitation interventions based upon acute assessment in a timely manner to prevent secondary complications and further functional deteriorations.

1.2 Multi-disciplinary care team will make appropriate post-acute rehabilitation referrals based upon initial and ongoing functional assessments, as well as the survivors' medical complexities.

Implementation Activities

- Evaluate types of rehabilitation facilities and services that will facilitate optimal patient outcomes.
- Develop an inventory/database of rehabilitation services that summarizes facility specialties and capacities.
- Integrate and support stroke survivors and their social networks in decision-making processes throughout acute and post-acute phases of care.

1.3 Ensure post-acute re-assessments occur with necessary adjustments made to the ongoing plan of care for stroke survivors to achieve optimal patient outcomes.

STROKE REHABILITATION AND POST STROKE OBJECTIVE 2: By 2013, establish communication systems to ensure that all stroke survivors have a written plan of care for follow-up services following hospitalization.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

2.1 Implement reciprocal feedback mechanisms among institutional and community systems to provide information related to stroke survivor outcomes and ongoing issues to all professionals and support networks within the continuum.

2.2 Provide standardized stroke care information among health care providers to ensure seamless communication along the continuum.

Implementation Activities

Promote the creation of standardized care plans that include:

- Type and etiology of stroke;
- Residual deficits;
- Diagnostic work up and results;
- Initiation of secondary prevention;
- Functional assessment/status, recommended ongoing rehabilitation intervention;
- Risk factor modification; and
- Recommendations and follow-up for medical and functional issues.

2.3 Develop and update an online clearinghouse of statewide resources that serves stroke survivors, their social networks, and health care providers.

STROKE REHABILITATION AND POST STROKE OBJECTIVE 3: By 2013, ensure that preventable complications and secondary prevention issues are addressed, including all modifiable risk factors. Increase awareness of optimal post-acute care by healthcare providers and third party payers.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

3.1 Educate the public, health care providers, and third party payers about the cost and public health implications of not addressing preventable complications and not providing the timely and appropriate level of post-stroke care.

3.2 Staff education for health care providers is required including information on residual physical, cognitive, and emotional deficits.

STROKE REHABILITATION AND POST STROKE OBJECTIVE 4: By 2013, ensure that stroke survivors and their social networks receive appropriate post-stroke education according to established protocols, and receive written information on stroke risk factors, warning signs, and the importance of timely use of EMS services.

Outcome Measure: Data source, baseline, target values to be determined.

Strategies

4.1 Establish or adapt existing post-stroke education materials for survivors and their social networks. These efforts will be linked to the education and prevention efforts.

4.2 Educate stroke survivors and their social networks on their initial individual rehabilitation needs and recommendations for care options.

Implementation Activities

- Inform and refer stroke survivors and their social networks to appropriate levels of care services that provide for the individual's needs for continued recovery.

4.3 Provide written information to stroke survivors and their social networks on community resources to support ongoing recovery.

E. SURVEILLANCE: TRACKING AND MONITORING

DPH is committed to expanding stroke care and prevention capacity. The Primary Stroke Center (PSC) Designation Program is a quality initiative that addresses the public health need for acute care hospitals to ensure rapid diagnostic evaluation and treatment of stroke patients. To be designated as a Primary Stroke Center, a hospital must demonstrate the capacity to meet criteria adapted from the American Stroke Association practice standards and recommendations from the Brain Attack Coalition.

The goal of the PSC Designation Program is to decrease premature deaths and disabilities associated with stroke through early diagnosis and treatment. The program serves as a mechanism to monitor and ensure quality of care for stroke patients. Hospitals that achieve PSC designation status are required to have a database (registry) to collect stroke related performance indicators that measure the degree to which best practice stroke care standards are implemented (e.g., number of stroke patients eligible and given tPA, number of stroke patients who receive stroke education, etc.).

Discussions are underway to determine if DPH's existing data collection systems will satisfy reporting/monitoring requirements to track performance indicators necessary to maintain PSC designation. A potential option would be the development of an outside registry, which could provide more comprehensive approach to track performance indicators necessary to maintain PSC designation.

DPH will collect stroke data to monitor hospital performance, patient outcomes, and quality of care. Potential data resources for this surveillance activity include:

- American Heart Association's **Get With The Guidelines** (GWTG): The largest stroke registry in the United States, GWTG is the primary data-reporting tool used by hospitals nationwide, including the majority of Connecticut hospitals. GWTG integrates the reporting criteria for AHA, JCAHO, and CDC to maintain certification and/or recognition status, and to ensure ongoing quality improvement measures. GWTG would allow DPH to assess how well hospitals are performing compared to other participating Connecticut and U.S. hospitals.
- The **Heart Disease & Stroke Surveillance System** at the Department of Public Health: This system tracks information regarding Connecticut hospitalizations and deaths due to heart disease and stroke, and related conditions, prevalence data, and related reports. The feasibility of including stroke specific data elements into the existing reporting system is

being evaluated for the purpose of tracking, monitoring and identifying trends in stroke care in Connecticut.[46]

- Information on risk factors for stroke is collected for adults age 18 and older through the Behavioral Risk Factor Surveillance System. The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. Connecticut has used the system to identify demographic groups and areas of the state that may be at increased risk for cardiovascular disease (CVD) based upon BRFSS data related to prevalence rates for the six major CVD risk factors or patterns of CVD risk factors, and to develop training for health professionals using state information on CVD risk factors.
- Through its Discharge Database, the Office of Health Care Access (OHCA) collects hospital utilization data on all discharges from the acute care hospitals within Connecticut. This Data includes demographic, utilization, clinical, charge, payer, and provider information. In addition, OHCA gathers, verifies, analyzes, and reports on a wide range of hospital financial data including hospital expenses, revenues, uncompensated care volumes, disproportionate share, and other financial data as needed. All 31 Connecticut acute care hospitals are required by state law to file financial data with OHCA on a quarterly, six-month, and twelve-month basis, and to submit net revenue limit information annually.
- DPH has access to the Connecticut Health Information Management Exchange (CHIME) database maintained by the Connecticut Hospital Association that collects data on inpatient admissions, hospital-based ambulatory surgery, and emergency department visits for all Connecticut hospitals. Stroke specific data may be extracted from this database for evaluation of PSC performance.

Once a framework for data collection has been established, protocols to review and analyze this stroke data will be created. DPH will lead the effort to implement continuous quality improvement initiatives based upon data findings and performance analysis.

F. IMPLEMENTATION AND FUNDING

In June 2008, the Stroke Planning partners met to review objectives and strategies and to prioritize implementation activities. The group focused on objectives to be implemented in the short-term using existing resources. This approach lays a foundation for the plan objectives. The first implementation activities are:

- Prevention & Community Education – Promote improved hypertension and cholesterol control in primary care settings.
- EMS Notification & Response – Develop a standardized stroke assessment tool and stroke education program for EMS providers.
- Hospital Care – Explore the use of telemedicine in stroke care, foster Primary Stroke Center and non-Primary Stroke Center partnerships (e.g., Telemedicine), and create a stroke resource listserv and a Web site that includes a statewide EMS inventory of available stroke care services.
- Rehabilitation & Post-Stroke – Establish or adapt existing post-stroke educational materials for survivors and their social networks.

Each activity addresses four identified areas: education, collaboration, access to care, and systems management. Implementing these priorities will position Connecticut to provide its residents with the coordinated, high quality, accessible stroke care and prevention.

The Connecticut Department of Public Health continues to increase staff capacity to carry out the Plan, and Heart Disease and Stroke Prevention efforts. DPH supports full-time equivalent DPH staff positions for Heart Disease and Stroke Prevention efforts. In addition, a high level of collaboration exists across DPH areas such as OEMS, Healthcare Systems Branch, and Planning Branch, among others. The following are DPH activities that further the goals and objectives of the Plan:

- As of January 1, 2009, seventeen hospitals received DPH designations as Primary Stroke Centers; two additional applications are pending. DPH staff will continue to support additional hospitals interested in obtaining PSC designation, particularly smaller hospitals.
- DPH continues implementation of prevention and community education programs, such as the African American Heart Disease and Stroke Prevention Program in four urban centers of New London, Hartford, Bridgeport, and New Haven (supported by Public Health and Health Services Block Grant federal funds) and the Women's Healthy Heart Program in five sites (supported by state funds). The Healthy Heart program shares common goals to identify and manage cardiac/stroke risk factors. DPH continues implementation of many other related efforts such as the Obesity Prevention Initiative, Cancer Prevention Plan, and Diabetes Prevention and Control Plan – all of which share

common elements related to prevention, education, nutrition, physical activity, and appropriate use of the healthcare system.

- In July 2008, DPH received a $350,000 annual grant award from the Centers for Disease Control and Prevention. This award increases DPH's capacity to address Heart Disease and Stroke Prevention priorities. Due in part to successful advocacy efforts by the Connecticut American Heart Association, the state receives funding to implement their proposed plans.

Annual Reports on Progress

During each year of the plan, the DPH will prepare a report that describes the activities undertaken in the previous year, and the results of those activities. The reports may be used in support of funding applications and in media campaigns publicizing the activities and successes of the Stroke Plan.

Action Steps for the Subsequent Year

Based upon information in the annual report, DPH will create an action plan for the subsequent year. The action plan will clearly state the objectives and the recommended strategies to realize those objectives in the next calendar year. The plan will include specific steps to be taken by specific groups and individuals to achieve the plan's goals.

Funding

While government funding provides a useful starting point for stroke prevention and care efforts, additional funding sources will be needed to realize a coordinated system of stroke care and prevention. This plan serves as a basis for seeking additional funds for telemedicine, training, and education. Technical assistance will be provided through DPH to partner organizations seeking funding from philanthropic organizations to implement activities aligned with state health plans.

Evaluation

DPH and its partners will measure progress towards each of the objectives discussed in the previous section. DPH will conduct some of the evaluation activities independently, while DPH partners may monitor other activities (e.g., monitoring the number of physicians attaining AHA recognition).

APPENDICES

Appendix A. A Chronic Care Model Approach

Connecticut proposes adapting the Robert Wood Johnson Chronic Care Model for stroke prevention and care. (See model on next page.) This approach creates a framework for a comprehensive system of care that meets the ASA standards of stroke care and prevention highlighted in Part I. This approach also addresses the four identified areas of need in the current system: education, access to care, collaboration, and systems management. As with other chronic diseases, Connecticut's Chronic Disease Model should include the following elements:

Communication

- **Establish Communication Protocols:** Regular communication among patients, providers, and payers will help to eliminate some of the misunderstanding that may impede good care.
- **Productive Interactions among Patients and Provider Teams:** Communication should be regular and useful. Providers should communicate in ways that are easy for patients to understand, and patients should use time with providers to ask questions and make certain their providers understand their needs.

Treatment Protocols

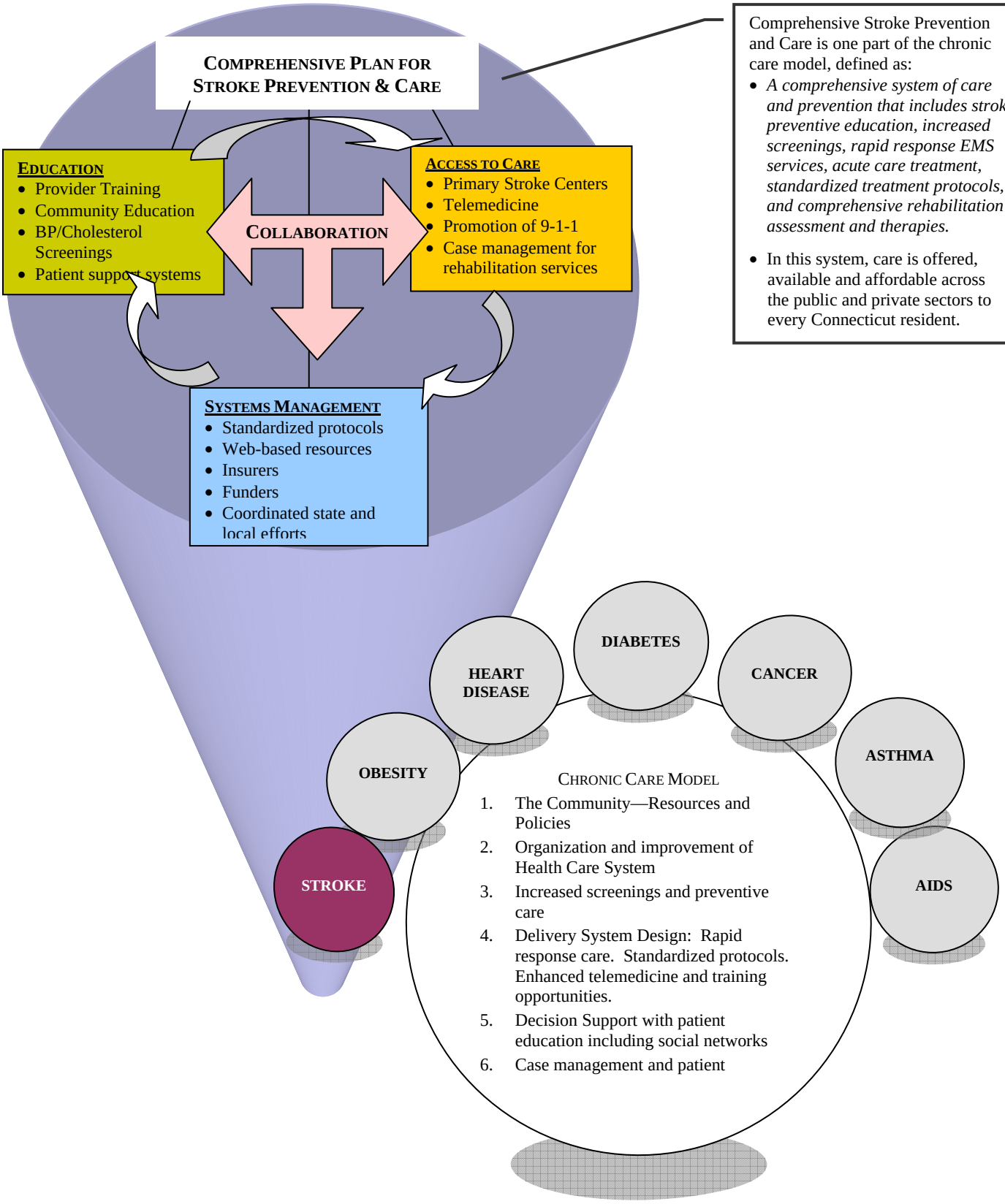
- **Regular Assessment of Patients:** Patients should receive laboratory testing and face-to-face meetings with providers according to standardized protocols.
- **Development of Treatment Plans** that consider cultural, linguistic, psychosocial, and physiological needs of the patient.
- **Systematic Application of Proven Therapies:** Providers integrate accepted best practices into their clinical practices.
- **Sustained Follow-up for Treatment Adherence:** Patient compliance with disease management protocols is one of the best ways to reduce costs and improve outcomes.

Systems Management

- **User-Friendly Delivery System:** Patients are more likely to be compliant with their treatment programs when they are treated with respect, and when accessing needed services is easy.
- **Scheduling of Appointments:** Managed care organizations and providers communicate to allow scheduling of all related appointments in one day. The current fragmentation of services is a barrier to many seeking care.
- **Get Managed Care Organizations to Recognize Barriers:** In some cases, payers may not be aware of the steps they can take to improve chronic disease management.
- **Address Payment Issues:** In some cases, insurance does not cover a service or treatment necessary for proper chronic disease management.
- **Accepted/Uniform Provider Responsibilities:** Best practices should be in place for all providers in the state, and provider responsibilities should be standardized for all payer organizations.
- **Multi-Pronged Case Finding Approach:** Develop multiple surveillance strategies to document chronic disease cases because not all patients access care the same way.

This proposed system allows for comprehensive care of Connecticut residents living with chronic diseases. The benefits of putting Connecticut's Chronic Care Model into practice include decreased sick days, lowered health care costs, and higher quality of life for people living with chronic disease.

Comprehensive Public Health System
Model for Chronic Care
STROKE



Comprehensive Stroke Prevention and Care is one part of the chronic care model, defined as:

- *A comprehensive system of care and prevention that includes stroke preventive education, increased screenings, rapid response EMS services, acute care treatment, standardized treatment protocols, and comprehensive rehabilitation assessment and therapies.*
- In this system, care is offered, available and affordable across the public and private sectors to every Connecticut resident.

Appendix B. Glossary of Terms

Acute Care	Short-term medical treatment, typically in a hospital, for patients experiencing an acute illness or injury, or recovering from surgery.
Acute Stroke	The critical stage of stroke, starting at the onset of symptoms and lasting for a few hours until the patient's condition stabilizes.
Age-Adjusted Rates	Used to compare risks of two or more populations at one point in time or one population at two or more points in time.
Aneurysm	The ballooning-out of the wall of an artery or vein due to weakening of the wall by disease, injury or a structural abnormality.
Behavioral Risk Factor Surveillance System (BRFSS)	Established in 1984 by the Centers for Disease Control and Prevention (CDC), the Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury.
Body Mass Index (BMI)	A number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people to screen for weight categories that may lead to health problems.
Cardiovascular Disease (CVD)	Refers to any of the disorders that can affect the circulatory system, but often means coronary heart disease (CHD), heart failure, and stroke, taken together.
Carotid Artery Stenosis	The narrowing of the carotid arteries. These are the main arteries in the neck that supply blood to the brain. Carotid artery stenosis, also called carotid artery disease, is a major risk factor for ischemic stroke.
Case Manager	A person (usually a social worker or nurse) who assists in the planning, coordination, monitoring, and evaluation of medical services for a patient with emphasis on quality of care, continuity of services, and cost-effectiveness.
Cerebrovascular Accident (CVA)	A sudden diminution or loss of consciousness, sensation, and voluntary motion caused by rupture or obstruction (as by a clot) of a blood vessel of the brain. Also called apoplexy, brain attack, or stroke.
Cerebrovascular Disease	All disorders in which an area of the brain is temporarily or permanently affected by ischemia or bleeding and one or more of the cerebral blood vessels are involved in the pathological process. Includes stroke, carotid artery stenosis, vertebral artery stenosis, intracranial artery stenosis, aneurysms, and vascular malformations.
Cerebrovascular Pathophysiology	The study of the functional changes that accompany a particular syndrome or disease involving the cerebrum and/or the blood vessels supplying it.

Cerebrum	The main and largest portion of the brain that's responsible for intellect, sensation, memory, speech and direction of conscious movements of the body.
Cholesterol	Cholesterol is a waxy, fat-like substance that occurs naturally in all parts of the body and that the body needs to function normally. It is present in cell walls or membranes everywhere in the body, including the brain, nerves, muscle, skin, liver, intestines, and heart. The body uses cholesterol to produce many hormones, vitamin D, and the bile acids that help to digest fat. It takes only a small amount of cholesterol in the blood to meet these needs. Excess cholesterol in the bloodstream is deposited in arteries, including the coronary arteries, where it contributes to the narrowing and blockages that cause the signs and symptoms of heart disease.
Circulatory Diseases	Any condition that affects the circulatory system. This ranges from diseases of the arteries, veins and lymph vessels to blood disorders that affect circulation.
Clinical Trial	A scientifically controlled study of the safety and effectiveness of a therapeutic agent (such as a drug or vaccine) using consenting human subjects.
Comorbidities	Conditions that exist at the same time as the primary condition in the same patient (e.g., hypertension is a co-morbidity of many conditions such as diabetes, ischemic heart disease, and end-stage renal disease).
Comprehensive Stroke Center	A health care facility or system with the necessary personnel, infrastructure, expertise, and programs to diagnose and treat stroke patients who require a high intensity of medical and surgical care, specialized tests, or interventional therapies.
Continuum of Care	The entire spectrum of specialized health, rehabilitative, and residential services available. Services focus on the social, residential, rehabilitative and supportive needs of individuals as well as needs that are essentially medical in nature.
Coprevalence	When two or more diseases or conditions co-exist within a population at the same/given time.
Coronary Artery Disease (CAD)	Occurs when the arteries that supply blood to heart muscle become hardened and narrowed. This is due to the buildup of cholesterol and other material, called plaque, on their inner walls. As the buildup grows, less blood can flow through the arteries. As a result, the heart muscle can't get the blood or oxygen it needs. This can lead to chest pain (angina) or a heart attack.
Coronary Heart Disease (CHD)	Heart disease caused by impaired circulation in one or more coronary arteries; often manifests as chest pain (angina pectoris) or heart attack.
Cultural Competency	The ability to interact effectively with people of different cultures. Cultural competence is comprised of four components:

	(a) Awareness of one's own cultural worldview, (b) Attitude towards cultural differences, (c) Knowledge of different cultural practices and worldviews, and (d) Cross-cultural Skills. Developing cultural competence results in an ability to understand, communicate with, and effectively interact with people across cultures.
Diabetes	A disease in which the body does not produce or properly use insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. The cause of diabetes is not known, although both genetics and environmental factors such as obesity and lack of exercise appear to play roles.
Dietician	An expert in food and nutrition. Dietitians help promote good health through proper eating. They also supervise the preparation and service of food, develop modified diets, participate in research, and educate individuals and groups on good nutritional habits.
Disability	The limitation of normal physical, mental, social activity of an individual. There are varying types (functional, occupational, learning), degrees (partial, total), and durations (temporary, permanent) of disability.
Dyslipidemia	A condition marked by abnormal concentrations of lipids or lipoproteins in the blood.
Embolism	The sudden obstruction of a blood vessel by an embolus (blood clot).
EMS Inventory	A detailed description of quantities and locations of different kinds of facilities, major equipment, and personnel which are available in a geographic area and the amount, type, and distribution of services these resources can support.
EMS System of Care	Services utilized in responding to the perceived individual need for immediate treatment for medical, physiological, or psychological illness or injury.
Endovascular Therapies	Minimally invasive, catheter-based techniques used to treat vascular diseases. Performed through a needle puncture or small incision, these techniques typically save the patient from the trauma and long recovery time typical of a major surgical procedure. These therapies are typically performed by cardiologists, vascular surgeons, interventional radiologists, or neuroradiologists with special training on these procedures.
Etiology	The cause or causes of a disease or abnormal condition.
Evidence-Based Practice	The systematic selection, implementation, and evaluation of strategies, programs and policies with evidence from the scientific literature that they have demonstrated effectiveness in accomplishing intended outcomes.
Health Disparities	Differences in the burden and impact of disease among different populations, defined, for example, by sex, race or ethnicity,

	education or income, disability, place of residence, or sexual orientation.
Health Literacy	The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.
Hemorrhage	Bleeding or the abnormal flow of blood.
Hemorrhagic Stroke	Hemorrhagic stroke involves bleeding within the brain that damages nearby brain tissue. A common cause of hemorrhagic stroke is the bursting of an aneurysm (a weak spot in an artery wall). Hemorrhagic stroke is often associated with high blood pressure. About 20% of all strokes are hemorrhagic.
Hyper-Acute Care	Intense, short-term health care, provided within the first 6-hours from the onset of stroke symptoms.
Hypertension	A condition in which the pressure in the arterial circulation is greater than desired; associated with increased risk for heart disease, stroke, chronic kidney disease, and other conditions.
Incidence	The number of new cases of disease occurring in a population of given size within a specified time interval.
Intracranial Artery Stenosis	Narrowing of the arteries inside the intracranial cavity at the base of the brain.
Ischemia	Reduced blood flow to an organ, usually due to a constricted or blocked artery.
Ischemic Stroke	The most common type of stroke that occurs when too little blood reaches an area of the brain usually due to a clot that has blocked a blood vessel. An ischemic stroke can sometimes lead to a brain hemorrhage. About 80% of strokes are ischemic.
Lipids	A fatty substance insoluble in blood. Cholesterol, cholesterol compounds, and triglycerides are all lipids. They are transported in the blood as part of large molecules called lipoproteins. Abnormalities in lipids can contribute to heart disease.
Logic Model	A systematic and visual way to present and share your understanding of the relationships among the resources you have to operate a program, the activities planned, and the changes or results expected.
Los Angeles Pre-Hospital Stroke Screen (LAPSS)	A pre-hospital screening instrument used to identify acute stroke patients.
Modifiable Risk Factors	Factors that are amenable to change such as diet, physical activity and smoking.
Morbidity	Refers to: • the state of being diseased, • the degree or severity of a disease, • the prevalence of a disease: the total number of cases in a particular population at a particular point in time, • the incidence of a disease: the number of new cases in a particular population during a particular time interval. • disability irrespective of cause.

Mortality	Rate of death expressed as the number of deaths occurring in a population of given size within a specified time interval.
Multidisciplinary	Treatment or medical management that utilizes a team of physicians and other health care providers from many different specialties. (e.g., physician, nurse, psychologist, physical therapist).
Neurologist	A physician that specializes in the prevention, diagnosis and treatment of stroke and other diseases of the brain and spinal cord.
Neuropsychologist	A psychologist that diagnoses and treats stroke survivors who may be facing changes in thinking, memory, and behavior.
Non-Modifiable Risk Factors	Factors that cannot be changed such as age, gender, race, family history.
Obesity	Usually defined in terms of body mass index (BMI), which is calculated as body weight in kilograms (1 kg = 2.2 lbs) divided by height in meters (1 m = 39.37 in) squared; adults with a BMI of greater than or equal to 30.0 kg/m2 are considered "obese," and those with a BMI of 25–29.9 kg/m2 are considered "overweight." In children, overweight is defined as BMI greater than the 95th percentile value for the same age and sex group.
Occupational Therapist (OT)	Clinician that is trained to help stroke survivors learn strategies to manage daily activities such as eating, bathing, dressing, writing or cooking.
Occupational Therapy	Therapy based on engagement in meaningful activities of daily life (as self-care skills, education, work, or social interaction) especially to enable or encourage participation in such activities despite impairments or limitations in physical or mental functioning.
Physiatrist	Specializes in rehabilitation following injuries, accidents or illness.
Physical Therapist (PT)	Clinician that is trained to help stroke survivors with problems in moving and balance; suggests exercises to strengthen muscles for walking, standing and other activities.
Physical Therapy	Designed to restore/improve movement and strength in people whose mobility has been impaired by injury and disease. May include exercise, massage, water therapy, and assistive devices. Also called Physiotherapy.
Post-Acute Care (Also called sub-acute care or transitional care.)	A type of short-term care provided by many long-term care facilities and hospitals which may include rehabilitation services, specialized care for certain conditions (such as stroke and diabetes) and/or post-surgical care and other services associated with the transition between the hospital and home. Residents on these units often have been hospitalized recently and typically have more complicated medical needs. The goal of subacute care is to discharge residents to their homes or to a lower level of care.

Power of Attorney	A legal document that allows an individual to appoint someone else (proxy) to make medical or health care decisions, in the event the individual becomes unable to make or communicate such decisions personally.
Prehypertensive	Slightly to moderately elevated arterial blood pressure that in adults is usually indicated by a systolic blood pressure of 120 to 139 mm Hg or a diastolic blood pressure of 80 to 89 mm Hg and that is considered a risk factor for hypertension.
Prevalence	The prevalence of a disease is the total number of cases in a particular population at a particular point in time.
Primary Care Physician	A generalist physician who serves as the entry point for substantially all of the patient's medical and health care needs - not limited by problem origin, organ system, or diagnosis. Primary care physicians are advocates for the patient in coordinating the use of the entire health care system to benefit the patient.
Primary Prevention	Those measures provided to individuals to prevent the onset of a targeted condition.
Primary Stroke Center (PSC)	A health care facility or system with the necessary personnel, infrastructure, expertise, and programs to stabilize and treat stroke patients, providing initial acute care. PSCs are able to appropriately use t-PA and other acute therapies such as stabilization of vital functions, provision of neuroimaging procedures, and management of intracranial and blood pressures. Based on patient needs and the hospital's capabilities, they either admit patients or transfer them to a comprehensive stroke center for more high intensity care.
Primordial Prevention	Efforts to reduce the onset of the risk factors known to predispose people to CVD. For example, lifestyle modifications to maintain ideal body weight and to limit sodium consumption are means of preventing the development of high blood pressure.
Quality Improvement	Refinement of care delivery systems to make sure patients get the right care at the right time resulting in optimal clinical outcomes.
Rapid Response System	A specially designated team of health care professionals consisting of neurologists, Emergency Department (ED) physicians, nurses, and radiologists that follow a predetermined protocol to quickly ddiagnose and initiate treatment of stroke patients. EMS personnel also have a key role in the rapid response system by starting effective assessment and treatment strategies when responding to 9-1-1 calls. This protocol helps maximize a patient's survival and well-being, and helps to minimize brain damage and disability.
Recreation Therapist	Clinician that is trained to help stroke survivors learn strategies to improve the thinking and movement skills needed to join in recreational activities.

Rehabilitation Nurse	Specializes in helping people with disabilities; helps survivors manage health problems that affect stroke (diabetes, high blood pressure) and adjust to life after stroke.
Rehabilitation Services	The combined and coordinated use of medical, social, educational, and vocational measures for training or retaining individuals disabled by disease or injury to the highest possible level of functional ability. Several different types of rehabilitation are distinguished: vocational, social, psychological, medical, and educational. Services are designed to improve/restore a person's functioning; includes physical therapy, occupational therapy, and/or speech therapy. May be provided at home or in long-term care facilities.
Relative Risk	Ratio of the risk of disease or death among the exposed segment of the population to the risk among the unexposed.
Secondary Prevention	Identify and treat asymptomatic persons who have already developed risk factors or preclinical disease but in whom the condition is not clinically apparent.
Social Worker	Clinician that is trained to help survivors make decisions about rehab programs, living arrangements, insurance, and support services in the home.
Speech-Language Pathologist (SLP)	Clinician that is trained to help stroke survivors re-learn language skills (talking, reading and writing); shares strategies to help with swallowing problems.
Standardized Stroke Protocol	A document with the aim of guiding decisions and criteria regarding diagnosis, management, and treatment in specific areas of stroke care. They are based on an examination of current evidence within the paradigm of evidence-based medicine. They define the most important questions related to clinical practice and identify all possible decision options and their outcomes. Some guidelines contain decision or computation algorithms to be followed. Thus, they integrate the identified decision points and respective courses of action to the clinical judgment and experience of practitioners.
Stroke	Sudden interruption of blood supply to the brain caused by an obstruction or the rupture of a blood vessel.
Stroke Care Pathways	A step-by-step action plan taken by healthcare professionals in caring for stroke patients once a diagnosis has been made. Pathways (also called care tracks and care maps) include a range of documents such as internal hospital forms, triage and protocol guidelines, intervention guidelines, as well as stroke care systems development and stroke team/center development.
Stroke Team	An interdisciplinary team of highly skilled professionals who focus exclusively on diagnosis and treatment of stroke patients. The team typically includes: an emergency room physician; a neurologist; a radiologist; a clinical nurse specialist trained in neurology; nurses with extensive training in the management of

	stroke patients; physical, occupational and speech therapists; a dietitian; a social worker; a pharmacist; a patient care coordinator; the medical director of the stroke unit; and emergency medical services.
Sub-Acute Care	Care that is provided in nursing facilities that specialize in treating patients who require extensive physiological monitoring, intravenous therapy or postoperative care, intensive rehabilitation, ventilatory care, pulmonary rehabilitation or other medically complex interventions. Forms of sub-acute care treatment include medical interventions for oncologic complications, spinal cord and head injuries, neurological impairments, infectious diseases and other complex conditions.
Telemedicine	The application of clinical medicine where medical information is transferred via telephone, the Internet or other communication networks for the purpose of consulting, and sometimes remote medical procedures or examinations.
Teleradiology	Radiology concerned with the transmission of digitized medical images (as X-rays, CAT scans, and sonograms) over electronic networks and with the interpretation of the transmitted images for diagnostic purposes.
Tertiary Prevention	Involves the care of established disease, with attempts made to restore to highest function, minimize the negative effects of disease, and prevent disease-related complications.
Tertiary Care Centers	Medical services are provided by specialist hospitals or regional centers equipped with diagnostic and treatment facilities not generally available at local hospitals. These include trauma centers, burn treatment centers, advanced neonatology unit services, organ transplants, high-risk pregnancy, radiation oncology, etc.
Third-Party Payers	Any health insurance carrier, health maintenance organization, managed care entity, organized delivery system insurer or other entity that provides payment for medical and related services.
Transient Ischemic Attack (TIA)	Occurs when a blood clot temporarily clogs an artery, and part of the brain doesn't get the blood it needs. The symptoms occur rapidly and last a relatively short time. Most TIAs last less than five minutes. The average is about a minute. Unlike stroke, when a TIA is over, there's no injury to the brain.
Thrombolysis	To destroy or break up a thrombus (blood clot).
Thrombosis	The formation or presence of a blood clot within a blood vessel.
Tissue Plasminogen Activator (tPA)	A thrombolytic agent (clot-busting drug), for use in certain patients having a heart attack or stroke. tPA is the only drug approved by the U.S. Food and Drug Administration for the acute (urgent) treatment of ischemic stroke. The drug can dissolve blood clots, which cause most heart attacks and strokes.
Triage	The sorting of patients (as in an emergency room) according to the urgency of their need for care.

Triglycerides	A type of fat in the bloodstream and fat tissue. Too much of this type of fat can contribute to the hardening and narrowing of the arteries. Increases the risk of having a heart attack or stroke.
Vertebral Stenosis	The narrowing of the vertebral arteries. These arteries are one type of major blood vessel in the neck that carries blood from the heart to the brain. The other type is the carotid arteries.
Worksite Wellness	A variety of services that assist employees in maintaining or improving their health.

Sources: U.S. Department of Health & Human Services; Centers for Disease Control & Prevention; American Heart Association; Agency for Healthcare Research and Quality; National Institutes of Health; Wikipedia; The Brain Attack Coalition, American Diabetes Association; American Academy of Family Physicians and Medline Plus.

Abbreviations

ACSM	American College of Sports Medicine
AHA	American Heart Association
ASA	American Stroke Association
BAC	Brain Attack Coalition
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CHIME	Connecticut Health Information Management Exchange
CPHA	Connecticut Public Health Association
CTAHA	Connecticut Chapter of the American Heart Association
DPH	Department of Public Health
ED	Emergency Department
EMS	Emergency Medical Services
EMT	Emergency Medical Technicians
GWTG	Get With The Guidelines
JCAHO	Joint Commission on Accreditation of Health Care Organizations
NINDS	National Institute of Neurological Disorders and Stroke
NPSC	Non Primary Stroke Centers
OEMS	Office of Emergency Medical Services
OPM	Office of Policy and Management
PSC	Primary Stroke Center

Appendix C. Link To Primary Stroke Center Designation Program Application/Evaluation Criteria

After laying the groundwork in partnership with University of Connecticut Health Center, DPH initiated the creation of a formal Primary Stroke Center Designation Program in January 2007. The Connecticut-specific primary stroke center criteria were adapted based on the Brain Attack Coalition and the American Stroke Association recommendations. The PSC Designation Program application and evaluation criteria can be viewed at:

http://www.ct.gov/dph/cwp/view.asp?a=3135&q=387022&dphNav_GID=1601&dphPNavCtr=|#47052

Appendix D. Planning Process Work Group Logic Models and Work Group Members

DPH divided a diverse panel of more than 80 experts from across the stroke care continuum into four work groups – Prevention, EMS Services, Hospital Care, and Rehabilitation - to begin creating Connecticut's Stroke Care and Prevention Plan. Work groups discussed current practices, reviewed established policies and existing stroke resources, and identified gaps in services. Work groups developed logic models to capture the goals, objectives, strategies, and action steps outlined in the Plan. These logic models and the list of work group members are outlined in the following pages.

Prevention and Community Education Goal: To promote reduction of stroke risk factors and healthy living for all Connecticut residents, particularly high-risk individuals, through a coordinated effort with existing plans and community efforts. (Healthy living includes proper nutrition, having knowledge of family history, improving physical activity and the management of high blood pressure, cholesterol, and diabetes, limiting alcohol consumption and avoiding illicit drug use.)			
Problem(s):	**Objectives**	**Strategies**	**Outcomes**
1. Messages about the benefits of maintaining a healthy lifestyle are not being heeded	1. Increase the percentage of Connecticut residents aware of the risk factors for stroke, stroke prevention strategies, signs & symptoms of stroke, and the importance of calling 9-1-1 through a local, regional and statewide network of communication and dissemination of information.	1.1 Establish a statewide communication network that provides stroke educators with the necessary tools to deliver consistent messages on how to prevent a stroke, recognize signs and symptoms of stroke, and what to do in a stroke event (call 9-1-1). ▪ Implement statewide programs to assist communities with coordination, integration and partnering among urban and rural resources. ▪ Enhance collaboration among hospitals, EMS providers, and local health departments to develop stroke prevention and awareness programs ▪ Collaborate with other state agencies to promote stroke prevention and awareness strategies. ▪ Engage partners to highlight successful programs for replication (e.g., healthy foods at schools, safe walking paths, health promotion/work site wellness programs). ▪ Develop a centralized Web site to provide stroke education and resources. ▪ Develop partnerships with hospitals to enhance public education efforts to meet DPH Primary Stroke Center Designation aligned with JCAHO Stroke Center requirements.	1.1.a. X% of CT residents will be aware of stroke risk factors, signs & symptoms, prevention, and importance of calling 9-1-1. 1.1.b. Web site is established and maintained. 1.1.c. Partnerships established. Count: hits on Web site, 9-1-1, # hospital public education programs, and people attending Data source – BRFSS: 2004 ▪ 20% know all warning signs. ▪ 18% aware of stroke and to call 9-1-1.
		1.2 Develop consistent stroke prevention and awareness messages tailored to specific populations. Messages should convey a sense of urgency and priority about stroke risk factors, signs and symptoms, and response to a stroke event. ▪ Develop stroke prevention messages that are culturally appropriate, multilingual, and accessible and consider the health literacy of the target population. ▪ Use traditional and nontraditional venues to convey stroke prevention and awareness messages. ▪ Use a variety of communication methods appropriate for the target audience. ▪ Create standardized press releases for publication in regional and community newspapers.	1.2.a Messages are developed and disseminated via multiple methods and in various venues.

Problem(s):	PCE -Objectives	PCE - Strategies	Outcomes
		1.3 Provide information (e.g., marketing, fliers, Web sites, community organizations, health departments, churches, etc.) to the general public on stroke risk factors, stroke prevention, what to do in the event of a stroke, healthy lifestyles, and communicating with health care providers about stroke. ▪ Collaborate with Infoline (2-1-1) to develop and maintain a state map that highlights stroke resources and programs with links to other information (e.g., hospitals and primary stroke centers). ▪ Identify and collaborate with local and regional partners involved in promoting healthy lifestyles. ▪ Examine strategies such as partnering with Public Access TV to deliver stroke education programming.	1.3.a Marketing campaigns conducted X times per year. 1.3.b Local resources tabulated on the site for public access.
2. Modifying behaviors to reduce risk factors is challenging and impeded by barriers such as cost, time, and environment.	2. Increase the percentage of stroke care providers, stroke patients, and use persons at risk who have access to and receive appropriate education and information on stroke prevention and care.	2.1 **For Professionals**: Create or promote existing stroke prevention educational programs for healthcare professionals, EMS, and Acute Care Teams. ▪ Train providers on how to educate at-risk patients about stroke risk factors and prevention strategies. ▪ Promote training to improve the management and treatment of hypertension. ▪ Educate healthcare professionals on how to prevent a second stroke. ▪ Increase capacity to conduct stroke risk assessments in other healthcare venues, (e.g., OB/GYN). 2.2 Encourage Healthcare Providers to: ▪ Partner with local health departments and other venues to educate at-risk and post-TIA individuals, and to make this a priority across all venues and populations. ▪ Engage stroke and TIA patients to share their experiences to enhance community education efforts. 2.3 **For patients and general public:** Structure education and prevention programs based upon best practices. ▪ Replicate evidence-based healthy lifestyle and/or stroke prevention interventions for high-risk and disparate populations, and their social networks. 2.4 Collaborate with existing healthy living initiatives, workplace wellness programs and community-based programs. ▪ Identify elements of a successful and sustainable community stroke screening program and promote their inclusion in education and prevention efforts across all venues.	2.1.a X% of stroke care professionals have received intensive re-education on stroke prevention and care. 2.3.a X number of at-risk and post-TIA individuals are receiving information on stroke prevention and care. Data source: Establish baseline. Data and target values to be determined.

Problem(s):	PCE - Objectives	PCE - Strategies	Outcomes
3. Funding is limited for prevention, community education efforts, including marketing, screening, and access to appropriate medications to control risk factors	3. Work with chronic disease partners to increase healthy behaviors through environmental, policy, and systems changes in communities and workplaces. e.g., safe walking paths, physical activity, eating five or more fruits and vegetables a day, and coverage for persons without insurance	3.1 Work with employers to incorporate wellness activities into the workplace. ▪ Offer smoking cessation classes, weight watchers groups, exercise classes, health competitions, etc. ▪ Publicly recognize employers who support workplace wellness. ▪ Provide worksite wellness toolkits to employers. 3.2 Increase stroke awareness among legislators and the need for funding for education, equipment, and payment for EMS services for uninsured residents. ▪ Promote funding for safe walking environments. ▪ Work with AHA, Connecticut Public Health Association (CPHA) and other partners to advocate for stroke prevention funding. ▪ Educate legislators about EMS payment issues for the uninsured.	3.1.a X #of CT employers have a wellness program or activities in the workplace. Counts: # of employers recognized; # of reports requested: 3.2.a X # of meetings have been held with legislators. 3.2.b X # of proposed policies submitted to legislature for consideration on additional funds for education, equipment, EMS services. <u>Data source-BRFSS: 2007 baselines</u> 80.3% (n=5764) physical activity in last mos. 28.5% (n=2191) fruits/vegs >5 times a day.
4. Insurance coverage for preventive services is inconsistent	4. Increase the number of screenings and stroke education programs statewide.	4.1 Work with health care providers, insurers/insurance companies, and others to promote reimbursement for prevention services such as blood pressure monitoring equipment and risk education, to increase use of comprehensive risk factor screenings. ▪ Increase community stroke screenings. ▪ Establish regularly scheduled screenings at recurring locations. ▪ Provide screenings in non-traditional locations. ▪ Provide screenings at night and on weekends. ▪ Work with local health care providers to sponsor screenings and offer a follow-up appointment for patients without a physician. ▪ Promote age specific regular preventive screenings. 4.2 Seek funding to cover costs for other education efforts. ▪ Promote existing education efforts including videos, awareness campaigns, and outreach programs. ▪ Secure resources for additional screenings and blood pressure equipment for community programs and local health departments. ▪ Identify financial assistance options to cover the costs of EMS services. ▪ Assist community based organizations and DPH to develop incentives for individuals that complete an education program and reduce their blood pressure through lifestyle changes.	4.1.a The number of screenings for stroke have increased by X%. 4.1.b The number of stroke education programs have increased by X%. 4.1.c In the next five years, increase the number of screenings by X %. 4.2.a Funding secured for videos, awareness campaigns, coverage for uninsured EMS services, incentives. <u>Data source:</u> Establish baselines. Data and target values to be determined.

PCE: Resources	Strategies	Expected Direct Outcomes	Long-term Outcomes/Impact
DPH; CADH; Elder groups; United Way; Parish nurses	▪ Coordinate marketing campaigns based on target populations (e.g., youth, high-risk)	▪ Public receiving consistent messages on healthier lifestyles and stroke recognition	▪ Increased use of 9-1-1 ▪ Faster EMS arrival
DPH; School districts; school nurses,	▪ Engage primary and secondary school systems to promote healthy nutrition and early education	▪ Healthier school meals ▪ Increase/allow time for PE	▪ Healthier children ▪ Increased use of 9-1-1
CT Hospital Association; local providers; ER Physicians; EMS/EMT; Parish nurses	▪ Improve risk-factor screening and referrals (blood pressure, cholesterol, etc)	▪ Improve monitoring of high-risk populations	▪ Fewer strokes
DPH; Chambers of Commerce; CDC; CT Public Health Association; Business Councils; ASA; AHA	▪ Educate employers, public, insurance companies that prevention costs less in the long run	▪ CBOs, communities, workplaces, etc. working together to provide healthy options and BP control	▪ Lower health care costs

Partners

- AARP
- AHEC - Area Health Educators Centers
- Business Councils
- Community Health Ctrs
- CADH and Local Health Depts
- Community Health Center Association of Connecticut (CHCACT)
- Community Centers
- CT Hospital Association
- CT Fire Chiefs Assoc. & EMS
- CT Public Health Assoc. Red Cross
- Churches: Parish Nurse/Health Ministries Chamber of Commerce
- EMT/EMS and EMS Coordinators
- Emergency Room Physicians
- Health Planning Groups Elder Groups
- HMOs
- Hospitals
- Fitness Organizations
- Medical Societies
- NRZs
- Public Health Nurses
- Pharmaceuticals
- Public Health Schools
- Public Schools
- United Way
- University of Connecticut Health Center
- Rehabilitation Centers
- Stroke Center Hospitals
- School Nurses
- Statewide Center on Aging
- VNA

Partner Programs for collaboration (*strategy 3.5.b)

- Kidney Early Evaluation Program, American Heart Association's START program Start prevention messages early (schools, daycare), use HeartSafe resources in communities
- Lifestyle Counseling, e.g., Meriden Health Department, wherein an individual receives information, counseling/support after risk assessment that will help them to adapt a healthier lifestyle, help to reduce apathy in those who feel they cannot change
- New Haven Walks – successful program to reduce BP, weight, increase activity
- Healthcare under the bridge, Greenwich – connects immigrants to FQHC
- Create info card that highlights questions you should ask your doctor about stroke, hypertension and blood pressure
- University of Connecticut food and nutrition program – targets low income families in community

Message content

- Use Stroke Risk Assessment from AHA and highlight on May 18th 2008
- Check Blood Pressure every day, show how and where
- Emphasize nutrition, exercise, stop smoking
- Can live a full life by controlling BP through diet, exercise, medications
- Highlight success stories - Connecticut Health IDOLS
- EMS is the Emergency Department coming to you – use 9-1-1
- Affects all body types and activity levels
- Convey urgency, e.g., "Stroke may happen to anyone, not just the older population!" "You can save someone's life or keep them from severe harm," work with MDs & community to develop best message to be understood.

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Notification and Response of Emergency Medical Services - Goal: To facilitate timely access to EMS care, enhanced pre-hospital recognition and treatment, and rapid transport to the appropriate health care facility of patients experiencing a stroke event.			
EMS Problem(s):	**EMS Objectives**	**EMS Strategies**	**EMS Outcomes**
1. Lack of a statewide, pre-hospital stroke alert protocol for EMS services to notify hospitals prior to arrival. ▪ Inconsistent protocols for EMS providers to determine where to transport stroke patients ▪ Inconsistent relationships and communication among EMS responders and hospital Emergency Departments can limit collaboration and stroke care efficacy.	1. Create an EMS statewide stroke protocol with core elements for assessment, transportation, and communication among hospitals and EMS responders that allows for regional differences.	1.1 Support consistent dispatcher response regardless of the dispatch protocol being used. ▪ Improve the statewide data collection and analysis of EMS stroke response times. ▪ Support the development of flexible local/regional EMS protocols appropriate to regional resources and infrastructure Change state regulations to provide a clear protocol to help EMS responders determine where to transport stroke patients. 1.2 Advocate for state regulations to establish a protocol for EMS responders on where to transport stroke patients. ▪ Research stroke transport protocols used in other states. ▪ Reference state trauma transport protocols to assist in the development of state stroke transport protocol. ▪ Support the development of inter-facility transport agreements and protocols. 1.3 Encourage ongoing communication among EMS medical directors, pre-hospital providers, emergency department directors, and stroke center directors regarding operational issues and collaborative educational efforts. ▪ Develop and support formal feedback and recognition protocols specific to stroke for EMS responders. ▪ Encourage hospitals to develop/build upon recognition programs for EMS responders who respond appropriately to stroke emergencies. 1.4 Advocate for use of electronic EMS clinical impressions and track accuracy of EMS responders' impressions. 1.5 Seek federal, state, and local funding and legislation to provide universal wireless capabilities.	Completed EMS statewide protocol. 1.1.a 100% of patients with signs or symptoms of stroke are transported using a statewide stroke transport protocol by 1/1/2010. 1.2.a By 1/1/2013, 100% of EMS responders demonstrate scope-of-practice-appropriate knowledge and competency in: ▪ the performance of assessments and screening; ▪ the use of the approved assessment tool; and ▪ initial and recertification education and training in stroke. 1.3.a The statewide stroke assessment tool *(see Obj. 2)* will trigger EMS communication with a hospital in 100% of stroke cases by 1/1/2013. 1.4.a Electronic EMS clinical impressions will be used in 100% of stroke cases by 1/1/2010. 1.5.a 100% of Connecticut residents will have W-E911 coverage by 1/1/2011.

EMS Problem(s):	EMS -Objectives	EMS -Strategies	EMS Outcomes
2. Lack of consistent use of a single, validated pre-hospital stroke assessment tool to rapidly and accurately identify stroke patients.	2. By 2013, develop a stroke assessment tool based upon best practices for EMS responders.	2.1 Develop and implement a modified version of the Los Angeles Pre-Hospital Stroke Screen and mandate its use across the state. ▪ Move stroke screening criteria to the beginning of the tool. ▪ Enhance the exam portion of the screening criteria. ▪ Include a clear protocol to describe the circumstances under which a hospital should be contacted. 2.2 Submit the tool for approval to the CT EMS Advisory Board and other necessary governing bodies. 2.3 Monitor the appropriate use of the tool. 2.4 Evaluate the validity and sensitivity of the tool in identifying individuals who may be having a stroke.	Stroke Assessment Tool developed 2.1.a 100% of EMS responders use one assessment tool to identify stroke patients prior to arrival at the hospital by 1/1/2013. 2.2.a The validity of the tool has been determined by 1/1/2013.
3. Stroke training is not mandated as part of continuing education for EMS professionals. ▪ Basic EMS training in Connecticut does not include a stroke module because it is not included in the current National Standard Curricula.	3. By 2013, all EMS responders receive initial and ongoing training in stroke assessment, treatment and care.	3.1. Train all EMS affiliated personnel on the selected stroke assessment tool to ensure seamless implementation across the EMS continuum. ▪ Determine and deliver the initial and continuing education needed to provide optimal patient care. ▪ Educate EMS responders on statewide transport protocol. ▪ Increase simultaneous stroke training for EMS responders and hospital staff. ▪ Promote the inclusion of a stroke module in basic EMT training to EMT training providers. ▪ Mandate a stroke training component as part of EMT continuing education. 3.2. Identify the core components of an EMS stroke education program, distribute to training providers statewide, and require their inclusion in stroke training programs. ▪ Create a comprehensive, composite stroke curriculum for distribution to all Connecticut EMT training providers as a training program development resource. ▪ Create a list of approved stroke education programs (e.g., Middlesex Hospital Program, NSA Program) for distribution to all Connecticut EMT training providers). ▪ Select the preferred training approach (curricula) to be included in stroke education programs (e.g., online options).	3.1.a 100% of EMS responders receive the appropriate education and ongoing training in stroke assessment, treatment and care by 1/1/2013. 3.2.a 100% of EMS responders demonstrate (by online or in-class test) competency in stroke assessment, treatment, and care by 1/1/2013. Data source: Establish baselines. Data and target values to be determined.

Resources: CT's Current Status	EMS - Partners/Resources	
Support mechanisms Should also include: ▪ EMS Units/Services ▪ Hospitals ▪ Neuro Intensive Care Units **Support Tools** ▪ Referral protocols **Targeted Programs** ▪ DPH stroke center recognition program development	AHA William Backus Hospital Bridgeport Hospital Bristol Hospital Hospital of Central CT Danbury Hospital Greenwich Hospital Griffin Hospital Hartford Hospital Lawrence & Memorial Hospital Middlesex Hospital MidState Medical Center St. Francis Hospital Medical Center	St. Mary's Hospital St. Vincent's Medical Center Stamford Hospital University of Connecticut Health Center Waterbury Hospital Yale-New Haven Hospital EMS Units Dispatch Units Interfacility Transport Reps Skilled Nursing Facilities General Public (through AARP, American Legion, etc.) Police and Fire Insurance Companies

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Hospital Care-Hyper Acute Care Goal: To ensure all Connecticut residents that have experienced a stroke have equal access to high quality acute stroke care services.			
Hospital Problem(s):	**Hospital Objectives**	**Hospital Strategies**	**Hospital Outcomes**
1. Lack of a current, easily accessible hospital stroke capacity inventory for EMS provider use. ▪ Many stroke patients require transfers out of their community to access appropriate care.	1. By 2013, all stroke care providers (hospitals and EMS) have a readily accessible statewide inventory of information on the location of designated stroke centers, available stroke services and bed capacity.	1.1 Create an interactive, Web-based inventory of current acute stroke treatment capacity of all Connecticut hospitals that is readily available to EMS providers. ▪ Examine and include best practices of current diversion protocols when hospitals redirect EMS and patients to other facilities. ▪ Link this tool to the Web-based education tool in Strategy 2.4 below. ▪ The system should reflect that not all hospitals might have or continue to administer tPA.	Web based inventory created *Data, baseline, target values TBD.* 1.1.a X% of EMS services in CT have specific information on primary stroke centers, bed capacity and any problems that may affect hyper acute treatment. 1.1.b X% of hospitals have information on PSC, telemedicine, bed capacity, etc.
2. Lack of coordination among providers to reduce the time from stroke onset and recognition to treatment, especially in rural and underserved areas* ▪ Inconsistent coordination and collaboration among hospitals. ▪ Liability concerns related to stroke care (e.g., tPA administration). *Numerous studies show that only a small percentage of eligible patients receive tPA. An important limiting factor in treatment is the lack of the necessary organization, resources, expertise, and infrastructure in many hospitals to rapidly evaluate and treat patients with stroke (*Neurology 2003*; 60:1452-1456).	2. By 2013, increase the number of Connecticut Hospitals that meet the Primary Stroke Center designation criteria.	2.1. Use telemedicine, teleradiology and other technologies to increase hospitals' 24/7 access to neurology consultations. ▪ Research stroke telemedicine systems in other states including New York and Massachusetts. ▪ Address reimbursement issues related to telemedicine services. ▪ Address liability issues related to telemedicine services. ▪ Identify funding sources to support a telemedicine system. ▪ Establish telemedicine network to connect CT hospitals. 2.2. Encourage partnerships and mentoring among PSC hospitals and NPSC Hospitals to facilitate capacity building for PSC designation. ▪ Foster communication among hospitals to share assessment tools, stroke care pathways, stroke protocols and other resources, with an initial focus on emergency departments. ▪ Telemedicine activities as noted in 2.1 above. 2.3. Promulgate awareness of Primary Stroke Center designation requirements. 2.4. Create a listserv and/or Web site for hospitals to post assessment tools, stroke protocols, and to encourage their use for ongoing posting of questions and answers among hospital stroke staff. ▪ Analyze stroke capacity for all Connecticut hospitals (e.g., number of neurosurgeons, staffing, etc.). ▪ Develop a resource list of all providers in the stroke care system including stroke centers and EMS.	2.1.a X% of PSC and non-PSC hospitals have telemedicine capabilities. 2.2.a The number of PSC hospitals in CT has increased by X%. 2.3.a A comprehensive statewide resource list of stroke care providers in the stroke care system is created and made available via Web site. 2.4.a XX % of tPA eligible patients receive timely and appropriate treatment. <u>Data source:</u> PSC designation program. Baseline = 17 as of 1/2009 Target values TBD

Hospital Problem(s):	Hospital Objectives	Hospital Strategies	Hospital Outcomes
3. Limited access to clinical trials for patients who are not tPA eligible, or who are not improving after tPA has been administered.	3. By 2013, advocate for revisions to state legislation that currently requires a power of attorney to make decisions for clinical trials and to consider next of kin as sufficient decision maker.	3.1 Promote awareness at the State Legislature on the power of attorney implications for clinical trials related to stroke. ▪ Coordinate efforts with American Heart Association, Connecticut Public Health Association, and others.	3.1.a Legislators have been informed of the need for power of attorney change. 3.1.b Proposal is brought forward for the 2008-9 legislative agenda. Data source: Establish baselines. Data and target values to be determined..

Hospital - Acute Care Stay to Discharge Goal: Standardized stroke care protocols are available and consistently implemented during acute care stay through discharge including post- hospitalization care referrals and rehabilitation services.			
4. Inconsistent availability of resources for appropriate acute treatment.	4. By 2013, all hospitals use the same standard for stroke education that meets JCAHO and DPH education requirements for all levels of professionals providing stroke care, which includes core elements of a stroke care curriculum.	4.1. Agree upon a curriculum for stroke education and create a repository of educational resources to be shared with all hospitals and health care providers.* ▪ Build capacity for a listserv and/or Web site to post stroke care questions and responses, and include information about successful programs, educational opportunities, and patient specific tools used by hospitals across the state. ▪ DPH will review these materials, post to, and maintain Web site; ▪ Web site highlights educational opportunities w/or w/o CMEs. ▪ Endorse and foster use of ASA's online resources for education. ▪ Education strategies should consider any prevention and rehabilitation public education efforts. 4.2. Develop and disseminate a statewide best practice standardized approach for "acute care to discharge" pathway. 4.3. Expand resources for stroke education and increase educational opportunities for nurses, such as online resources, videos, self-directed programs and conferences. Encourage organizational support with financial assistance and time designated for staff to attend trainings. Educational opportunities should contain: ▪ Stroke etiology, cerebrovascular pathophysiology. ▪ Risk factors, signs/symptoms of stroke and prevention strategies. ▪ Initial assessment and monitoring. ▪ Current treatment options. ▪ Post acute care and rehabilitation. ▪ Discharge planning w/patient education/secondary prevention.	4.1.a All stroke care professionals receive JCAHO and DPH required education/continuing education, and DPH stroke designation requirements recognize JCAHO requirements. 4.2.a X number of hospitals are using best practice standards for care of stroke patients from acute to discharge. 4.3.a The number of nurses receiving stroke education has increased by X%. Data source: Establish baselines. Data and target values to be determined.

Hospital Problem(s):	Hospital Objectives	Hospital Strategies	Hospital Outcomes
5. Lack of consistent guidelines for in-hospital treatment of stroke patients whose condition deteriorates, and non-stroke patients who develop stroke-like symptoms.	5. By 2013, all hospitals have practice guidelines and protocols for treatment and care of stroke patients whose condition deteriorates; and identification and treatment of non-stroke patients who may develop stroke-like symptoms during their hospital stay.	5.1 Identify current practice guidelines used in hospitals across the state for the treatment of stroke patients whose condition deteriorates; and identification and treatment of non-stroke patients who may develop symptoms during their hospital stay. (See guidelines on "Administration of tPA" and "Early Management of the Ischemic Stroke") and make the guidelines available to all hospitals. Elements of guidelines should include: ▪ Signs/symptoms bedside care provider should report immediately. ▪ Who should respond, including target response times and identified roles and responsibilities. ▪ Nursing assessments and initial treatments to be done to rule out mimics and initiate care. ▪ Treatment options for including administration of tPA and neurovascular interventions.	5.1.a X % of CT Hospitals have a protocol in place for care of stroke patients whose condition deteriorates, and for in hospital stroke events. <u>Data source:</u> Establish baselines. Data and target values to be determined.
6. Lack of communication among hospital staff, primary care physicians, and rehabilitation services.	6. By 2013, all hospitals have established protocols that include criteria to make appropriate referrals, for follow-up care and to ensure a reciprocal relationship among all stroke care providers and primary care physicians (PCP).	6.1 Identify and create current discharge and referral practices that may be used across all hospital settings. ▪ A discharge summary should be sent to the stroke patients' PCP. ▪ Use of Standardized, discharge protocols for secondary prevention aligned with JCAHO requirements. ▪ Promote communication among primary stroke centers and tertiary care centers. 6.2 Develop and share an inventory/database of identified stroke services available at each rehabilitation facility. 6.3 Involve case managers, discharge planners, and care coordinators in the development and use of discharge protocols and/or practices to facilitate effective communication with physicians and other providers in and out of the hospital setting. ▪ Ensure PCPs and other appropriate providers are informed of patient discharge and/or completion of rehabilitation. ▪ Rehabilitation and discharge plans consider the patient's social networks. A standard of care is developed for sharing information and resources with family and social networks. ▪ Consistent messages disseminated across the continuum of care.	6.1.a X % of CT Hospitals are using JCAHO compliant discharge and referral protocols. 6.2.a A comprehensive list of services for care of stroke victims is created and made available to all stroke care providers. 6.3.a X% of CT stroke care providers (including rehab, hospitals, PCPs) are communicating among providers post discharge and conducting appropriate client follow-up. <u>Data source:</u> Establish baselines. Data and target values to be determined.

Hospital Partners and Resources			
▪ AARP ▪ AHEC - Area Health Educators Centers ▪ Business Councils ▪ Community Health Ctrs ▪ CADH and Local Health Depts ▪ Community Centers ▪ CT Hospital Association ▪ CT Fire Chiefs Assoc. & EMS ▪ CT Public Health Assoc. Red Cross	▪ Churches: Parish Nurse/Health Ministries Chamber of Commerce ▪ Health Planning Groups Elder Groups HMOs Hospitals ▪ Fitness Organizations ▪ Medical Societies ▪ NRZs ▪ Public Health Nurses ▪ Pharmaceuticals ▪ Public Health Schools ▪ Public Schools	▪ United Way ▪ University of Connecticut Health Center ▪ Rehabilitation Centers ▪ Stroke Center Hospitals ▪ School Nurses ▪ Statewide Center on Aging ▪ VNA	Guidelines and Policies ▪ Activation of Code Stroke Algorithm ▪ Guidelines for Early Management of Ischemic Stroke ▪ Guidelines for Management of TIA, stroke ▪ Guidelines for Use of IV tPA for Ischemic Stroke ▪ Policy Stroke Team ▪ Standards of Care for Stroke http://www.aann.org/members/stroke1.pdf ▪ Discharge Instructions for Stroke ▪ Guidelines for Early Management of Ichemic Stroke ▪ Guidelines for Management of TIA, Stroke ▪ Guidelines for Use of IV tPA for Ischemic Stroke ▪ Inpatient Stroke Center Protocol

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Stroke Rehabilitation and Post Stroke Goal: Ensure all stroke survivors receive an initial hospital evaluation or standardized screening by a rehabilitation professional to determine their individual rehabilitation needs, and receive appropriate care in a timely manner with periodic re-evaluation of rehabilitation needs and resources to achieve optimal outcomes.

Rehab Problems	Rehab Objectives	Rehab Strategies	Rehab Outcome Measures
1. A coordinated, multi-disciplinary and integrated system is not in place across the state, limiting the multi-disciplinary approach proven to achieve the best clinical outcomes for stroke survivors. This lack of coordination and collaboration results in service fragmentation at several different levels of care.	1. By 2013, all survivors receive individualized assessment, intervention and referral to appropriate levels of rehabilitation care necessary to achieve optimal post-stroke outcomes. Patients, acute care and rehabilitation teams, rehabilitation facilities (e.g. skilled nursing facilities, home health agencies), primary care physicians, community agencies, community professionals, and the patient's social networks are actively involved in the development of a stroke survivor recovery plan.	1.1 Work with acute and post-acute care providers on available recommended options for functional assessment of stroke survivors. ▪ Initiate rehabilitation interventions based upon acute assessment in a timely manner to prevent secondary complications and further functional deteriorations. 1.2 Multi-disciplinary care team will make appropriate post-acute rehabilitation referrals based upon initial and ongoing functional assessments, as well as the survivors' medical complexities. ▪ Evaluate types of rehabilitation facilities and services that will facilitate optimal patient outcomes. ▪ Develop an inventory/database of rehabilitation services that summarizes facility specialties and capacities. ▪ Integrate and support stroke survivors and their social networks in decision making processes throughout acute and post-acute phases of care. 1.3 Ensure post-acute re-assessments occur with necessary adjustments made to the ongoing plan of care for stroke survivors to achieve optimal patient outcomes.	1.1.a X% of survivors who received individualized assessment, intervention, and referral to appropriate levels of care to achieve optimal post stroke outcomes. 1.2.a X% increase in providers of acute/post acute care who chose and implemented assessment tool for stroke survivors. 1.3.a X % of rehab assessments completed within 48 hours of admission. ▪ Count # coordinators identified for data collection, integration, and assessment of data and appropriate level of referral for survivors. ▪ Count # of stroke survivors who received a designated practitioner to provide education, information, and provide support along the continuum. ▪ Count # facility based survivors reassessed for functional status/rehab needs within 14 days. ▪ Count #community based survivors reassessed for functional status/rehab needs within 30 days. ▪ Count # of facility and community based survivors not receiving ongoing interventions assessed every 6 months. Data source: Establish baselines. Data and target values to be determined.

Rehab Problems	Rehab Objectives	Rehab Strategies	Rehab Outcome Measures
2. Improved communication along the care continuum is needed.	2. By 2013, establish communication systems to ensure that all stroke survivors have a written plan of care for follow-up services following hospitalization.	2.1 Implement reciprocal feedback mechanisms among institutional and community systems to provide information related to stroke survivor outcomes and ongoing issues to all professionals and support networks within the continuum. 2.2 Provide standardized stroke care information among health care providers to ensure seamless communication along the continuum. ▪ Promote the creation of standardized care plans that include: • Type and etiology of stroke; • Residual deficits; • Diagnostic work up and results; • Secondary prevention initiated; • Functional assessment/status, ongoing; rehabilitation intervention recommended • Risk factor modification; and • Recommendations and follow-up for medical and functional issues. 2.3 Develop and update a Web site of statewide resources that serves as a clearinghouse for stroke survivors, their social network, and health care providers.	2.1.a Reciprocal feedback mechanism developed and implemented. ▪ Count: # used 2.2.a Written communication tool developed and implemented facility and community based organizations caring for stroke survivors. ▪ Count: # distributed, # used 2.3.a Web site developed and updated. ▪ Count: # hits Data source: Establish baselines. Data and target values to be determined.
3. Inconsistencies exist among professional care providers and institutions in their level of post-stroke clinical service, expertise and available resources.	3. By 2013, ensure that preventable complications and secondary prevention issues are addressed, including all modifiable risk factors. Increase awareness of optimal post-acute care by healthcare providers and third party payers.	3.1 Educate the public, health care providers, and third party payers about the cost and public health implications of not addressing preventable complications and not providing the timely and appropriate level of post-stroke care. 3.2 Stroke specific staff education is required for health care providers along the continuum including education on residual physical, cognitive and emotional deficits.	3.1.a X % of public, healthcare providers and 3rd party payers received information on preventable complications and secondary prevention. 3.2.a X% increase of care providers who received stroke specific education curriculum. Data source: Establish baselines. Data and target values to be determined.

Rehab Problems	Rehab Objectives	Rehab Strategies	Rehab Outcome Measures
4. There is a need for enhancement of post-stroke education and the development of standardized stroke-rehabilitation protocols.	4. By 2013, ensure stroke survivors and their social networks receive appropriate post – stroke education according to established protocols, and receive written information on stroke risk factors, warning signs and the importance of timely use of EMS services.	4.1 Establish or adapt existing post-stroke education materials for survivors and their social network. These efforts will be linked to the education and prevention efforts. 4.2 Educate stroke survivors and their social network on their initial individual rehabilitation needs and recommendations for care options. ▪ Inform and refer stroke survivors and their social networks to appropriate levels of care services that provide for the individual's needs for continued recovery. 4.3 Provide written information to stroke survivors and their social network on available community resources to support ongoing recovery.	4.1.a X education materials developed and disseminated. 4.2.a X% of stroke survivors and their social network that received appropriate post stroke education. Counts: # requested; # distributed 4.3.a X flyers/informational pamphlets on available community resources developed and disseminated. Counts: # developed, # requested; # distributed Data source: Establish baselines. Data and target values to be determined.

Rehab Resources/Partners	Strategies	Expected Direct Outcomes	Long-term Outcomes/Impact
AHA/ASA **Acute Care and Rehab Team**	• Education to prevent recurrent strokes • Educate the public, healthcare providers, and 3rd party payers about the cost and public health implications of not addressing preventable complications.	• Stroke recurrence is prevented. • Public, healthcare providers, and 3rd party payers received information on preventable complications and secondary prevention. • Increase number of care providers who received stroke specific education curriculum.	• Fewer strokes • Increased education and awareness
DPH	• Educate employers, public, insurance companies that prevention costs less in the long run.	• Communities work together to address preventable complications.	• Healthy Communities
Hospitals/Acute Care Facilities	• Written plans for primary care created to ensure all stroke survivors have a plan for care and follow up.	• Increased levels of care and treatment for stoke survivors.	• Optimal outcomes for stroke survivors.
Acute Care and Rehab Team/Rehab Facility/Family	• Provide early assessment and intervention to optimize rehabilitation. • Use evidence-based interventions that are based upon functional goals. • Provide ongoing medical management of risk factors to ensure survival.	• Every patient has access to an experienced multi-disciplinary rehabilitation team to ensure optimal outcomes.	• All rehab patients receive services to prevent complications, minimize impairments, and maximize function. • All rehab patients receive follow-up primary care and assessments.

Rehabilitation Partners

- AARP
- Area Health Educators Centers
- Business Councils
- Community Health Centers
- CADH and Local Health Depts.
- Community Centers
- CT Hospital Association
- CT Fire Chiefs Assoc. & EMS
- CT Public Health Assoc. Red Cross
- Churches: Parish Nurse/Health Ministries
- Chamber of Commerce
- EMT/EMS and EMS Coordinators
- Emergency Room Physicians
- Health Planning Groups Elder Groups
- HMOs
- Hospitals
- Fitness Organizations
- Medical Societies
- NRZs
- Public Health Nurses
- Pharmaceuticals
- Public Health Schools
- Public Schools
- United Way
- University of CT Hlth Ctr
- Rehabilitation Centers
- Stroke Center Hospitals
- School Nurses
- Statewide Center on Aging
- VNA
- CT Hospital Association
- The Brain Injury Association of CT
- Connecticut Association for Home Care/Hospice (CAHCH)
- CANPFA

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Appendix E. Link To Hospital Stroke Survey Report

In 2006, DPH commissioned the University of Connecticut, Department of Public Policy to conduct a survey of Connecticut hospitals based upon the recommendations for the establishment of stroke systems of care published by the Brain Attack Coalition and the American Stroke Association. Twenty-nine of Connecticut's 30 adult acute care hospitals responded to the survey. The full Stroke Survey Report can be viewed at:
http://www.ct.gov/dph/lib/dph/hisr/pdf/hospitalstrokesurveyreport_final2006.pdf

Appendix F. List of Figures and Tables

Web links:
http://www.ct.gov/dph
See links to Programs and Services or Publications on the top of the menu bar
Select Heart Disease and Stroke Surveillance or Heart Disease and Stroke Prevention.

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