

**Justus-Warren Heart Disease and Stroke Prevention Task Force  
Stroke Advisory Council**

**Preliminary Findings and Recommendations for a  
NC System of Stroke Care**

**January 2007**

**Prepared by:**

Justus-Warren Heart Disease and Stroke Prevention  
Task Force's Stroke Advisory Council

Heart Disease and Stroke Prevention Branch  
Chronic Disease and Injury Section  
North Carolina Division of Public Health  
NC Department of Health and Human Services  
1915 Mail Service Center  
Raleigh, NC 27699  
919-707-5360

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Health and Human Services

Senate Appropriations Committee on  
Health and Human Services

Fiscal Research Division

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**The Justus-Warren Heart Disease and Stroke Prevention Task Force**  
**Stroke Advisory Council Members**

**Karen McCall**

Chairperson, Stroke Advisory Council

Member, Justus-Warren Heart Disease and Stroke Prevention Task Force  
and  
Stroke Survivor

**Andrew Asimos, MD**

NC Council of Emergency Medical  
Physicians

**Michael Brown, EMT-P, MPH**

NC Association of Rescue and Emergency  
Medical Services

**Marie Debnam, MD**

Old North State Medical Society

**Martha Dixon**

NC Hospital Association

**Don Ensley, PhD**

Vice-Chairperson, Stroke Advisory Council  
and  
Justus-Warren Heart Disease and Stroke  
Prevention Task Force

**Larry Goldstein, MD**

American Heart Association

**David Huang, MD**

Physician Specializing in Stroke  
UNC School of Medicine

**Robin Jones, RN**

Mission Hospital

**Greg Mears, MD**

NC Office of Emergency Medical Services

**William Paugh**

NC Hospital Association

**Drexdal Pratt**

NC Office of Emergency Medical Services

**Wayne Rosamond, PhD**

NC Collaborative Stroke Registry

**Judy Schanel, RN**

Moses Cone Hospital

**Jim Stackhouse, MD**

NC Medical Society

**Charles Tegeler, MD**

Wake Forest University Baptist Medical Center

**Stephen Willis, MD**

Area Health Education Centers

# Executive Summary

The following is a preliminary report of the Stroke Advisory Council to address the complex issue of stroke care improvement in the state. As the Council addressed the multiple issues surrounding the development of a system of stroke care for North Carolina, it became apparent that addressing the elements needed for the formation of a comprehensive plan would require that the Council extend its work. Therefore, the recommendations contained in this report are only a beginning and reflect initiatives to address the acute phase of stroke care. By acute we are referring to that period from the onset of symptoms through discharge from the first hospital admission. These recommendations reflect what the state can do now while the Council resumes operation and develops a comprehensive analysis of what can be done in the state to improve the continuum of stroke prevention and care in order to lighten the burden of stroke over time.

It is important to acknowledge the prior work on stroke systems of care done by the American Stroke Association (ASA). This work serves as the foundation for building an effective system of stroke care for North Carolina. A great debt of gratitude is owed to ASA for making the science-based case for a systemic approach as contained in their seminal white paper: *Recommendations for Establishment of Stroke Systems of Care*<sup>1</sup> published in 2005. Their initiative marked the beginning in NC of a process that gathered key stakeholders to look into the benefits of systems level changes in stroke care that will mean so much to so many in our state.

It is important to highlight some of the other resources developed in the state that can be used to improve stroke care for North Carolinians. Several of these will be highlighted in the Findings and Recommendations section of this report. Others will be included in the Resource Section of the Appendix. As we continue to develop a regional system of stroke care in the state, communication and cooperation among all of the stroke stakeholders will be critical to our success.

North Carolina is one of only four states funded by the Centers for Disease Control and Prevention (CDC) to develop and implement a hospital-based stroke registry. Registry data are used by participating hospitals to monitor and improve the quality of stroke care. We are presented with a good opportunity to leverage the federal dollars and significantly enhance the registry and broaden its reach into underserved regions of the state. Therefore, a key recommendation is that the stroke registry should receive supplemental state funding.

From the beginning of the Council's deliberations, work was done to achieve consensus that any system of stroke care must work towards an equal quality of stroke care across the state, while allowing regions to determine what might work best for them. There are 100 counties in the state that range from very rural to densely populated urban areas. Therefore, one of the key recommendations from the Council is that there be

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<sup>1</sup> Schwamm LH, Pancioli A, Acker JE III, Goldstein LB, Zorowitz RD, Shephard TJ, Moyer P, Gorman M, Johnston SC, Duncan PW, Gorelick P, Frank J, Stranne SK, Smith R, Federspiel W, Horton KB, Magnis E, Adams RJ. Recommendations for the establishment of stroke systems of care: recommendations from the American Stroke Association's Task Force on the Development of Stroke Systems. *Stroke*. 2005; 36: 690–703.

regionally based, locally determined networks, which are guided by statewide core principles.

Gratitude is owed to the members of the Council who expressed their dedication to improving stroke care in NC by participating in the proceedings without compensation. Many traveled from afar to attend meetings in person and stayed overnight without reimbursement.

The American Heart Association and the NC Hospital Association graciously hosted and helped cover the costs of meetings, including providing lunch and assisting with speaker recruitment and compensation. The Council could not have completed its work without their considerable support.

# **Stroke in North Carolina**

## **Burden of Stroke**

Stroke is the third leading cause of death and a leading cause of premature death and years of life lost in North Carolina. In 2005, stroke caused 4,846 deaths among North Carolinians, 6.9% of all deaths in that year. Strokes resulted in an estimated 20,717 years of life lost during 2003.

North Carolina has one of the highest stroke death rates in the nation --the 2003 age-adjusted stroke death rate for NC is the 5th highest among the 50 states. North Carolina is part of the Stroke Belt, a multi-state region in the southeastern U.S. that historically has had substantially higher stroke death rates than the rest of the nation.

Stroke results in significant morbidity and disability among North Carolinians. In 2004, there were 27,092 hospitalizations in NC for stroke, accounting for 16% of all cardiovascular disease hospitalizations. Age-adjusted hospital discharge rates for stroke in NC rose from 346.7 per 100,000 population in 1995 to 372.5 in 1997, and have since declined to 323.7 in 2004.

## **Economic Burden of Stroke**

The mortality, morbidity and disability caused by stroke have a large economic impact in North Carolina. The average lifetime cost of a stroke is estimated at \$103,576 per stroke event. An analysis of the economic burden of stroke (which included the direct costs of initial hospitalization, subsequent hospitalizations, inpatient and outpatient physician costs, and drug costs) estimated conservatively that stroke costs NC \$1.05 billion each year.

## **Health Disparities and Stroke in North Carolina**

Significant racial and geographic disparities in stroke exist in NC. African American North Carolinians have higher stroke death rates than do white North Carolinians. This disparity in death rates between African Americans and whites has persisted, and actually has increased slightly, over time. African American North Carolinians are also more likely to die of stroke at relatively young ages than are their white counterparts.

To effectively alleviate the burden of stroke on NC, a multifaceted approach involving the public, healthcare providers, hospitals, public health practitioners, and local and state government is essential.

# **Stroke Legislation in North Carolina 2005-06**

## **House Bill 1396**

On April 21, 2005, House Bill 1396, short titled “Statewide System of Stroke Care”, was introduced. This bill proposed that the Department of Health and Human Services develop and implement a system of identifying and disseminating information about the location of hospitals in North Carolina that are recognized as primary stroke centers by a national medical accreditation association. Hospitals not identified as a primary stroke center were to have a plan indicating the hospital’s procedures for providing emergent care for stroke patients including circumstances for transport to and consulting with a primary stroke center.

The bill also required emergency medical services (EMS) to develop diagnostic algorithms and protocols to facilitate the rapid identification of possible stroke victims and the dispatch of appropriate pre-hospital providers. Further, EMS was required to develop written policies and procedures, to the extent possible with input from primary stroke centers, in order to facilitate the identification and transport of suspected victims of stroke to an appropriate health care facility.

House Bill 1396 was sent to the House Committee on Health after its introduction and was not taken up.

## **House Bill 1860**

In the May 2006 short legislative session, H1860 was introduced. At the time, the bill was identical to H1396. In its original form, H1860 was not able to develop the needed support, but the issue of a statewide system of stroke care was getting increasing attention, and efforts to develop stroke legislation persisted.

## **House Bill 1860- Version 2**

In July 2005, negotiations resulted in a committee substitute for H1860. This second version of H1860 is very different from the original version and provided for the creation of the Stroke Advisory Council (Council), an advisory group to the state’s existing Justus-Warren Heart Disease and Stroke Prevention Task Force (G.S. 143B§ 216.60 (j)(10)). House Bill 1860 in this latter form passed both chambers of the legislature and was signed into law by Governor Easley in August 2006.

# **Stroke Advisory Council Formation and Proceedings**

## **Appointment of Members**

The new H1860, now law, provided a formula for the membership of the Council and required that findings and recommendations be reported through the Justus-Warren Heart Disease and Stroke Prevention Task Force (HDSP) to the General Assembly no later than February 15, 2007.

A planning group comprised of Division of Public Health personnel, Task Force staff, and consultants contacted stroke experts, physicians, and the various organizations named in the legislation in order to compile a list of prospective Council members. This list was then presented to the Task Force Operational Management Group (OMG) for review and approval. The OMG voted unanimously on August 30, 2006 to approve the nominated individuals for membership and nominated Karen McCall as Council Chairperson and Dr. Don Ensley as Vice-Chairperson.

## **Stroke Advisory Council Proceedings**

Four meetings of the Council have been held to date. The Council first met on September 22, 2006. The first order of business was to decide the scope of work that could be achieved in the time before the report due date. This scope is reflected in the Council's Charge. In this first meeting, Dr. Larry Goldstein gave a presentation on the history of the NC Statewide System of Stroke Care bill that encompassed a general overview of the concept. The Council heard a presentation from Dr. Wayne Rosamond, entitled "Improving the Quality of Stroke Care", that described the history and operation of the NC Collaborative Stroke Registry. The Registry is one of only four CDC funded stroke registries in the country and has had a uniquely collaborative approach since its inception. In this presentation the Council heard how participating hospitals use registry data and support to drive their stroke quality improvement initiatives.

The second meeting was held on October 23, 2006. The Council heard presentations from Martha Dixon and Dr. Greg Mears. Martha Dixon, Vice-President of General and Rehabilitation Services at Pitt County Memorial Hospital, presented on the topic of "The Eastern North Carolina Regional Stroke Networking Initiative". The Eastern Regional Network was developed in collaboration with the American Stroke Association and the Regional HDSP Coordinator and built on similar work done earlier in the Western part of the state. The presentation described collaborative efforts in that region to enhance stroke recognition and treatment and to build a system for stroke care. Dr. Greg Mears of the NC EMS gave a presentation on the challenges EMS currently faces and their role in pre-hospital stroke care.

The Council met for a third time on November 20, 2006. Dr. Tim Shepard of Stroke Systems Consulting (Charlottesville, VA) presented "Trends and Methods for State Stroke Systems of Care". The presentation provided a summary of efforts in other states to improve stroke care at a systems level and what specifically is being done in Virginia. The Council also heard a presentation from Dr. Andrew Asimos, past Chairperson of the Tri-State Stroke Network (TSSN) and Director of Emergency Stroke Care at Carolinas Medical Center in Charlotte. His presentation, "Insight from



Preliminary Geographic Information System Mapping”, used work done by the TSSN to provide a graphic illustration of, among other things, the distribution of stroke deaths in NC and the location of hospitals with primary stroke center certification.

The final meeting of the Council was held on December 11, 2006. That meeting was entirely dedicated to reaching consensus on the recommendations set out in this document.

The recommendations were gradually developed through Council discussion that followed the presentations, and were carried forward throughout the proceedings. In the final meeting, Council discussions focused on ensuring that there was agreement on the recommendations that would be presented to the Justus-Warren Heart Disease and Stroke Prevention Task Force and ultimately to the state legislature.

# Preliminary Findings and Recommendations

## **FINDING #1**

In terms of a system of stroke care for NC, no one size fits all. To achieve improved acute stroke care for the entire state, a regionally based and locally determined configuration guided by statewide core principles and objectives is a more desirable approach.

The Council recognizes that, to be effective, a coordinated system of stroke care in North Carolina must serve the following critical functions and core principles:

- Provide a mechanism to accommodate regionalized and local approaches within a statewide system of care
- Clearly define the components of the system
- Support use of science-based practices
- Use transparent, objective, evidence-based criteria to monitor and evaluate system performance
- Create and support conditions to facilitate participation for all system entities
  - Use consensus-based decision-making in system development and implementation
  - Ensure effective interaction and collaboration between all entities involved in the prevention, treatment and rehabilitation of stroke
- All hospitals participating in the regional stroke networks should have a stroke-care plan integrated with the local emergency response system
- Identify all NC hospitals designated by the Joint Commission for Accreditation of Healthcare Organizations (JCAHO) as Primary Stroke Centers
- Operate with adequate funding

## **RECOMMENDATION #1**

The Council recommends a system of regionally distributed and locally determined inclusive stroke care networks for North Carolina. The recommended regional approach would include core principles that are equally applicable to all networks across the state in addition to the locally determined components.

Fully articulated regional protocols should guide the implementation, management and evaluation of regional systems of stroke care tailored to the circumstances of a given region. Regional protocols should define the roles of all local hospitals in stroke care. Specific plans for stroke treatment and/or triage should be developed for individual hospitals as dictated by the regional plan.

There is no intent to mandate that stroke patients be preferentially transported to a Primary Stroke Center unless the regional stroke system determines that this is appropriate for their region.

**FINDING #2**

Data are available to support the benefits of many of the components of Primary Stroke Centers as certified by the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) in terms of improved patient outcomes and implementation of secondary prevention treatments.

JCAHO certified primary stroke centers can serve as regional and state resources for stroke care systems, and should be so identified by the state.

The Advisory Council reviewed other states' legislation and the current state of organization of stroke care in North Carolina and does not recommend a state-based certification process of Primary and/or Comprehensive Stroke Centers.

**RECOMMENDATION #2**

The Council recommends that NC continue to allow hospitals to apply voluntarily for Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) certification on their own. Council further recommends that a process for identifying and disseminating information about JCAHO certified primary stroke centers be included in a comprehensive plan to be developed by this Council in FY 2008.

**FINDING #3**

Monitoring care for stroke patients is an essential component of any system of care in the state. Several stroke care monitoring and quality improvement tools are available to NC hospitals such as the American Heart Association's Get With the Guidelines-Stroke and the NC Collaborative Stroke Registry. Employing either of these tools can help improve a hospital's level and quality of care for stroke patients.

**RECOMMENDATION #3**

The Council recommends expanded use of recognized stroke registries to monitor and improve the quality of acute stroke care in NC. Performance improvement stroke tools must be designed to:

- Improve the quality of stroke care
- Facilitate secondary prevention
- Enhance communication between emergency responders, hospitals, providers and other key stroke stakeholders

**FINDING #4**

North Carolina is one of only four states that is funded by the CDC to operate a stroke registry within the Paul Coverdell National Stroke Registry initiative. NC's Collaborative Stroke Registry has received federal (CDC) commendation for stroke care performance measures and the sustained improvement in quality that has been achieved by participating NC registry hospitals.

**RECOMMENDATION #4**

The Council recommends a state-funded financial match to augment existing federal funds for the NC Collaborative Stroke Registry to increase NC hospital participation particularly for hospitals in high stroke/ low resource areas/ regions of the state. The NC Collaborative Stroke Registry will be competing for continuation of CDC funding in

2007. A state- funded financial match will reflect state support of the registry and strengthen the application.

FUNDING REQUEST: \$400,000 PER YEAR RECURRING

#### **FINDING #5**

Professional workforce development, training, and communication among providers are essential to foster and grow any system of stroke care in the state. The NC Collaborative Stroke Registry team will work collaboratively with hospitals, emergency medical services responders, 9-1-1 operators, other providers, and key stroke stakeholders on enhanced communications and training in conjunction with Area Health Education Centers (AHEC). This will significantly contribute to a successful statewide system of stroke care for NC.

#### **RECOMMENDATION #5**

The Council recommends that state funding be provided to the Heart Disease and Stroke Prevention Branch of the Division of Public Health to contract with AHEC in order to carry out this professional workforce development, training, and communication objective.

FUNDING REQUESTED: \$150,000 PER YEAR RECURRING

#### **FINDING #6**

Timely and appropriate stroke treatment is essential to improving stroke patient outcomes. Too many members of the public are currently unaware of the signs and symptoms of stroke, and are therefore less likely to access the system within the critical window of time that would save lives and reduce disability. According to the latest Behavioral Risk Factor Surveillance System (BRFSS) survey (2005), 87.6% of NC adults say they would call 9-1-1 if they thought someone was having a stroke, but only 18.8% could correctly identify all the stroke symptoms. Research has been done to guide the selection of strategies for conducting an effective public awareness campaign.<sup>2</sup>

It is critical to engage community groups (e.g., faith-based organizations) in high need areas to assist in disseminating and reinforcing awareness messages and materials. Increasing community awareness of signs and symptoms of stroke and the need to call 9-1-1 is essential in order to get the patient to an appropriate source for care as soon after stroke symptom onset as possible. The only FDA approved treatment for ischemic stroke must be started within three hours of the onset of symptoms.

#### **RECOMMENDATION #6**

The Council recommends that the state provide funding to the Heart Disease and Stroke Prevention Branch of the Division of Public Health for the development and implementation of public awareness campaigns and communication strategies on stroke signs and symptoms and the importance of immediately calling 9-1-1.

FUNDING REQUEST: \$300,000 PER YEAR RECURRING

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<sup>2</sup> Silver FL, Rubini F, Black D, and Hodgson CS. Advertising strategies to increase public knowledge of the warning signs of stroke. *Stroke*. 2003; 34:1965-1969.

### **FINDING #7**

Continuing to recognize that timely and appropriate treatment of stroke improves outcomes, EMS plays a critical role in the success of any stroke care system. However, there are many challenges that EMS faces, particularly in rural and poorer counties.

### **RECOMMENDATION #7**

The Council recommends the following steps and resources to improve stroke recognition and response times:

- Evidence-based EMS stroke training and treatment protocols
- Implementation of the EMS Performance Improvement Program (i.e., Stroke Toolkit currently under development)
- Transport and destination protocols that are regionally-based and locally determined
- EMS system coverage to maintain the level of service in an area if a unit is transporting a patient to an appropriate facility outside of the county
- The Council recommends the following technological enhancements for 9-1-1 call centers:
  - Enhanced caller location technology implementation
  - Emergency Medical Dispatch (EMD) implementation

### **FINDING # 8**

A survey designed to assess stroke prevention and treatment services in NC was conducted in 1998<sup>3,4</sup>. This was the first survey of its kind conducted in the nation. In 2003<sup>5</sup> a follow-up survey was conducted to assess any changes since 1998.

### **RECOMMENDATION #8**

The Council recommends that funding be provided to the Heart Disease and Stroke Prevention Branch of the Division of Public Health in order to conduct a follow-up survey and gap analysis. The analysis will be designed to provide a current assessment of stroke prevention and treatment services in NC to assist in the development of a comprehensive stroke care system plan.

**FUNDING REQUEST: \$10,000 PER YEAR FOR TWO YEARS**

### **FINDING #9**

The Council outlined areas essential to developing an effective system to provide quality stroke care in NC. The recommendations presented in this report represent the Council's initial findings related particularly to the acute care of stroke. In addition to these findings, the Council has identified other areas that require further examination to outline and construct a comprehensive system of stroke care in NC.

### **RECOMMENDATION # 9**

The Council recommends that primary prevention of stroke, acute stroke care, rehabilitation, and long term care issues be further addressed and integrated into a

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<sup>3</sup> Goldstein LB, Hey LA, Laney R. North Carolina Stroke Prevention and Treatment Facilities Survey: statewide availability of rtPA for acute ischemic stroke. *Stroke*. 1998; 29:2069-2072.

<sup>4</sup> Goldstein LB, Hey LA, Laney R. North Carolina Stroke Prevention and Treatment Facilities Survey: statewide availability of programs and services. *Stroke*. 2000;31:66-70.

<sup>5</sup> Camilo O, Goldstein LB. Statewide Assessment of Hospital-Based Stroke Prevention and Treatment Services in North Carolina. *Stroke*. 2003;34:2945-2950.

comprehensive plan in FY 2008. In order to achieve this objective, the Council recommends that there be appropriated state funds for Council operations.  
FUNDING REQUEST: \$50,000 PER YEAR

# Appendix

## Fact Sheet: Stroke in North Carolina

### Stroke is a leading cause of death, premature death, and years of life lost in N.C.

- Stroke is the 3rd leading cause of death in N.C.<sup>1</sup>
- In 2004, stroke caused 4,949 deaths among North Carolinians, 6.9% of all deaths in that year.<sup>1</sup>
- Stroke is the 5th leading cause of years of life lost in N.C., resulting in an estimated 20,717 years of life lost during 2003.<sup>2</sup>

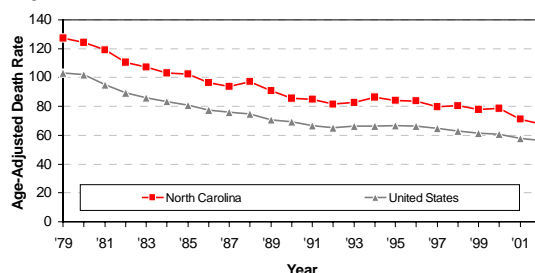
### N.C. has one of the highest stroke death rates in the nation.

- N.C.'s 2003 age-adjusted stroke death rate is the 5th highest among the 50 states.<sup>3</sup>
- N.C. is part of the Stroke Belt, an 8- to 12-state region (typically including Ala., Ark., Ga., LA., Miss., N.C., S.C., Tenn., and often including Fla., Ind., Ky., Va., and Washington, DC as well) that historically has had substantially higher stroke death rates than the rest of the nation.<sup>4-6</sup>
- The eastern counties of N.C. are part of the Buckle of the Stroke Belt, the coastal plains region of Ga., S.C., and N.C. that has consistently had the very highest stroke death rates in the nation for at least the past 30 years.<sup>7-9</sup> The causes of the Stroke Buckle are largely unknown and have historically been underinvestigated.<sup>10</sup>
- For residents of the Stroke Buckle, stroke death rates among 35-54 year olds are more than twice that of the rest of the nation, and those for 55-74 year olds are 1.7 times greater than those of the rest of the nation,<sup>8</sup> resulting in an estimated 1,200 excess stroke deaths in these 153 counties each year.<sup>9</sup>

### While N.C.'s stroke death rate is on the decline, it remains substantially higher than the U.S. rate and the Healthy People 2010 target.

- Stroke death rates in N.C. declined only 8.2% between 1990 and 2000 (an average annual decline of less than 1%), but have since declined by 13.5% between 2000 and 2002, an average annual decline of almost 7%.
- The state's 2002 age-adjusted stroke death rate of 67.9 per 100,000 was 20.8% higher than the national rate of 56.2 per 100,000 and is still well above the Healthy People 2010 target of 48 per 100,000. The state will need to maintain at least a 4.3% annual decline to reach that target.

Figure 1. Stroke Death Rates, 1979-2002

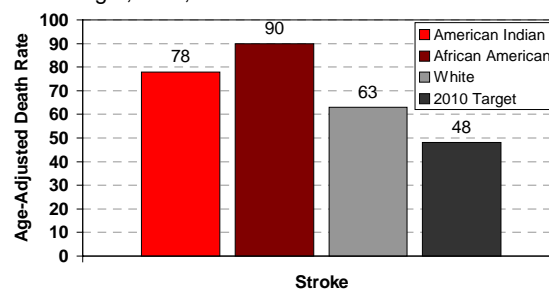


1999-2002: ICD-10 codes I60-I69; 1979-1998: ICD-9 codes 430-434, 436-438 multiplied by comparability ratio of 1.0588. Rates per 100,000 population, age-adjusted to the 2000 U.S. standard population. Data Source: Compressed Mortality File, CDC Wonder.

### Stroke results in significant morbidity and disability among North Carolinians.

- In 2003, there were 27,556 hospitalizations in N.C. for stroke, accounting for 16% of all cardiovascular disease hospitalizations.
- According to the 2005 N.C. Behavioral Risk Factor Surveillance System (BRFSS), a statewide telephone survey of non-institutionalized adults, 2.8% of N.C. adults — almost 180,000 people — have a history of stroke. Since this survey excludes people living in long-term care facilities and people who had difficulty

Figure 2. Death Rates by Race Groups & Healthy People 2010 Target, N.C., 2002



Stroke: ICD-10 codes I60-I69. Rates per 100,000 population, age-adjusted to the 2000 U.S. standard population. Data Source: DATA2010, CDC, NCHS.



communicating over the phone, this is likely to be an underestimate of the true prevalence of stroke.

- Age-adjusted hospital discharge rates for stroke in N.C. rose from 346.7 per 100,000 population in 1995 to 372.5 in 1997, and have since declined to 335.5 in 2003.

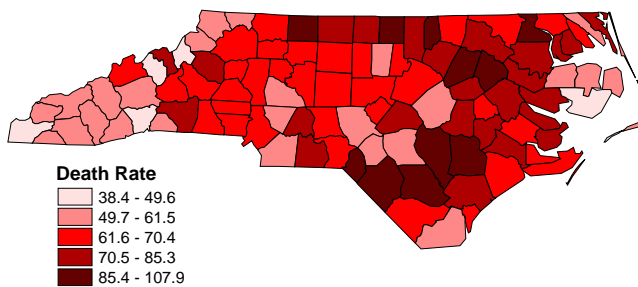
### **The mortality, morbidity and disability caused by stroke have a large economic impact in N.C.**

- The average lifetime cost of a stroke is estimated at \$103,576 per stroke event.<sup>11</sup>
- An analysis of the economic burden of stroke (which included the direct costs of initial hospitalization, subsequent hospitalizations, inpatient and outpatient physician costs, and drug costs) estimated conservatively that stroke costs N.C. \$1.05 billion each year.<sup>12</sup>
- In N.C., total hospital charges for stroke climbed from \$250 million to \$412 million between 1995 and 2003. These N.C. cost estimates are direct hospital charges only and do not include either indirect costs or other healthcare charges.
- Between 1995 and 2003, the average charge per stay for stroke hospitalizations in N.C. rose from \$10,276 to \$14,965.

### **Significant racial and geographic disparities in stroke exist in N.C.**

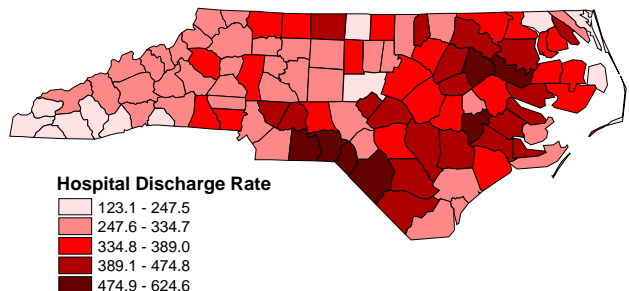
- Both American Indian and African American North Carolinians have higher stroke death rates than do white North Carolinians. The disparities in death rates between African Americans and whites have persisted, and actually have increased slightly, over time.
- African American North Carolinians are more likely to die of stroke at relatively young ages than are their white counterparts. Among African American men, 32% of stroke deaths occur before age 65, compared with 14% among white men; 18% of stroke deaths among African American women occur before age 65, compared with 7% among white women.
- The highest stroke death rates in N.C. are clustered primarily in the coastal plains region and along the Virginia border.<sup>1</sup> The highest stroke hospital discharge rates are also clustered primarily in the coastal plains region of N.C.

Figure 3. Stroke Death Rates by County, N.C., 2000-2004



Stroke: ICD-10 codes I60-I69.  
Rates per 100,000 population, age-adjusted to the 2000 U.S. standard population.  
Source: N.C. Center for Health Statistics, North Carolina Vital Statistics, Volume 2: Leading Causes of Death, 2004.  
Raleigh, N.C.: N.C. Dept of Health & Human Services; 2005.

Figure 4. Stroke Hospital Discharge Rates by County, N.C., 1999-2003



Discharge rates per 100,000 population age-adjusted to the U.S. 2000 standard population.  
ICD-9-CM 430-438; principal diagnosis only.  
Data Source: N.C. Hospital Discharge Database, State Center for Health Statistics.

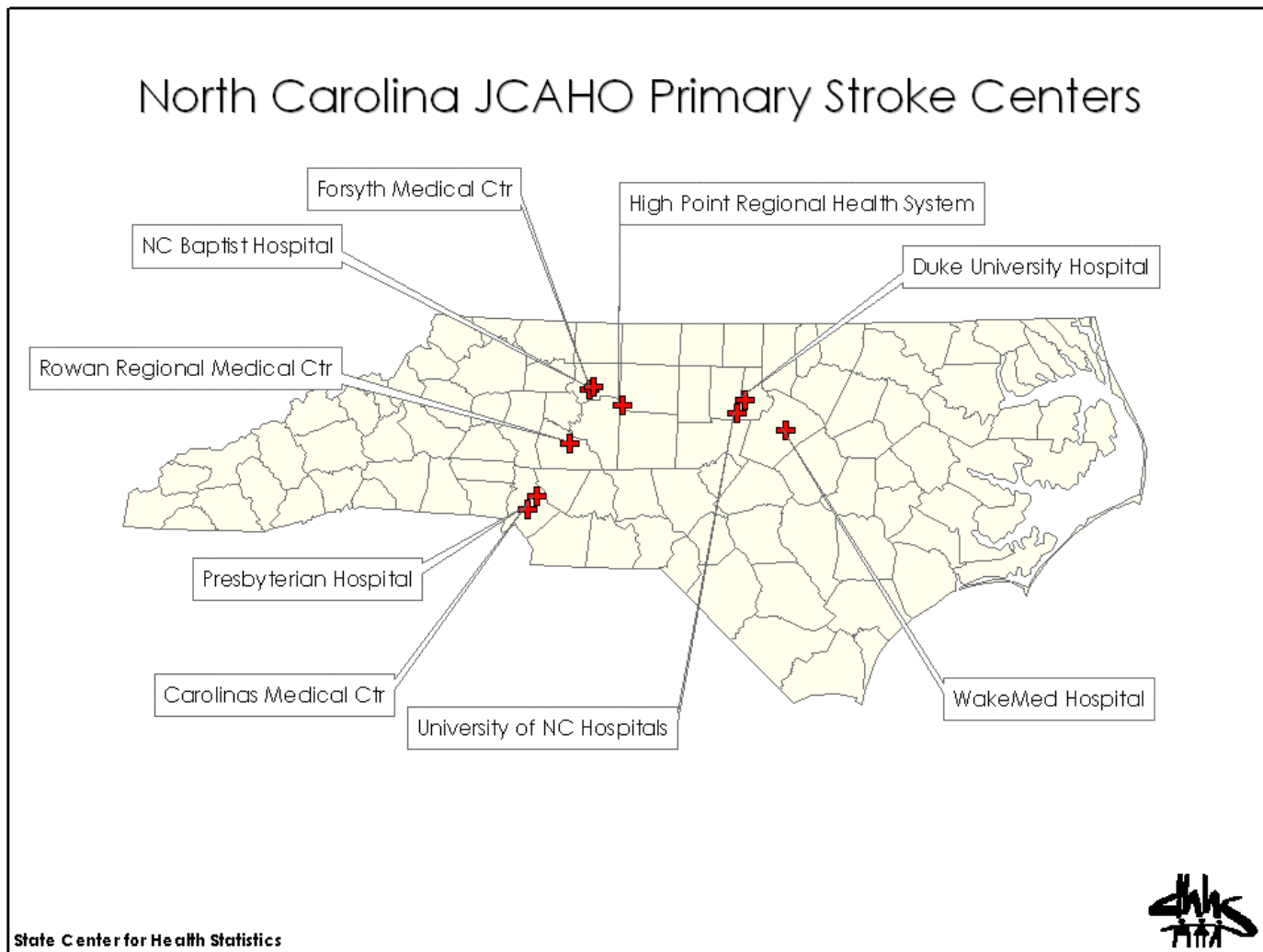
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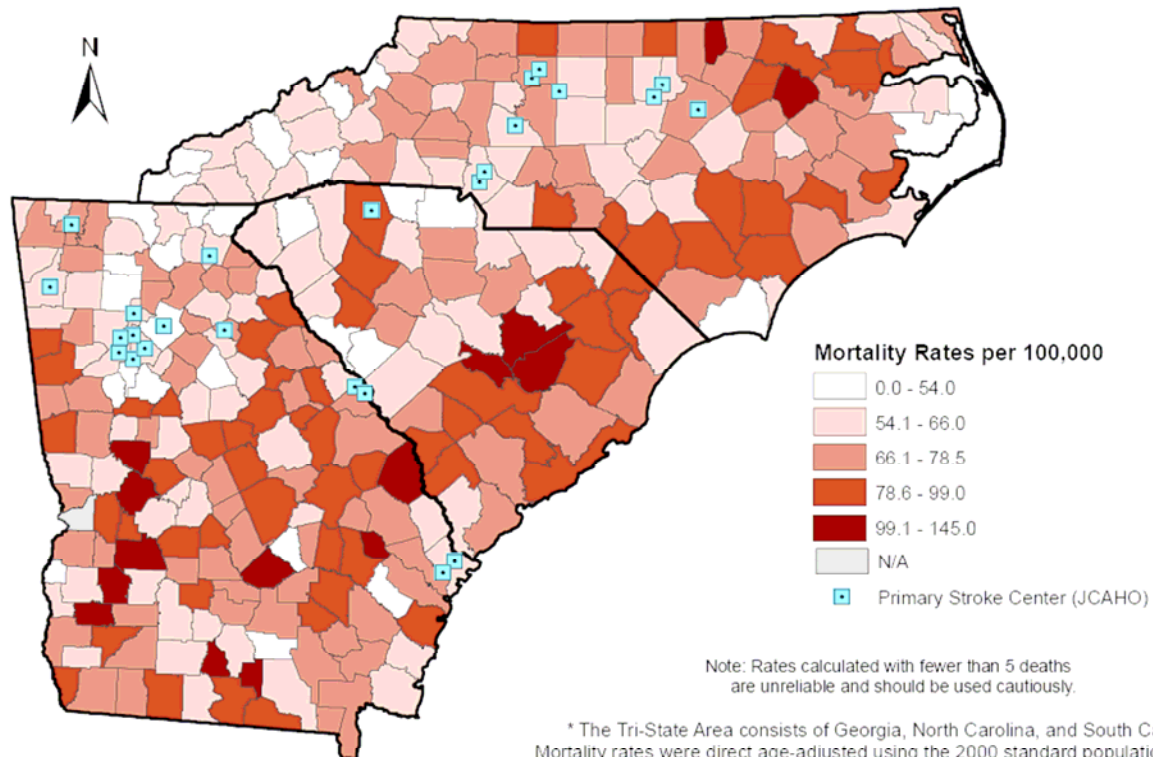
# NC's JCAHO Certified Primary Stroke Centers

(Current as of December 2006)



# Age- Adjusted Stroke Mortality

Age-adjusted Stroke Mortality Rates by County  
for the Tri-State Stroke Network Area, 2000-2004\*



\* The Tri-State Area consists of Georgia, North Carolina, and South Carolina. Mortality rates were direct age-adjusted using the 2000 standard population weights.

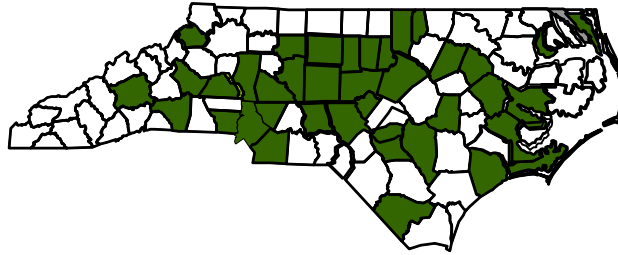


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Data Source:  
Online Analytical Statistical Information System (OASIS), Georgia DHR Division of Public Health  
North Carolina Department of Health and Human Services  
South Carolina Community Assessment Network (SCAN), PHSIS, SC DHEC  
Map Source:  
Division of Public Health Informatics, PHSIS, SC DHEC  
10/19/06 (I.S., R.C.)

# NC Collaborative Stroke Registry: Counties with Participating Hospitals

(Current as of January 2007)



Alamance Regional Medical Center  
 Albemarle Hospital  
 Annie Penn Hospital  
 Beaufort County Hospital  
 Blowing Rock Hospital  
 Cape Fear Valley Health System  
 Carolinas Medical Center  
 Carteret General Hospital  
 Catawba Valley Medical Center  
 Central Carolina Hospital  
 Chowan Hospital  
 Columbus County Hospital  
 Craven Medical Center  
 Duke University Hospital  
 Duke Health Raleigh

First Health Montgomery  
 First Health Moore Regional  
 Forsyth Medical Center  
 Frye Regional Medical Center  
 Grace Hospital  
 Granville Medical Center  
 Heritage Hospital  
 Iredell Memorial Hospital  
 Lake Norman Medical Center  
 Lexington Memorial Hospital  
 Maria Parham Medical Center  
 Mission Hospitals  
 Moses Cone Memorial Hospital  
 Nash Health Care Systems  
 Northeast Medical Center

Onslow Memorial Hospital  
 Outer Banks Hospital  
 Pitt County Memorial Hospital  
 Randolph Hospital  
 Rowan Regional Medical Center  
 Rutherfordton Hospital  
 Sampson Regional Med. Center  
 Thomasville Medical Center  
 UNC Hospitals  
 Union Regional Medical Center  
 Valdese Hospital  
 Wake Forest U. Baptist Med Ctr.  
 Wake Medical Center  
 Watauga Medical Center  
 Wayne Memorial Hospital

# **Justus-Warren Heart Disease and Stroke Prevention Task Force Statute Update**

Part 32. Heart Disease and Stroke Prevention Task Force.

## **§ 143B-216.60. The Justus-Warren Heart Disease and Stroke Prevention Task Force.**

(a) The Justus-Warren Heart Disease and Stroke Prevention Task Force is created in the Department of Health and Human Services.

(b) The Task Force shall have 27 members. The Governor shall appoint the Chair, and the Vice-Chair shall be elected by the Task Force. The Director of the Department of Health and Human Services, the Director of the Division of Medical Assistance in the Department of Health and Human Services, and the Director of the Division of Aging in the Department of Health and Human Services, or their designees, shall be members of the Task Force. Appointments to the Task Force shall be made as follows:

- (1) By the General Assembly upon the recommendation of the President Pro Tempore of the Senate, as follows:
  - a. Three members of the Senate;
  - b. A heart attack survivor;
  - c. A local health director;
  - d. A certified health educator;
  - e. A hospital administrator; and
  - f. A representative of the North Carolina Association of Area Agencies on Aging.
- (2) By the General Assembly upon the recommendation of the Speaker of the House of Representatives, as follows:
  - a. Three members of the House of Representatives;
  - b. A stroke survivor;
  - c. A county commissioner;
  - d. A licensed dietitian/nutritionist;
  - e. A pharmacist; and
  - f. A registered nurse.
- (3) By the Governor, as follows:
  - a. A practicing family physician, pediatrician, or internist;
  - b. A president or chief executive officer of a business upon recommendation of a North Carolina wellness council which is a member of the Wellness Councils of America;
  - c. A news director of a newspaper or television or radio station;
  - d. A volunteer of the North Carolina Affiliate of the American Heart Association;
  - e. A representative from the North Carolina Cooperative Extension Service;

- f. A representative of the Governor's Council on Physical Fitness and Health; and
  - g. Two members at large.
- (c) Each appointing authority shall assure insofar as possible that its appointees to the Task Force reflect the composition of the North Carolina population with regard to ethnic, racial, age, gender, and religious composition.
- (d) The General Assembly and the Governor shall make their appointments to the Task Force not later than 30 days after the adjournment of the 1995 General Assembly, Regular Session 1995. A vacancy on the Task Force shall be filled by the original appointing authority, using the criteria set out in this section for the original appointment.
- (e) The Task Force shall meet at least quarterly or more frequently at the call of the Chair.
- (f) The Task Force Chair may establish committees for the purpose of making special studies pursuant to its duties, and may appoint non-Task Force members to serve on each committee as resource persons. Resource persons shall be voting members of the committees and shall receive subsistence and travel expenses in accordance with G.S. 138-5 and G.S. 138-6. Committees may meet with the frequency needed to accomplish the purposes of this section.
- (g) Members of the Task Force shall receive per diem and necessary travel and subsistence expenses in accordance with G.S. 120-3.1, 138-5 and 138-6, as applicable.
- (h) A majority of the Task Force shall constitute a quorum for the transaction of its business.
- (i) The Task Force may use funds allocated to it to establish two positions and for other expenditures needed to assist the Task Force in carrying out its duties.
- (j) The Task Force has the following duties:
- (1) To undertake a statistical and qualitative examination of the incidence of and causes of heart disease and stroke deaths and risks, including identification of subpopulations at highest risk for developing heart disease and stroke, and establish a profile of the heart disease and stroke burden in North Carolina.
  - (2) To publicize the profile of the heart disease and stroke burden and its preventability in North Carolina.
  - (3) To identify priority strategies which are effective in preventing and controlling risks for heart disease and stroke.
  - (4) To identify, examine limitations of, and recommend to the Governor and the General Assembly changes to existing laws, regulations, programs, services, and policies to enhance heart disease and stroke prevention by and for the people of North Carolina.
  - (5) To determine and recommend to the Governor and the General Assembly the funding and strategies needed to enact new or to modify existing laws, regulations, programs, services, and

policies to enhance heart disease and stroke prevention by and for the people of North Carolina.

- (6) To adopt and promote a statewide comprehensive Heart Disease and Stroke Prevention Plan to the general public, State and local elected officials, various public and private organizations and associations, businesses and industries, agencies, potential funders, and other community resources.
- (7) To identify and facilitate specific commitments to help implement the Plan from the entities listed in subdivision (6) above.
- (8) To facilitate coordination of and communication among State and local agencies and organizations regarding current or future involvement in achieving the aims of the Heart Disease and Stroke Prevention Plan.
- (9) To receive and consider reports and testimony from individuals, local health departments, community-based organizations, voluntary health organizations, and other public and private organizations statewide, to learn more about their contributions to heart disease and stroke prevention, and their ideas for improving heart disease and stroke prevention in North Carolina.
- (10) Establish and maintain a Stroke Advisory Council, which shall advise the Task Force regarding the development of a statewide system of stroke care that shall include, among other items, a system for identifying and disseminating information about the location of primary stroke centers.

(k) Notwithstanding Section 11.57 of S.L. 1999-237, the Task Force shall submit a final report to the Governor and the General Assembly by June 30, 2003, and a report to each subsequent regular legislative session within one week of its convening. (1995-507, s. 26.9; 1997-443, ss. 11A-122, 11A-123; 2001-424, s. 21.95; 2002-126, s. 10.45; 2003-284, s. 10.33B; 2006-197, s. 1.)



## **Stroke Care Programs and Resources in NC**



## **Justus-Warren Heart Disease and Stroke Prevention Task Force**

The Justus-Warren Heart Disease and Stroke Prevention Task Force was named after deceased legislators and Task Force leaders, Representative Larry Justus and Senator Ed Warren, who died of cardiovascular related causes.

The North Carolina General Assembly created the Task Force in 1995 to develop a plan to prevent heart disease and stroke, which remain the first and third leading causes of death in our state. The Task Force has three overall functions as its charge:

1. assess the burden of heart disease and stroke in NC,
2. develop a plan to reduce death and disability due to heart disease and stroke, and
3. increase public awareness of heart disease and stroke.

The Task Force continues to provide guidance to the State and to oversee implementation of and funding for the *North Carolina Plan to Prevent Heart Disease and Stroke*, which is a document setting the course for five years of heart disease and stroke prevention in NC.

The Task Force has 27 members. One-third is appointed upon the recommendation of the Speaker of the House, one-third upon the recommendation of the President Pro Tempore of the Senate, and one-third by the Governor. The Task Force meets quarterly when the legislators are out of session.

The Task Force sponsors Legislative Heart Health Day at the NC Legislative Building in Raleigh every odd year to coincide with the long legislative session. This major event provides an excellent opportunity to educate legislators on the issues of heart disease and stroke.

In August 2006, House Bill 1860 was enacted and added the Stroke Advisory Council to the Task Force. This Council will address stroke prevention and care issues, and produce findings and recommendations to the Task Force.

For more information please:

Call: 919-707-5360

or

Visit: <http://www.startwithyourheart.com/taskforce/>



## *North Carolina Collaborative Stroke Registry*

The North Carolina Collaborative Stroke Registry is an initiative to work with hospitals across the state to improve their quality of stroke care. Hospitals participating in the Collaborative collect data on key quality indicators and enter those data into an online database provided by the Registry.

Each hospital can download reports regarding its own performance on the ten JCAHO indicators and compare its performance to the aggregate data for the Collaborative. The JCAHO reports are updated every 24 hours. Additional reports involving more complicated statistical analysis are provided regularly, and participating hospitals can request customized reports providing analysis of the indicators they select. Participating hospitals also regularly collaborate with each other on various aspects of performance improvement. This collaboration takes place through a variety of means including monthly conference calls, online communication, and annual quality improvement workshops. There are currently 44 hospitals participating in the Registry, and it is anticipated that a total of 50 hospitals will be participating by December 2006.

The Registry is funded by the Centers for Disease Control and Prevention (CDC) through a contract with the North Carolina Heart Disease and Stroke Prevention (HDSP) Branch which in turn subcontracts with the UNC School of Public Health, Department of Epidemiology. The HDSP Branch coordinates the Registry's strategic role in reducing North Carolina's stroke morbidity and mortality rates. The UNC team provides expertise in epidemiologic methods, data analysis and collection, and, in conjunction with the HDSP Branch, implements public health projects. The database is provided through a contract with an RTP-based company, Clinipace, Inc.

| <i><b>Principal Investigator</b></i>   | <i><b>Project Manager</b></i>   |
|--|---|
| Wayne Rosamond, PhD,<br>UNC Department of Epidemiology<br>137 E. Franklin Street, Suite 306<br>Chapel Hill, NC 27514<br>TELEPHONE: (919) 962-3230<br>EMAIL: <a href="mailto:wayne_rosamond@unc.edu">wayne_rosamond@unc.edu</a> | Carol Murphy, RN, MPH<br>UNC Department of Epidemiology<br>137 E. Franklin Street, Suite 306<br>Chapel Hill, NC 27514<br>TELEPHONE: (919) 843-2396<br>EMAIL: <a href="mailto:cmurphy@unc.edu">cmurphy@unc.edu</a> |

For information contact:

***NC Collaborative Stroke Registry Coordinator***

Sylvia Coleman, BSN, MPH  
NC Heart Disease and Stroke Prevention Branch  
1915 Mail Service Center  
Raleigh, NC 27699-1915  
TELEPHONE: (336) 294-1616  
EMAIL: [swcoleman@triad.rr.com](mailto:swcoleman@triad.rr.com)  
or visit: <http://www.ncstrokeregistry.com/>



## **Summary of stroke-related public awareness efforts for Stroke Advisory Council** October 12, 2006

North Carolina's **Strike Out Stroke** campaign was first funded by the National Heart Lung and Blood Institute in the early 1990s, and included radio and print ads appearing in media expected to reach African American adults in the state. The Justus-Warren Heart Disease and Stroke Prevention Task Force built upon this earlier work, sponsoring recurring waves of the Strike Out Stroke campaign in North Carolina from 2000 to the present.

The primary audience for this campaign is African American adults, and the focus of the campaign is on hypertension and stroke awareness and knowledge. Objectives for the Strike Out Stroke campaign include: increasing awareness of the need to have blood pressure checked; increasing the percentage of adults who know their own numbers and what they mean; increasing the percentage of adults who know the warning signs of stroke; and increasing the number of people calling 911 in the presence of stroke signs.

Formative research was conducted to prepare for the Strike Out Stroke campaign, including the use of PRIZM to identify clusters of households at highest risk for stroke (clusters that had higher percentages of African American adults, the highest propensity to smoke, and the lowest propensity to exercise). The process generated four clusters comprising 327,250 households. The formative research indicated that, among target audience members, certain stroke symptoms were more readily recognized than others. The signs more widely recognized were: sudden numbness or weakness on one side, and sudden confusion and difficulty speaking. Lesser known signs included sudden: trouble seeing, trouble walking or dizziness, and headache.

Radio ads ("Seconds Count") were developed for the campaign on the warning signs of stroke, and calling 911 in the presence of those signs, and these ads ran in May-June 2004, 2005, and 2006 in targeted counties (reflecting the PRIZM clusters at highest risk). Print brochures and ads were also developed on stroke prevention and taking action quickly, and on blood pressure (including a discussion of what the numbers mean). Key campaign messages include:

- A stroke is a brain attack.
- The stroke death rate among African Americans in North Carolina is much higher than among whites.
- High blood pressure is the leading cause of stroke, and controlling your blood pressure reduces your risk for stroke.

- Know these signs of stroke: sudden trouble seeing in one or both eyes; sudden trouble walking or dizziness; and sudden, severe headache (as well as the better known symptoms).
- If you suspect a stroke, call 911. Minutes can make a big difference in survival and outcomes.
- Go to [www.startwithyourheart.com](http://www.startwithyourheart.com) for more information.

The **Start with Your Heart** campaign also provided public awareness messages related to stroke prevention. The “Lost in Translation” radio ad was designed to increase understanding of blood pressure numbers and emphasize the importance of controlling high blood pressure. This ad was first aired in May-June 2004, and was aired again in May-June of 2005.

Campaign Outcomes:

- African Americans in North Carolina significantly increased their awareness of 120/80 as the blood pressure reading to fall below for optimal health.
- African Americans in North Carolina were more likely to identify “sudden trouble walking, dizziness and loss of balance” and “sudden severe headache with no known cause” as symptoms of stroke.



## TSSN History

On September 23 and 24, 1999, Georgia, South Carolina, and North Carolina stroke experts met for a Tri-State Stroke Summit. The Summit brought representatives from three states together. They shared scientific findings on stroke and made recommendations on addressing the high rate of stroke mortality in this region known as the “Buckle of the Stroke Belt”. In May 2000, the Summit report, *Unexplained Stroke Disparity: Report and Recommendations from Three Southeastern States* highlighted the data on the stroke burden in the three states. In October 2000, the Centers for Disease Control and Prevention (CDC) funded the proposal to establish the Tri-State Stroke Network for three years.

## TSSN- Members

The Tri-State Stroke Network (TSSN) is comprised of 27 Active/Appointed members, approximately nine from each state and resource persons. These dedicated health professionals have expertise in stroke prevention and treatment in the region. Members represent many types of organization such as hospitals, university research centers, public health departments in the 3 states, not-for-profit organizations, and private organizations focusing on health initiatives. A core function of the Network is to enhance prevention efforts of state heart disease and prevention programs in NC, SC, and GA.

The CDC continues to support the Tri-State Stroke Networks activities with grant funds and technical assistance. The TSSN Executive Director coordinates the project through the NC Heart Disease and Stroke Prevention Branch.

## TSSN Mission

*TSSN – a consortium of public health leaders and experts in stroke prevention and treatment in NC, SC, and GA –creates system and policy improvements to reduce morbidity, mortality, and reduce the impact of stroke in the “Stroke Buckle” of the 3 states.*

## TSSN Committees & Goals

- **Awareness and Advocacy:**  
Increase awareness of the burden of stroke (health, economic, social) among key decision makers to promote policy and systems change
- **Epidemiology and Data:**  
Generates information resources based on current data that could be used to reduce the burden of stroke in the Stroke Buckle
- **Best Practices and Prevention:**  
Identify and promote best practices in prevention and treatment for replication across state lines.
- **Health Disparities:**  
Reduce stroke-related health disparities in the Tri-State Region

# The heart OF YOUR COMMUNITY



## Stroke Resources At-A-Glance

### Prevention/Awareness/ Patient Education



#### POWER TO END STROKE

A movement to increase education and awareness among African Americans that stroke is not inevitable but preventable.

#### ASA AD COUNCIL CAMPAIGN

A three-year public service announcement campaign distributed in partnership with the Ad Council. The focus is the African American community.

#### LET'S TALK ABOUT STROKE

Series of downloadable patient information sheets available on the Internet.

#### "MANY FACES OF STROKE"

Line of awareness materials encouraging people to learn the warning signs of stroke.

#### PATIENT EDUCATION BROCHURES

Booklets and brochures on stroke risk, warning signs and recovery.

#### SEARCH YOUR HEART

Primarily community-based education program to reduce the incidence of heart disease and stroke among African Americans and Hispanics/Latinos.

#### STROKE: PATIENT EDUCATION TOOLKIT

Toolkit with the latest information on stroke prevention and life after stroke.

#### STROKE: WHEN MINUTES MATTER

Speaker's bureau kit with the tools necessary to conduct an educational workshop about stroke for the general public and at-risk populations.

#### QUINTESSENTIALS® — STROKE PREVENTION

CME-accredited, self-assessment program for primary care physicians.

#### Pre-hospital/EMS

#### PRE-HOSPITAL STROKE TRAINING

This interactive, self-paced CD-ROM increases pre-hospital providers' knowledge about the two types of stroke and demonstrates potential stroke-related complaints.



**STROKE IS A LEADING CAUSE OF DISABILITY IN THE UNITED STATES, AND THE NO. 3 KILLER OF AMERICANS TODAY. THE AMERICAN STROKE ASSOCIATION IS WORKING CLOSELY WITH THE GENERAL PUBLIC, PATIENTS, CLINICIANS AND HOSPITALS TO BUILD AWARENESS, FUND RESEARCH AND ADVANCE THE STANDARDS OF CARE TO WIN THE FIGHT AGAINST THIS DEVASTATING DISEASE.**

**FOR MORE INFORMATION ABOUT THESE PROGRAMS, CONTACT**

**KATHY CHEEK, DIRECTOR,  
STATE HEALTH ALLIANCES**

[kathy.cheek@heart.org](mailto:kathy.cheek@heart.org)

**919.463.8316**

**Or VISIT**

**[WWW.STROKEASSOCIATION.ORG](http://WWW.STROKEASSOCIATION.ORG) OR  
[WWW.AMERICANHEART.ORG](http://WWW.AMERICANHEART.ORG).**

# The heart OF YOUR COMMUNITY



## Stroke Resources At-A-Glance

### *Acute Care/ Quality Improvement Initiatives*

#### **NIH STROKE SCALE TRAINING**

Free, CME/CE-certified, online training program reviews how to administer the NIH Stroke Scale for acute stroke assessment.

#### **ACUTE STROKE TREATMENT PROGRAM**

Program to evaluate existing stroke protocols and establish a primary stroke care center.

#### **GET WITH THE GUIDELINES<sup>SM</sup> — STROKE**

The American Heart Association/American Stroke Association's premier hospital-based quality improvement program.

#### **JCAHO PRIMARY STROKE CENTER CERTIFICATION**

The Joint Commission on Accreditation of Healthcare Organizations' advanced disease-specific care certification program to evaluate stroke care in the hospital setting.

#### **SATELLITE BROADCAST**

Satellite broadcast at hospitals to help medical professionals understand emerging stroke science.

#### **STROKESTOP**

Curriculum for first- and second-year medical students that builds knowledge, skills and attitude to allow a proactive approach to stroke diagnosis and prevention.

### *Secondary Prevention*

#### **HEART/STROKE RECOGNITION PROGRAM**

Physician skills-based assessment program developed collaboratively with the National Council on Quality Assurance. Those who meet specific criteria are recognized in national health plan directories.

### *Rehabilitation*

#### **THE WARMLINE: 1-888-4-STROKE**

Toll-free information and referral service that offers free stroke support information to survivors, caregivers, family members and healthcare professionals.

#### **STARTING NOW**

A program available to rehabilitation healthcare professionals to teach stroke survivors and families about the risk of recurrent stroke.

#### **STROKE CONNECTION MAGAZINE**

Information and inspiration to support the stroke recovery process for survivors and their families. Free one-year subscription.

#### **STROKE: PATIENT EDUCATION TOOLKIT**

Toolkit with the latest information on stroke prevention and life after stroke

#### **STROKE SURVIVORS WORKOUT VIDEO**

Thirty minute workout video for stroke survivors.

### *Knowledge Base & Publications*

#### **STROKE TRIALS DIRECTORY**

Comprehensive online data of completed and ongoing stroke therapeutic trials.

### *Federal and State Advocacy Initiatives*

#### **YOU'RE THE CURE NETWORK**

Nationwide network of citizens who fight cardiovascular diseases by communicating with legislators, organizing their community and educating others. [www.americanheart.org/yourethecure](http://www.americanheart.org/yourethecure)



## **CARTERET STROKE INITIATIVE**

### **Carteret General Hospital**

Carteret General Hospital joined the North Carolina Stroke Registry in November, 2005 and began entering data in March, 2006. Carteret General is a 135 bed not-for-profit hospital in Morehead City with a neurologist available two days a week, CT and Ultrasound available 24/7 and an MRI on site.

Acute stroke care is typically initiated by our ED physicians. In September we created a "Stroke Box" for our ED which includes all the necessary paperwork and medications for CVA patients being considered for thrombolytics. A non-tPA Ischemic Stroke/TIA admission order set was recently implemented and early data shows significant improvement in compliance with JCAHO recommendations for stroke care.

Our Speech Pathologist has trained our Respiratory Therapists to do a bedside Aspiration Risk Assessment. A focus on patient education has increased the number of Stroke Videos shown to patients and their families and we have created Stroke information packets and stocked them on all the nursing stations so that they can be given out to families. The percent of patients/families receiving stroke specific education has improved from 23% in April, 2006 to 90% in October, 2006.

Two of our nurses have completed the Advanced Stroke Life Support Instructor course and plan to present ASLS provider classes in spring, 2007. Also, four of our Critical Care/Telemetry nurses have completed the NIHSS certification.

Carteret Stroke Initiative recognizes that Community Education presents the best opportunity to impact stroke care in our county. An educational program has been created that focuses on mitigation of risk factors, recognition of signs and symptoms and the need for rapid transport and has been presented at local health fairs, Senior Centers and will be utilized by our hospital sponsored Parish Nursing program.

Carteret Stroke Initiative's coordinators are Bob Thomas, RN ([rthomas@ccgh.org](mailto:rthomas@ccgh.org)) and Susan Darden, RN ([sdarden@ccgh.org](mailto:sdarden@ccgh.org)).

## Chowan Hospital Stroke Program Description

- Emergency Department
- Standing Stroke Order Sets
- Protocol for using TPA in eligible patients
- Offer Physical Therapy, Speech Therapy and Occupational Therapy Inpatient and Outpatient (Acute Hospital and Skilled Nursing Facility)
- Intensive Care Unit
- CT capability 24 hours a day
- Skilled Nursing Facility
- Stroke Team
- Physician champion for the Stroke Team
- Participating in the North Carolina Stroke Registry
- Indicators are reported by the Registry
- Stroke Support Group that was organized by the hospital and now run by the stroke survivors themselves
- Stroke Education Program with the National Stroke Association
- Speakers Bureau for Stroke Education in the Community
- Participate in Community Education through health fairs, etc.
- Participate with the Eastern Stroke Networking Group

## **Lake Norman RMC Stroke Support Group**

**Facilitator:** Bob Guns, Ph.D., 704-664-7050, [bob.guns@adelphia.net](mailto:bob.guns@adelphia.net)

**Medical Director:** Dr. Andrew Braunstein, 704-662-3077

**Meeting Location:** S. Iredell Senior Center@ Charles Mack Citizen Center, 215 N. Main St., Mooresville, NC 28115, 704-662-3337

**Meeting Date:** first Monday of every month

**Meeting Time:** 1:00- 2:30 pm

**Purpose:** To provide useful information and support for one another in order to have a better life as a stroke survivor

**Procedure:** Monthly meetings with presenters, sharing of information, and providing support

**Potential:** Better lives for an increasing number of stroke survivors and caregivers in the Lake Norman area

Moses Cone Hospital  
Stroke Center  
December 5, 2006

The Moses Cone Health System is comprised of five separate hospitals; Moses H Cone Memorial Hospital is designated as the center for Neuroscience Care, and the Moses Cone Stroke Center for the specific care of stroke victims. We admitted and treated over 1,000 patients last year with the diagnosis of stroke or TIA. Our stroke team is comprised of a Medical Director, Nurse Practitioner, Nurse Coordinator and Registrar. The Medical Director is a private practice neurologist who is contracted by the hospital. He has seven partners that rotate stroke call and care of patients on the stroke service. One of them rounds daily on each patient with the NP. The Nurse Coordinator rounds on all patients by other physicians in the community admitted with the presumptive diagnosis of stroke/ TIA. The goal of both rounding groups is to ensure standard of care. They assure compliance with the core measures designated for stroke care by JCAHO as well as clinical practice guidelines from the American Heart Association (AHA) and American Stroke Association (ASA).

Extensive resources are available to our stroke patients:

- ED Code Stroke Protocol in place to expedite stroke care.
- CT scanning capabilities 24/7 with onsite radiology staff
- There is a neuro interventional radiologist available 24/7
- There is 24/7 neurosurgical support
- In-patient Code Stroke Protocol
- Dedicated Neuro ICU, Neuro OR, Neuro recovery and Neuro Unit with telemetry capability
- A Rapid Response Team is staffed 24/7 to respond to In-Patient Code Strokes. These are patients who are admitted for some other reason, but experience signs and symptom of stroke while in the hospital. The Neurologist responds to these pages within 5 minutes. During office hours, the Stroke Coordinator also responds to help orchestrate the patient's care.
- Pharmacy support is also available 24/7 to calculate and mix the dose of tPA if needed, as well as provide other interventions such as blood pressure or diabetes management.
- A collegial relationship is maintained with our emergency medical service, with educational events presented to the EMS staff bi-annually by the Stroke Center. Communication with EMS is on going to fine tune initiatives. We have recently implemented an EMS to CT protocol, where the EMS takes the patient directly to the CT scanner and hands off to the ED nurse there. (The ED physician briefly clears the patient for A-B-C stability upon arrival.) This allows us to get the CT scan done more quickly.
- The full continuum of rehab services is available at Moses Cone, from acute PT, OT, and ST to Comprehensive Inpatient Rehab. Out-patient services and home health are also available.
- Clinical Practice Guidelines have recently been revised to reflect the standard of care for stroke patients outlined by AHA/ASA. Standardized order sets and clinical pathways have also been updated to guide the multidiscipline team caring for our stroke patients.
- We have a Clinical Performance Improvement team (multidiscipline) that meets monthly to develop strategies for improvement in our stroke care. A performance improvement plan as well as NC Stroke Registry data is used to measure our progress.
- A swallow screen video was developed and is used to train nurses how to properly screen the stroke patient for dysphagia. Our goal is for all patients with the presumptive diagnosis of stroke to be screened for dysphagia prior to having anything by mouth. Training has been done for nurses in our ED and on floors that have been designated to admit stroke patients.
- Patient education for stroke risk factors has been streamlined, including healthy living and smoking cessation counseling. Community education is on going with various presentations and community health screenings.
- We currently are participating in three stroke-related research studies, and are investigating a fourth.
- We maintain membership in the National Stroke Association, American Stroke Association, Tri-State Stroke Network, and NC Stroke Registry.
- Share \$2.4 million CITIES grant with Novant - Forsyth Memorial Hospital for community stroke prevention initiative.
- Stroke Center sponsored yearly community education programs
- Stroke Center sponsored yearly professional stroke education programs
-



## North Carolina Stroke Association: History

The following summary defines the North Carolina Stroke Association's scope of services as it works toward developing a healthier community. The North Carolina Stroke Association has been in operation since 1999 and its mission is to reduce the incidence and impact of stroke through screening and education. The Kate B. Reynolds Charitable Trust provided operational seed money. The North Carolina Stroke Association's goal is to create transportable stroke programs that address stroke prevention, stroke education, and post-stroke services. The North Carolina Stroke Association was founded in 1998 by a group of physicians and lay persons who saw a need to create a stroke association to address problems generated by the high prevalence of stroke in North Carolina. Nationally, approximately 739,000 strokes occur, annually. North Carolina is in the "stroke buckle" with South Carolina and Georgia where stroke death rate is two times greater than the national average. Among the "stroke buckle" states, North Carolina follows South Carolina and precedes Georgia in stroke death rate.

Stroke disables more than it kills and it is the leading cause of serious long-term adult disability. Nationally, there are approximately 4.8 million stroke survivors of whom two-thirds are moderately or severely disabled. The single most important fact, in the face of these statistics, is that stroke is largely preventable.

The North Carolina Stroke Association has two centerpiece programs: Stroke Risk Identification Program and the Hospital Visitation Program. The Hospital Visitation Program will be entering into its next stage that is called Beyond the Hospital, and this is being piloted at Stanly Regional Medical Center November 2006-January, 2007. See below for details.

The **Stroke Risk Identification Program** is designed to: 1) identify individuals who are at high risk of developing stroke; 2) review and counsel with the participants screening results, and 3) provide them with identified community medical resources for intervention treatment. The correlation between the high frequency of cerebrovascular disease and the incidence of poverty supports our priority efforts in the elderly, the working poor and the minority populations. The program is standardized, and data is available in aggregate or site specific.

An estimate 11,000 people have been screened, to date. The NC Stroke Association received a grant to measure the efficacy of its screening program, and stroke risk intervention among people who are screened. In a two-year study that ended in Spring 2006, and that was conducted by Drs. Roger Anderson and Dr. Charles Tegeler of Wake Forest University Baptist Medical Center, approximately 40% of people who were found to be a stroke risk, and who were provided with counseling at the screening followed up with their physician. With the additional follow-up letter to the person's physician, signed by Dr. Tegeler, the intervention increased to 70%. Currently, Drs. Anderson and Tegeler, and Dr. David Goff, are preparing a second phase grant, that will include carotid ultrasound to the screening process.

The North Carolina Stroke Association's other centerpiece program is the **Hospital Visitation Program**. The Winston-Salem Foundation funded the program's pilot year of 2002. The program is designed to be a venue for disseminating stroke education, for obtaining demographic data on stroke survivors, and to provide three-month follow-up telephone calls to recipients.

The NC Stroke Association is currently in the process of enhancing the post-stroke outcomes and secondary prevention with "Beyond the Hospital", a program that is designed to meet JCAHO standards of patient education, using evidenced-based questions. The association's infrastructure provides the mechanism

for implementation, and it is piloting the program at Stanly Regional Medical Center. The program is standardized, and data will be available, hospital specific.

In addition, the NC Stroke Association provides thousands of stroke survivors with post-stroke education through its biannual *Stroke Notes* publication. In June 2004, the North Carolina Stroke Association launched its first publication.

### **Strategic Partnerships**

The North Carolina Stroke Association's local efforts have resulted in enlarging its circle of influence in the state as it takes the lead in providing stroke prevention, education, and post-stroke services for the high-risk and underserved populations. The stroke association has identified hospitals in the state where program sites will serve the surrounding communities. The strategic design will encapsulate, in concentric circles, all counties of the state.

Over the past three years, in Forsyth County, the North Carolina Stroke Association has developed, tested, and continues to refine, a unique stroke prevention and education program. In 2003, the North Carolina Stroke Association created a nucleus site in Pitt County, through **Pitt County Memorial Hospital (Eastern NC Partnership)**. The hospital will sustain the program site once a three-year grant funding the program ends. The Kate B. Reynolds Charitable Trust is providing the three-year funding for this rural outreach that will, over time, serve a 29-county service area in the eastern part of the state.

In June 2004, the North Carolina Stroke Association created another program nucleus site through a joint partnership between **Forsyth Medical Center and Wake Forest University Baptist Medical Center (Piedmont Partnership)**. The rural outreach effort that will eventually canvas nine counties is being funded by a three-year grant from the Kate B. Reynolds Charitable Trust and by the two medical centers. As with the Pitt County model, the two medical centers will sustain the program nucleus site when the grant expires.

Stanly Regional Medical Center, Albemarle, NC, launched a program site in January 2006, and it is self-funded.

The following hospitals are scheduled to become partners:

**Albemarle Hospital, Elizabeth City, NC: March 2007**

Other strategic modalities offer smaller hospitals opportunities to partner with the stroke association. One modality is planned with UNC-G School of Nursing for 2007. The graduate school will be facilitating stroke risk screenings and will be a pilot program for 2007. The plan is to export this strategy to other Schools of Nursing, as a mechanism to provide community screenings.

### **Additional Stroke Prevention and Education Activities**

In 2004, the North Carolina Stroke Association partnered with Forsyth Medical Center on a CDC funded three-year Stroke Initiative Project, CITIES, in Forsyth County that focuses on minority populations and individuals who have limited access to healthcare and limited education on stroke risk identification and treatment.

In October 2002 and 2004, the North Carolina Stroke Association co-sponsored with Wake Forest University Health Sciences stroke prevention symposiums that provided category 1 credits to the physicians who attended. In April 2005, the association partnered with Forsyth Medical Center as the latter organized and staged a CME stroke seminar.

In 2005, the North Carolina Stroke Association received grant money to create a library of stroke education brochures that are written at a level that the majority of people understand. The materials are

accessible and affordable and they are available to the North Carolina Stroke Association's partnership hospitals and the communities they serve. The topics include: the North Carolina Stroke Association Brain Brochure, Reducing Risk and Recognizing Symptoms, Smoking and Stroke, African-Americans and Stroke, Diabetes and Stroke, High Blood Pressure and Stroke, Exercise and Stroke, Nutrition Guide, Healthy Eating Recipes, and Acute Care Decisions for the Caregiver and Stroke Survivor.

In year 2004, the North Carolina Stroke Association received a \$50,000 grant to conduct a treatment follow-up component for high risk screening participants. The project will be completed in April 2006, and results will enable the stroke association to design strategies for stroke risk intervention, especially for the uninsured and working poor.

In 2005, Genentech funded an EMS stroke training pilot project in eight selected North Carolina counties. The North Carolina Stroke Association provided the EMS training tools and the facilitator in this outreach project. Dr. David Cline, Emergency Room Physician and Associate Professor at Wake Forest University School of Medicine designed the tool. The pilot project set the stage for a more expansive effort in 2006 to train the EMS employees of North Carolina. In 2006, Genentech and Start With Your Heart provided grants for the continuation of EMS training. The training is scheduled to begin in July 2006 to include the following counties: Watauga, Caldwell, Alexander, Stokes, Davidson, Wilkes, Surry, Yadkin, Iredell, Davie, and Rowan counties. Additional counties are being determined.

On the NC Stroke Association website is information about the **“Cycle for Life...2006”** annual bike tour that was held on October 14<sup>th</sup> in North Carolina wine country. **“Stroke Notes”** publications are archived on the website at [www.ncstroke.org](http://www.ncstroke.org).



## **STROKE INITIATIVES AT PITT COUNTY MEMORIAL HOSPITAL**

The Stroke Center at Pitt County Memorial Hospital (PCMH) focuses on the entire continuum of stroke care from prevention through rehabilitation.

### **I. COMMUNITY-BASED PREVENTION & EDUCATION**

- A. Screening has been conducted in nine counties in Eastern North Carolina for the past three years in association with the North Carolina Stroke Association through a Kate B. Reynolds Grant.
- B. Education about risk factors, warning signs and lifestyle changes is provided continuously to various community groups, schools, and churches.

### **II. PRE-HOSPITAL CARE**

- A. EAST tool developed at PCMH is used by Pitt County EMS to facilitate effective communication with PCMH Emergency Department regarding incoming stroke patients.
- B. EastCare Air Ambulance service is available 24/7, based at PCMH, with service throughout eastern North Carolina.

### **III. HOSPITAL CARE**

- A. JCAHO Primary Stroke Center application submitted. Anticipate site survey February 2007.
- B. Code Stroke Response Team is available 24/7.
- C. Stroke Center Medical Director has specialty certification in Vascular Neurology.
- D. tPA administration increased significantly over the past 12-months.
- E. Neurosurgery available 24/7.
- F. Stroke nurses certified in NIH Stroke Scale.
- G. Stroke order sets and stroke care paths implemented.
- H. Physical Therapy, Occupational Therapy and Speech-Language Pathology consulted within 24-hours of acute hospitalization.

### **IV. REHABILITATION CENTER**

- A. 75-bed Regional Rehabilitation Center is accredited by CARF . . . The Rehabilitation Accreditation Commission.
- B. Comprehensive inpatient rehabilitation team of professionals include Physical Therapy, Occupational Therapy and Speech-Language Pathology, Audiology, Psychology, Case Management, Chaplains, Orthotics, Rehab Medicine, and Stroke Neurologists.
- C. Outpatient and day rehabilitation services available.
- D. Stroke Support Group for patients and family members.
- E. Follow-up Clinic visits at 1, 6, and 12-months post-discharge.

### **V. QUALITY IMPROVEMENT TOOLS**

- A. Stroke Registry
- B. Get With The Guidelines Stroke
- C. Physician Scorecards
- D. Functional Independence Measures for Rehabilitation Center Patients
- E. Focus on Therapeutic Outcomes for Outpatients





While some stroke survivors think of stroke as the most serious life threatening caution signal they have ever received, others consider stroke a detour or maybe even a roadblock. With these thoughts in mind, the Stroke Peer Visitor Program (PVP) began in 1981 with a grant to the American Stroke Association from the George and Effie L. Seay Foundation. The program was designed to educate and support patients and families who suddenly find themselves dealing with a stroke diagnosis.

In April, 2006, with the help of Staff at Presbyterian Hospital and the American Stroke Association in Charlotte, a group of 12 stroke survivors began their journey to help others. These determined folks went through a rigorous 20 hours of training that included:

- Methods to increase self- awareness, self-acceptance and self-reliance
- Communication and listening skills
- Information about the ethics involved in working with patients
- Knowledge about stroke including the physical, psychological and emotional changes
- Knowledge of community resources for living with a disability
- Appreciation for different lifestyles and ways of coping with stroke

Armed with new strategies to help them increase their own self-acceptance and self-reliance, this amazing group began calling on newly diagnosed stroke patients offering them the emotional and social support they needed to begin their own road to recovery. Referrals are made through Presbyterian Hospital's Stroke Coordinator who in turn matches the visitor with the patient. The visits occur while the patient is still hospitalized; the family members are strongly encouraged to be present during the visit. Afterwards, we request that the patient or family complete a survey to let us know how we are doing. As one family member relayed, "...our Peer visitor is surely an angel. She was informative and encouraging. Some of the best therapy yet!" For more information about this program, contact Anita Webber, Stroke Coordinator, Presbyterian Hospital, 704-384-4960.



### **UNC Hospitals Stroke Center**

The UNC Hospitals Stroke Center is a comprehensive, multi-department program led by the UNC Department of Neurology. Established in 2002, the Stroke Center achieved JCAHO Certification in Stroke in 2004 and recently underwent successful recertification in 2006.

The Center includes an acute stroke team, a state-of-the-art Stroke Treatment and Prevention Unit, a stroke clinic, and stroke research efforts including a stroke registry and clinical trials. The primary staff currently includes fellowship-trained stroke faculty members, a stroke nurse practitioner,, stroke study coordinators, and stroke fellows. The Center is supported by excellent nursing and ancillary services, critical to providing high-quality stroke care. The program is also supported by the Carolina Aircare patient transport system, which allows UNC Hospitals to extend tertiary-level acute stroke care to remote areas of North Carolina.

The Stroke Center currently has active collaborations with the UNC Departments of Emergency Medicine, Radiology, Interventional Neuroradiology, Neurosurgery, Cardiology and the UNC School of Public Health. State-of-the-art vascular neuroimaging is available including 3.0 and 1.5 T MRI scanners capable of DWI/PWI, and a 16-detector spiral CT scanner with CT angiography and CT perfusion imaging capabilities. In addition, the Center is involved in projects funded by the NIH and the pharmaceutical industry. The Center has ongoing trials (Phase I-IV) investigating the latest medications and medical devices for acute stroke as well for stroke prevention.

Members of the Stroke Center have been active in promoting stroke care at the state and regional level. Center members contribute time and effort to a number of committees and organizations including: the Stroke Advisory Council, the Justus-Warren Heart Disease and Stroke Prevention Task Force, the Tri-State Stroke Network, the American Heart/Stroke Association, the National Stroke Association, and the North Carolina Collaborative Stroke Registry Advisory Council. In collaboration with North Carolina AHEC, Center members contribute to physician education through regional seminars. Local education efforts for health care professionals include nursing seminars and programs for EMS providers.

The Center maintains active community service and outreach programs. Members have volunteered time and expertise at area health screenings and have organized educational outreach programs at local churches and retirement communities. The Stroke Center also sponsors the UNC Stroke Support Group.

For additional information, please contact Dr. Souvik Sen, Director, UNC Hospitals Stroke Center, at 919-966-5547.

## WNC Regional Stroke Network Summary for SAC

Robin Jones, BSN – Mission Hospitals

Carolyn Crook, MS – HDSP, MAHEC

10/10/06

### GOAL:

**Get patients to a Stroke Center within 6 hours of onset of symptoms**

### 5 Recommendations for Stroke Systems of Care *Schwamm, et. al. Stroke 2005; 36:690-703*

The WNC Stroke Network will:

1) Serve 3 critical functions.

1- Ensure effective interaction and collaboration among the agencies, services and people involved in providing prevention, identification, transport, treatment and rehabilitation of stroke patients in a locality or region.

2- Promote the use of an organized, standardized approach in each facility and component of the system.

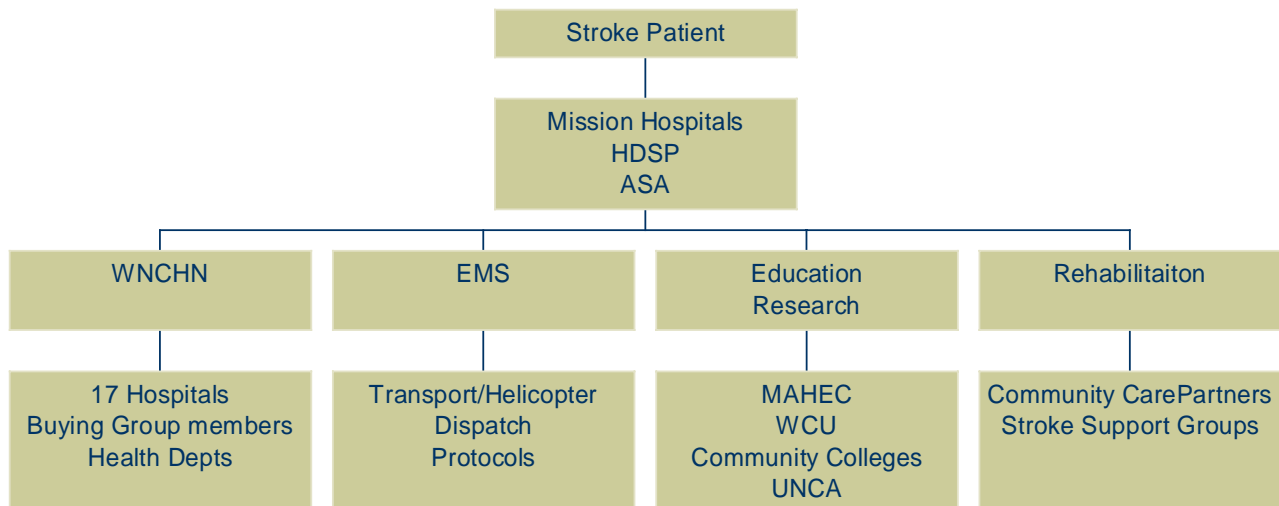
3- Identify performance measure (process and outcomes) and include a mechanism for evaluating effectiveness through which the entire system and components continue to evolve and improve.

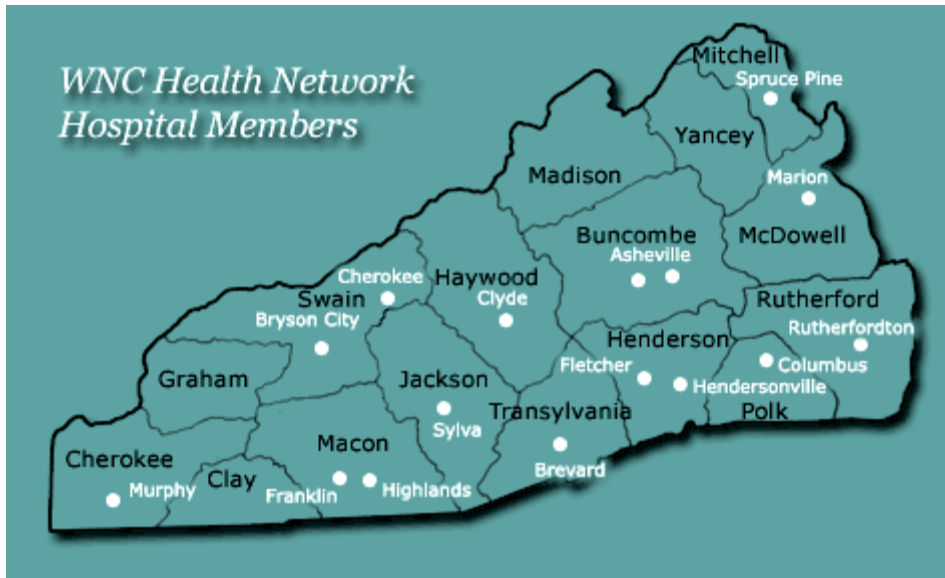
2) Provide both patients and providers with the tools necessary to promote effective stroke prevention, treatment and rehabilitation.

3) Ensure that decisions about protocols and patient care are based on what is in the best interests of stroke patients.

4) Identify and address potential obstacles to successful implementation.

5) Customized for each state, region or locality, although certain universal elements are encouraged to help ensure optimal prevention, identification, transport, treatment and rehabilitation of stroke patients.





### **Stroke Network a PROCESS, a series of small steps (highlights below)**

- 1980 Mission Hospitals Neurosciences Dept. Established
- 1993 Stroke Case Manager-Disease Management Model
- 1995 Stroke team/pathway
- (1996 FDA Approval of tPA for hyperacute ischemic stroke)
- 1999 Interventional Neuro-Radiologist
- 1999 Ongoing participation in trials
- 2000 Code Stroke w/ RN responding to ED
- 2003 Participate in Stroke Registries
- 2004 Hospital-based Stroke Neurologist hired
- 2005 Provide regional access to Neurology Consult 24/7 via toll-free number
- 2005 First regional Stroke Conference
- 2006 Stroke Program Coordinator, Case Manager and Data Analyst added
- 2006 Present Stroke Network to Region
- 2006 Provide ASLS for EMS providers

### **Current Status**

- 2 Regional hospitals joining Coverdell Registry
- 2 Additional hospitals have indicated interest
- Stroke CE program for Allied Health to be held this spring
- ASLS will be held this spring in conjunction w/ ASA and Coverdell(?)
- Regional Stroke program for ED will be held in winter w/ RACE

### **Future Vision**

- JCAHO Certification of Mission Hospital
- Passing of Stroke Bill
- Hire additional hospital-based neurologist
- Third Regional Stroke Conference
- Assist communities to develop local programs

### **“Package” provided for interested parties**

We respond to every county/organization in our region that requests help or indicates interest along any segment of the stroke care continuum. We personally go to their organization and start there with gaining commitment for the WNC Stroke Network. The 17 counties in WNC are in various stages and levels of commitment along the stroke continuum.

The contacts are utilized to gain access to another portion of the continuum of care. Services we offer are listed below along with the portion of the continuum that it addresses.

|                    |                                |
|--------------------|--------------------------------|
| Newspaper Article  | Public Awareness & Education   |
| ASLS               | Prehospital-EMS Education      |
| ED Training        | Hospital RN Education          |
| CME                | Hospital & Physician Education |
| Coverdell Registry | NC Registry – QI               |
| Community Program  | Public Awareness & Education   |

Stroke Ambassadors are also being recruited to handle requests for small group education in the community.

### **Potential Resources & Partners (\* indicates a current relationship in WNC)**

- \*211
- \*Advanced Stroke Life Support (ASLS)
- \*AHA/ASA
- \*Case Managers
- \*Community Colleges
- \*Community Groups
- \*EMS
- \*Faith-based Organizations
- \*Heart Disease & Stroke Prevention Coordinator
- \*Hospitals
- \*Internet
- Joint Commission (JCAHO)
- \*Lifeline Screening
- \*Long-term care
- \*MAHEC
- \*National Stroke Association (NSA)
- \*North Carolina Stroke Association (NCSA)
- Orthotic Companies
- \*Payers (BC/BS)
- \*Pharmaceutical Companies
- \*Physicians

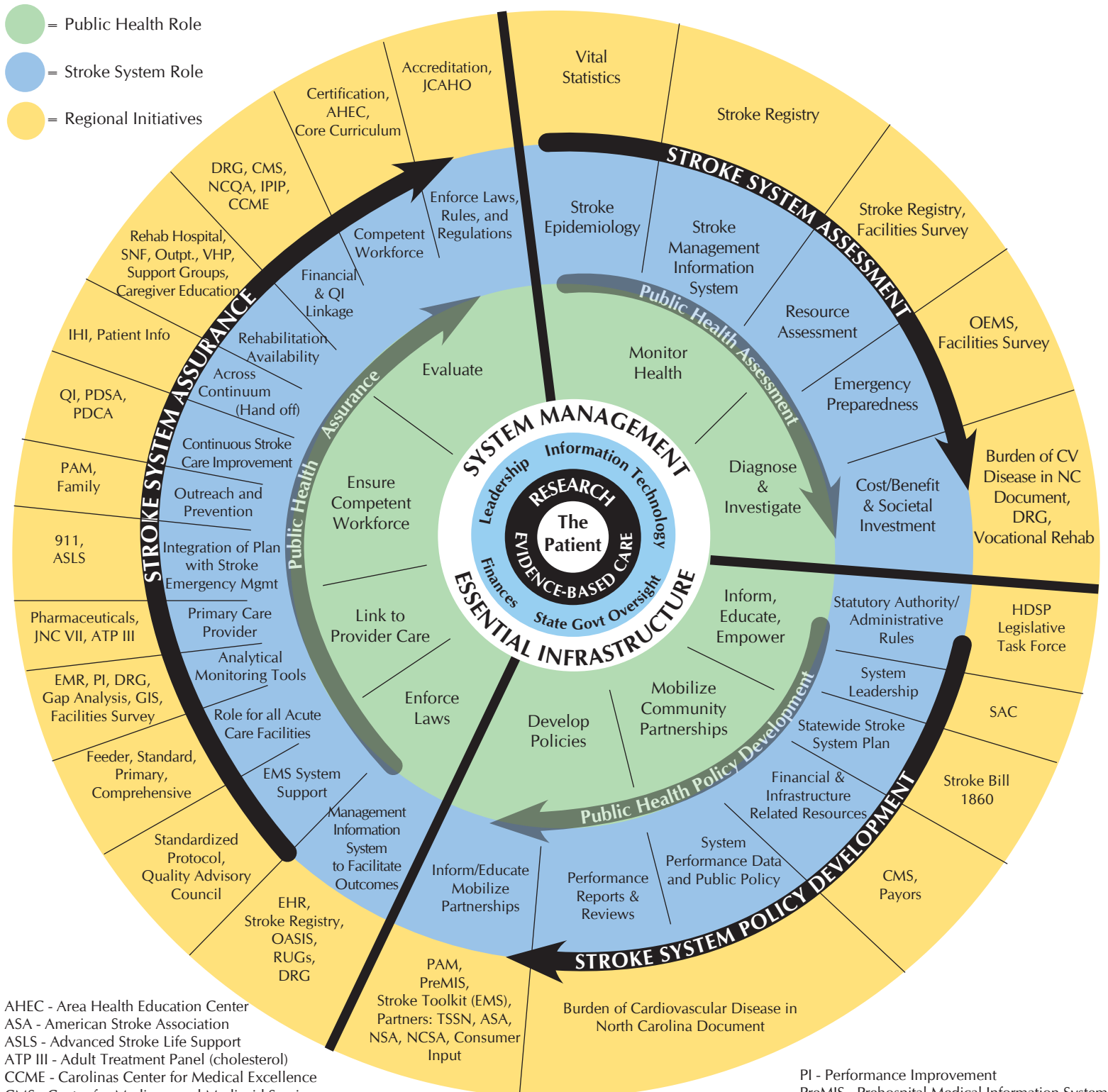
- \*Professional Organizations (ENA, ANA, AANN)
- \*RAC Coordinator
- \*RACE Coordinator
- \*Rehabilitation Organizations
- \*Stroke Registry
- \*Stroke Survivors & Caregivers
- \*Support Groups
- \*Teaching Videos
- \*Universities
- \*Visiting Health Professionals
- \*WNCHN (Western North Carolina Health Network)

Integrated Model for Stroke Systems of Care *attached*



# Integration Model for Stroke Systems of Care

Goal: Reduction of death and disability due to stroke



AHEC - Area Health Education Center  
 ASA - American Stroke Association  
 ASLS - Advanced Stroke Life Support  
 ATP III - Adult Treatment Panel (cholesterol)  
 CCME - Carolinas Center for Medical Excellence  
 CMS - Center for Medicare and Medicaid Services  
 DRG - Diagnosis Related Group  
 EHR - Electronic Health Record  
 EMR - Electronic Medical Record  
 GIS - Geographic Information System  
 HDSP - Heart Disease & Stroke Prevention  
 IHI - Institute for Healthcare Improvement  
 IPIP - Improving Performance in Practice  
 JCAHO - Joint Commission on Accreditation of Healthcare Organizations

JNC VII - Joint National Committee (blood pressure)  
 NCQA - National Center for Quality Assurance  
 NCSA - North Carolina Stroke Association  
 NSA - National Stroke Association  
 OASIS - Outcome & Assessment Information Set  
 OEMS - Office of Emergency Medical Services  
 PAM - Public Awareness Message  
 PDCA - Plan-Do-Change-Act  
 PDSA - Plan-Do-Study-Act

PI - Performance Improvement  
 PreMIS - Prehospital Medical Information System  
 QI - Quality Improvement  
 RUGs - Resource Utilization Groups  
 SAC - Stroke Advisory Council  
 SNF - Skilled Nursing Facility  
 TSSN - Tri-State Stroke Network  
 VHP - Visiting Health Professional

Created: October 10, 2006  
 Contact: carolyn.crook@mahec.net