

# **Unexplained Stroke Disparity:**

## **Report and Recommendations from Three Southeastern States**

North Carolina

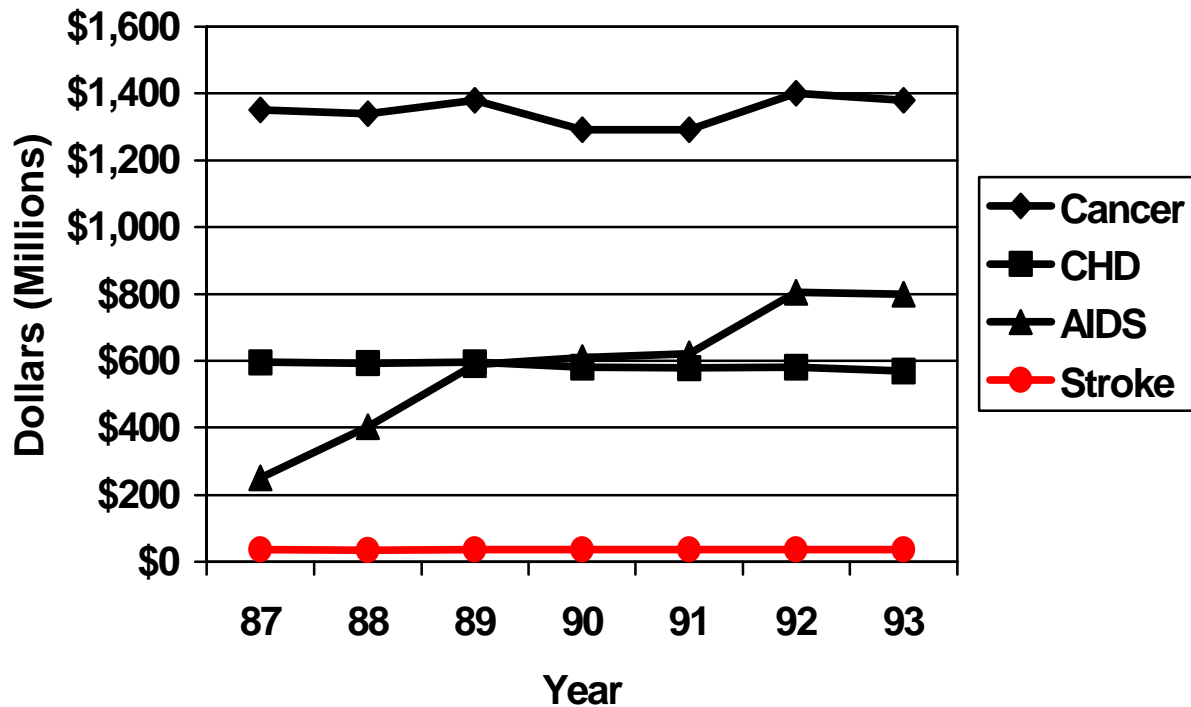
South  
Carolina

Georgia

### **Executive Summary**

**May 2000**

## NIH Research Funding: Constant Dollars



CHD = coronary heart disease

Source: NIH Fact Book

### LEADING CAUSES OF DEATH, U.S., 1997

1. Heart Disease
2. Cancer
- 3. STROKE**
4. COPD\*
5. Unintentional Injuries

\*Chronic obstructive pulmonary diseases and allied conditions

Source: Hoyert DL, Kochanek KD, Murphy SL. *Natl Vital Stat Rep.* Vol. 47, No. 19, June 30, 1999.

# **Unexplained Stroke Disparity: Report and Recommendations from Three Southeastern States**

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## **EXECUTIVE SUMMARY**

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for

The North Carolina Heart Disease and Stroke Prevention Task Force  
and the State Health Officers of Georgia, North Carolina, and South Carolina

May 2000

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## Acknowledgements

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## **Fast Facts about Stroke**

### **STROKE IN THE UNITED STATES**

- Stroke killed 159,942 people in the United States during 1996, 7% of all deaths that year.
- Stroke is the 3<sup>rd</sup> leading cause of death in the U.S. (behind heart disease and cancer).
- Stroke is the leading cause of serious, long-term disability in the U.S.
- Over 4 million stroke survivors are alive today in the U.S.; an estimated two-thirds of these survivors are either moderately or severely impaired due to the stroke.
- Stroke accounts for more than half the patients hospitalized for acute neurological diseases.
- Stroke is a major factor in the late-life dementia that affects more than 40% of Americans over age 80.
- The combined cost of health care and lost productivity due to stroke in the U.S. is estimated at \$45.3 billion during 1999 alone.
- The estimated lifetime cost of a mild stroke in an older individual is \$100,000. The estimated lifetime cost of a severe stroke in a younger individual is \$500,000.
- Stroke risk factors that can be changed or controlled include high blood pressure, diabetes, atrial fibrillation, smoking, high blood cholesterol, obesity, and physical inactivity.

### **THE STROKE BELT AND BUCKLE**

- The “Stroke Belt” is usually defined as an 8 – 12 state region (typically including Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee, and often including Florida, Indiana, Kentucky, Virginia, and Washington, D.C. as well) where stroke death rates are substantially higher than the rest of the country.
- Within the Stroke Belt, the highest stroke death rates are clustered in the coastal plains regions of Georgia (GA), North Carolina (NC), and South Carolina (SC); this region has been called the “Buckle” of the Stroke Belt.
- The stroke death rate in the Buckle is two times greater than that in the rest of the nation.

- The excess risk of stroke death in the Buckle affects both men and women, blacks and whites.
- The pattern of excess stroke death rates in the Buckle has existed for at least 50 years.
- The causes of the excess stroke death rates in the Buckle are not known. Causes that have been suggested include a higher prevalence of stroke risk factors, lack of access to health care, quality of health care, or factors associated with the geography of the region (such as water content).

### **STROKE IN GEORGIA, NORTH CAROLINA, AND SOUTH CAROLINA**

- Stroke is the 3<sup>rd</sup> leading cause of death in GA, NC, and SC.
- In 1997, stroke killed 4,269 Georgians (7% of all deaths); 5,200 North Carolinians (8% of all deaths); and 2,844 South Carolinians (8% of all deaths).
- SC has the highest stroke death rate of all states in the country — and has maintained this distinction for five decades. GA has the 3<sup>rd</sup> highest stroke death rate, and NC has the 5<sup>th</sup> highest.
- Stroke death rates in GA and NC are on the rise. Stroke death rates in SC are increasing among white men, but are steady among white women and are decreasing among black men and women.
- African Americans in each of the three states are at greater risk of dying from a stroke than their white counterparts; stroke death rates for African Americans are more than 50% higher than for whites.
- One of every five Georgians and South Carolinians who died from stroke in 1996 was younger than 65 years of age. One of every six North Carolinians who died from stroke that year was younger than 65 years of age.
- Strokes killed at least 50% more women than men in each of the three states during 1996.
- In 1997, cerebrovascular disease was the primary diagnosis for 25,200 hospitalizations in GA; 29,900 in NC; and 15,900 in SC. These hospitalizations resulted in hospital charges of more than \$310 million in GA; more than \$343 million in NC; and more than \$217 million in SC during 1997.
- During 1998, hospitalizations for cerebrovascular disease among Medicare beneficiaries ages 65 and older totaled 14,890 in GA; 19,548 in NC; and 9,657 in SC.

## Introduction, History and Outcomes

This document summarizes the findings and recommendations from the Tri-State Stroke Summit, which was held in Chapel Hill, North Carolina (NC) on September 23 and 24, 1999. The summit was part of an ongoing process that started a number of years ago in NC. The summit was a significant event, not only because of its scientific findings and the fact that it brought three states together to discuss a regional health problem, but more importantly because it proposed a course of action that may affect the cardiovascular health of residents of the Southeast.

The dedication of the participants and the overwhelming evidence of presented research resulted in the following summit resolution.

*Whereas residents of the southeastern states suffer the highest stroke mortality rates in the United States, this region thereby receiving the designation of the Stroke Belt;*

*Whereas residents of South Carolina, Georgia and North Carolina experience the first, third and fifth highest stroke mortality rates in the United States, thereby suffering disproportionately even in comparison with residents of other Stroke Belt states;*

*Whereas residents of the eastern coastal plains of South Carolina, North Carolina and Georgia experience stroke mortality rates even greater than the high rates experienced by other residents of these states, this region thereby receiving the designation of the Stroke Buckle;*

*Whereas the impact of the Stroke Buckle is estimated at over 1,400 excess stroke deaths and over 4,500 excess stroke incidents annually among residents of the coastal plains of South Carolina, North Carolina and Georgia, with additional excess strokes occurring in the Stroke Belt region within these states;*

*Whereas the cost associated with the excess strokes experienced by residents of the Stroke Belt is estimated to exceed \$2,000,000 per year;*

*Whereas the Stroke Belt and the Stroke Buckle have existed for 50 years without full elucidation of their causes or vigorous implementation of stroke prevention programs; and*

*Whereas, in the absence of the implementation of effective prevention programs, the Stroke Belt and the Stroke Buckle are projected to persist into the foreseeable future;*

***Therefore, the attendees at the Tri-State Stroke Summit call on the Governors and Legislatures of South Carolina, North Carolina and Georgia to support the establishment of a Tri-State Stroke Task Force charged with developing and implementing a collaborative plan to address the public health challenge of the Stroke Buckle through the coordinated use of federal, state and local resources, combined with a coordinated effort to bring focused attention to this national disgrace.***

## History

The NC General Assembly established and funded a Heart Disease and Stroke Prevention Task Force in August 1995 to examine and publicize the burden and preventability of CVD in NC and to develop a comprehensive state plan to address it.

In March of 1998, the task force held a meeting at Wake Forest University School of Medicine in Winston-Salem. One of the speakers at that day-long meeting was Dr. George Howard, who presented his work on the epidemiology of stroke in the easternmost counties of Georgia (GA), NC and South Carolina (SC): the “Buckle” of the Stroke Belt. At that meeting, the task force was challenged with doing something to address this phenomenon. As a result, a series of meetings was held to brief officials in the NC Department of Health and Human Services (DHHS). At those meetings, arranged by state Senator Ed Warren, Chairman of the task force, buy-in and commitment was obtained from DHHS Secretary David Bruton, MD, and from the former and current State Health Directors, Drs. Ron Levine and Dennis McBride.

In 1997, the task force had succeeded in obtaining state funding for a Cardiovascular Health (CVH) Data Unit. One of the activities of the CVH Data Unit has been to sponsor an annual Data Summit to bring together research, ideas and priorities related to CVH data and epidemiology in NC. The first Data Summit was held in April 1998. Dr. McBride agreed to enlist the support of his colleagues in GA and SC to co-sponsor the 1999 Data Summit, making it a tri-state event with a stroke focus. It was further decided that the scientific sessions would be followed by a “Lunch with Our Leaders” where findings could be shared with those in a position to mobilize support for more attention to stroke in general, and the phenomenon of the Stroke Buckle in particular. With the help of a small planning grant from the Stroke Belt Consortium (SBC), a steering committee began the work of planning for the 1999 Tri-State Stroke Summit.

GA and SC have also been working to address the problem of stroke. In GA, a Joint Study Committee (JSC) on the Impact of Stroke on Georgia Citizens was created by the General Assembly in 1998 to study the “conditions, needs, and problems associated with prevention, screening, diagnosis, and treatment of

## INTRODUCTION, HISTORY AND OUTCOMES

stroke and its impact on Georgians and recommend any actions or legislation which the committee deems necessary or appropriate.”<sup>1</sup> Representative Barbara Mobley, Chair of the JSC, created the GA Strike Out Stroke Committee to assist the JSC with its mission. This committee is composed of a group of legislators, public health officials, clinicians, program specialists, representatives from private corporations and hospitals and stroke survivors. The committee met approximately once a month to discuss stroke issues and to assist in planning the JSC’s formal hearings. Two hearings were held in Atlanta and Augusta with testimony from neurologists, nurses, public health workers, representatives from the Emergency Medical System and the American Heart Association, stroke survivors and others. The JSC concentrated its study on stroke prevention; recognition of stroke warning signs; the transport, treatment and rehabilitation of stroke victims; and evaluation of each of the components. For each component, problems were identified and solutions were offered.

The GA Division of Public Health and the American Heart Association, Southeast Affiliate, jointly issued the 1998 Georgia Stroke Report — a statistical report for cerebrovascular disease in the state, including county-specific death and hospitalization data, trends in stroke mortality, stroke warning signs and ways to reduce the risk of stroke. The report will be updated and modified based on data from subsequent Behavioral Risk Factor Surveillance System (BRFSS) surveys.

Stroke prevention efforts in SC have generally focused on hypertension screening and treatment. During the early 1990’s, the CDC funded a “Heart to Heart” prevention pilot project in the Pee Dee Region of the state. The purpose of this five-year community-based project was to develop public health-based programs in communities, which would result in sustained reductions in behavioral risk factors and ultimately reductions in CVD. Interventions included strategies directed both at the individual and the community. In addition to establishing a lay and professional council, the project involved partnerships with non-traditional partners such as beauticians, barbers and African-American churches. Education campaigns were developed and implemented. Community members were encouraged to have blood pressure and cholesterol screenings, adhere to treatment when indicated and to quit smoking. Evaluation of the project indicated that although knowledge around hypertension, cholesterol and tobacco use was improved, actual reductions in uncontrolled hypertension, cholesterol and tobacco use were not realized. It is significant to note that “as a direct result of the Heart to Heart Project, walking trails are marked in parks, in shopping malls, and on school grounds; local organizations continue to work on annual community walks; restaurant menus have labels indicating ‘heart healthy meals,’ and screening programs are more accessible to the general population.”<sup>2</sup> The State Department of Health and Environmental Control and other groups have continued to encourage blood pressure screenings, particularly through African-American churches.

## Outcomes

The Tri-State Stroke efforts did not end with the close of the summit. The Steering Committee for the summit has continued to hold monthly teleconferences to develop a plan of action and the steps needed to move forward on this issue. The Steering Committee developed principles for a proposed Tri-State Stroke Task Force and its subcommittees, and agreed upon a process for recommending and appointing members. The vision of the Steering Committee was presented to Dr. Janet Croft, Acting Chief of the Cardiovascular Health Branch of the Centers for Disease Control and Prevention (CDC), in February as follows.

Objectives of the Tri-State Stroke Task Force:

1. To advocate for increased funding for stroke research, prevention and control.
2. To advocate for the development of a research initiative designed to elucidate the etiology of the geographic disparity in stroke deaths that affects the Stroke Buckle states.
3. To advocate for the development and implementation of stroke prevention and control programs in the Stroke Buckle states.

The proposed task force will work collaboratively with and include representation from other interested regional and national organizations, such as the American Heart Association (AHA), the National Stroke Association (NSA), the Stroke Belt Consortium (SBC) and the Consortium of Southeastern Hypertension Control (COSEHC).

The task force will have a diverse and representative membership, consisting of an equal number (8 – 9) of distinguished experts and leaders on the topic of stroke from each of the three states, including epidemiologists, specialist providers, leaders/legislators and representatives of voluntary and governmental organizations. Members will be proposed by participants in the planning of the summit and will be approved by the appropriate coalition or task force in each state (for example, the NC Heart Disease and Stroke Prevention Task Force, SC Stroke Task Force, GA Strike Out Stroke Coalition).

The Chairperson will be elected by task force members at the first meeting, and leadership will rotate among the three states on an annual basis.

Meetings will be held quarterly; via teleconference three times a year, and one half-day face-to-face meeting in conjunction with another meeting, such as the COSEHC, SBC or AHA Stroke meeting.

Three subcommittees will be established, each chaired by a member from a different state. The proposed subcommittees are:

1. Epidemiology and Data,

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2. Stroke Prevention and Control, and
3. Awareness and Advocacy.

Some proposed activities and products of the task force include:

1. a “White Paper” on stroke to be presented at a Congressional Hearing in Washington,
2. a 2001 Stroke Summit to be held in either SC or GA, and
3. a call for analysis of existing data that may help answer some of the questions surrounding the Stroke Buckle.

The CDC has asked NC to increase the state’s base funding in its 2000 – 2001 re-application for the Cardiovascular Health Program by \$100,000. This money will be used to fund an Executive Director position and operational costs for the group — to be re-named the Tri-State Stroke **Network** at CDC’s request. The network is envisioned as a pilot regional effort with staff placed in the NC program.

The sponsors of the summit are profoundly grateful to the CDC for their willingness to support the vision of the summit planners and attendees and look forward to continued progress in addressing the mystery of the Stroke Belt Buckle.

Many thanks are due to all of the above-mentioned supporters of this cause, the members of the planning committees, sponsoring organizations and leaders and staff in the three states who helped to bring this event to fruition, despite the devastation wrought by Hurricane Floyd just one week prior to the summit.

## REFERENCES

1. Georgia bill HR1000; signed by Gov. Zell Miller on 4/20/98.
2. Goodman RM, Wheeler FC, Lee PR. Evaluation of the Heart To Heart Project: Lessons from a Community-Based Chronic Disease Prevention Project. *American Journal of Health Promotion*. 1995;9:443-455.

## Scientific Findings

### The Decline in Stroke Mortality — An Analysis of Temporal Patterns by Gender, Ethnicity and Geographic Region

George Howard, DrPH,<sup>1</sup> Virginia J. Howard, MSPH,<sup>2</sup> Charles Katholi, PhD,<sup>1</sup> Madan Oli, PhD,<sup>1</sup> Sara Huston, PhD<sup>3</sup>; <sup>1</sup>Depts. of Biostatistics and <sup>2</sup>Epidemiology, University of Alabama at Birmingham, Birmingham, AL; <sup>3</sup>Cardiovascular Health Data Unit, NC Div. of Public Health.

#### Background

- While stroke mortality rates have declined rapidly over the past 30 years, the decline has slowed to a plateau.
- This study: (1) assessed if the gender-ethnic-regional groups have participated equally in this decline of stroke mortality rates, (2) assessed if there are gender-ethnic-regional groups where stroke mortality rates continue to decline, and (3) predicted how stroke mortality rates will eventually differ between these groups.

#### Results

- White males have experienced the largest decline of stroke mortality and black males the smallest decline, with women (regardless of race) showing intermediate declines.
- For whites, most U.S. counties have reached the plateau for stroke rates, and there are few counties where declines of greater than 4% are anticipated.
- Stroke death rates among African Americans are anticipated to decline further in many counties, but this further decline is not sufficient to remove the substantial ethnic difference in stroke mortality.

#### Conclusions

- Ethnic and gender differences in stroke mortality are predicted to persist when stroke mortality rates plateau.
- The Stroke Buckle region has experienced only moderate declines in stroke mortality, and only small future declines are anticipated. Therefore, this region will likely persist in having relatively high stroke mortality rates.

### Stroke Hospitalizations among Georgia, North Carolina and South Carolina Medicare Beneficiaries, 1996 – 1998

Louise M. Henderson, MSPH, Anna P. Schenck, PhD, MSPH, Ross J. Simpson, Jr., MD, PhD, MPH; Medical Review of North Carolina.

- Stroke is a leading cause of hospitalizations for Georgia (GA), North Carolina (NC), and South Carolina (SC) Medicare beneficiaries.
- In 1998, there were 43,083 stroke discharges among Medicare beneficiaries age 65+ in the 3 states.
- Between 1996 and 1998, age-adjusted discharge rates for all stroke categories combined decreased from 23.9 per 1000 enrollees to 22.9 per 1000 enrollees.
- Age-adjusted discharge rates provide an estimated incidence rate of approximately 23 per 1000 enrollees among the Medicare age 65+ population.
- The discharge rates per 1000 enrollees:
  - increased with age (6.3 for 65–74, 14.5 for 75–84, and 25.8 for 85+),
  - were higher among African-Americans compared with Caucasians (26.2 vs. 21.6, respectively), and

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- were higher among males compared with females (24.0 vs. 21.5, respectively).
- Within the three states, stroke discharge rates were higher in the Buckle region compared to the non-Buckle region regardless of age, race, or sex.

### **Hospitalization for Stroke among Residents of Georgia, North Carolina and South Carolina, 1997**

Eugene J. Lengerich, VMD, MS, Ben A. Leiby, BA; Dept. of Health Evaluation Sciences, Pennsylvania State University.

#### **Hospitalization Rates**

- Approximately 83,000 hospitalizations for stroke occurred in NC, SC, and GA during 1997, for an age-adjusted rate of 501 per 100,000 population, a crude rate of 447 per 100,000.
- While there were more hospitalizations of females, males had higher rates.
- Approximately 30% (24,878) of all stroke hospitalizations were among individuals younger than 65 years of age.
- The hospitalization rate for all stroke and ischemic stroke was highest in SC.
- The age-adjusted rate of all stroke hospitalization for residents of a Stroke Buckle county was 1.22 times higher than the rate for residents of a non-Stroke Buckle county within the three states.

#### **In-Hospital Fatalities**

- Approximately 6,100 stroke hospitalizations resulted in in-hospital fatalities in NC, SC, and GA during 1997, and the rate was higher in SC (42.3 per 100,000 population) than in NC (35.3) and GA (37.6).
- While the rate of in-hospital fatalities was 24% higher in Stroke Buckle counties than in non-Stroke Buckle counties, the percentages of hospitalizations that resulted in an in-hospital fatality was only slightly greater in the Stroke Buckle than outside the Stroke Buckle.

#### **Cross-border Hospitalizations**

- By including cross-border hospitalizations, the rate of stroke hospitalization increased 1.8%. For the state of SC a rate increase of 5.3% was observed.

#### **Conclusions**

- These findings support the hypothesis that excess mortality in the Stroke Belt and Buckle is primarily a result of factors that affect stroke hospitalization rates, not factors that affect case-fatality rates only.

### **Stroke Surveillance in North Carolina: History and Direction**

Sara L. Huston, PhD; Cardiovascular Health Data Unit, NC Div. of Public Health.

#### **Highlights about Stroke in NC**

- The decline in NC's stroke death rates stalled during the 1990's for black and white men and women.
- NC African Americans are at increased risk of stroke death compared with their white counterparts; the disparity has persisted over time.
- North Carolinians with low incomes have a particularly high burden of CVD risk factors.
- Future stroke surveillance in NC should include:
  - Improvement in stroke incidence and prevalence estimates.
  - Expanded use of data from the Behavioral Risk Factor Surveillance System.

- Movement toward multi-level surveillance.
- Expanded collaboration with partners in NC, SC, GA.

### **Stroke in South Carolina**

Tim E. Aldrich, PhD, MPH, Mohammad I. Ullah, MD, MPH; SC Dept. of Health and Environmental Control.

- The causes of SC's high stroke death rate are unknown; it is postulated that high prevalences of stroke risk factors, such as hypertension, obesity, diabetes, and physical inactivity may contribute.
  - SC has a high prevalence of diabetes.
  - African Americans in SC have a very high prevalence of diabetes (10.9%), which contributes to the higher mortality rate from CVD in this population.
  - SC has a higher prevalence of hypertension than the nation.
  - SC has the highest prevalence of obesity in the U.S., and about one-third of the total population is overweight.
- The high prevalence of stroke and other CVDs results in increased burden on the health care system, including more emergency room (ER) visits as well as hospitalizations.
- Even within SC, there is geographic diversity in different health events and risk factors.
  - SC has taken a multi-level approach to analyze diabetes data at the zip code level to identify people residing in urban areas whose morbidity/mortality patterns are similar to that of rural areas.
  - Greenville County, which is considered an urban county, was found to contain a zip code having a higher proportionate mortality rate (PMR) from diabetes than the rest of the county.
  - Similarly, parts of Sumter, York and Beaufort counties had higher PMRs, though these are considered urban.

### **Stroke-Related Surveillance Activities and Possibilities in Georgia**

Kenneth E. Powell, MD, MPH; Epidemiology and Health Information Branch, Div. of Public Health, GA Dept. of Human Resources.

- Public health surveillance activities pertinent to the prevention and control of stroke encompass 1) antecedent events and conditions, 2) recognition and response to the stroke event, and 3) health outcomes of stroke.
- In GA, public health surveillance systems exist for some of these, are being developed for some others, while still others have not yet come up for discussion.
- A broad range of events would be appropriate to place under surveillance, and decisions need to be made about which are most important.

### **Church-Based Survey of Diet and Blood Pressure among African Americans in North Carolina**

Lori Carter-Edwards, PhD; Depts. of Epidemiology and Health Behavior/Health Education, School of Public Health, University of North Carolina at Chapel Hill.

#### **Background**

- Though national recommendations suggest that community-based education may improve lifestyle factors such as diet, and that modifications may reduce

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hypertension (HTN) prevalence and its complications, little is known about the detailed levels of awareness among populations at highest risk.

- 196 adults were randomly recruited by phone from rosters of six churches in an urban area of NC to investigate whether there is an association between diet- and blood pressure-related knowledge and prevalence of HTN among a church-based population of African Americans.

### Results

- Knowledge did not differ by gender, education, or BMI, but did differ by age and educational level.
- Though there was no statistically significant difference in mean knowledge score by hypertension status, on average, those with positive, rather than negative attitudes, had greater knowledge and a lower prevalence of HTN.

### Conclusions

- In this middle class, church-based population of African Americans, attitudes may be important both to blood pressure- and diet-related knowledge and HTN prevalence.

## Using the Findings of the National Institute of Neurological Disorders and Stroke (NINDS) t-PA Stroke Trial in the Carolinas

Barbara C. Tilley, PhD; Medical University of South Carolina, College of Medicine, and Principal Investigator, NINDS t-PA Stroke Trials' Coordinating Center.

- *The NINDS t-PA Stroke Trial Study* included two randomized, double-blind, placebo-controlled trials comparing t-PA to placebo for treatment of acute ischemic stroke.
- Ischemic stroke patients treated with t-PA within 180 minutes of stroke onset according to the trial protocol had an increased odds for a favorable outcome as compared to placebo treated patients.
- An assessment of the current utilization of t-PA for ischemic stroke in SC emergency departments led to the conclusion that few patients are receiving t-PA, even when patients arrive at the emergency department (ED) in time for treatment.
- A barrier to the use of t-PA is the limited time available (180 minutes) in which to initiate treatment.
- Other barriers have been created by a number of myths that have arisen with respect to the use of t-PA.
  - Myth 1: "Benefits are modest." Scientific evidence: The number needed to treat = 8 for t-PA, which is comparable or better than other accepted treatments (e.g. carotid endarterectomy, Warfarin for atrial fibrillation).
  - Myth 2: "High risk of hemorrhage outweighs benefit." Scientific evidence: Even given a higher risk of hemorrhage, appropriate use of t-PA provides outcome superior to no t-PA.
  - Myth 3: "Using t-PA requires costly reorganization of an emergency department." Scientific evidence: Emergency departments can quickly develop an efficient process for treating stroke patients in the emergency department.

## **Knowledge of Stroke Symptoms and Treatment Among North Carolina Residents**

Cheryl Bushnell, MD,<sup>1</sup> Mark J. Alberts, MD<sup>1,2</sup>; <sup>1</sup>Duke University Medical Center, Durham, NC; <sup>2</sup>Executive Committee of the Stroke Belt Consortium.

### **Background**

- A telephone survey of 300 randomly selected members from three communities in NC that are in the Stroke Buckle region (Greenville, Fayetteville, and Wilmington) was conducted.

### **Results**

- Hypertension and smoking were recognized as risk factors by about 1/3 of respondents.
- Blood pressure control and smoking cessation were not recognized as interventions.
- Respondents recognized that stroke treatment should begin as soon as possible, but a significant proportion felt that there were no consequences of not seeking immediate treatment (23%), or that strokes could not be treated (20%).

### **Conclusions**

- The study found a lack of awareness about stroke in these communities, especially with regards to stroke symptoms, response to an acute stroke, recognition of risk factors, and stroke prevention measures.
- These results emphasize the need for improved stroke education, particularly regarding symptom awareness and appropriately responding to an acute stroke.

## **1999 Georgia Stroke Awareness Survey — Preliminary Findings**

Alexander K. Rowe, MD, MPH, Kenneth E. Powell, MD, MPH; Epidemiology and Health Information Branch, Div. of Public Health, GA Dept. of Human Resources.

### **Background**

- A random-digit-dial telephone survey of GA residents 18 years and older was conducted to assess the level of awareness of stroke warning signs, recommended response to stroke warning signs and stroke risk factors, and to compare responses to prompted and unprompted questions.

### **Results**

- Without prompting, 62% of respondents were unable to name one sign of stroke; 24% named weakness or numbness, 14% named speech difficulty.
- Ability to name one or more signs of stroke increased with increasing level of education, and family history of stroke.

### **Conclusions**

- Without prompting, few GA adults can name common signs of stroke.
- Broadly based educational efforts are justified, with special emphasis on persons with fewer years of education.
- The difference between level of knowledge assessed by unprompted questions and assessed by prompted questions is large, and needs to be considered in survey design and interpretation.

## **Dispatching Emergency Medical Services for Stroke Symptoms: Preliminary Report**

Wayne D. Rosamond, PhD,<sup>1</sup> Dexter L. Morris, PhD, MD,<sup>2</sup> Jane H. Brice, MD,<sup>2</sup> Kelly R. Evenson, PhD,<sup>1</sup> Emily B. Schroeder,<sup>1</sup> Trent B. Legare<sup>1</sup>; <sup>1</sup>Dept. of Epidemiology, School of Public Health, and <sup>2</sup>Dept. of Emergency Medicine, School of Medicine, University of North Carolina at Chapel Hill.

### **Background**

- Delays that occur between the onset of stroke symptoms and arrival to the hospital are often too long for most patients to be eligible for acute stroke treatments, such as thrombolytic agents (such as t-PA).
- Emergency medical system (EMS) plays a key role in helping patients reach medical care quickly.
- The purposes of this study were (1) to assess how stroke events are communicated to emergency medical service (EMS) 911 operators, (2) to evaluate the dispatch determination for patients known to have experienced a stroke or TIA, and (3) to assess key time intervals of the EMS system for stroke patients. Preliminary results are presented.
- Researchers transcribed 24 911-call tapes of patients who were discharged from the UNC-Chapel Hill Hospitals with a confirmed stroke or TIA between January 1, 1999 and December 31, 1999 and who were transported to the hospital by Orange County (NC) EMS.

### **Results**

- 13 of the 24 calls included symptoms that are traditionally considered stroke symptoms. The most common symptom reported was abnormal breathing.
- The study found that although only 17% of the dispatch determinations were given a classification of “stroke/CVA,” most of the cases were dispatched at the highest priority.
- Overall time from the 911 call to arrival at the hospital (40 minutes) represented a small portion of total prehospital delay (4 – 6 hours in most studies), but is still a substantial segment of the 3-hour treatment window required for thrombolytic therapy.

### **Conclusions**

- Efforts to reduce total prehospital delay for stroke patients should focus on expediting the time it takes for 911 to be called after the onset of stroke symptoms.

## **Creating Safer, Heart Healthy Communities — the New Urbanism**

John Perry, MBA; Town Manager, Port Royal, SC.

- In 1994, the new town manager, John Perry, brought in a town planning company to establish a master plan to redesign Port Royal, SC.
- The town sought out partnership opportunities to create an aesthetically pleasing, heart healthy community where people could engage in some physical activity in the process of performing their day-to-day activities involving visits to the post office, school, shops, fine arts building, and town hall. Walking paths and trails throughout the town were also developed.
- While the impact of Port Royal’s new urbanism has not been measured as yet, at times more people are seen walking than driving, the town’s population has

substantially increased since the town got its face lift from 2,900 to nearly 5,000, and the town's assessed value has almost doubled.

### **Colonial Life & Accident Insurance Company — A UnumProvident Company**

Frank Rutowski, MPH; Colonial Life & Accident Insurance Co., Columbia, SC.

- Colonial strives to make health promotion a part of the work environment through “Wellpower,” Colonial’s wellness program that includes components to address health assessments, health enhancements and screenings, physical fitness and employee assistance. The program also includes a Healthy Behavior Incentive Program that rewards employees for their consistent exercise and healthy behaviors.
- Recent studies done by the company have shown that for every one dollar invested in the wellness program there is a \$2.75 return.
- “Well-power” is engrained in the culture and holds an important place in the company’s work environment.

### **Horry County Schools**

Laura Farmer, MEd; Horry County Schools, Conway, SC.

- For several years, Horry County Schools have made a conscious effort to make breakfast and lunch meals more nutritious and appealing to students, faculty and staff.
- One year ago, the SC State Department of Education received a grant from USDA to help promote nutrition and wellness in the middle school age group.
- North Myrtle Beach Middle School was one of five middle schools in the state chosen to participate in the program.
- As part of the program:
  - The school hired a wellness instructor and initiated a wellness course to be taken by all sixth, seventh and eighth graders.
  - A wellness room, available to the wellness class, faculty, staff, and community, opened with a small number of exercise machines.
  - A resource center has been established by the school nurse and placed in the library, which is easily accessible to students, faculty, staff, parents and the community.
- North Myrtle Beach Middle School has drawn national attention with the implementation of its program.

### **Implications for Surveillance and Evaluation Data from Programs that Seek Environmental and Policy Change**

Linda Neff, MSPH,<sup>1</sup> Donald Goodwin, MS, DrPH,<sup>2</sup> Anne Lockwood, MPH<sup>2</sup>; Dept. of Epidemiology and Biostatistics, School of Public Health, University of South Carolina; <sup>2</sup>SC Dept. of Health and Environmental Control.

- Recognition that good health may be moderated between individuals and their communities by the ability to adopt and maintain healthy lifestyles, such as being physically active, has prompted the development of programs that focus on environmental and policy change to promote health.

## SCIENTIFIC FINDINGS

- ▶ In 1995, the Centers for Disease Control and Prevention hosted an interdisciplinary workshop focused on environmental and policy indicators related to cardiovascular disease.
  - Through the discussion it became clear that appropriate data were not available for the description or analysis of environmental impacts on health outcomes.
  - Furthermore, it was recognized that collection of surveillance data at a lower hierarchical level (community level) would be required versus the traditional collection of national and state level data. Surveillance methodology for collection of community level data needs to be developed.
- ▶ By the late 1990s, the ideals of the Healthy Communities program, begun in the 1980s by the World Health Organization, have taken foothold in 1,100 cities and communities around the world.
- ▶ Undoubtedly, there will be an increased demand for epidemiologists to explore various methodologies to measure the relationships between community level factors, social and health behaviors, and the health and well-being of individuals.

### **Economic Burden of Stroke in the Tri-State Area**

Santanu K. Datta, MS, MBA, David B. Matchar, MD, FACP; Duke Center for Clinical Health Policy Research.

#### **Background**

- ▶ The Medicare data set for the calendar year 1991 was used to estimate the initial hospitalization cost and the 90-day, two year, and lifetime cost by stroke category. These cost estimates included initial hospitalization costs, rehospitalizations, inpatient and outpatient physician costs, and drug costs.

#### **Results**

- ▶ The average expected cost of an ischemic stroke (IS) for the Tri-State (GA, NC, SC) was \$5,578, compared with the \$7,112 national average.
- ▶ The average expected cost of a hemorrhagic stroke (HS) for the Tri-State was \$9,001, which was significantly lower than the \$12,269 national average.
- ▶ The average IS incidence in the Tri-State area was 8.3 per 1,000, which was significantly higher than the 6.7 per 1,000 national average.
- ▶ The average HS incidence in the Tri-State area was 1.1 per 1,000, which was higher than the 0.9 per 1,000 national HS average.
- ▶ The net discounted lifetime cost incurred by the average IS and HS patient in the Tri-State is \$87,459 and \$101,311 (1999 dollars), respectively.
- ▶ The total burden for the Tri-State area in 1999 is expected to be \$2.1 billion, and \$32.4 billion for the U.S.
- ▶ This represents a cost of \$189 per adult resident in the Tri-State area, \$16 higher per capita cost than the \$173 national per capita cost.

#### **Conclusions**

- ▶ Stroke events are approximately 25% less expensive in the Tri-State area than in the rest of the U.S.
- ▶ These lower per-event costs are achieved without sacrificing LOS, inpatient or post-hospitalization survival, or by shifting upfront costs downstream (e.g., substituting initial hospitalization costs for increased post-hospitalization outpatient visits).

- ▶ However, these cost savings are offset by a similar percentage (22 – 24%) of higher incidences of stroke in the Tri-State area.
- ▶ As the population ages and becomes more susceptible to stroke, and as health care wages rise to national levels, the economic burden of stroke will rise substantially in the Tri-State area.

## Lunch with Our Leaders

**Moderator:** David Goff, MD, PhD, Associate Professor, Public Health Sciences and Internal Medicine, Wake Forest University School of Medicine.

### WELCOME FROM DR. GOFF

It is a great pleasure to see so many people here today devoting their attention to this major public health problem. Although you were all able to attend, we also realize that the recent flooding has disrupted many, many lives and has complicated the plans of many attendees. In recognition of the tremendous human suffering attributable to the recent flooding, please join me in a moment of silent reflection.

This is an extremely important meeting. For the first time, we are focusing attention on the population at the greatest risk of stroke in the U.S., residents of the coastal plains of North and South Carolina and Georgia. By focusing attention on this problem, we hope to stimulate research regarding its causes and development of programs designed to effect its prevention.

I consider it a special honor to serve as moderator of this luncheon session. I was born and brought up in Rocky Mount, a thriving and resilient community located in the Stroke Buckle in Nash and Edgecombe Counties. Stroke has had a tremendous impact on my hometown and on my family. Some of my earliest memories involve climbing the pecan tree on my grandfather's farm in west Edgecombe County. But Willie Goff suffered a major disabling stroke when he was 66 and I was 4 years old. He spent the remaining eight years of his life trapped in a body that would not allow him to talk or walk. He was no longer able to live on his farm, and life for several generations of the Goff family was changed irrevocably. I recall visiting him in the rest home on many a Sunday afternoon, my father struggling to understand him through his dense aphasia. Naturally, one of my father's greatest fears was to end up like his father. Ten years ago at the age of 61, my father suffered a major disabling stroke as a complication of bypass surgery. Currently he walks with great difficulty, using a wheelchair most of the time, and has difficulty finding words to convey his thoughts. His grandchildren, yet another generation of the Goff family, now feel the impact of stroke in their young lives. These are but small glimpses of the personal tragedy that is experienced by the populations of North and South Carolina and Georgia, experiences reduced to the data we have been discussing yesterday and today. Most of the residents of our three states could relate similar experiences regarding their families or close friends. That is why we must call attention to the tremendous burden of stroke in our populations. That is why we must act now to reduce that burden.

Effective action requires leaders with vision and vitality. In our three states, we are blessed with effective leaders who will help us win the day in our struggle against stroke. Among them are several who were able to be with us today. Senator Ed Warren, the Chairman of the North Carolina Heart Disease and Stroke Prevention Task Force. His leadership of the task force has been crucial in advancing the agenda of cardiovascular health in NC. Senator Warren is from Pitt County, in the heart of the Stroke Buckle and the floods. Dr. Don Ensley, Vice Chairman of the task force, and Senator Warren drove here today despite the fact that Governor Hunt is in Greenville.

Also, Director of the NC Division of Public Health Dr. Ann Wolfe, NC Senator Allen Wellons, Georgia Representative Barbara Mobley, NC Deputy Secretary for Health Dr. Ron Levine, NC Section Chief of Chronic Disease Control Dr. Leah Devlin, NC Insurance Commissioner Mr. Jim Long, SC Director of Chronic Disease Prevention and Control Ms. Brenda Nickerson, and GA Director of Chronic Disease Prevention and Control Mr. James Brannon. We also welcome Ms. Dena Van Husen, Senior Vice President of the National Stroke Association; Dr. Dale Cannon, President of the Board of Directors of the Mid-Atlantic Affiliate of the American Heart Association; Dr. Janet Croft, Acting Chief of the Cardiovascular Health Branch at the Centers for Disease Control and Prevention; and Ms. Diane Wade from the Health Care Financing Administration. We are especially pleased to have Mr. Robert Smith, a stroke survivor from Tarboro, NC, here with us today.

The success of this meeting is due to the efforts of a group of dedicated individuals. First and foremost, Ms. Libby Puckett, the Executive Director of the NC Task Force. Libby was there from the beginning of the idea and made the idea into a reality. Thanks for your leadership Libby. Libby assembled a steering committee to plan this event. Our great appreciation goes out to the members of the Steering Committee for their numerous contributions. Dr. Gene Lengerich, Dr. Sara Huston, and the Data Work Group organized the Scientific Sessions and Sonia Pratap served as Summit Coordinator extraordinaire. Many other members of the Steering Committee deserve special thanks, but time will not allow me to mention them all. I would like to express our gratitude to our sponsors and partner organizations: the American Heart Association, Carolina Medical Review, the GA Department of Human Resources, Medical Review of North Carolina, represented by Ms. Peg O'Connell, the National Stroke Association, the NC Department of Health and Human Services, the NC Heart Disease and Stroke Prevention Task Force, the SC Department of Health and Environmental Control, and the Stroke Belt Consortium. In addition, I'd like to express our gratitude to the following supporters of this summit: Bristol-Myers Squibb, Dupont, Genentech, Glaxo Wellcome, Hoffman-LaRoche, Merck, and Pfizer. Let's show our appreciation with a round of applause.

## PRESENTATIONS

**The Stroke Belt Buckle.** *George Howard, DrPH, Professor and Chair, Department of Epidemiology, University of Alabama at Birmingham, Birmingham, AL.*

**National Stroke Association.** *Dena Van Husen, MBA, Senior Vice President, National Stroke Association.*

**American Stroke Association.** *Dale Cannon, MD, President, Mid-Atlantic Affiliate of the American Heart Association.*

**CDC's State Cardiovascular Health Program: Addressing Challenges for the Future.** *Janet B. Croft, PhD, MPH, Acting Chief, Cardiovascular Health Branch, Centers for Disease Control and Prevention.*

## CLOSING REMARKS FROM DR. GOFF

This has been a nice meeting. We have learned a lot and shared a lot of information. Yes, it's been a very nice meeting, so now we can go home and get back to our lives and families and jobs, and nothing will happen. Nothing will change. But wait! Dr. Howard shared with us the burden of the Stroke Buckle — 1,400 extra stroke deaths each year and over 4,000 extra strokes each year. We have heard that this problem isn't going away and may get worse as our population ages due to demographic influences and retirement-related migration patterns. So the question is: How long will we accept this situation? How long will we accept the deaths and disability suffered by our loved ones, our friends, our neighbors? We have endured this sorry situation too long. We can endure it no longer. I would like to propose that the attendees at this conference endorse the establishment of a Tri-State Stroke Task Force charged with developing a collaborative plan for addressing the public health challenge posed by the Stroke Buckle through the coordinated use of state and local resources combined with a coordinated effort to bring federal attention to this national disgrace. Your enthusiastic applause will suffice to demonstrate your support for this resolution.

Early in the meeting, Dr. Lengerich posed two questions for all of us to ponder: "What have I learned? What can I do?" Well, what can you do? You can talk with your local leaders, your state and federal representatives. Educate them and support positive changes in policy and environmental influences that affect the risk of stroke. Support the establishment of a Tri-State Stroke Task Force. Work with your schools, businesses, religious organizations, health care providers, and voluntary organizations. There are many things you can do. The one thing you mustn't do is go home thinking we have accomplished a great deal just by having this conference. This summit is just the first small step in our battle against stroke. Much hard work remains to be done to see

us to our goal. Our ultimate success depends upon our working together to meet the challenge posed by stroke in our region.

# **NORTH CAROLINA HEART DISEASE & STROKE PREVENTION TASK FORCE**

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