

Prevention/Public Awareness Area Overview/Statement of Problem

Stroke is the fourth leading cause of death for North Carolina residents (NC State Center for Health Statistics). The number of stroke deaths actually increased slightly from 2007 to 2008 (Huston, 2010).¹ In 2008, stroke caused 4,477 deaths among North Carolinians, 5.8 percent of all deaths in that year. The state's 2006 age-adjusted stroke death rate is the 6th highest among the 50 states and Washington, DC. Stroke death rates in North Carolina declined only 8.2 percent between 1990 and 2000 (an average annual decline of less than one percent) but have since declined by 33.2 percent between 2000 and 2006, an average annual decline of 6.5 percent. Stroke death rates declined faster in North Carolina between 2000 and 2006 than they did in the United States overall. New data just released in December 2010 from the NC Department of Health and Human Services, Division of Public Health, Chronic Disease and Injury Section, State Center for Health Statistics shows that NC has met the Healthy People 2010 goal of an age-adjusted death rate of 61.0 deaths per 100,000 residents. The 2009 age-adjusted stroke mortality rate was 46.1 per 100,000 population (Appendix B, Heart Disease and Stroke Data Charts).

Stroke imposes a heavy burden on the state not just in terms of mortality but also in terms of morbidity as it relates to the economic costs of stroke. An analysis of the direct costs of initial hospitalization, subsequent hospitalizations, inpatient and outpatient physician costs, and drug costs estimated conservatively indicates that stroke costs North Carolina \$1.05 billion each year (Huston, 2010). The average charge for *each* hospital stay for stroke in North Carolina exceeds \$22,000 with Medicaid costs to the state due to stroke exceeding \$279 million annually (Huston, 2010).

Preventing stroke makes sense from an economic and public health standpoint. From socioeconomic factors to risky behaviors, stroke prevention efforts can encompass a very wide spectrum of interventions. In order to impact the burden of stroke in North Carolina, multiple strategies, including primordial prevention of risk factors, primary prevention of stroke, as well as secondary prevention for those who have already had a stroke are needed to sustain a decline in stroke mortality and morbidity. The American Heart Association/American Stroke Association (AHA/ASA) identifies several risk factors and separates them according to the type of risk² such as: Risk Factors That Can't Be Changed (e.g., age), Controllable Risk Factors (e.g., high blood pressure or cigarette smoking), and also lists Less Well-Documented Risk Factors such as socioeconomic factors.

Over the past few years, North Carolina has worked to identify action steps for the prevention of chronic diseases, including stroke. The NC Institute of Medicine (IOM) Prevention Action Plan released in October 2009 provides a road map to preventing disease in the state. Healthy North

¹ Visit www.startwithyourheart.com/Default.aspx?pn=CVDBurden.

² Visit: <http://www.americanheart.org/presenter.jhtml?identifier=4716>.

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Carolina 2020 (HNC 2020) is an initiative that is developing North Carolina's Healthy People 2020³ objectives, which include tobacco use, physical activity, nutrition, social determinants of health, and chronic disease reduction. The recommendations on stroke prevention in this plan are aligned, wherever possible, with these HNC 2020 objectives.

Preventable Risk Factors for Stroke in NC

North Carolina has a high prevalence of *hypertension* compared to the rest of the US. In 2007, NC had the 14th highest rate of diagnosed hypertension in the nation. More than 28% of all NC adults have been diagnosed with hypertension by a health care professional.⁴ These high rates of hypertension cost NC in lives lost, disability, and economically. The actual costs are likely higher due to the rate of undiagnosed hypertension. Estimates from the National Health and Nutrition Examination Survey (NHANES) show that, nationally, 22% of adult hypertensives were unaware of their condition. Since NC is in the stroke belt, and parts of the state are in the stroke buckle where stroke rates are historically highest, it is a reasonable assumption that at least 22% of NC's population is unaware that they have hypertension.

Diabetes dramatically increases the risk of suffering a stroke. The rate of diabetes in NC has been increasing steadily in recent years. The percentage of 2007 BRFSS North Carolina respondents reporting that they have diabetes was 9.1 percent. By race, the percentage with diabetes was 13.7 percent for African Americans and 12.8 percent for American Indians compared to 8.5 percent for whites (1.6 and 1.5 times higher, respectively).

Cigarette smoking is the leading cause of premature mortality and morbidity and is harmful not only to those who smoke but also to those exposed to secondhand smoke. Tobacco use and secondhand smoke are major risk factors for cardiovascular disease. Despite these facts, nearly two million or 20.9% of adults in NC smoke (2009 BRFSS).

Obesity is a key risk factor for stroke, hypertension and diabetes, among other ailments. The percentage of adults who reported being obese (from the 2007 BRFSS) was 38.9 for African Americans, 36.5 for American Indians, and 26.4 for whites.

Atrial fibrillation (AFib), an abnormal heart rhythm in which the two upper chambers of the heart (the atria) beat in a rapid and disorganized way, is a strong independent risk factor for stroke and other cardiovascular diseases. People with AFib have a risk of stroke that is five times that of people without AFib and it is responsible for at least 15 to 20 percent of all ischemic strokes.

³ <http://www.nciom.org/task-forces-and-projects/?healthy-nc-2020>.

⁴ Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System Survey Data, hypertension awareness; 2007, all states.

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Minority Populations, the Poor, and the Burden of Health Disparities

In NC, African Americans, the poor, and most ethnic populations suffer from higher rates and severity of stroke compared to white North Carolinians. Significant improvements in stroke prevention in these populations will significantly reduce the rates of stroke incidence and mortality in NC.

North Carolina is becoming increasingly diverse, with the 2000 US census data showing that NC had the fastest rate of growth of its Latino population compared to the rest of the country. Data from 2007 indicated that NC had a higher proportion of African Americans than the nation as a whole with 21.7% (12.8% for the US), and NC had the seventh highest proportion of African Americans compared to other states. The American Indian population in the state is one of the largest in the nation comprising 1.2% of the NC population.

A demographic shift in state population requires a public health response in order to better address the needs of the people it serves. Minority respondents are more likely to report that their health status is fair or poor compared to whites. Health outcomes, behaviors, and health care access are impacted by social and economic factors such as whether living environments are conducive to good health, whether communities have access to fresh food or opportunities to exercise, and access to quality education and a suitable living wage.

Passage of The Patient Protection and Affordable Care Act (2010) presents a major advancement in disease prevention by, for example, increasing access to clinical preventive health care services, eliminating several cost barriers, promoting worksite wellness, and encouraging community participation in disease prevention. However, reducing disparities in health involves more than increasing access to health services (Berkman & Epstein, 2008).

Low treatment adherence rates for modifiable risk factors contribute to stroke death and disability. The issue of treatment adherence is of particular importance to African American North Carolinians who suffer from disproportionately high rates of hypertension and stroke and poor North Carolinians who have a higher incidence of high blood cholesterol (Huston, 2010). There are also various factors that impact patient adherence to blood pressure medication such as cost, distrust of physicians and medications, and potential or perceived side effects. Older African Americans and those of lower socioeconomic status or of lower educational attainment are more likely to hold myths about hypertension (Wilson et. al., 2002). Studies suggest that specially tailored educational interventions and physician-patient communications developed for the African American population will improve treatment adherence to hypertension medication.

The ABCS of Heart Disease and Stroke Prevention and Other Resources

The Centers for Disease Control and Prevention (CDC) have articulated to their funded state programs that the majority of resources and effort should be used to address the “ABCS” of heart disease and stroke prevention, with the main focus on preventing and controlling high blood

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pressure and reducing sodium intake (CDC, 2010) (Appendix C, National Heart Disease and Stroke Prevention Program, Strategies to Address the “ABCS”). The ABCS are:

- Aspirin: Increase low dose aspirin therapy according to recognized guidelines
- Blood pressure: Prevent and control high blood pressure; reduce sodium intake
- Cholesterol: Prevent and control high cholesterol
- Smoking Cessation: Increase the number of smokers counseled to quit and referred to quit lines; increase availability of no or low cost cessation products

Additional work and recommendations have come forward from the National Institute of Medicine (IOM), the Justus-Warren Heart Disease and Stroke Prevention Task Force (JWTF), the Joint Legislative Childhood Obesity Task Force, the Health and Wellness Trust Fund (HWTF) Fit Families, and Eat Smart Move More North Carolina.

In its 2010 report entitled *Strategies to Decrease Sodium Intake in the United States*, the IOM recommends that the Food and Drug Administration (FDA) set standards for the salt content of processed and restaurant foods. Other recommendations include strengthening collaboration between the Centers for Disease Control and Prevention (CDC) and related agencies to include hypertension among their lifestyle improvement efforts, monitoring and reducing sodium intake, improving the reporting of hypertension to determine general population and subgroup trends, and improving the quality of care and removing economic barriers to effective antihypertensive treatments. It is also recommended that the Division of Heart Disease and Stroke Prevention and related agencies focus on preventing hypertension by reducing overweight and obesity, increasing physical activity, reducing sodium intake, and increasing intake of fruits, vegetables, and whole grains, especially foods rich in potassium. At the policy level, recommendations urge state and local public health agencies to emphasize populationwide approaches and to integrate hypertension prevention into programs to influence obesity prevention, increase physical activity, and encourage healthy diets.

Mindful of gaps and existing resources within the state, the above documents, initiatives, milestones, and evidence-based interventions have been used as starting points to develop recommendations on stroke prevention for North Carolina. While some recommendations are at the policy or environmental level, others are specific steps, tools, or initiatives. The recommendations work together to address stroke-related disparities and resource gaps within NC.

PREVENTION/PUBLIC AWARENESS RECOMMENDATIONS SECTION

The recommendations below were selected from a large number of potential interventions. Attempts were made to select the best recommendations at the time of writing, while leaving open the possibility that other initiatives may be identified and implemented within the plan period of five years. The prevention recommendations included have been selected because they are implementable within five years, impact the largest number of risk factors, are evidence-

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based, address health inequities throughout the state, and are viewed as leveraging existing resources.

MAJOR MODIFIABLE RISK FACTORS

Tobacco use, physical inactivity and poor nutrition (unhealthy diet) are the leading primary preventable risk factors for stroke. These are the underlying risky behaviors that directly contribute to other conditions including hypertension, high cholesterol, and diabetes. Evidence-based public policy interventions that contribute to positive behavior changes and promote healthy work and community environments will contribute to the prevention of stroke and other chronic diseases. Statewide policy change can positively impact the public's health. For example, with the implementation of House Bill 2, which prohibited smoking in bars and restaurants, 69% of NC's workforce is protected from secondhand smoke at their workplace, and business customers are protected from secondhand smoke exposure.

A. Tobacco

The state of NC should partner with the NC Alliance for Health, American Heart Association, American Cancer Society, American Lung Association, Campaign for Tobacco Free Kids, NC Association of Public Health, and North Carolina Association of Local Health Directors to build upon the successful passage of House Bill 2 which prohibited smoking in bars and restaurants. Data shows that, with every 10% increase in the retail cost of a pack of cigarettes, there is a corresponding 7% decrease in the number of youth that start smoking and a 4% overall decrease in the number of smokers. Recommendations are:

1. Increasing price as a reasonable cost-of-use fee and prevention measure

Support an increase in North Carolina's cigarette excise tax by at least \$1.00 and an increase on other tobacco (non-cigarette) products to a tax rate equivalent with that of cigarettes.

2. Protecting past success and expanding smoke-free regulations

Strongly defend the statewide smoke-free law, supporting local efforts to extend secondhand smoke protections to other public places and building support to make all workplaces and public places in NC smoke-free.

3. Preventing new users and helping current smokers to stop

Advocate for funds to prevent tobacco use and for tobacco cessation programs.

4. Encouraging tobacco cessation as an employee benefit

Encourage employers to offer evidence-based cessation coverage as a benefit to attract and retain employees, and promote the NC tobacco use quit line, QuitlineNC, as a cessation resource for their employees.

B. Physical Activity and Nutrition

Many factors, including where people live, work and play, have a significant role in their ability to practice healthful behaviors. According to the Convergence Partners' *Promising Strategies for*

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Creating Healthy Eating and Active Living Environments, “people need environments structured in ways that help them access healthy foods and easily incorporate physical activity into their daily routines.”⁵ Because physical inactivity and poor nutrition are leading primary preventable risk factors for stroke along with high blood pressure, creating healthy communities, schools and workplaces is essential to supporting good nutrition and physical activity behaviors to prevent stroke and other chronic diseases.

NC supports evidence-based public policy interventions that promote strong nutrition policies that are consistent with national guidelines and address calories, fats, sodium, sugar, as well as obesity diagnosis, prevention, and treatment. The nutrition-related recommendations below are consistent with the NC Institute of Medicine Prevention Action Plan⁶, CDC’s Recommended Community Strategies to Prevent Obesity in the United States⁷, CDC’s National Heart Disease and Stroke Prevention Program’s Strategies to Address the “ABCS”, and the Prevention Institute Promising Strategies for Creating Healthy Eating and Active Living Environments.

In collaboration with partners that include the NC Alliance for Health, American Heart Association, American Diabetes Association, American Cancer Society, NC Pediatric Society, and Eat Smart Move More North Carolina, recommendations include:

1. Physical Activity

a) Supporting policy that requires quality physical education

Advocate for local and statewide policy that requires quality physical education (PE) for students and includes minimum standards for elementary students of at least 150 minutes of PE during each school week and at least 225 minutes per week for middle school students.

b) Promoting physical activity by creating safe communities

Provide spaces for community members to engage in physical activity, and include places such as parks and green space, outdoor sports fields and facilities, walking and biking trails, public pools, and community playgrounds. Encourage local governments and schools to enter into joint use agreements that will allow the shared use of facilities.

c) Creating and/or implementing Complete Streets

Design safe and convenient means of travel for all roadway users including pedestrians, bicyclists, users of public transit, motorists, children, the elderly and people with disabilities.

⁵ Prevention Institute, Healthy Eating Active Living Convergence Partnership. *Promising Strategies for Creating Healthy Eating and Active Living Environments*. Oakland, CA. Convergence Partnership, 2008.

⁶ North Carolina Institute of Medicine Task Force on Prevention. *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine, 2009.

⁷ Keener, D, Goodman, K., Lowry, A., Zaro, S., & Kettel Kahn, L. (2009). *Recommended community strategies and measurements to prevent obesity in the United States: Implementation and measurement guide*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

2. Nutrition: Healthful Eating and Access to Healthy Foods

a) Adopting Nutrition Standards for Children

The state and school systems should adopt child nutrition standards that are consistent with national guidelines⁸ for competitive foods and beverages sold in schools, and ensure all foods and beverages in schools, child care, and worksites are healthy.

b) Increasing Healthy Food Access

Promote healthy foods and beverages in grocery and food stores, restaurants and entertainment venues.

c) Facilitating Informed Purchasing Decisions

Support menu labeling in restaurants that is consistent with federal law, and encourage menu labeling participation by non-obligated restaurants both to include information on sodium content and otherwise support informed food purchasing decisions.

d) Supporting Healthy Food Preparation

Promote the reduction in the use and consumption of industrially produced trans fats including partially hydrogenated oils in restaurants.

e) Enabling farmers markets at the workplace

f) Building Support for Responsible Product Marketing - Marketing to Children

Support policies identified to reduce children's exposure to marketing and advertising of unhealthy foods.

g) Pursuing the establishment of procurement policies that encourage the reduction of sodium in prepared foods.

OTHER RISK, ENVIRONMENTAL AND SYSTEMS FACTORS

A. Social Determinants of Health (SDOH)

By addressing the social determinants of health, the state and its partners can improve health outcomes in minority and high-risk-for-stroke populations. Based on a World Health Organization Commission's Principles of Action, NC should work to: **1)** Improve the conditions of daily life – the circumstances in which people are born, grow, live, work, and age; **2)** Tackle the inequitable distribution of power, money, and resources – the structural drivers of those conditions of daily life; and **3)** Measure the problem, evaluate action, expand the knowledge base, develop a workforce that is trained in the social determinants of health, and raise public awareness about the social determinants of health.⁹ In order to address the SDOH, recommendations include:

1. Supporting efforts to increase the High School Graduation Rate

Collaborate with the NC Department of Public Instruction, Healthy Carolinians and the HP 2020 initiative to increase the high school graduation rate.

⁸ Guidelines promoted by the Alliance for a Healthier Generation, or the National Academies of Science's Institute of Medicine should be considered for NC.

⁹ http://whqlibdoc.who.int/publications/2008/9789241563703_eng.pdf.

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2. Partnering with Physicians and Provider Organizations on Cultural Competency

Work with the NC Academy of Family Physicians on the NC Health Disparities Project to improve cultural competency in family medicine and primary care to improve health outcomes for minority populations.

3. Participating in a Public Education Campaign to Help Residents Understand Relevant Provisions of the Patient Protection and Affordable Care Act

- i.** Collaborate with the Department of Insurance, NC Seniors' Health Insurance Information Program and American Association of Retired Persons to develop public awareness about: high risk insurance pools created under the Patient Protection and Affordable Care Act; eligibility requirements; and premium and cost-sharing obligation.
- ii.** Partner with the state Division of Medical Assistance and other state entities to help with the transition to state-based Health Insurance Exchanges and Accountable Care Organizations.

B. Public Education and Awareness

Consistent messaging from all sources – mass media, health care providers, and community and faith-based organizations – is required to create a climate where awareness of stroke risks and symptoms is inherent in the population. To this end, from 2008-2010, the Justus-Warren Heart Disease and Stroke Prevention Task Force (Task Force) has aired a successful signs and symptoms/call 9-1-1 campaign on television that has been shown, through pre- and post-surveys, to raise awareness levels of the signs and symptoms of stroke in high risk communities. The television campaign is being extended, in 2011, with messaging on the need to reach the hospital quickly. In addition to the Task Force campaign, several ongoing programs from stakeholder groups and community organizations have shown promising results in raising awareness about stroke risks, stroke symptoms, and the need to call 9-1-1.

Further action is needed to cement the coalitions that have been forming across the state for primary prevention and awareness about stroke. A seamless process of statewide screenings using a model that partners hospitals, public health departments, and federally qualified health centers (FQHCs) with cardiovascular screening programs such as WiseWoman can achieve this kind of outreach. There are successful models in the state already underway such as the Stroke Risk Identification Program (SRIP) (Appendix D), which has been shown to increase timely treatment for stroke when combined with mass media campaigns and grassroots efforts by local public and private agencies. Through relationships and collaborations on stroke screening, education, outcome assessments, and advocacy, the SRIP can be leveraged into an evidence-based and cost-efficient intervention throughout the state. Recommendations include:

- 1. Seeking funding to extend the proven stroke recognition and call 9-1-1 television campaign to more areas of the state.**
- 2. Creating a coalition of public and private stakeholders in order to implement and extend the SRIP across the state.**

- 3. Establishing screening programs with referral links to Chronic Disease Self-Management Programs (CDSMP) and referring identified high risk patients to a CDSMP.**

C. Health Literacy/Public Awareness

The term "health literacy" encompasses not just the ability to read and understand words and numbers but also the ability to function within the modern medical system, to understand health-related information, and to take charge of one's own health. The problem of inadequate health literacy is especially pronounced in North Carolina. State level estimates place North Carolina 41st in terms of adequate adult literacy levels. Along with adverse social and economic factors, low health literacy contributes to poor health outcomes. People with low health literacy and chronic illnesses, such as stroke, are repeatedly hospitalized and often do not take medication correctly. They may also be unable to advocate for themselves or access care when they need it.

In 2007, the Cecil G. Sheps Center for Health Services Research at the University of North Carolina (UNC-CH) established the Program on Health Literacy to promote collaboration on and dissemination of the subject across the UNC-CH campus and with community organizations and neighboring universities. Researchers with the program have created an evidence-based training toolkit¹⁰ for clinical personnel that can be used to provide better care to all patients. Recommendations include:

- 1. Funding the strategic dissemination of the health literacy toolkit**

Use a portion of the recurring state funding for health care provider education and training on stroke administered through the HDSP Branch to disseminate this toolkit through provider training workshops across the state.

D. Federally Qualified Health Centers (FQHC)

The NC Community Health Centers are the Federally Qualified Health Centers (FQHC) in the state. The mission of the FQHC is to provide access to quality primary health care regardless of ability to pay, and federal regulations require that these centers be located in Medically Underserved Areas (MUA). FQHCs provide comprehensive care through all life cycles, ages and stages. The scope of primary care includes medical and dental care, pharmacy, and behavioral health, enabling services including translation, vision, transportation, and outreach.

FQHCs are an important resource to achieve and maintain wellness among NC's medically underserved populations. FQHCs use health indicators such as hemoglobin A1c, blood pressure (BP) control, immunization rates, and screening tests to demonstrate quality of care. Federal grants are intended to cover the cost of providing care for uninsured, under-insured and under-served populations. Recommendations include:

¹⁰ Tool found at <http://nchealthliteracy.org/toolkit/>.

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- 1. Encouraging and supporting all NC physicians practicing in FQHCs to become certified by the American Society of Hypertension (ASH) as Hypertension Specialists.**
- 2. Working with the network of FQHCs to enhance cardiovascular risk detection and treatment, and expanding links to state resources to achieve measurable improvements for otherwise under-served populations as an important strategy for stroke prevention.**
- 3. Promoting the NC tobacco use quit line, QuitlineNC, as an evidence-based cessation resource for patients who use tobacco.**
- 4. Encouraging healthcare/dental professionals to offer 5A cessation counseling for their patients who use tobacco.**
- 5. Working with the network of FQHCs to increase the availability of obesity screening and obesity counseling.**

E. Environment and Individual Action

Prevention requires both environments that are conducive to healthy behaviors and action by individuals toward more healthful living. An informed population is more likely to engage in prevention efforts compared to the uninformed. Informed patients are likely to understand and adhere to treatment and may be more empowered to manage their condition. Recommendations include:

- 1. Expanding public awareness efforts that encourage healthy behaviors and educate individuals about the risk factors/warning signs for stroke**
Expand work that has been successfully done in Eastern NC to a statewide effort. Funding is required, and estimates can be based on current costs.
- 2. Maximizing worksite wellness initiatives through partnering by Regional Heart Disease and Stroke Prevention (HDSP) Coordinators**
NC Prevention Partners (WorkHealthy America), AHA (START!), Eat Smart Move More North Carolina.
- 3. Collaborating with the American Heart Association (AHA) to encourage participation in the My Life Check program**
In collaboration with the AHA, encourage individual participation in the My Life Check program, which provides an individualized action plan for healthy living.
- 4. Expanding the use of HEART 360**
Heart 360¹¹ is a program designed to help patients and physicians better manage high blood pressure by actively engaging patients. NC should explore the “Check it, Change it” program model piloting in Durham, NC.
- 5. Expanding the use of the Starting the Conversation Tools**
Examine ways to utilize NC Prevention Partner’s Starting the Conversation tools (developed under contract to the state HDSP and Tobacco Control programs) to assist healthcare providers in engaging patients to adopt healthy behavior changes.

¹¹ www.heart360.org for free tour.

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F. Atrial Fibrillation

In 2007, 13,281 North Carolinians were hospitalized due to Atrial Fibrillation (AFib). In 2008, AFib was the underlying cause of death of 664 North Carolinians and was listed as a contributing cause of death for 140 of the 4,477 North Carolinians who died of stroke. Treatments are available to manage AFib and lower the risk of stroke. Recommendations include:

1. Collaborating with healthcare providers to improve detection, diagnosis and management of AFib as an important strategy for stroke prevention and control

As part of the A-Fib STAT national campaign, the Justus-Warren Task Force invited Jerry West to a meeting to educate members about living with A-Fib.

G. Surveillance

Data is essential to developing and evaluating public health interventions. North Carolina does not have hypertension incidence data based upon actual physical measurements of blood pressure, which is the leading risk factor for stroke. For dyslipidemia/lipid disorders, another leading risk factor in cardiovascular disease, there are no data on prevalence or screening based upon actual clinical measurements of blood lipids among North Carolinians (Huston, 2010).

Data from clinical measurements is essential to combat the disparities in hypertension rates. Diagnosed hypertension prevalence rates are significantly higher for African Americans than whites in North Carolina (39.8 percent vs. 28.2 percent). African American women have the highest prevalence of diagnosed hypertension (42.8 percent), followed by African American men (36.5 percent), white men (28.5 percent), and white women (27.9 percent) (Huston, 2010).

Diagnosed hypertension prevalence rates are highest in the lowest education groups and decrease with increasing education. Among those in the “less than high school” education group, 33.9 percent have high blood pressure, and the diagnosed hypertension prevalence rate decreases to 23.4 percent among those in the “college graduate” education group. Similarly, diagnosed hypertension prevalence rates are highest in the lowest income groups and decrease with increasing income (Huston, 2010).

Since there are serious gaps in our surveillance systems and knowledge of the epidemiology of cardiovascular disease in the state, recommendations include:

1. Promoting surveillance systems for cardiovascular disease risk factors

- a. Promote surveillance systems that include data collection of incidence and management of high blood pressure, high blood cholesterol, Type II diabetes, as well as other risk factors for stroke such as atrial fibrillation.
- b. Work to ensure that this information will be a part of any statewide health information exchange and is transmittable between other data collection systems in order to monitor continuous quality improvement in risk factor management.

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CONCLUSION

By making prevention a top priority with a combination of effective strong public health policy and individual behavior change, North Carolina can successfully improve its stroke statistics. A commitment to prevention creates the strong foundation of statewide systems of stroke care. The ultimate goal is to dramatically reduce strokes occurring in the first place. But when strokes do occur, outcomes are optimized through coordinated statewide systems of care that result in more lives saved and higher level quality of life retained or regained. The state plan for coordinated statewide systems of stroke care begins with strategies for primary prevention and management of risk factors and with secondary prevention efforts for stroke survivors.

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APPENDICES

- National Heart Disease and Stroke Prevention Program's Strategies to Address the "ABCS". Program Guidance, November 2010
- Stroke Risk Identification Program (SRIP)