

# The North Carolina Plan for Prevention and Management of Heart Disease and Stroke

## 2012-2017



**Start** WITH  
**YOUR Heart**  
Justus-Warren Heart Disease & Stroke Prevention Task Force

## Dedication



It is with great pride, affection, and gratitude that past and present members, partners, and staff of the Justus-Warren Heart Disease and Stroke Prevention Task Force dedicate this plan to Senator William R. Purcell, M.D. The *North Carolina Plan for Prevention and Management of Heart Disease and Stroke 2012-2017* is the third plan of its kind, and it maps a course that builds on the accomplishments of the previous 17 years.

Senator Purcell served as Task Force Chair from his appointment by then Governor Mike Easley in 2003 through his retirement from the legislature in 2012. His awareness of and appreciation for the Task Force's mission of preventing premature deaths and disabilities due to heart disease and stroke persuaded him to accept the appointment.

This was despite his misgivings about an already heavy load as the go-to person for every North Carolina health group as co-chair of the Senate Appropriations Committee on Health. His steady leadership and the respect of his legislative colleagues have helped the Task Force not just to survive through many changes and some difficult years but also to demonstrate effectiveness in carrying out the charges listed in the enabling legislation passed by the General Assembly in August 1995.

While our departing chairman will be sorely missed, we wish him a well-deserved and enjoyable retirement and dedicate not just the plan, but also ourselves as we strive to honor his example by working together to continue a proud legacy of improving cardiovascular health in our state.

December 5, 2012

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## Acknowledgements

We wish to extend a very special thank you to Justus-Warren Heart Disease and Stroke Prevention Task Force Members **Peg O’Connell, JD and David Goff, Jr., MD, PhD**, for their excellent and tireless leadership in co-chairing the State Plan Committee. The development of the State Plan was truly a collaborative effort with many partners providing expert input and becoming vested in its implementation. While every attempt has been made to acknowledge the work of each contributor, with the number and diversity of the contributions, we extend an apology for any omissions that may have occurred.

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Reaching consensus on and gaining Task Force approval for a new state plan takes concentrated effort and considerable staff support. Special thanks are due to **Sylvia Coleman**, who coordinated the development process and to **Rosemary Ritzman, PhD**, who did the lion's share of taking the group's ideas and translating them into CDC's recommended format, as described in the State Health Plan Index. Listed below are many others who have contributed to bringing this document to publication. We again extend an apology for any omissions that may have occurred.

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## Executive Summary

The N.C. Plan for the Prevention and Management of Heart Disease and Stroke 2012-2017 is the third comprehensive statewide plan to address these leading causes of morbidity and mortality since the N.C. Heart Disease and Stroke Prevention Task Force was established in 1995. The Plan builds upon progress made in decreasing morbidity and mortality in heart disease and stroke and in improving the quality of care provided through the collaboration and leadership of partners and stakeholders across the state.

The initial focus of this series of plans was on prevention through strategies addressing primary risk factors (e.g., unhealthy eating, physical inactivity, and tobacco use and exposure). In response to the need for a more comprehensive approach to a broader spectrum of the state's cardiovascular issues, plans have been expanded to incorporate management and control of secondary risk factors (e.g., high blood pressure, high cholesterol, and obesity) as well as treatment of acute cardiovascular events, transitions back to the community, and rehabilitation or long term care with control of chronic cardiovascular conditions to prevent recurrent events.

The State Plan Steering Committee initially identified four overarching goals that focus on the continuum of care. A fifth goal related to surveillance and evaluation emerged as subgroups working on these goals identified indicators for the data needed to measure and monitor progress. The five goals are listed in the chart below.

### Overarching Goals for the 2012 – 2017 Plan

- Goal 1:** Increase the proportion of North Carolinians who live healthy lifestyles conducive to cardiovascular health.
- Goal 2:** Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled.
- Goal 3:** Increase the proportion of North Carolinians who have access to and receive appropriate integrated emergency and acute care for cardiovascular events.
- Goal 4:** Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute and transitional care following cardiovascular events.
- Goal 5:** Enhance utilization of current data resources, expand and develop additional resources, extend their availability, and improve accessibility of information derived from evaluation and surveillance.

**Goal 1** focuses on promoting lifestyle choices that significantly reduce major risk factors for heart disease and stroke (e.g., high blood pressure, high cholesterol, and obesity). Strategies include:

1. Public education initiatives that inform North Carolinians about relationships between modifiable risk factors and the life-threatening consequences of heart attack and/or stroke;
2. Promoting an environment that supports making healthy choices including policy, systems, and environmental changes that make healthy choices easier; such as:
  - a. Educating the public about the health risks associated with foods and beverages high in sugar, sodium, and/or trans fats and increasing availability and access to healthy foods;
  - b. Increasing accessibility to and opportunities for physical activity; and,
  - c. Decreasing the use of tobacco, especially among young people; educating business owners and the public about the dangers of secondhand smoke; and decreasing exposure to secondhand smoke.
3. Creating and/or maintaining partnerships among stakeholders whose efforts focus on the prevention of primary risk factors.

**Goal 2** focuses on controlling risk factors that have already developed to prevent them from progressing to heart attacks and/or strokes. Strategies in addition to those for Goal 1 include:

1. Promotion of policies that:
  - a. Support reimbursement of preventive health services and management of risk factors;
  - b. Improve access to preventive health services;
  - c. Improve adherence to recommended clinical guidelines for treatment and management of risk factors; and,
  - d. Improve community-clinical linkages to ensure that providers refer patients to programs that help improve management of cardiovascular risk factors and conditions.
2. Health care systems changes, such as technology prompts, to assure use of the latest clinical guidelines for properly identifying and managing key risk factors.
3. Public education initiatives that inform North Carolinians about:
  - a. The relationship between modifying risk factors and the life-threatening consequences of heart attack and stroke; and,
  - b. The importance of and resources for identifying and controlling preventable risk factors.
4. Wellness programs in worksites and other community locations that include opportunities for healthier lifestyle choices and events that provide for identification of and education about the importance of controlling risk factors.
5. Training and technical assistance for worksites, other community agencies, and groups to develop and implement health education programs and health promotion initiatives that address the identification and management of cardiovascular risk factors.

**Goal 3** focuses on acute care for heart attack and stroke from symptom onset through hospitalization. Immediate appropriate responses are critical to survival and influence quality of life and long term health outcomes. Strategies include:

1. Promotion of policies that:



- a. Establish and monitor standards of care for first responders through emergency department staff and inpatient care;
  - b. Establish and monitor training standards for emergency workers;
  - c. Improve integration and continuity of services along the continuum of care;
  - d. Provide adequate funding to assure appropriate coordinated services;
  - e. Establish facility designations for acute care capability; and,
  - f. Enhance communication between health care agencies and the public.
2. Systems changes that:
- a. Improve communication and coordination among agencies involved in acute care;
  - b. Include standardization, data reporting, and facility designation; and,
  - c. Provide training and quality improvement initiatives that increase the effectiveness of health care providers and extenders in response to heart attack and stroke.
3. Public education initiatives that inform North Carolinians about:
- a. Signs and symptoms of heart attack and stroke as well as initial actions such as calling 9-1-1 and initiating cardiopulmonary resuscitation (CPR); and,
  - b. Resources available to assist with and support emergency care.
4. Partnerships that:
- a. Improve communication and coordination among stakeholder groups;
  - b. Gather and share data pertaining to care pathways and health outcomes; and,
  - c. Develop and implement communication and education initiatives based on community needs.

**Goal 4** focuses on the management of post-acute care, including transitions back to community care, and/or among health care facilities and long term care. Strategies include:

1. Promotion of policies that:
  - a. Support reimbursement for rehabilitative, transitional, and long-term health services for heart disease and stroke survivors;
  - b. Encourage expanded rehabilitation services for post-acute patients; and,
  - c. Develop and implement protocols for transitions that address long-term needs.
2. Systems changes that:
  - a. Develop and implement communication and education initiatives based on community needs; and,
  - b. Enhance workforce development in facilities and in the community for managing the long-term effects of acute cardiovascular events and preventing recurrences.
3. Public education initiatives that inform North Carolinians about:
  - a. The need for long-term management of cardiovascular disease; and,
  - b. Available resources for patients and caregivers.
4. Partnerships that:
  - a. Improve communication and coordination among agencies; and,
  - b. Develop and implement communication and education initiatives based on community needs.

**Goal 5** addresses the need for adequate data to measure progress toward achieving the first four goals, the capability to gather and analyze such data, and the development of a mechanism to report findings. Strategies include:

1. Organizing and sharing information about existing sources of data;

2. Securing adequate funding for collecting, analyzing, and reporting new data;
3. Partnering with stakeholders to develop ways of linking and sharing data; and,
4. Disseminating findings and conclusions to stakeholders based on data analysis.

In addition to the above goals, the Core Planning Group identified overarching issues that relate to all of the goals along the continuum of care. These issues include:

1. Health disparities;
2. Access to quality care; and,
3. Expanded use of telehealth technologies.

These issues are interrelated in that access to and quality of care varies by disparate groups, and telehealth technologies offer one way to increase access, particularly in underserved areas.

Recommendations to address these issues focus on:

1. Reducing out-of-pocket costs, e.g., co-payments and other personal expenses;
2. Increasing the effectiveness of public awareness and education initiatives, by tailoring and targeting content and materials to disparate populations;
3. Increasing use of community health workers and health care extenders in underserved areas;
4. Improving coordination of care across health care specialties;
5. Increasing availability of medical care homes for at-risk populations;
6. Strengthening safety net services for the poor, i.e., those providers that organize and deliver a significant level of health care and other related services to uninsured, Medicaid, and other vulnerable patients; and,
7. Developing administrative and regulatory structures and technical infrastructure to extend telehealth technologies to more areas and to expand their use along the continuum of care, including secondary prevention and rehabilitation/long term care.

The actions outlined in this Plan provide a roadmap to reduce the burden of cardiovascular disease in North Carolina through the collective work of many partners. To be successful with Plan implementation, and accomplishment of the goals and objectives outlined in the Plan, this critical work will require actions at both the clinical and community levels by scores of individuals and organizations. These actions will be most effective when they are appropriately and strongly linked.

## Background and History

*Additional information is posted on the Start With Your Heart website.*

In 1994, North Carolina's state health department had no ongoing sources of funds for the prevention of heart disease and stroke, despite the fact that these were the first and third leading causes of deaths, disabilities, and health care costs in the state. In response to this situation, an internal work group in the state health department developed a preliminary plan for heart disease and stroke prevention. The leaders of 25 key partner organizations reviewed and endorsed the plan. It included a list of 10 recommended activities, the first of which was to establish a legislatively appointed and funded Heart Disease and Stroke Prevention (HDSP) Task Force for North Carolina. The purpose was to raise awareness among legislative, professional, and community leaders of the severity, prevalence, and preventability of heart disease and stroke and to obtain the necessary resources to combat these conditions.

Influential leaders from organizations including the American Heart Association, the N.C. Medical Society, the N.C. Hospital Association, the state's four academic medical centers, and others collaborated with the state health department's Division of Community Health to support legislation establishing the Task Force. That legislation, passed in August of 1995, established the Heart Disease and Stroke Prevention Task Force (TF) and listed three main charges for the group:

- To develop a profile of the burden of heart disease and stroke in North Carolina;
- To publicize that burden and its preventability; and,
- To develop a comprehensive statewide plan to prevent heart disease and stroke.

The legislation listed 27 appointed member slots, including six legislators and representatives of designated partner organizations, distinguished professionals, heart attack and stroke survivors, and two at-large members. It also appropriated \$100,000 a year for two years to fund two positions, to be placed in the Division of Public Health (DPH), and other needed resources.

The TF held its first meeting at the N.C. Legislature on February 1, 1996. It established four standing committees, as well as an Operational Management Group consisting of the chair and vice-chair of the TF, chairs of the committees, and the executive director to address issues that might arise between TF meetings.

In 1997, the Legislature extended funding for the TF for another two years. The name of the Task Force was later changed to The Justus-Warren Heart Disease and Stroke Prevention Task Force (JWTF) in honor of two early legislative leaders who were champions for its establishment and continuation.

North Carolina's investment in the JWTF and its activities paid off in 1998 when the Centers for Disease Control and Prevention (CDC) made funding available for Cardiovascular Health (CVH). The state was uniquely positioned to compete for this funding, thanks to the structure already in place with the JWTF, matching state funds, and strong state and local partnerships. North Carolina was one of only two states that received this initial federal funding at the implementation (highest) level. CDC's program called for a focus on policy and environmental changes to increase physical activity and improve nutrition. It also called for collaboration with the state's Tobacco Prevention and Control (TPC) Program to decrease tobacco use and exposure.

With the awarding of CDC funding and the launching of the first state plan, the Legislature considered disbanding the JWTF and replacing it with a smaller advisory committee. Members and partners advocated for its continuance, and the Legislature agreed and made funding of the JWTF a recurring item in the state budget.

### **Development and Selected Early Accomplishments of the TF: 1996 – 2003**

- Statewide Convocation of Community Leaders to Prevent Heart Disease and Stroke and *Making it Happen*, published proceedings of the Convocation in 1996.
- “Save Your Sweet Heart”, first Legislative Heart Health Day, 1997, held biennially every odd year until 2009.
- First edition (1997) of *The Burden of Heart Disease and Stroke in North Carolina* was printed and has been updated periodically..
- Legislative funding was extended from 1997 through 1999 with additional appropriations for:
  - a CVD Data Unit for one year; and,
  - a public awareness campaign for two years.
- CDC award in 1998 of \$1.25 million/year for five years for the Heart Disease and Stroke Prevention (HDSP) Program. Beginning in 1999, the HDSP program awarded \$100,000 a year to each of six regions of the state, with subsequent additional funding for two “lead” counties to target African Americans.
- First Cardiovascular Disease (CVD) Data Summit was held in 1998 with publication of *Findings and Recommendations*.
- Second CVD Data Summit was held in 1999 with a focus on stroke. The summit included South Carolina and Georgia, resulting in the development of the Tri-State Stroke Network (TSSN). CDC awarded funds for the TSSN in 2000.
- “Start With Your Heart” public awareness campaign starts in 1998 with outdoor advertising.
- Publication of the *NC Plan to Prevent Heart Disease and Stroke 1999 – 2003*.
- Partnership with Subway Sandwich stores including \$560,000 value of co-sponsored TV ads in 1999.
- Publication: *Unexplained Stroke Disparity: Report and Recommendations from Three Southeastern States* – Tri-state Stroke Network (TSSN), 2000.
- Non-recurring state funding was provided in 2000 for “Strike Out Stroke,” a public education program targeting hypertension and stroke in African Americans. The Tri-State Stroke Summit was held annually from 2001- 2010 when CDC funding for stroke networks was discontinued.
- Funds were awarded by CDC in 2002 to the University of North Carolina at Chapel Hill to lead a collaborative effort to develop a prototype for the N.C. Stroke Registry. After this successful project, CDC awarded a three-year grant in 2004 to the HDSP Program to implement the NC Stroke Care Collaborative, (NCSCC), originally the NC Acute Stroke Registry.
- Funds were awarded by CDC in 2002 for a new five-year cycle of the HDSP Program. “*NC Community Change Chronicles*” - State and local HDSP success stories were added as a continuing feature on website.
- New “Start With Your Heart” Public Awareness campaign in 2002.

Among other changes over the years, the JWTF adapted to a 2003 change in CDC priorities, which required states funded for heart disease and stroke prevention to shift their focus downstream to

address hypertension, dyslipidemia, and diabetes, as well as emergency response for heart attacks and strokes. This involved:

- A new emphasis on changing systems and improving quality along the continuum of care from risk factor prevention through early detection and treatment of risk factors and acute events through to recovery.
- Additional partners and resource persons with the focus on proven strategies that could produce measurable changes in population health.
- An increasing focus on stroke, especially in the Stroke Belt “Buckle” states.

### **Selected Accomplishments Following CDC’s Changed Focus:**

- “NC Plan to Prevent Heart Disease and Stroke 2005 – 2010” – 2<sup>nd</sup> state plan was published.
- “The Burden of Cardiovascular Disease in N.C., 2<sup>nd</sup> edition, 2006, was published with periodic updates.
- Partnership was formed with Carolinas/Georgia Chapter of American Society of Hypertension (ASH) in 2004 to provide Continuing Medical Education regarding new Hypertension (HTN) Guidelines (The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure).
- TSSN – Geographic Information Systems (GIS) Mapping Project in 2004 for stroke care resources in North Carolina, South Carolina and Georgia.
- N.C. House voted in 2005 to ban smoking on House floor – influenced by Legislative Heart Health Day. In 2007, the Legislature banned smoking in all government buildings.
- The Clean Indoor Air Bill passes, effective January 1, 2010.
- TV Spots were developed and shown statewide: “Lost in Translation”, 2006 award winner; “Know Your Numbers”, 2006.
- “Bar Flies” regarding Second Hand Smoke targeted policy makers, 2008 award winner.
- CDC provided funding in 2006 for the DHHS Office of Emergency Medical Services (OEMS) to develop an Acute Stroke Care Toolkit for Emergency Responders.
- In 2006, JWTF was directed by the Legislature to establish a Stroke Advisory Council (SAC) to develop a Stroke System of Care (SSoC) Plan, and the SAC established work groups. SAC recommendations were presented to the General Assembly in 2007. The Association of State and Territorial Health Officials (ASTHO) awarded funding in 2010 to develop SSoC Plan, which was published in 2011.
- Legislature appropriated funds in 2007 to:
  - Implement recommendations of SAC;
  - Continue operations of SAC;
  - Fund the NCSCC; and,
  - Fund “Stroke Signs and Symptoms” awareness campaign.
- NCSCC started the Innovative Quality Improvement (QI) Grant Program for participating hospitals in 2007.
- QI webinars were held by NCSCC in partnership with TSSN in 2007.
- Data linkage project was established between NCSCC and OEMS following a CDC grant for a feasibility study in 2008.
- Advanced Stroke Life Support (ASLS) trainings were held for pre-hospital and hospital personnel and representatives from other NCSCC partner organizations) across the state in 2008.

- Non-recurring State funding in 2011 of \$450,000 was granted for a public awareness campaign and SAC operations.
- New CDC award was given in 2012 for three years for the NCSCC to include the EMS data linkage component.

### **Selected Publications:**

- *“Establishing a Legislative Task Force to Prevent Heart Disease and Stroke”*, 2004
- *“Hosting a Legislative Heart Health Day”*, 2004
- *“The Burden of Cardiovascular Disease in N.C.”*, 1997, with annual updates; revised in 2006
- *“Impact of Stroke in the Southeastern Region”* (TSSN) 2008
- *“NC Stroke Rehabilitation Programs and Services – (SAC) 2009*
- *“The North Carolina Smoke Free Restaurants and Bars Law and Emergency Admissions for Acute Myocardial Infarctions: A Report to the State Health Director”* (Tobacco Prevention and Control Branch) 2011
- *“N.C Stroke System of Care Plan”* (SAC) 2011
- In addition, staff and partners have made numerous presentations to public and professional groups and have published numerous articles in juried journals about the work supported by the JWTF and its partners.

The following data testify to the effectiveness of the JWTF and the partnerships forged in the groundbreaking events of 1995 and in progress made since then:

- Heart disease death rates among North Carolinians decreased 32.7 percent from 2000 – 2009, a decline that was faster than the national rate
- N.C. stroke death rates decreased 37.9 percent from 2000-2009
- North Carolina met its Healthy People 2010 goals for stroke and heart disease death rates in 2009
- Heart disease is now the second leading cause of death in North Carolina (after all cancers combined)
- Stroke is now the fourth leading cause of death in the state (after decades at third place)
- Between 1995 and 2007, hospital discharges for those with a definitive diagnosis of heart disease dropped an average of 6,716 a year, representing an approximate cumulative savings of \$249,009,132.

## Mission Statement and Framework for Action

### Mission Statement

Increase the quality and years of healthy life through heart healthy and stroke smart environments, improved cardiovascular disease prevention, treatment and rehabilitation, and the elimination of health-related disparities.

The following Framework for Action, adopted by the State Plan Core Group, was adapted from The North Carolina Plan to Prevent Heart Disease and Stroke 2005 – 2010. The Framework was originally developed for ***A National Action Plan to Prevent Heart Disease and Stroke*** first published by CDC in 2003. Goals were developed by the Core Group and added to the framework as refined by work groups representing areas along the continuum of care. The Framework shows a logical progression from a vision for the future of North Carolinians' cardiovascular health to intervention approaches to prevent and manage heart disease and stroke in North Carolina.

The vision begins with social and environmental supports and individual behaviors that promote cardiovascular health. With these in place, the risk factors for cardiovascular disease are minimized and managed, which in turn reduces the incidence of acute cardiovascular events. These supports and behaviors minimize recurrence, maximize functionality, and improve quality of life for those who do experience a heart attack or stroke.

The four main goals focus on the continuum of care from primary prevention through rehabilitation to long-term care. They contribute to the overarching goal of increasing quality and years of healthy life through improved cardiovascular health and the elimination of health-related disparities.

The state's HDSP Program is critical to but not alone in implementing this plan. Many strategies are being addressed by partners. The program has a largely supportive role in primary prevention efforts. Program partners, many of which are listed under Key Organizations, are working collaboratively to implement strategies to achieve improvements in individual care, community initiatives, and health care system enhancements.

Primary prevention interventions are directed toward policy and environmental changes to support and encourage heart healthy behaviors and communities. Risk factor detection and control strategies are directed toward preventing or delaying acute cardiovascular events as well as chronic conditions for those who are at risk. System changes are needed to improve delivery of services along the continuum of care for all North Carolinians who develop cardiovascular disease and/or experience acute events.



## A Vision of the Future

Social and Environmental Conditions favorable to cardiovascular health	Behavioral Patterns that promote cardiovascular health	Low population risk	Few cardiovascular events/rare deaths	Full functional capacity/ low risk of recurrence	Good quality of life until death
<b>Overarching Goal:</b> Increase quality and years of healthy life through improved cardiovascular health and the elimination of health-related disparities					
<b>Goal 1</b>	<b>Goal 2</b>	<b>Goal 3</b>	<b>Goal 4</b>		
Increase the proportion of North Carolinians who live healthy lifestyles conducive to cardiovascular health	Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled	Increase the proportion of North Carolinians who receive appropriate integrated emergency and acute care for cardiovascular events	Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute and transitional care following cardiovascular events		

## Roles of State Program

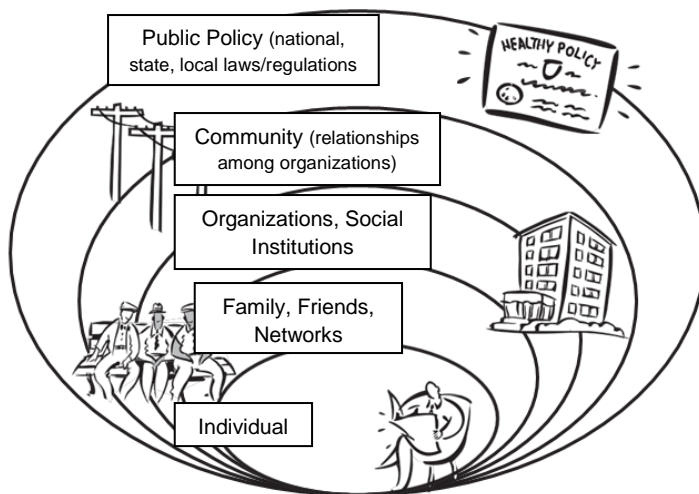
Prevent development of primary risk factors for heart disease and stroke  <i>Supportive Role</i>	Promote <b>A</b> spirin therapy* Control High <b>B</b> lood Pressure* Control High <b>C</b> holesterol* Promote <b>S</b> moking cessation* * =ABCS  <i>Direct Program Role</i>	Increase awareness of signs and symptoms Improve emergency response Improve quality of care Eliminate disparities
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## Intervention Approaches

<b>Policy, Environmental &amp; Systems Change</b>	<b>Risk Factor Detection and Control</b>	<b>Emergency Care/ Acute Case Management</b>	<b>Rehabilitation/ Long-term Case Management</b>	<b>End of Life Care</b>
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The framework is adapted from [A Public Health Action Plan to Prevent Heart Disease and Stroke](#), USDHHS, CDC, 2003, [North Carolina Plan to Prevent Heart Disease and Stroke, 2005-2010](#), DHHS, DPH, 2005, and from [National Heart Disease and Stroke Prevention Program Staff Orientation Guide](#), USDHHS, CDC, 2011. It includes the components from the CDC 2011 framework, the Intervention approaches from the 2005 – 2010 NC Plan, and the continuum of care goals for the 2012 – 2017 NC Plan.

Commitment to the HDSP mission requires efforts and interventions targeting individual, interpersonal, organizational, community, and public policy levels as depicted in the social-ecological model.



Addressing all levels at the same time produces more enduring changes than a focus on one level, particularly the individual, alone. While population-level changes in health outcomes require changes in the health and behaviors of individuals, the required individual changes are unlikely to occur in isolation. Changes are even less likely to persevere in the absence of supporting changes in social networks and organizations where individuals interact. Individuals and organizations alike influence and are influenced by the social institutions and public policies within which they operate.

The logic model, which is a graphic description of the HDSP Plan, addresses all levels of the social-ecological model. It begins with inputs from state and federal mandates and resources, from critical partners within communities, organizations, and institutions. The Plan also requires a concerned and engaged public consisting of individuals, families, and organizations.

Groundwork involves all the activities around assessment and evaluation, which guide and inform about needs, direction, and effectiveness. Developing and disseminating planning products, recruiting new partners, maintaining existing partnerships, and building and sustaining the structure of the JWTF are other ongoing activities that support the program. Strategic actions and programs are needed to implement interventions to achieve desired outcomes.

Short-term and intermediate outcomes are changes at the different levels of the social-ecological model that lead to long-term outcomes at the population level. Achieving these long-term outcomes will benefit all North Carolinians by significantly decreasing the burden of cardiovascular disease.

## Heart Disease and Stroke Prevention Logic Model

Inputs	Activities		Outcomes	
	Groundwork	Strategic Actions	Short/Intermediate	Long Term
Legislative mandate and funding  Justus-Warren Task Force (JWTF) Members and Stroke Advisory Council (SAC)  Internal and external partners  Resource persons  CDC guidance and resources  Engaged public	<b>Assessment</b> Burden Data Evidence-based Practices Gap Analysis Hospital Inventories  <b>Planning Products</b> Burden Document and Updates State Plan Statewide Stroke System Care Informational Resources and Distribution Plans  <b>Recruit/Retain Partners</b>  <b>JWTF Organization:</b> Committee Structure	<b>Public Education/ Awareness regarding:</b> Signs and Symptoms; Immediate Responses Risk Factors and Importance Accessing Resources  <b>Capacity Building for:</b> <u>Providers:</u> Evidence-based Practices Partnering Strategies  <u>Staff:</u> Evidence-based Practices Partnering Strategies Media Strategies Advocacy Strategies  <u>Legislators and Partners:</u> Education about Changing Issues/Needs  Advocacy for New and/or Changes to Existing Laws, Programs, Policies, Systems	<b>Public:</b> <u>Knowledge, Skills and Attitudes regarding:</u> Preventive Health Behaviors Signs, Symptoms and Immediate Responses Resources and Services  <u>Policy/System Changes regarding:</u> Healthy Lifestyle Opportunities Risk Factors Immediate Responses Access to Services  <b>Providers/ Organizations</b> <u>Policy/System Changes regarding:</u> Emergency Response Timely and Appropriate Treatment Rehabilitation Telehealth  <b>Providers/ Practitioners:</b> <u>Knowledge, Skills &amp; Attitudes regarding:</u> Evidence-based Practices  <u>Changes in Practice regarding:</u> Emergency Response Appropriate Treatment Rehabilitation Telehealth	Decreased Disparities in Risk Factors, Cardiovascular Events, Mortality, and Access to Health Services  Decreased Incidence and Prevalence of Risk Factors  <b>Decreased Incidence and Prevalence of Cardiovascular Diseases</b>  <b>Decreased Morbidity and Mortality from Cardiovascular Diseases</b>

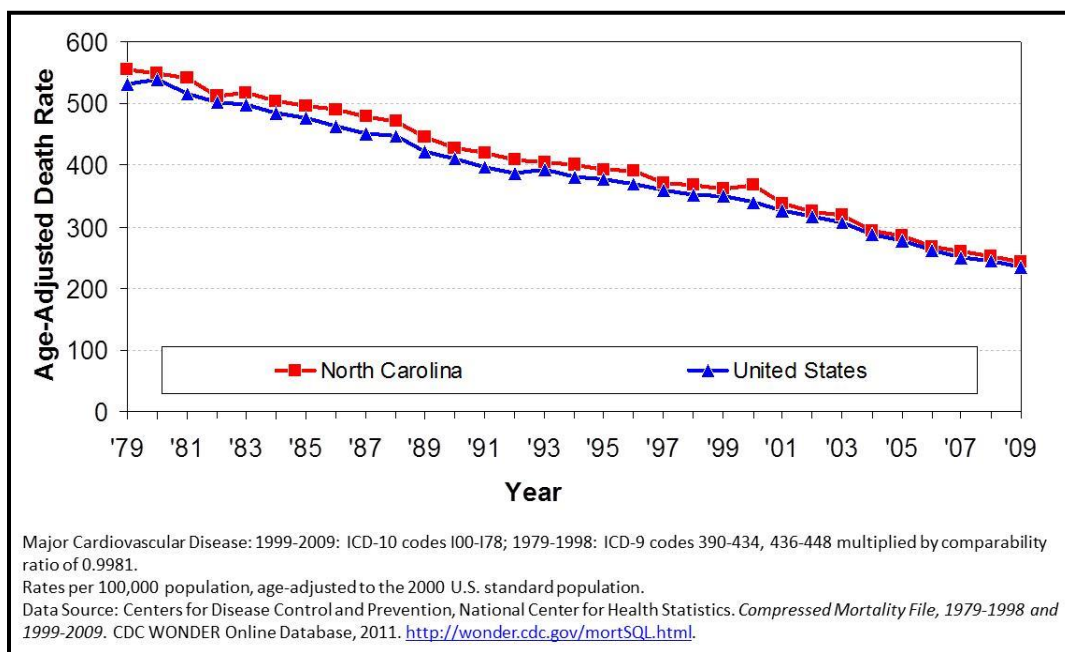
## A Summary of the Burden of Cardiovascular Disease in North Carolina

This section provides a brief summary of the most recent data related to cardiovascular disease in North Carolina, specifically addressing mortality and morbidity as well as economic impact, risk factors, and disparities.

### Mortality

Over the last three decades, mortality rates due to major cardiovascular disease (CVD) in North Carolina have been cut in half from about 555 deaths per 100,000 persons in 1979 to 242 deaths per 100,000 persons in 2009<sup>1</sup>. While CVD death rates in North Carolina remain slightly higher than the national average, the difference has narrowed (Figure 1). North Carolina's 2009 age-adjusted major CVD death rate was 20th highest in the nation<sup>1</sup>.

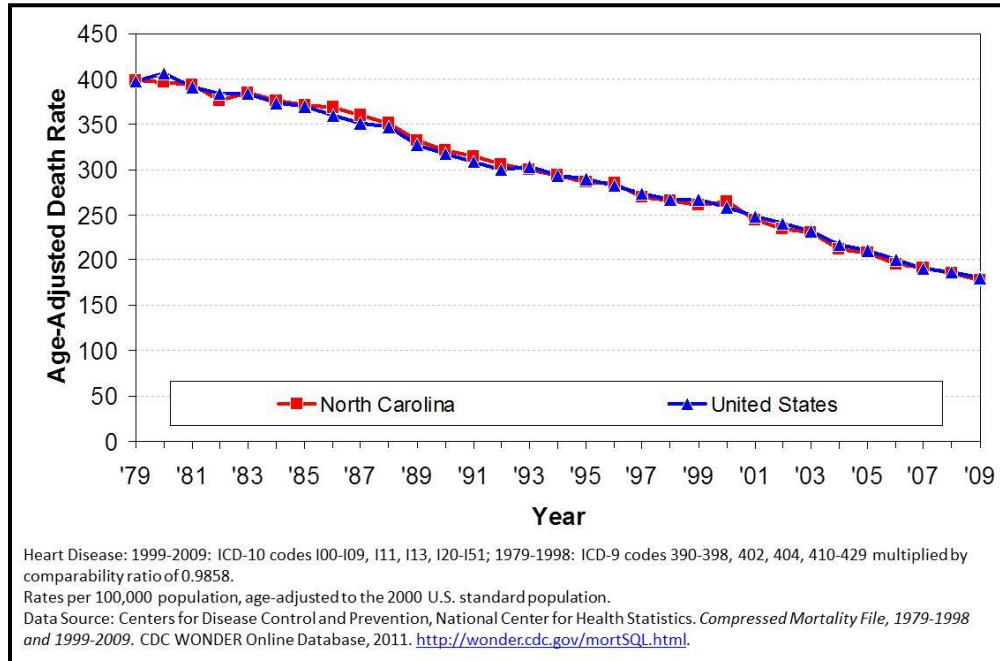
**Figure 1: Age-adjusted Major Cardiovascular Disease Death Rates, 1979-2009**



Total cardiovascular disease, which includes heart disease, stroke, all other diseases of the circulatory system, and congenital cardiovascular defects, is the leading cause of death in North Carolina, accounting for 29.6 percent of all deaths in 2010. Considered separately, heart disease is the second and stroke the fourth leading cause of death in North Carolina<sup>2</sup>.

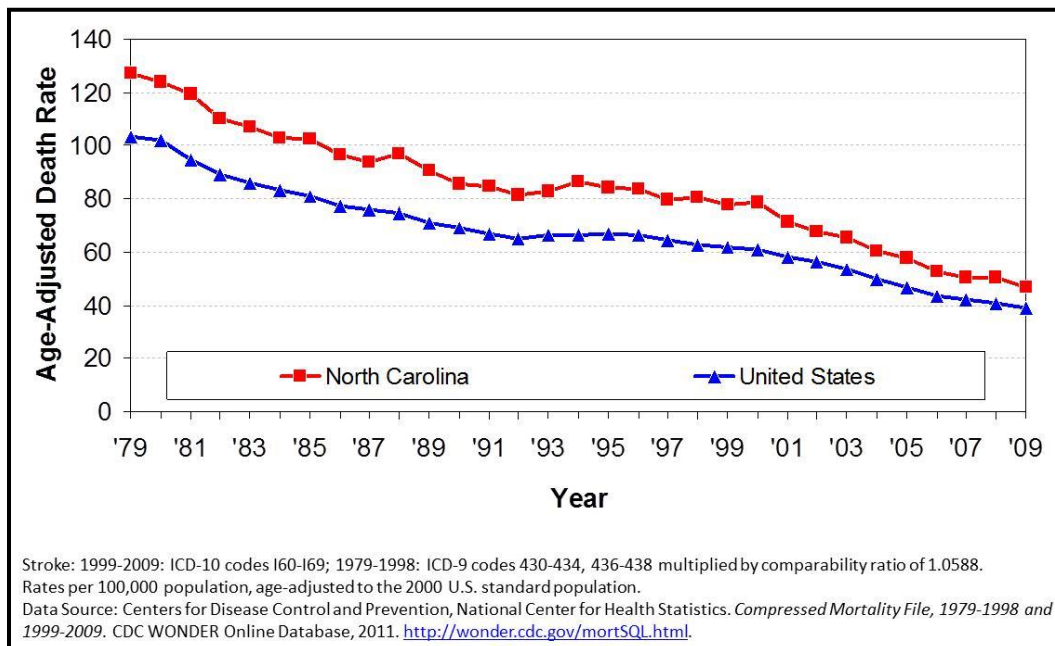
Figure 2 illustrates age-adjusted mortality trends for heart disease in North Carolina and in the United States from 1979 to 2009. Mortality from heart disease in North Carolina has been practically equal to the national average over the last three decades, declining from 399 deaths per 100,000 persons in 1979 to 178 deaths per 100,000 persons in 2009. In 2009, North Carolina had the 23rd highest heart disease mortality in the nation<sup>1</sup>.

**Figure 2: Age-adjusted Heart Disease Death Rates, 1979-2009**



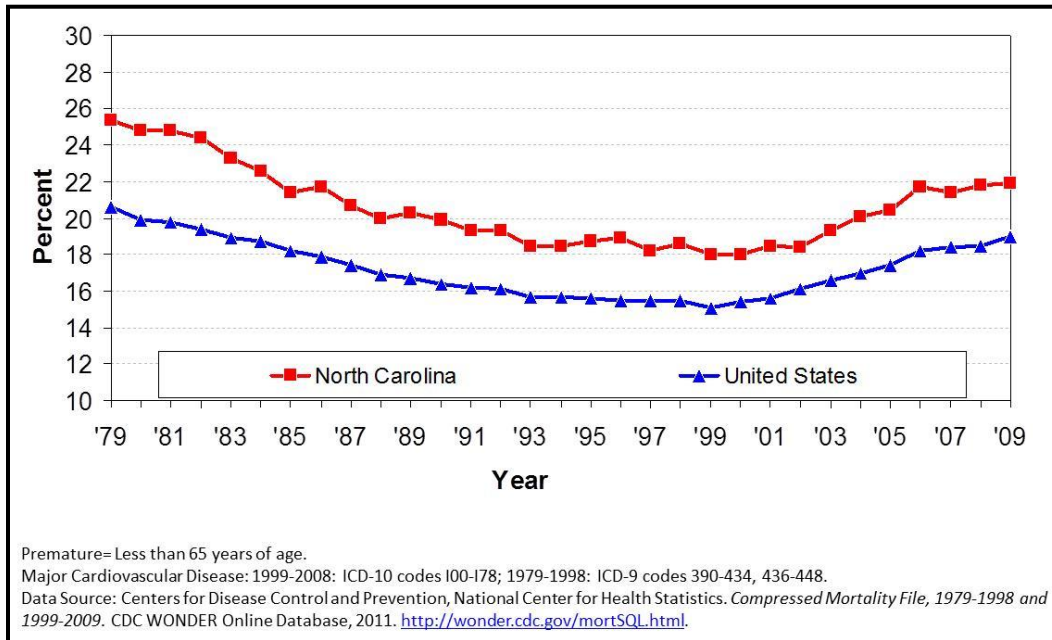
Unlike heart disease, stroke mortality has been consistently higher in North Carolina than in the United States as a whole. While the difference has narrowed, especially in the last 10 years (Figure 3), North Carolina still has the seventh highest stroke mortality rate in the nation<sup>1</sup>. The difference in stroke mortality between the United States and North Carolina accounts for the overall CVD mortality in North Carolina being higher than the U.S. national average as shown in Figure 1. Achieving additional progress in the reduction of overall CVD mortality in North Carolina will require continued emphasis on prevention measures that reduce the incidence of strokes as well as improved access to care and coordination of care along the stroke care continuum.

**Figure 3: Age-adjusted Stroke Death Rates, 1979-2009**



While overall mortality for major CVD has been declining as shown in Figures 1 – 3, the proportion of premature CVD deaths (people under 65 years old) has been rising since the late nineties (Figure 4). This trend is at least partially attributable to a rise in modifiable risk factors (hypertension, obesity, high cholesterol, and diabetes) in the last decade, and it underscores the need to decrease the prevalence of all CVD risk factors.

**Figure 4: Premature Deaths as a Percentage of all Major Cardiovascular Disease deaths, North Carolina, 1979-2009**

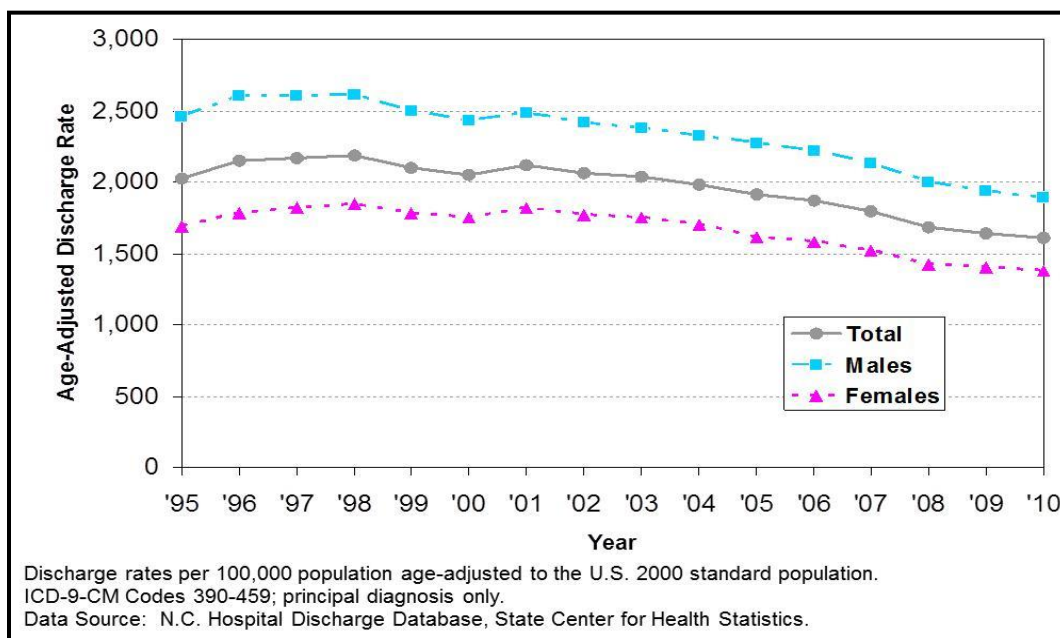


## Morbidity

According to the 2011 N.C. Behavioral Risk Factor Surveillance System (BRFSS) Survey, 9.2 percent of non-institutionalized adults (over 650,000 people) have a history of some kind of cardiovascular disease<sup>3</sup>. Since individuals who live in long term care facilities are not included in the BRFSS and may have a history of CVD, the preceding numbers probably underestimate the true prevalence of CVD conditions in North Carolina.

Figure 5 shows that hospital discharge rates for CVD in North Carolina have been dropping since the late nineties. Despite this drop, cardiovascular disease remains the leading cause of hospitalization in North Carolina, accounting for 162,329 hospital discharges (about 16.7 percent of all discharges) in 2010<sup>4</sup>.

**Figure 5: CVD Hospital Discharge Rates, North Carolina, 1995-2010**



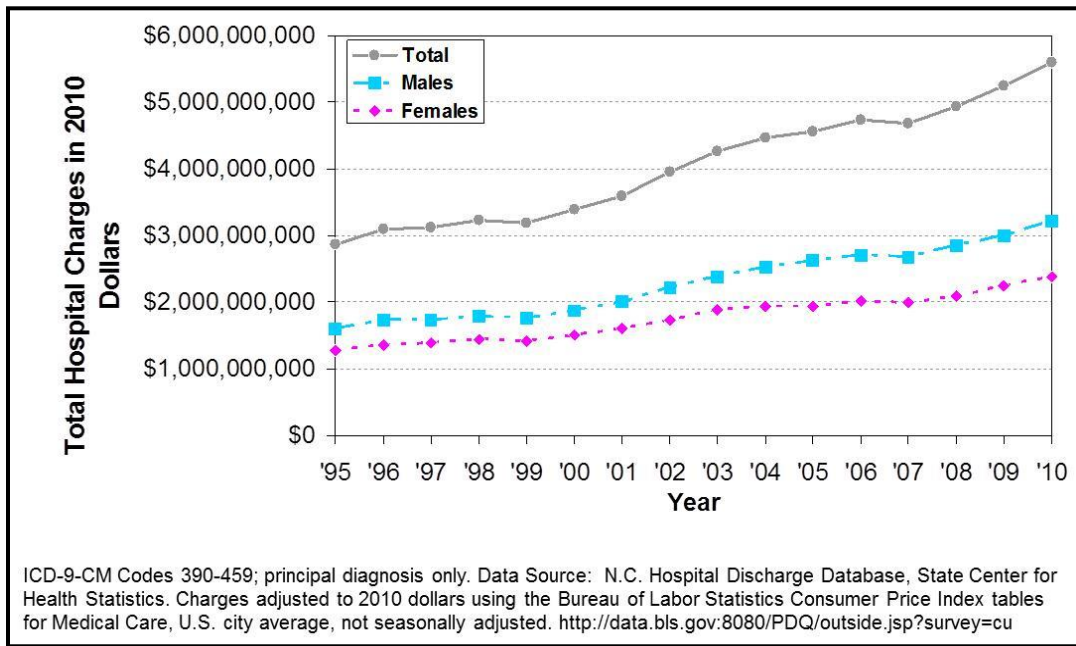
## Economic Impact

There are enormous costs, direct and indirect, associated with cardiovascular disease. Direct costs are those related to medical care provided, such as hospital care, physician and nursing services, diagnostic tests, and medications. Indirect costs are those incurred as a consequence of illness that are not part of medical service. They include lost productivity due to morbidity and mortality and are more difficult to estimate<sup>5</sup>. Cardiovascular disease conditions have a tremendous potential to accrue indirect costs because of their ability to cause major disability. Heart disease and stroke are among the top 10 causes of disability among non-institutionalized U.S. adults<sup>6</sup>.

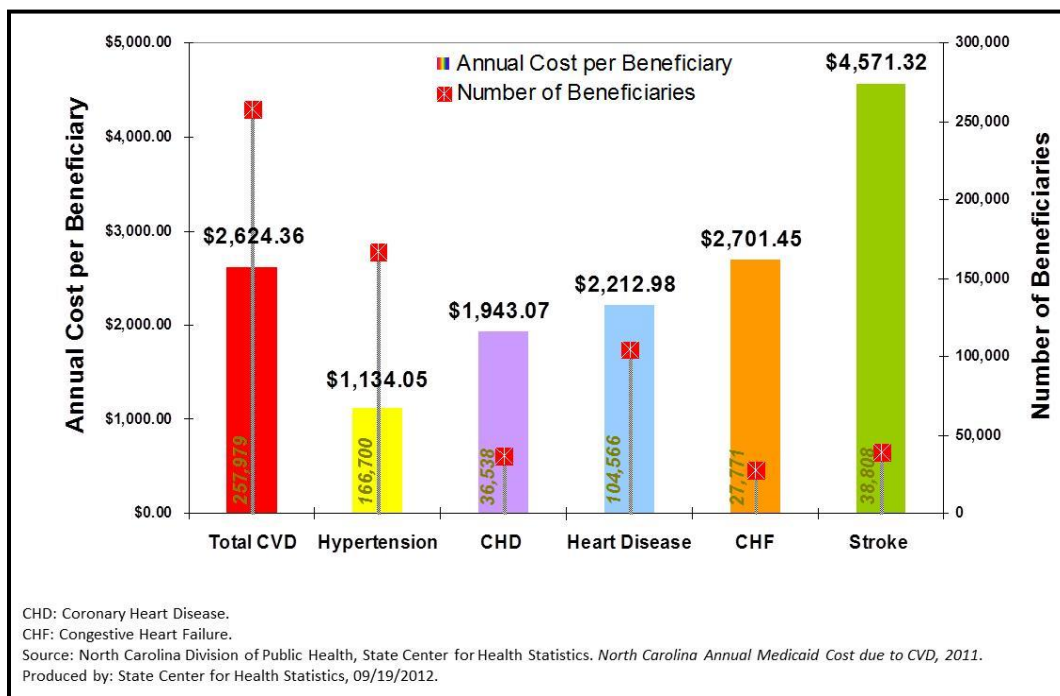
Total hospital charges (excluding indirect costs and other health care charges) for cardiovascular disease have practically doubled from about \$2.8 billion in 1995 to over \$5.5 billion in 2010 (Figure 6), despite a drop in hospital discharge rates over the same period<sup>4</sup>. The average lifetime cost of ischemic stroke for an individual in the United States is about \$140,048<sup>7</sup>. In 2011, the North Carolina Medicaid Program spent more than \$4,500 per Medicaid beneficiary for stroke management (excluding long term care and rehabilitation), compared to about \$1,100 per beneficiary for the management of hypertension (Figure 7). Given the considerably higher direct

and indirect costs of stroke compared to hypertension, and given that about 34 percent of all strokes are attributable to hypertension<sup>9</sup>, management of high blood pressure should be a cornerstone of stroke prevention efforts.

**Figure 6: Cardiovascular Disease Hospital Charges, North Carolina, 1995-2010**



**Figure 7: Annual Medicaid Costs per Beneficiary for Selected CVD Sub-Categories, North Carolina, 2011**



The hefty economic burden associated with CVD continues to grow despite and partly because of the progress made in reducing mortality. The American Heart Association (AHA) projects that the

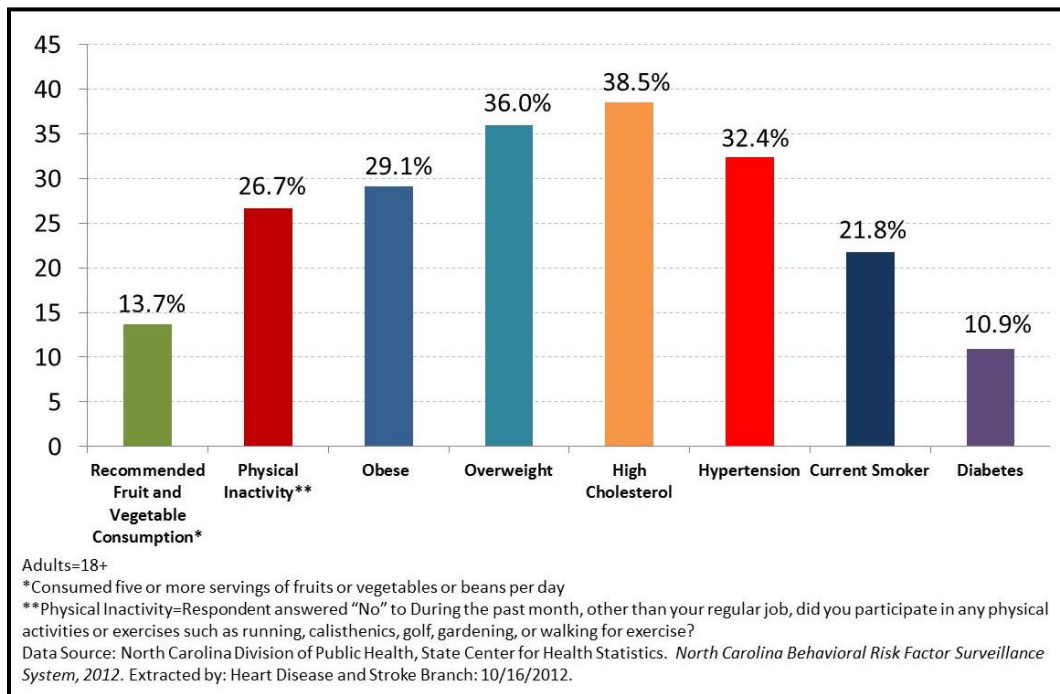


direct costs of CVD in the United States will triple from \$272.5 billion in 2010 to \$818.1 billion in 2030, while indirect costs will grow from \$171.7 billion in 2010 to \$275.8 billion in 2030<sup>5</sup>.

### Risk Factors

Risk factors can both promote the onset of cardiovascular events in previously healthy individuals and accelerate the progression of disease in those already suffering from CVD. Nine potentially modifiable risk factors have been shown to account for over 90 percent of the risk of heart attacks and stroke. These factors include hypertension, abnormal lipids (e.g. cholesterol), current smoking, obesity, unhealthy diet, physical inactivity, diabetes, alcohol intake, and psychosocial factors (psychological stress, financial stress, major adverse life events, loss of control, depression). The relative importance of these risk factors varies with the type of cardiovascular condition, gender, age, and other factors<sup>9-11</sup>. Figure 8 summarizes the 2011 prevalence estimates for some potentially modifiable CVD risk factors in North Carolina.

**Figure 8: Prevalence of Modifiable CVD Risk Factors, North Carolina, 2011**



In a 2011 policy statement on prevention of cardiovascular disease, the AHA noted that efforts aimed at either preventing the development of CVD risk factors altogether or modifying these risk factors when they are already present "... are all likely to be cost-effective and often cost-saving compared with common bench marks" and that most of the cost of CVD is related to care rather than prevention<sup>5</sup>.

### Disparities

Mortality, morbidity, and economic impact of CVD vary by race/ethnicity, gender, and age as well as by socioeconomic status and geographic location. There has been a relative decline in CVD mortality among all major racial/ethnic categories as shown in Figure 9. However, non-Hispanic African Americans still experience disproportionately higher mortality from CVD compared to other racial/ethnic groups. Mortality from CVD is considerably lower among Hispanics and Asians with rates staying pretty much unchanged over the past decade.

**Figure 9: Major Cardiovascular Disease Death Rates by Race/Ethnicity, North Carolina, 1999-2009**

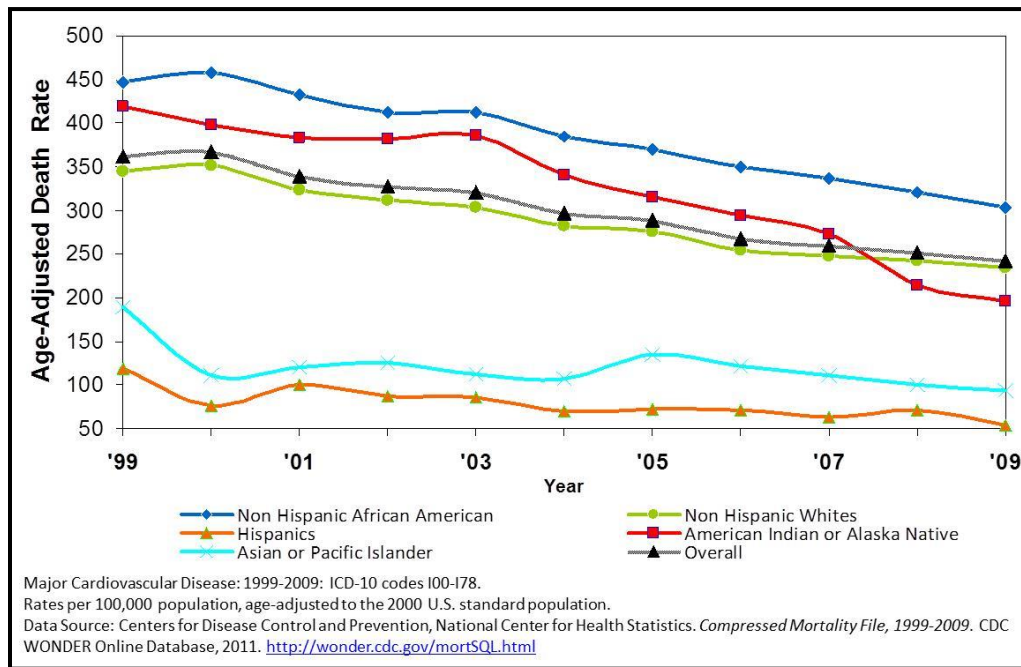
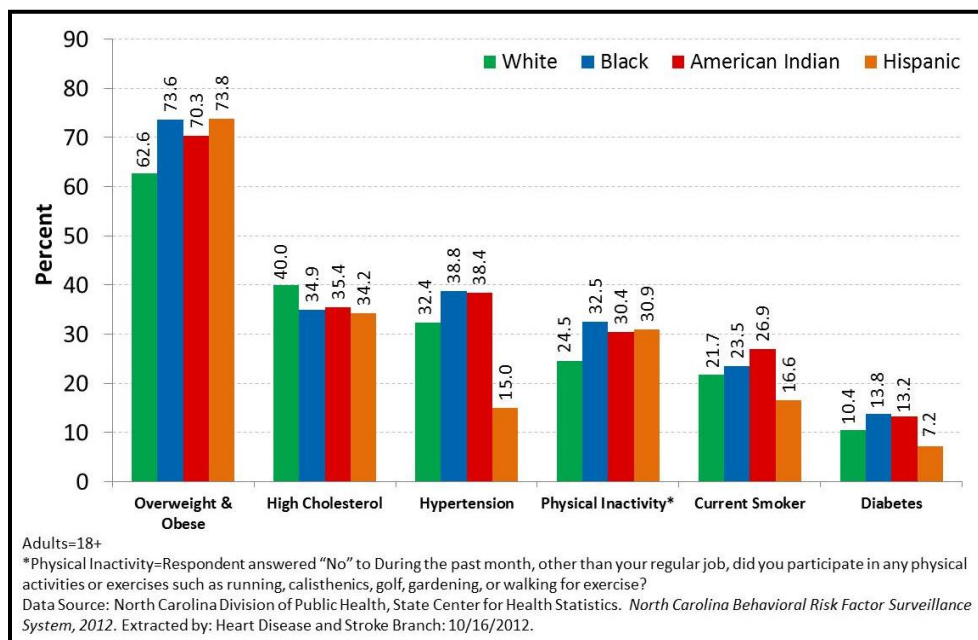


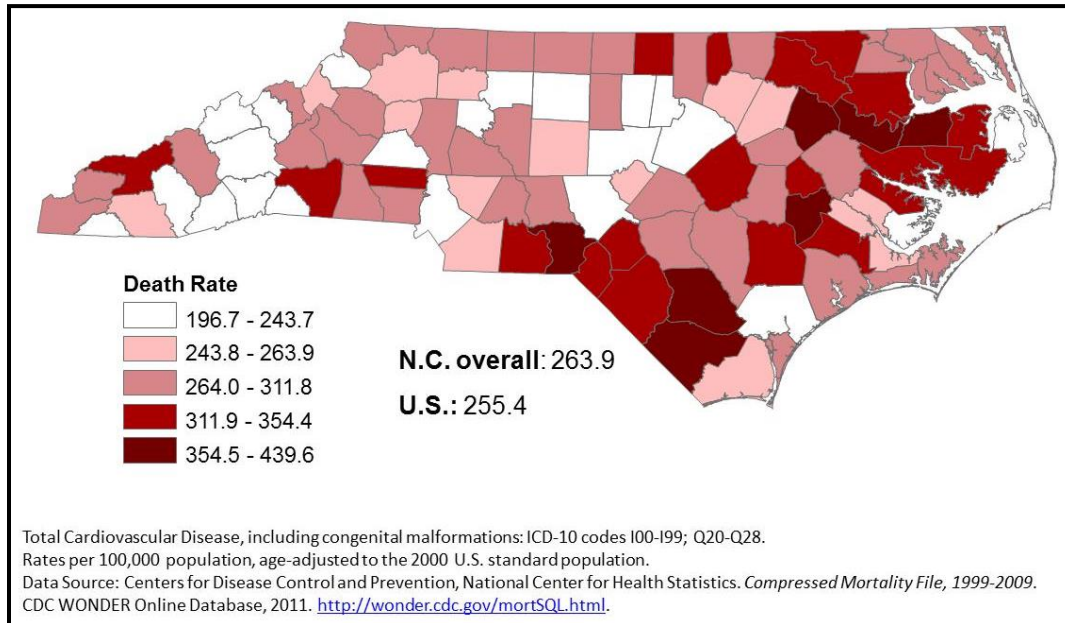
Figure 10 shows racial/ethnic disparities for modifiable risk factors. Except for obesity and physical inactivity, the prevalence of the modifiable CVD risk factors illustrated is lower in Hispanics compared to the other racial groups. American Indians/Alaska Natives have a particularly high prevalence of smoking, diabetes, and hypertension. Blacks/African Americans have a high prevalence of obesity, high blood pressure, physical inactivity, current smoking, and diabetes, while Whites have the highest prevalence of high cholesterol.

**Figure 10: Prevalence of Modifiable CVD Risk Factors by Race/Ethnicity, North Carolina, 2011**



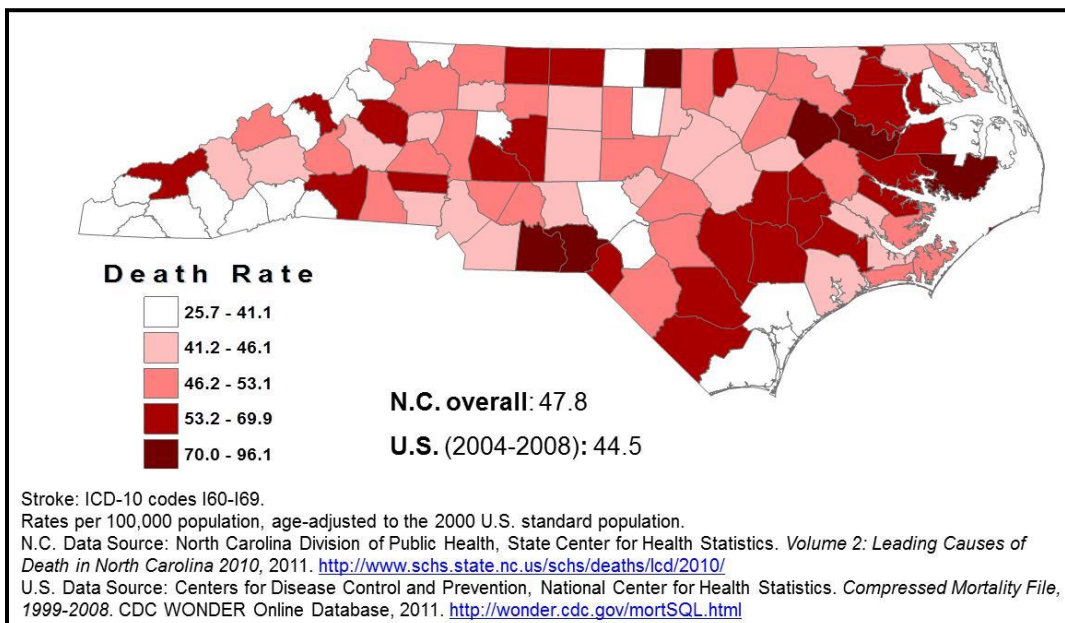
Finally, there is considerable geographic variation in the burden of cardiovascular disease across the state of North Carolina with the eastern part of North Carolina bearing the brunt of the state’s CVD mortality burden (Figure 11).

**Figure 11: Cardiovascular Disease Death Rates by County of Residence, North Carolina, 2005-2009**



North Carolina is part of the Stroke Belt, an eight to 12 state region, mostly in the southeast, that historically has had substantially higher stroke death rates compared to the rest of the nation<sup>12-14</sup>. The eastern counties of the state, along with the coastal plains region of Georgia and South Carolina, form the “buckle” of the Stroke Belt, a region that has had the highest stroke mortality rates in the nation for over three decades<sup>15,16</sup>.

**Figure 12: Stroke Death Rates by County of Residence, North Carolina, 2006-2010**



## **Conclusion**

In summary, while there has been a considerable decrease in mortality due to cardiovascular disease in North Carolina, heart disease and stroke remain the second and fourth leading causes of death, respectively. Overall, CVD mortality in North Carolina still lags behind the U.S. national average, mainly due to higher stroke mortality, and the percentage of premature CVD deaths is rising. In addition, non-Hispanic Blacks/ African Americans, the poor and less educated, and those who reside in the eastern portion of the state continue to be disproportionately affected by CVD, primarily due to a greater burden of risk factors.

There is also an increasing and unsustainable economic burden associated with CVD. Total hospital charges for CVD in North Carolina have doubled over the last 15 years, topping \$5.5 billion in 2010. Medicaid paid upwards of \$620 million in CVD claims in 2011. The aging of the population is expected to increase the prevalence of CVD in the coming years. For these and several other reasons, direct and indirect costs of CVD are projected to continue to rise at an exponential rate over the next two decades.

Timely diagnosis and effective treatment of acute CVD events are indispensable in reducing mortality and improving quality of life. However, prevention and control of risk factors has been shown to be both cost-effective and cost-saving compared to treatment. Prevention must therefore be emphasized as the centerpiece of all efforts aimed at reducing North Carolina's burden of cardiovascular disease.

***For more details and updates about the burden of cardiovascular disease in North Carolina, please visit the Justus-Warren Heart Disease and Stroke Prevention Task Force website: <http://startwithyourheart.com/Default.aspx?pn=CVDBurden>.***

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## Addressing the Burden: The Plan

The five-year plan is built around four main goals based on the continuum of care from primary prevention to rehabilitation and restoration, with a fifth goal related to data, monitoring, and evaluation. The four main goals are:

1. Increase the proportion of North Carolinians who live healthy lifestyles conducive to cardiovascular health.
2. Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled.
3. Increase the proportion of North Carolinians who have access to and receive appropriate integrated emergency and acute care for cardiovascular events.
4. Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute transitional care following cardiovascular events.

The fifth goal extends through all of the issues and primary goals: Develop and implement process and outcome evaluation plans and surveillance systems that utilize existing data, develop new data resources to track and report progress toward and achievement of goals and objectives, and assess and monitor the heart disease and stroke burden in North Carolina.

There are two main issues which cut across all of these goals. First is the uneven access to cardiovascular prevention, treatment, and management services across North Carolina. Second, and closely intertwined with the first, are health disparities themselves, i.e., differences in experience with risk factors, incidence of cardiovascular events, and access to health care based on sociocultural, economic, and geographic factors. Although more whites than minorities report having high cholesterol, minorities are disproportionately likely to have the other major risk factors and to experience cardiovascular events and death. Evidence of these disparities is presented in the findings reported in the Burden section of this document.

Contributing to problems of access to care are cost and reimbursement issues and unequal distribution of health care facilities and health care personnel, particularly physician specialists, with adequate capacity to meet demand along the continuum of care. Cost and reimbursement issues are particularly problematic for primary prevention services, for management of risk factors and chronic cardiovascular disease, and for rehabilitation. There are also sub-populations that experience significant health disparities. This plan calls for policies that provide for better reimbursement for health care services along the care continuum. There is a particular need for policies that seek to leverage additional resources and provide better reimbursement for specific health care services.

Given these commonalities, the following recommendations are made with the four main goals in mind:

**Reduce out-of-pocket costs** for primary prevention services, medical and non-medical approaches for controlling cardiovascular risk factors, and for rehabilitation and recovery services by:

1. Leveraging additional resources; and,
2. Promoting policies for reimbursement of these services.

**Increase accessibility** of public awareness and education programs and materials to disparate populations by:

1. Targeting geographic areas with low accessibility;
2. Promoting health literacy and developing/expanding culturally appropriate and relevant health education materials and programs;
3. Targeting health care and worksite settings with large disparate populations; and,
4. Increasing use of community health workers and health care extenders in underserved areas.

**Improve coordination** of care across health care specialties by:

1. Sharing patient information among health care providers;
2. Following up on referrals to other health care providers; and,
3. Encouraging all providers, including specialists, to incorporate conversations and information about risk factors (high blood pressure, obesity, etc.) in patient encounters.

**Decrease disparities** among race, ethnic, gender, educational, economic, and geographic groups in death and disability from and incidence of heart disease and stroke and the prevalence of their associated risk factors by:

1. Increasing availability of “medical homes” for at-risk populations;
2. Involving representatives from disparate populations in health care policy and decision-making;
3. Targeting geographic areas with low accessibility;
4. Improving reimbursement for prevention and control of major risk factors: hypertension, high cholesterol, obesity, smoking; and,
5. Strengthening safety net health care services for the poor.

Furthermore, it is recommended that administrative and regulatory structures, technical infrastructure, and reimbursement strategies be developed to extend telehealth technologies to more remote geographic areas and to provide more services along the care continuum. Many other states have employed a variety of means to develop and provide telemedicine systems that specifically target acute stroke care. This plan challenges North Carolina not only to expand telehealth capabilities for stroke care but also for heart disease and stroke along the continuum of care from primary prevention through rehabilitation and achievement and maintenance of optimum function. Use of these technologies would increase access to essential services and be more cost effective due to more efficient use of physicians, health care specialists, and other scarce resources across the state.

The plan’s writers developed this specific objective to guide expansion in the appropriate use of telehealth technologies in North Carolina.

**Telehealth Objective:** By 2017, increase capacity for providing appropriate treatment and services via telehealth technologies for North Carolinians along the continuum of cardiovascular care.

**Strategies:**

- T.1. Support policies and regulations that incorporate telehealth into all aspects of cardiovascular care in North Carolina from prevention and control of risk factors, the acute event, prevention of recurrent events, rehabilitation, and restoration to the highest

possible functional level.

- T.2. Support and promote appropriate reimbursement of telehealth services for all providers.
- T.3. Encourage the expansion of existing telehealth networks.
- T.4. Encourage and promote partnerships for health information technology (HIT) as it relates to the care of all North Carolinians with cardiovascular risk factors or disease.

## **Measuring Improvement**

### **Indicators:**

Number of facilities identified as a hub hospital for acute stroke care.

Number of facilities identified as a network hospital for acute stroke care.

Number of agencies using telehealth technology for preventive and rehabilitation services.

### **Measureable Outcomes:**

Baseline Measure: Four (4) active hub hospitals.

2017 Target: Increase the number of active hub hospitals to eight.

Baseline Measure: 0 agencies using telehealth technology for preventive and rehabilitation services.

### **Data sources:**

NC Stroke Advisory Council (SAC)

NCSCC/CDC Hospital Inventory and Updates



## 1: Primary Prevention of Cardiovascular Disease through Healthy Living

Substantial reductions in the burden of cardiovascular disease can be achieved by decreasing associated risk factors, primarily high blood pressure and high cholesterol. Lifestyle modifications that improve nutrition and physical activity, reduce tobacco use, and eliminate exposure to secondhand smoke can substantially lower these risk factors. These lifestyle modifications are supported through public education and awareness and through policy, system, and environmental changes that make healthy choices easier choices.

**Goal 1: Increase the proportion of North Carolinians who live healthy lifestyles conducive to cardiovascular health.**

**Objective 1.1:** By June 2017, increase the number of laws and/or policies that support reduction of cardiovascular risk factors (e.g., tobacco use and exposure, poor nutrition, and physical inactivity).

### Strategies:

- 1.1.1. Educate and inform key policymakers and other stakeholders about policy, system, and environmental factors that influence cardiovascular health and about the economic impact of cardiovascular disease.
- 1.1.2. Provide community education and relevant consumer tools regarding the reduction of cardiovascular (CV) disease.
- 1.1.3. Promote partnerships that link healthcare systems, providers, and community resources to develop policies and initiatives to reduce cardiovascular risk factors.
- 1.1.4. Support policy changes that reduce out-of-pocket costs for preventive services.

### Measure(s):

**Indicator: Number of laws and/or policies that address reduction of CV risk factors.**

Baseline: TBD

2017 Target: Baseline + three (3) laws and/or policies that address CV risk factors.

**Indicator: Number of laws and/or policies that address reduction of sodium in the food supply.**

Baseline: TBD

2017 Target: Baseline + four (4) laws or policies that reduce sodium in the food supply.

**Data Source(s):** TBD

**Objective 1.2:** By June 2017, decrease the percentage of North Carolinians who smoke and/or are exposed to secondhand smoke.

### Strategies:

- 1.2.1. Maintain strong support for the smoke-free restaurants and bars law.
- 1.2.2. Educate policymakers and the public about the benefits of regulations that eliminate exposure to secondhand smoke.

- 1.2.3. Build support for a comprehensive smoke-free law that eliminates exposure to secondhand smoke in all N.C. worksites and all public places.
- 1.2.4. Promote smoke-free and tobacco-free policies that increase safe and healthy workplaces and public places.
- 1.2.5. Support evidence-based pricing strategies and policies that lower smoking/tobacco use rates among youth and adults.
- 1.2.6. Promote and support statewide tobacco use prevention, control, and cessation initiatives based on recommendations from CDC and from the N.C. Institute of Medicine Prevention Task Force.

**Measure(s):**

**Indicator: Percentage of adults who are current smokers.**

Baseline: 21.8%

2017 Target: 17%

**Indicator: Percentage of adults who had recent (last seven days) indoor exposure to second-hand smoke at their workplace.**

Baseline: 9.2%

2017 Target: 6.0%

**Indicator: Percentage of adults who had recent (last seven days) indoor exposure to second-hand smoke at their home.**

Baseline: 14.9%

2017 Target: 13.5%

**Indicator: Percentage of high school students who report that they currently smoke cigarettes.**

Baseline: 15.5%

2017 Target: 10.5%

**Indicator: Percentage of high school students reporting current use of any tobacco products.**

Baseline: 22.5 %

2017 Target: 17.5%

**Indicator: Percentage of never-smoking high school students with recent exposure (last seven days) to secondhand smoke in a car.**

Baseline: 20.1 %

2017 Target: 18.0%

**Indicator: Percentage of never-smoking high school students with recent exposure (last seven days) to secondhand smoke in their home.**

Baseline: 16.9%

2017 Target: 15.0%

**Data Source(s):** NC-BRFSS, NC-YTS

**Objective 1.3:** By June 2017, increase the proportion of North Carolinians who consume heart healthy diets and engage in recommended amounts of physical activity.

**Strategies:**

- 1.3.1. Support and champion the Eat Smart Move More NC Plan.
- 1.3.2. Educate key policymakers on policies and legislation regarding nutrition and physical activity as they relate to heart disease and stroke prevention.
- 1.3.3. Support efforts to eliminate trans fats in the food supply.
- 1.3.4. Advocate for policies that encourage schools and day care settings to provide healthier food options and increased opportunities for physical activity.
- 1.3.5. Provide public education concerning the relationship between healthy eating, physical activity, and the prevention of heart disease and stroke.
- 1.3.6. Promote and support healthy eating and physical activity initiatives based on recommendations from CDC and from the N.C. Institute of Medicine Prevention Task Force.

**Measure(s):**

**Indicator: Percentage of adults who report getting the minimum recommended amount of both aerobic and muscle-strengthening activities weekly.**

Baseline: 18.3%

2017 Target: 22.0%

**Indicator: Percentage of adults who report getting the minimum recommended amount of aerobic activities weekly.**

Baseline: 46.8%

2017 Target: 52.0%

**Indicator: Percentage of adults who consume five or more servings of fruits or vegetables or beans per day.**

Baseline: 13.7%

2017 Target: 16.5%

**Indicator: Percentage of high school students who report getting the minimum recommended amount of physical activity daily.**

Baseline: 26.0%

2017 Target: 29.0%

**Indicator: Percentage of high school students with recent (last seven days) consumption of five or more servings per day of fruits and vegetables.**

Baseline: 19.4%

2017 Target: 24.0%

**Data Source(s):** NC-BRFSS, NC-YRBS

**Objective 1.4:** By June 2017, increase the proportion of adult North Carolinians who are reducing their consumption of dietary sodium by 20 percent.

**Strategies:**

- 1.4.1. Increase the availability, accessibility, and consumption of lower sodium food options (e.g., competitive pricing in worksites and government institutions; promote prominent placement of fresh produce).
- 1.4.2. Advocate for procurement policies that encourage the reduction of sodium in prepared foods, including through state contracts for foods served in schools, prisons, and other state venues.
- 1.4.3. Support efforts to reduce sodium in the food supply.
- 1.4.4. Provide public education/awareness regarding recommended daily sodium consumption.

**Measure(s):**

**Indicator: Proportion of adult North Carolinians who are reducing their consumption of dietary sodium.**

Baseline: TBD (2013)

2017 Target: Baseline + 20%

**Data Source(s):** NC-BRFSS

## **2. Prevention of Cardiovascular Disease through Control of Risk Factors**

**Goal 2: Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled.**

While North Carolina has made progress in reducing mortality from heart disease and stroke, many people at high risk for cardiovascular disease have never had their risk factors identified. While some risk factors for heart disease and stroke cannot be modified (age, sex, family history, and genetics), others can be controlled or changed. High blood pressure and high cholesterol are conditions that are closely associated with heart disease and stroke. Lifestyle approaches can significantly reduce high blood pressure and cholesterol for some people, but lifestyle alone is often insufficient to manage or control these risk factors. Early detection and treatment and control of risk factors can often prevent heart disease and stroke, can prolong and improve the quality of life for people so affected, and can significantly reduce the burden of cardiovascular disease. Identification of risk factors, wellness programs in worksites and other community entities, improved access to health services, and health care system changes that assure adherence to clinical guidelines for treatment and management of risk factors are essential to controlling and managing risk.

**Objective 2.1:** Decrease prevalence of high blood pressure and high cholesterol.

**Strategies:**

- 2.1.1. Promote provider adherence to current evidence-based hypertension guidelines.
- 2.1.2. Promote system changes that utilize quality improvement programs (such as Guideline Advantage offered by the American Heart Association and similar programs of the N.C. Area Health Education Centers, the Consortium for Southeastern Hypertension Control, and others) to promote implementation of

evidence-based guidelines for diagnosis and management of hypertension and high cholesterol.

- 2.1.3. Promote the use of health information technology by provider practices to detect and manage hypertension and high cholesterol, such as by using prompts, feedback reports, and/or disease registries.
- 2.1.4. Provide and/or facilitate continuing medical education regarding the use of evidence-based guidelines for risk factor prevention and disease management (such as the ABCS [Appropriate Aspirin Therapy for those who need it; Blood Pressure Control; Cholesterol Management; and Smoking Cessation] of Cardiovascular Disease Prevention, Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure, Adult Treatment Panel for Cholesterol).
- 2.1.5. Promote multi-disciplinary health care teams.
- 2.1.6. Promote blood pressure and cholesterol screenings, education and appropriate follow-up at worksites, local health departments, and other community settings, using mobile health units or other resources to disseminate these services.
- 2.1.7. Advocate for health care systems and practices to promote adherence to a diet that provides nutrition support for controlling high blood pressure and high cholesterol.
- 2.1.8. Promote the use of home blood pressure monitoring for patients with high blood pressure, including education and physician follow-up, and coverage of home blood pressure measurement devices that meet measurement performance quality standards.
- 2.1.9. Promote coverage for and participation in evidence-based lifestyle interventions that reduce high blood pressure and high cholesterol.

**Measure(s):**

**Indicator: Percentage of people who report having high blood pressure.**

Baseline: 32.4%

2017 Target: 29.0%

**Indicator: Percentage of people who report having high cholesterol.**

Baseline: 38.5%

2017 Target: 34.0%

**Data Source(s):** NC-BRFSS

**Objective 2.2:** By June 2017, increase the number of North Carolina worksites with environments and behavioral approaches that support detection and self-management of cardiovascular disease and related risk factors for employees.

**Strategies:**

- 2.2.1. Encourage employers/insurers to offer health screenings and chronic disease self-management programs as an employee benefit.
- 2.2.2. Encourage employers to work with their health insurers to include reimbursement for cardiovascular risk reduction and self-management services.
- 2.2.3. Provide training and technical assistance to worksites to help them develop and implement policy and environmental supports for the reduction of cardiovascular risk factors.

**Measure(s):**

**Indicator: Number of worksites supportive of cardiovascular risk factor and disease detection and management for employees.**

Baseline: TBD

2017 Target: Baseline + five (5)

**Data Source(s):** Worksite inventory established as part of State Plan Objective 5.1.

**Objective 2.3:** By June 2017, increase the number of community health workers in North Carolina addressing cardiovascular disease prevention and management.

**Strategies:**

- 2.3.1. Advocate for system changes that integrate and sustain use of community health workers and other healthcare extenders into healthcare settings.
- 2.3.2. Partner with relevant agencies to develop a network of community health workers.

**Measure(s):**

**Indicator: Percentage of community health workers in North Carolina addressing cardiovascular disease.**

Baseline: TBD

2017 Target: Baseline + 5%

**Data Source(s):** TBD

**Objective 2.4:** By June 2017, increase the percentage of North Carolinians that are at a healthy weight.

**Strategies:**

- 2.4.1. Support and champion the N.C. Obesity Prevention Plan.
- 2.4.2. Promote obesity diagnosis, prevention, and treatment in health care settings.
- 2.4.3. Promote reimbursement for obesity prevention and management services.
- 2.4.4. Promote availability of evidence-based weight management programs in worksites and communities, such as Eat Smart Move More Weigh Less.
- 2.4.5. Provide public education/awareness about the relationship between obesity and

cardiovascular disease.

**Measure(s):**

**Indicator: Percentage of high school students who are at their healthy weight.**

Baseline: 71.2%

2017 Target: 78.0%

**Indicator: Percentage of adults who are at their healthy weight.**

Baseline: 33.3%

2017 Target: 37.0%

**Data Source(s):** NC-YRBS, NC-BRFSS

**Objective 2.5:** By June 2017, increase the percentage of current smokers who receive evidence-based tobacco prevention and cessation services.

**Strategies:**

- 2.5.1. Promote coverage by insurers, payers, and employers for comprehensive, evidence-based tobacco cessation services and benefits including counseling and appropriate medications at no or low cost.
- 2.5.2. Advise health care providers to recommend and deliver comprehensive, evidence-based tobacco use treatment services including counseling, appropriate medications, and referrals to services such as the N.C. Quitline or other recommended services.
- 2.5.3. Promote sufficient funding to maintain existing and support additional evidence-based cessation programs.

**Measure(s):**

**Indicator: Percentage of adult smokers who tried to quit smoking and had health care professionals recommend strategies other than medications to assist them.**

Baseline: 30.1%

2017 Target: 33.0%

**Indicator: Percentage of N.C. high school students who report exposure to anti-tobacco education in school in the past year.**

Baseline: 32.5%

2017 Target: 35.7%

**Data Source(s):** NC-BRFSS, NC-YTS

**Objective 2.6:** By June 2017, increase the percentage of patients complying with physicians' recommendations for aspirin therapy.

**Strategies:**

- 2.6.1. Implement a public awareness/education campaign to encourage adults to initiate

a conversation with their healthcare providers about aspirin therapy.

2.6.2. Promote adherence to guidelines for aspirin therapy in health care practices.

**Measure(s):**

**Indicator: Percentage of patients for whom aspirin therapy is indicated.**

Baseline: TBD

2017 Target: TBD

**Data Source(s):** NC-BRFSS

### **3. Integrated emergency and acute care for patients who have experienced cardiovascular events.**

Immediate responses to acute cardiovascular events, such as heart attack and stroke, are critical both to survival and to long-term outcomes. An integrated and coordinated system of care includes consistency in emergency response, immediate treatment, transport and destination protocols, and hospital resources and protocols. While some of the necessary strategies are the same for any acute cardiovascular event, treatment protocols are different; therefore, there are objectives and strategies that are event-specific as well as some that apply to both heart attack and stroke.

**Goal 3: Increase the proportion of North Carolinians who have access to and receive appropriate integrated emergency and acute care for cardiovascular events.**

**Objective 3.1:** By June 2017, increase the number of state and local laws and/or policies that support strong, inclusive, and coordinated heart disease and stroke systems of care that improve the treatment of cardiovascular disease patients.

**Strategies:**

- 3.1.1. Promote efforts to create inclusive and coordinated statewide and regional systems of care to improve treatment and outcomes by adhering to nationally recognized guidelines.
- 3.1.2. Educate and inform key state and local policy makers about the critical importance of a strong emergency cardiovascular care system in saving the lives of victims of heart attack, cardiac arrest, or stroke.
- 3.1.3. Support the development of critical elements including standardization, data retrieval, and facility designation required to establish optimal systems of care for heart disease and stroke treatment, rehabilitation, and secondary prevention.

**Measure(s):**

**Indicator: Number of laws/policies that improve treatment of cardiovascular disease patients.**

Baseline: TBD

2017 Target: Baseline + five (5)

**Data Source(s):** Policy database established as part of State Plan Objective 5.1.

**Objective 3.2:** By June 2017, increase the percentage of North Carolinians who recognize the warning signs and symptoms of heart attack and stroke and who know to immediately call 9-1-1.



**Strategies:**

- 3.2.1. Pursue funding to extend the stroke recognition and call 9-1-1 television campaign to additional regions of the state.
- 3.2.2. Partner with emergency medical systems, hospitals, and other appropriate community and health care organizations to incorporate the signs and symptoms of acute cardiovascular events into various outreach communications. (Target priority populations).
- 3.2.3. Identify non-traditional partners to participate in public education concerning risk factors, signs and symptoms, and immediate response to acute events (e.g., call 9-1-1, CPR, AED), particularly in organizations and settings that serve or employ high-risk populations.
- 3.2.4. Provide resources and technical assistance for use in outreach communications concerning cardiovascular signs and symptoms and need to call 9-1-1.
- 3.2.5. Incorporate signs and symptoms and the need to call 9-1-1 into discharge protocols, including providing information in patients' discharge materials

**Measure(s):**

**Indicator: Percentage of North Carolinians that accurately identify the signs and symptoms of heart attack.**

Baseline: 12.9%

2017 Target: 26.0%

**Indicator: Percentage of North Carolinians that accurately identify the signs and symptoms of stroke.**

Baseline: 20.8%

2017 Target: 41.0%

**Data Source(s):** NC-BRFSS

**Objective 3.3:** By June 2017, all patients experiencing acute cardiovascular events who contact 9-1-1 will receive treatment by pre-hospital staff that is consistent with recognized protocols.

**Strategies:**

- 3.3.1. Advocate for a statewide policy requiring emergency medical dispatch (EMD) certification for all 9-1-1 center personnel.
- 3.3.2. Develop and implement standardized training for 9-1-1 call center personnel, first responders, and transport personnel on recognition of signs and symptoms of heart attack and stroke and appropriate actions for response.
- 3.3.3. Develop and implement standard, written protocols for transport of heart attack and stroke victims that include criteria for appropriate destination hospitals.

**Measure(s):**

**Indicator: Average dispatch center time for stroke patients.**

Baseline: 2.3 minutes

2017 Target: 1.7minutes

**Indicator: Average dispatch center time for heart attack patients.**

Baseline: 5.1 minutes

2017 Target: 3.8 minutes

**Indicator: Average on scene time for stroke patients.**

Baseline: 20.0 minutes

2017 Target: 15.0 minutes

**Indicator: Average on scene time for heart attack patients.**

Baseline: 25.8 minutes

2017 Target: 19.4 minutes

**Data Source(s):** EMS Performance Improvement Center

**Measure(s):**

**Indicator: Percentage of patients with stroke-like symptoms transported by EMS to NC hospitals.**

Baseline: 47.4% (09/20/2010 – 10/01/2011)

2017 Target: 58.0%

**Indicator: Percentage of patients with cardiac symptoms transported by EMS to NC hospitals.**

Baseline: 43.1% (09/20/2010 – 10/01/2011)

2017 Target: 53.0%

**Data Source(s):** N.C.DETECT

**Objective 3.4:** By June 2017, 100 percent of N.C. acute care facilities will implement protocols for management of heart attack and stroke as defined by current clinical guidelines.

**Strategies:**

- 3.4.1. Provide training and continuing education for primary care practitioners, emergency department physicians, urgent care, and clinical staff on current clinical practice guidelines for heart attack and stroke treatment and management.
- 3.4.2. Promote initiatives within the state that would enhance provision of rapid, coordinated care for heart attack and stroke.
- 3.4.3. Promote adoption of protocols that incorporate current clinical guidelines for management of heart attacks and stroke.
- 3.4.4. Partner with the N.C. Hospital Association (NCHA) to inform hospitals of these measures.
- 3.4.5. Provide resources to help hospitals prepare for reporting of these measures.

**Measure(s):**

**Indicator: Percentage of appropriate statin or other lipid-lowering medication prescribed at discharge for eligible patients.**

Baseline: 72% of N.C. hospitals reporting acute myocardial infarction data to CMS have 85% or greater in the measure of eligible heart attack patients given a prescription for statin at discharge.

2017 Target: 80% of N.C. hospitals reporting acute myocardial infarction data will have 85% or greater in the measure of eligible heart attack patients given a prescription for statin at discharge.

**Data Source(s):** Centers for Medicare and Medicaid Services (CMS) Hospital Quality Initiative (NC Data)

**Measure(s):**

**Indicator: Percentage of eligible stroke patients who receive IV tPA for ischemic strokes.**

Baseline Measure: 63%

2017 Target: 75%

**Indicator: The percentage of eligible stroke patients who receive a statin as lipid-lowering therapy at discharge.**

Baseline Measure: 90%

2017 Target: 99%

**Indicator: The percentage of stroke patients who receive dysphagia screening prior to any oral intake.**

Baseline Measure: 74%

2017 Target: 85%

**Indicator: Percentage of stroke patients who receive stroke patient/caregiver education (all measures).**

Baseline Measure: 82%

2017 Target: 99%

**Data Source(s):** North Carolina Stroke Care Collaborative

**Objective 3.5:** By June 2017, standardize statewide protocols that improve coordination of and minimize delays in care for acute heart disease and stroke patients among 9-1-1 personnel, first responders, transport personnel, and destination hospitals.

**Strategies:**

- 3.5.1. Develop systems that allow for the secure communication of patient information and outcome data among acute cardiovascular treatment personnel.
- 3.5.2. Coordinate statewide and local emergency response and transport policies for cardiovascular events with other time-sensitive illness and injury policies.
- 3.5.3. Develop, integrate and disseminate EMS providers' "Triage and Destination" plans for cardiovascular events.

3.5.4. Promote policies that integrate the 9-1-1 call centers with EMS systems.

**Measure(s):**

**Indicator: Percentage of 9-1-1 call centers that are administered by EMS.**

Baseline Measure: 27.1%

2017 Target: 35.0%

**Indicator: Percentage of public safety answering points (PSAPs) with EMD capability.**

Baseline Measure: 40.3%.

2017 Target: 70.0%.

**Indicator: Percentage of patients with stroke-like symptoms who had pre-notification by EMS to the hospital (NCSCC hospitals only).**

Baseline Measure: 31.5%

2017 Target: 50.0%

**Data Source(s):** Mission Lifeline, N.C.9-1-1 Board, NCSCC

**Objective 3.6:** By June 2017, adopt a statewide system for designating the stroke care capabilities of each hospital that is not a primary stroke center, to include elements of rehabilitation and secondary prevention.

**Strategies:**

- 3.6.1. Convene an expert panel to determine the process for defining N.C.'s hospital designation standards for stroke care capabilities, to include definitions that currently exist.
- 3.6.2. Partner with the NCHA to garner support from hospitals, emergency medical services, and other key stakeholders to endorse and implement the definitions/designations.

**Measure(s):**

**Indicator: Number of stroke care capability designations in place.**

Baseline: 0

2017 Target: TBD

**Data Source(s):** NC Office of Emergency Medical Services (OEMS)

**Objective 3.7:** By June 2017, every hospital in NC will adopt a stroke plan that is comprehensive in scope.

**Strategies:**

- 3.7.1. Promote the development and adoption of a model/standard for acute stroke care plans ensuring that these plans include:
  - a. Emergency department evaluation to determine candidacy for treatment with thrombolytic therapy.
  - b. Protocols for transferring patients to facilities providing higher levels of care, if needed.

- c. Interventional stroke care, ICU stroke care, and neurosurgery.
- 3.7.2. Promote the development and adoption of a model/standard for a stroke patient care plan to include strategies to reduce stroke-related complications, to begin secondary stroke prevention, and to provide stroke rehabilitation services.
- 3.7.3. Promote the development and adoption of a model/standard transfer plan for those hospitals that do not have all of the resources needed to treat acute stroke patients.
- 3.7.4. Ensure that EMS agencies know the stroke care level designations of all hospitals in their region as they follow the EMS Stroke Triage and Destination Plan.
- 3.7.5. Promote the adoption of a telehealth technology system that enables remote consultation capability for facilities that have CT scan capabilities but lack associated medical expertise for interpretation of the scan.

**Measure(s):**

**Indicator: Percentage of hospitals reporting that they have a written stroke plan.**

Baseline: TBD

2017 Target: 100%

**Data Source(s):** NC OEMS

**Objective 3.8:** By June 2017, develop and adopt a system that assures the public availability of information concerning acute stroke plans, stroke capabilities of hospitals, and NC OEMS triage plans and definitions for the state.

**Strategies:**

- 3.8.1. Establish a system whereby hospitals report their stroke plans and acute stroke capabilities to the NCHA and NC Department of Health and Human Services (DHHS), Division of Public Health, Heart Disease and Stroke Prevention Branch, and the information for each hospital is made publicly available.
- 3.8.2. Partner with the NCHA to encourage hospitals to submit these plans and to make them public.
- 3.8.3. Encourage EMS providers to develop/enhance transport plans based on area hospital stroke capability information and to make these plans public.
- 3.8.4. Partner with the NCHA and OEMS to encourage local EMS agencies and hospitals to keep public authorities informed about the stroke and transport plans, hospital designations, and definitions in the Stroke Triage and Destination Plan.

**Measure(s):**

**Indicator: Percentage of hospitals that report their acute stroke plans and capabilities.**

Baseline: TBD

2017 Target: 100%

**Indicator: Percentage of EMS agencies that have publically available acute stroke care destination plans.**

Baseline: TBD

2017 Target: 100%

**Data Source(s):** NC OEMS, NCHA

#### **4. Integrated, coordinated management of post-acute and transitional care following cardiovascular events.**

In addition to their effects on mortality and morbidity, heart attack and stroke are also leading causes of long-term disability. Coordinated planning and access to available resources and services are essential to help patients and their families cope with the effects of these acute events. The goal of rehabilitation is to improve function so that a heart attack or stroke survivor can become as independent as possible. Transitional care from hospital to rehabilitation to home or long term care (LTC) can help survivors and their families achieve the best possible long-term outcomes.

#### **Goal 4: Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute transitional care following cardiovascular events.**

**Objective 4.1:** By June 2017, increase the percentage of cardiovascular event patients who receive timely and appropriate rehabilitation and transitional care.

##### **Strategies:**

- 4.1.1. Promote policies that increase the availability of primary healthcare providers skilled in managing cardiovascular disease and preventing initial or recurrent cardiovascular events (workforce development).
- 4.1.2. Partner with hospitals to develop discharge protocols for cardiovascular patients that address post-acute, rehabilitation, and/or long term care needs.
- 4.1.3. Promote statewide policies that allow facilities to develop and expand cardiac and stroke rehabilitation programs (e.g., reimbursement, workforce development).
- 4.1.4. Increase communication about available community resources to patients with cardiovascular diseases and their providers.
- 4.1.5. Promote the use of transitional care and chronic disease self-management programs for both cardiac and stroke patients.
- 4.1.6. Identify community leaders and stakeholders and explore tailored communication strategies based upon specific community needs for cardiovascular patients and their caregivers.
- 4.1.7. Promote policies that encourage facilities to expand long-term care services offered to stroke patients.
- 4.1.8. Encourage hospitals and/or rehabilitation facilities to utilize a patient navigation

model for stroke and cardiac patients.

**Measure(s):**

**Indicator: Percentage of North Carolinians who indicate they received outpatient rehabilitation after their heart attack.**

Baseline: 36.6 %

2017 Target: 44.0 %

**Indicator: Percentage of North Carolinians who indicate they received outpatient rehabilitation after their stroke.**

Baseline: 28.9 %

2017 Target: 34.0 %

**Indicator: Number of facilities accredited by the Commission on Accreditation of Rehabilitation Facilities (CARF) as Stroke Specialty.**

Baseline: 12 facilities

2017 Target: 18 facilities

**Indicator: Number of rehabilitation facilities offering speech, occupational, and physical therapies to stroke patients.**

Baseline: TBD

2017 Target: Baseline + 25.0%

**Data Source(s):** BRFSS, NC Stroke Rehabilitation Survey

**Objective 4.2:** By June 2017, ensure primary care providers and rehabilitation professionals are receiving increased, appropriate reimbursement for transitional and rehabilitative care.

**Strategies:**

- 4.2.1. Promote and encourage policies that will increase reimbursement for rehabilitation and transitional care services.
- 4.2.2. Encourage insurance companies to incentivize their members to participate in rehabilitation and transitional care following cardiovascular events.
- 4.2.3. Pursue policies that support reimbursement for telehealth technology for rehabilitation.

**Measure(s):**

**Indicator: Average reimbursement per patient for all rehabilitation/transitional care services by the Division of Medical Assistance (DMA) for Medicaid patients following a cardiovascular event.**

Baseline: TBD

2017 Target: Baseline + 25.0%

**Indicator: Average reimbursement per patient for all rehabilitation/transitional care services by the State Health Plan for patients following a cardiovascular event.**

Baseline: TBD

2017 Target: Baseline + 25.0%

**Data Source(s):** Medicaid data from DMA, State Health Plan data

## 5. Surveillance and Evaluation

Process and outcome evaluation plans and surveillance systems are needed to show progress toward and achievement of goals and objectives and to assess and monitor the heart disease and stroke burden in North Carolina.

**Goal 5: Enhance utilization of current data resources, expand/develop additional resources, extend their availability, and improve accessibility of information derived from evaluation and surveillance processes.**

**Objective 5.1:** By June, 2017, develop and implement a database to track systems and policies that affect heart disease and stroke prevention practices in North Carolina.

### Strategies:

- 5.1.1. Develop and maintain a directory of data sources to include type and content of data, indicators, measures, time frames, locations, responsible agencies, goals, and strategies to which each source relates.
- 5.1.2. Identify and/or create opportunities for data sharing with partners and with other stakeholders.
- 5.1.3. Ensure adequate fiscal, material, and human resources for collection, analysis, reporting, and dissemination of data.
- 5.1.4. Develop a registry of worksites and insurers that provide prevention services and share registry results among stakeholders. Partner with NC Prevention Partners (NCPP) which maintains data on primary prevention services in NC and provides an annual report card on this. Their database includes information on NC hospitals as worksites.

**Objective 5.2:** By June, 2017, improve accessibility and dissemination of data related to heart disease and stroke to North Carolinians.

### Strategies:

- 5.2.1. Seek opportunities for sharing data-based information through local, regional, and statewide media outlets, conferences, presentations, and web postings.
- 5.2.2. Partner with stakeholder agencies and groups to disseminate data-based information.
- 5.2.3. Disseminate reports of burden data and of reach and impact findings regarding interventions.

**Objective 5.3:** By June, 2017, increase the number of N.C. hospitals that report quality improvement (QI) data to the Coverdell Stroke Registry from 46 to 55 hospitals.

### Strategies:

- 5.3.1. Encourage hospitals to participate in the North Carolina Stroke Care Collaborative (NCSCC) and Stroke Registry.
- 5.3.2. Increase awareness of the NCSCC and Stroke Registry via appropriate media,



conferences, websites, and other outlets.

- 5.3.3. Partner with stakeholder agencies and groups to increase visibility of the NCSCC and to increase utilization of Stroke Registry data.
- 5.3.4. Share future linked data (pre-hospital and post-hospital) with NCSCC participating hospitals.
- 5.3.5. Continue to encourage and incentivize participating hospitals to report data to the Stroke Registry.

**Objective 5.4:** By June 2017, extend the existing NCSCC/Stroke Registry's Quality Improvement Program into EMS and rehabilitation.

**Strategies:**

- 5.4.1. Advocate for policies for linking rehabilitation and outcomes data to the NCSCC/Stroke Registry.
- 5.4.2. Conduct a feasibility study for linking rehabilitation and outcomes data to the NCSCC/Stroke Registry.
- 5.4.3. Pursue funding to expand EMS Data Linkage with the NCSCC to all EMS systems.

**Objective 5.5:** By June 2017, collect, analyze, and report data specifically related to achieving and/or making progress toward State Goals 1 - 4.

**Strategies:**

- 5.5.1. Develop and/or expand and improve data resources, particularly for clinical and rehabilitation services and facilities.
- 5.5.2. Promote inter-agency linkages of relevant data, particularly from EMS agencies, health care systems, individual health care practices, rehabilitation and follow-up services and facilities, and other state agencies.
- 5.5.3. Develop and/or expand policies and partnerships that encourage data sharing, coordination, and communication.

**Objective 5.6:** By June 2017, explore means and resources to improve cardiovascular health surveillance and evaluation.

**Strategies:**

- 5.6.1. Convene stakeholders with interest and resources to determine feasibility and processes for development of survey instruments and data collection.
- 5.6.2. Identify and pursue funding for implementation of the surveillance system and for evaluation and dissemination of results.
- 5.6.3. Support efforts and appropriations to conduct school-based longitudinal fitness/physical activity assessment in children that can be reported in an

aggregate manner to the appropriate state agency or integrated into existing surveillance methods.

- 5.6.4. Promote use and monitoring of prevention registries and/or identification of opportunities for quality improvement programs that support prevention and management priorities.

**Objective 5.7:** Develop and implement an evaluation plan that documents efforts, monitors progress toward, and measures achievement of State goals and objectives for cardiovascular health.

**Strategies:**

- 5.7.1. For each objective, define relevant Healthy People 2020 and Healthy NC 2020 objectives, indicators, interventions, data sources, and relevant data types.
- 5.7.2. Document interventions, including planned outcomes, target populations, settings, partners and their roles, actions taken, reach and impact.
- 5.7.3. Maintain and modify as needed reporting mechanisms that document progress.

**Process Evaluation**

Process evaluation monitors implementation of programs and activities. Its focus is on progress toward implementing planned strategies and interventions directly linked to goals and objectives. This evaluation will be used to validate that the plan is implemented as intended as well as to identify areas where improvements can be made or where modifications may be necessary.

Strategic actions in this plan fall into the broad categories of:

1. Policy development and promotion, to include state and local laws, regulations, and ordinances, as well as institutional policies and practices at all levels. Evaluation involves tracking types and implementation of health-related policies (treatment/management protocol, public policy, evidence-based standards, organizational wellness, and risk factor awareness/prevention), to include:
  - Level of impact (state, local, organizational);
  - Population sector(s) affected; and,
  - Partners involved.
2. Systems changes to improve health care delivery and accessibility, (including use of electronic records and monitoring systems to validate adherence to recommended treatment guidelines), protocols to facilitate coordination of care across specialty areas, (along the continuum of care), and transitions between settings. Evaluation involves:
  - Documentation of protocols in place in health care settings;
  - Recordation reviews to validate implementation; and,
  - Documentation of established collaborations that expedite multidisciplinary approaches and communications among providers and settings.
3. Education and awareness programs, initiatives, and campaigns: approaches include both public and professional as well as individual and collective, including conferences, training

sessions, media, consultation, and technical assistance. Evaluation involves documentation of:

- Development and distribution of products such as treatment/management protocols, toolkits, media campaigns, website pages, and fact sheets, to include:
  - Content;
  - Intended audience, e.g., health workers or lay groups; disparate populations; geographic area; and,
  - Reach, e.g., the extent to which a program impacts its target audience
- Accessibility of information in terms of:
  - Cultural appropriateness/linguistic competence;
  - Health literacy; and,
  - Proximity and ease of use.

4. Partnership development and maintenance: includes identifying and engaging partners who represent interests across North Carolina in all aspects of health care; relevant industry, state and local agencies; worksites and other congregant populations; all race, ethnic, socioeconomic and age groups; and all geographic areas. Evaluation will involve tracking:

- Representation across geographic areas, race, ethnic, gender, educational, economic and age groups, organizational sizes and types, industry, and the continuum of health care provision;
- Diversity in types of partners' activities relevant to cardiovascular health; and,
- Diversity in types of partners' stake in cardiovascular health.

Specific strategies from the State Plan's Goals 1 - 4 are selected for each strategic action category (Policy, Systems, Education, and Partnership) for review of plan progress on the merits as listed above. The strategies chosen for process evaluation are:

**Goal 1:** Increase the proportion of North Carolinians who live healthy lifestyles conducive to cardiovascular health.

**Strategies:**

- 1.1.3. Promote partnerships that link healthcare systems, providers, and community resources to develop policies and initiatives to reduce cardiovascular risk factors.
- 1.2.2. Educate policymakers and the public about the benefits of regulations that eliminate exposure to secondhand smoke.
- 1.4.1. Increase the availability, accessibility, and consumption of lower sodium food options (e.g., competitive pricing in worksites and government institutions; promotion and prominent placement of fresh produce).
- 1.4.3. Support efforts to reduce sodium in the food supply and prepared foods.

**Goal 2:** Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled.

**Strategies:**

- 2.1.1. Promote provider adherence to current evidence-based hypertension guidelines.

- 2.2.1. Encourage employers/insurers to offer health screenings and chronic disease self-management programs as employee benefits.
- 2.2.3. Provide training and technical assistance to worksites to help develop and implement policy and environmental supports for the reduction of cardiovascular disease risk factors.
- 2.3.2. Partner with relevant agencies to develop a network of community health workers.

**Goal 3:** Increase the proportion of North Carolinians who have access to and receive appropriate integrated emergency and acute care for cardiovascular events.

**Strategies:**

- 3.6.1. Convene an expert panel to determine the process for defining N.C.'s hospital designation standards for stroke care capabilities to include definitions that currently exist.
- 3.7.4. Ensure that EMS agencies know the stroke care level designations of all hospitals in their region as they follow the EMS Stroke Triage and Destination Plan.
- 3.7.5. Promote the adoption of a telehealth technology system that enables remote consultation for facilities with CT scan capabilities but without associated medical expertise to interpret scans.
- 3.8.1. Establish a system for hospitals to report their stroke plans and acute stroke capabilities to the North Carolina Hospital Association (NCHA) and NC Department of Health and Human Services, Division of Public Health, Heart Disease and Stroke Prevention Branch, and that makes the information for each hospital publicly available.

**Goal 4:** Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute transitional care following cardiovascular events.

**Strategies:**

- 4.1.2. Partner with hospitals to develop discharge protocols for cardiovascular patients that address post-acute, rehabilitation, transitional, and/or long term care needs.
- 4.1.4. Increase communication about available community resources to patients with cardiovascular diseases and their providers.
- 4.1.5. Promote the use of transitional care and chronic disease self-management programs for both cardiac and stroke patients.
- 4.1.8. Encourage hospitals and/or rehabilitation facilities to utilize a patient navigation model for stroke and cardiac patients.

## How to Help?

While the NC Heart Disease and Stroke Prevention (HDSP) Plan 2012 – 2017 outlines broad goals and specific objectives, it will require concerted efforts from partners and stakeholders across the state to implement the plan and achieve the overall goal of significantly reducing the burden of heart disease and stroke in North Carolina.

In addition to endorsing and becoming a champion for the N.C. HDSP Plan, there are many things that can be done to help reduce heart disease and stroke in your area. The sections below provide a few examples of opportunities to contribute to this statewide effort. An additional contribution can be made by thinking of and sharing other actions to help achieve the goals and objectives.

### Hospitals can:

- Collaborate with community organizations and worksites to sponsor blood pressure and cholesterol screening and education events.
- Promote training for care staff on current clinical practice guidelines for heart disease and stroke treatment and management and on improving cultural competency.
- Conduct community education events to increase awareness of risk factors for heart disease and stroke, and increase knowledge of signs and symptoms and the need to immediately call 9-1-1.
- Support efforts to expand/extend telehealth technology.

### Employers can:

- Implement worksite wellness policies and environmental supports for heart disease and stroke prevention by creating tobacco-free campuses, providing healthy food options, increasing opportunities for physical activity, and providing education about risk factor prevention and control.
- Partner with health care agencies such as hospitals, health departments, and private or public health care practices to host blood pressure and cholesterol screening and education events.
- Provide employee training on awareness of signs and symptoms of heart attack and stroke, the need to call 9-1-1, and the appropriate use of cardiopulmonary resuscitation (CPR) and automated external defibrillators (AEDs).
- Negotiate with health insurers to provide adequate coverage for preventive, management, and rehabilitation services for heart attack and stroke survivors.

### Schools can:

- Provide staff training on signs and symptoms of heart attack and stroke, the need to call 9-1-1 immediately, CPR, and AED use.
- Implement policies and environmental supports for heart disease and stroke prevention including 100 percent tobacco-free campuses, healthy food choices, and opportunities for physical activity.
- Include content on heart healthy lifestyles in health education curricula.

### Health care providers can:

- Treat and manage patients' conditions following current clinical guidelines for diseases of the heart and stroke.

- Initiate conversations during visits with patients at risk for heart disease and stroke concerning tobacco use and exposure, sodium, sugar and fat consumption, and physical activity habits.
- Provide information regarding heart disease and stroke risk factors and prevention to patients.
- Provide blood pressure and cholesterol screening, management, and follow-up for patients.
- Partner with health extenders/community health workers to reach patients at the community level.

**Emergency Medical Services can:**

- Support policy development of statewide, standardized EMS treatment protocols that are consistent with established clinical guidelines for heart attack and stroke.
- Support and implement standardized training for emergency medical personnel.
- Partner with hospitals to implement protocols and hospital pre-notification guidelines.
- Partner with community agencies to provide public education regarding signs and symptoms of heart attack and stroke, the need to call 9-1-1 immediately, and how to best utilize emergency medical services.

**Local health departments can:**

- Collaborate with community agencies and worksites to provide and publicize public education on risk factors for heart disease and stroke, signs and symptoms of heart attack and stroke, and the need to call 9-1-1 immediately.
- Sponsor blood pressure and cholesterol screening and education events to include referrals for follow-up.
- Record and track blood pressure readings for patients seen in health department clinics, and provide referrals and follow-up as indicated.

**Community organizations can:**

- Provide, or partner with health care agencies to provide, health education for members and their networks to include CVD risk factors, signs and symptoms of heart attack and stroke, and the need to call 9-1-1 immediately.
- Provide, or partner with health care agencies to provide, opportunities for risk factor screening and education.
- Support the implementation of emergency 9-1-1 systems.

**Local government agencies can:**

- Support the implementation of EMS and 9-1-1 policies to facilitate communication and integration of services.
- Implement and support policies that increase public access to information and services regarding prevention and management of risk factors for heart disease and stroke.

**Individuals can:**

- Advocate for policies that increase public awareness concerning healthy lifestyle choices, risk factors for heart disease and stroke, and access to prevention and management services for cardiovascular disease.

- Start conversations with your doctor about ways to reduce your risks for heart disease and stroke.
- Participate in community events that offer screening of risk factors and education on the signs and symptoms of heart attack and stroke and the need to call 9-1-1 immediately.

Overlapping responsibilities across groups form a basis for collaborative actions to support and enhance efforts to prevent and manage heart disease and stroke.

**It takes all of us – all of us working together!**

**Appendix 1: Combined List of Key Organizations**

<b>Key Organizations</b>	<b>Goal 1</b>	<b>Goal 2</b>	<b>Goal 3</b>	<b>Goal 4</b>	<b>Goal 5</b>
AARP	x			x	
Academic Medical Centers in N.C.	x	x	x	x	
ACTION Registry – GWTG			x	x	x
American College of Cardiology		x	x		
American Diabetes Association	x	x			
American Dietetic Association	x			x	
American Heart Association/American Stroke Association (AHA/ASA)	x	x	x	x	x
American Telehealth Association				x	
American Telemedicine Association			x	x	
Area Agencies on Aging	x			x	
Blue Cross and Blue Shield of NC (BCBS)	x	x	x	x	
Cardiac Support Groups				x	
Carolinas Center for Medical Excellence (CCME)	x	x	x	x	x
Centers for Disease Control and Prevention (CDC)	x	x	x		
Centers for Medicare and Medicaid Services (CMS)	x	x	x	x	x
City and County Governments	x	x		x	
Community Care of NC (CCNC)	x	x		x	
Consortium for Southeastern Hypertension Control (COSEHC)	x	x			
Division of Medical Assistance (DMA)				x	
Duke Clinical Research Institute (DCRI)			x	x	
Eat Smart Move More N.C.	x	x			



Key Organizations	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Faith-based and Community Organizations	x	x		x	
Fraternal and Civic Organizations	x			x	
Media	x	x	x		
Mended Hearts				x	
National Forum for Heart Disease and Stroke Prevention	x	x	x		
National Heart Lung Blood Institute's "Act in Time" Program (NHLBI)			x		
NC Academy of Family Physicians	x	x		x	
NC Alliance for Health	x	x			
NC Association of Health Plans	x			x	
NC Chapter of American College of Cardiology	x	x	x	x	
NC College of Emergency Physicians			x		
NC Cooperative Extension	x	x			
NC Council of Churches	x	x			
NC Department of Health and Human Services (DHHS)	x	x	x	x	x
NC Department of Insurance	x	x	x	x	
NC DHHS Division of Public Health (DPH) Diabetes Prevention and Control	x	x			x
NC DHHS DPH Heart Disease and Stroke Prevention (HDSP)	x	x	x	x	x
NC DHHS DPH Physical Activity and Nutrition	x	x			x
NC DHHS DPH Tobacco Prevention and Control Branch	x	x			x
NC Division of Public Health Chronic Disease and Injury Prevention Section	x	x	x	x	x
NC Division on Aging	x			x	x
NC Hospital Association (NCHA)	x	x	x	x	x

<b>Key Organizations</b>	<b>Goal 1</b>	<b>Goal 2</b>	<b>Goal 3</b>	<b>Goal 4</b>	<b>Goal 5</b>
NC Medical Society (NCMS)	x	x	x		
NC Mission LifeLine			x		x
NC Neurological Society			x		
NC Occupational Therapy Association				x	
NC Office of Emergency Medical Services (NCOEMS)	x		x		x
NC Office of Minority Health and Health Disparities	x	x	x	x	x
NC Office of Rural Health (NCORH)	x	x			
NC Office on Disability and Health				x	x
NC Pediatric Society	x	x			
NC Physical Therapy Association			x	x	
NC Prevention Partners	x	x			x
NC Speech Hearing and Language Association			x	x	
NC Stroke Association		x	x	x	x
NC Stroke Care Collaborative (NCSCC)			x	x	x
NC Telehealth Network			x	x	
NCCareLink				x	
North Carolina Cardiopulmonary Rehabilitation Association (NCCRA)				x	
North Carolina Health Information Exchange (NCHIE)				x	x
North Carolina Healthcare Information and Communications Alliance (NCHICA)			x	x	
North Carolina Association of Pharmacists	x	x			
Pharmaceutical Companies	x	x			
Primary Care Association	x	x		x	

<b>Key Organizations</b>	<b>Goal 1</b>	<b>Goal 2</b>	<b>Goal 3</b>	<b>Goal 4</b>	<b>Goal 5</b>
State Health Plan of N.C.	x	x	x	x	x
Stroke Support Groups				x	
UNC Center for Health Promotion and Disease Prevention	x	x			
UNC Gillings School of Public Health	x	x	x	x	x

## Appendix 2: Outcome Evaluation Measures

**Goal 1:** Increase the proportion of North Carolinians who live healthy lifestyles conducive to cardiovascular health.

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Objective 1.1:</b> Increase the number of laws and/or policies that support reduction of cardiovascular (CV) risk factors.	The number of laws and/or policies that address reduction of CV risk factors.	TBD	Baseline + three (3) laws and/or policies that address CV risk factors.	TBD
<b>Objective 1.1:</b> See above.	The number of laws and/or policies that address reduction of sodium in the food supply.	TBD	Baseline + one (1) law or policy that reduces sodium in the food supply.	TBD
<b>Objective 1.2:</b> Decrease the percentage of North Carolinians who smoke and/or are exposed to secondhand smoke.	The percentage of adults who are current smokers.	21.8 %	17.0 %	NC-BRFSS 2011
<b>Objective 1.2:</b> See above.	The percentage of adults who had recent (last seven days) indoor exposure to second-hand smoke at their workplace.	9.2 %	6.0 %	NC-BRFSS 2011
<b>Objective 1.2:</b> See above.	The percentage of adults who had recent (last seven days) indoor exposure to second-hand smoke at their home.	14.9 %	13.5 %	NC-BRFSS 2011
<b>Objective 1.2:</b> See above.	The percentage of high school students who report that they currently smoke cigarettes.	15.5 %	10.5 %	NC-YTS 2011
<b>Objective 1.2:</b> See above.	The percentage of high school	22.5 %	17.5 %	NC-YTS 2011

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
	students reporting current use of any tobacco products.			
<b>Objective 1.2:</b> See above.	The percentage of never-smoking high school students with recent exposure (last seven days) to secondhand smoke in a car.	20.1 %	18.0 %	NC-YTS 2011
<b>Objective 1.2:</b> See above.	The percentage of never-smoking high school students with recent exposure (last seven days) to secondhand smoke in their home.	16.9 %	15.0 %	NC-YTS 2011
<b>Objective 1.3:</b> See above.	The percentage of adults who report getting the minimum recommended amount of aerobic activities weekly.	46.8 %	52.0 %	NC-BRFSS 2011
<b>Objective 1.3:</b> See above.	The percentage of adults who consume five or more servings of fruits or vegetables or beans per day.	13.7 %	16.5 %	NC-BRFSS 2011
<b>Objective 1.3:</b> See above.	The percentage of high school students who report getting the minimum recommended amount of physical activity daily.	26.0 %	29.0 %	NC-YRBS 2011
<b>Objective 1.3:</b> See above.	The percentage of high school students with recent (last seven days) consumption of five or more servings per day of fruits and vegetables.	19.4 %	24.0 %	NC-YRBS 2011
<b>Objective 1.4:</b> Increase the proportion of adult North Carolinians who are reducing their consumption of dietary sodium by 20%.	The proportion of adult North Carolinians who are reducing their consumption of dietary sodium.	TBD (2013)	Baseline + 20.0 % of baseline	NC-BRFSS 2013

**Goal 2:** Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled.

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Objective 2.1:</b> Decrease prevalence of high blood pressure and high cholesterol.	The percentage of people who report having high blood pressure.	32.4 %	29.0 %	NC-BRFSS 2011
<b>Objective 2.1:</b> See above.	The percentage of people who report having high cholesterol.	38.5 %	34.0 %	NC-BRFSS 2011
<b>Objective 2.2:</b> Increase the number of North Carolina worksites with environments and behavioral approaches that support detection and self-management of cardiovascular disease and the related risk factors for employees.	Number of worksites supportive of cardiovascular risk factor and disease detection and management for employees.	TBD	Baseline + five (5)	Worksite inventory established as part of State Plan Objective 5.1.
<b>Objective 2.3:</b> Increase the number of community health workers in North Carolina addressing cardiovascular disease prevention and management.	The percentage of community health workers in North Carolina addressing cardiovascular disease.	TBD	Baseline + five (5) %	TBD
<b>Objective 2.4:</b> Increase the percentage of North Carolinians at a healthy weight.	The percentage of high school students who are at their healthy weight.	71.2 %	78.0 %	NC-YRBS 2011
<b>Objective 2.4:</b> See above.	The percentage of adults who are at their healthy weight.	33.3 %	37.0 %	NC-BRFSS 2011
<b>Objective 2.5:</b> Increase the percentage of current smokers who receive evidence-based tobacco prevention and cessation services.	The percentage of adult smokers who tried to quit smoking and had health care professionals recommend strategies other than medications to assist them.	30.1 %	33.0 %	NC-BRFSS 2011

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Objective 2.5:</b> See above.	The percentage of NC high school students who report exposure to anti-tobacco education in school in the past year.	32.5 %	35.7 %	NC-YTS 2011
<b>Objective 2.6:</b> Increase the percentage of patients for whom aspirin therapy is indicated and are complying with physicians' recommendations for aspirin therapy.	Percentage of patients for whom aspirin therapy is indicated.	TBD (Awaiting two measures of cross tabulation BRFSS data to get specification of data for: 1) men; and 2) women who should increase aspirin therapy.	TBD	NC-BRFSS 2011

**Goal 3:** Increase the proportion of North Carolinians who have access to and receive appropriate integrated emergency and acute care for cardiovascular events.

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Objective 3.1:</b> Increase the number of state and local laws and/or policies that support strong, inclusive, and coordinated heart disease and stroke systems of care that improve the treatment of cardiovascular disease patients.	Number of laws/policies that improve treatment of cardiovascular disease patients.	TBD	Baseline + five (5)	Policy database established as part of State Plan Objective 5.1.
<b>Objective 3.2:</b> Increase the percentage of North Carolinians who recognize the warning signs and symptoms of heart attack and stroke and who know to immediately call 9-1-1.	Percentage of North Carolinians that accurately identify the signs and symptoms of heart attack.	12.9 %	26.0 %	NC-BRFSS 2011
<b>Objective 3.2:</b> See above.	Percentage of North Carolinians that accurately identify the signs and symptoms of stroke.	20.8 %	41.0 %	NC-BRFSS 2011
<b>Objective 3.3:</b> All patients with cardiovascular events who contact 9-1-1 will receive treatment by pre-hospital staff that is consistent with recognized protocols.	Average dispatch center time for stroke patients.	2.3 minutes	1.7 minutes	EMS Performance Improvement Center (EMSPIC)
<b>Objective 3.3:</b> See above.	Average dispatch center time for heart attack patients.	5.1 minutes	3.8 minutes	EMSPIC
<b>Objective 3.3:</b> See above.	Average on scene time for stroke patients.	20.0 minutes	15.0 minutes	EMSPIC
<b>Objective 3.3:</b> See above.	Average on scene time for heart attack patients.	25.8 minutes	19.4 minutes	EMSPIC



Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Objective 3.3:</b> See above.	Percentage of patients with stroke-like symptoms transported by EMS to NC hospitals.	47.4 %	58.0 %	NC DETECT
<b>Objective 3.3:</b> See above.	Percentage of patients with cardiac symptoms transported by EMS to NC hospitals.	43.1 %	53.0 %	NC DETECT
<b>Objective 3.4:</b> 100% of NC acute care facilities will implement protocols for management of heart attack and stroke as defined by current clinical guidelines.	Percentage of appropriate statin or other lipid-lowering medication prescribed at discharge for eligible patients.	72.0 % of NC hospitals reporting acute myocardial infarction data to CMS have 85% or greater in the measure of heart attack patients given a prescription for statin at discharge.	80.0% of NC hospitals reporting acute myocardial infarction data will have 85% or greater in the measure of heart attack patients given a prescription for statin at discharge.	Centers for Medicare & Medicaid Services (CMS) Hospital Quality Initiative (NC Data)
<b>Objective 3.4:</b> See above.	Percentage of eligible stroke patients who receive IV tPA for ischemic strokes.	63.0 %	75.0 %	North Carolina Stroke Care Collaborative (NCSCC)
<b>Objective 3.4:</b> See above.	The percentage of eligible stroke patients who receive a statin as lipid-lowering therapy at discharge.	90.0 %	99.0 %	NCSCC
<b>Objective 3.4:</b> See above.	The percentage of stroke patients who receive dysphagia screening prior to any oral intake.	74.0 %	85.0 %	NCSCC
<b>Objective 3.4:</b> See above.	Percentage of stroke patients who	82.0 %	99.0 %	NCSCC

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
	receive stroke patient/caregiver education (all measures).			
<b>Objective 3.5:</b> Standardize statewide protocols that improve coordination of and minimize delays in care for acute heart disease and stroke patients among 9-1-1 personnel, first responders, transport personnel, and destination hospitals.	Percentage of 9-1-1 call centers that are governed by EMS.	27.1 %	35.0 %	Mission Lifeline NC 9-1-1 Board
<b>Objective 3.5:</b> See above.	Percentage of PSAPs with EMD capability.	40.3 %	70.0 %	Mission Lifeline NC 9-1-1 Board
<b>Objective 3.5:</b> See above.	Percentage of patients with stroke-like symptoms who had pre-notification by EMS to the hospital (NCSCC hospitals only).	31.5 %	50.0 %	NCSCC
<b>Objective 3.6:</b> Adopt a statewide system for designating the stroke care capabilities of each hospital that is not a primary stroke center, to include elements of rehabilitation and secondary prevention.	Number of stroke care capability designations in place.	0	TBD	TBD
<b>Objective 3.7:</b> Every hospital in NC will adopt a stroke plan that is comprehensive in scope.	Percentage of hospitals reporting that they have a written stroke plan.	TBD	100.0 %	NC Office of Emergency Medical Services (OEMS)
<b>Objective 3.8:</b> Develop and adopt a system or plan that assures public availability of information concerning	Percentage of hospitals that report their acute stroke plans and	TBD	100.0 %	NC OEMS NC Hospital

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
acute stroke plans, stroke capabilities of hospitals, and NC OEMS triage plans and definitions.	capabilities.			Association (NCHA)
<b>Objective 3.8:</b> See above.	Percentage of EMS agencies that have publically available acute stroke care destination plans.	TBD	100.0 %	NC OEMS NCHA

**Goal 4:** Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute transitional care following cardiovascular events.

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Objective 4.1:</b> Increase the percentage of cardiovascular event patients who receive timely and appropriate rehabilitation and transitional care.	Percentage of North Carolinians who indicate they received outpatient rehabilitation after their heart attack.	36.6 %	44.0 %	NC-BRFSS 2011
<b>Objective 4.1:</b> See above.	Percentage of North Carolinians who indicate they received outpatient rehabilitation after their stroke.	28.9 %	34.0 %	NC-BRFSS 2011
<b>Objective 4.1:</b> See above.	Number of facilities accredited by CARF as Stroke Specialty.	12.0	18.0	NC Stroke Rehabilitation Survey
<b>Objective 4.1:</b> See above.	Number of rehabilitation facilities offering speech, occupational, and physical therapy to stroke patients.	TBD	Baseline + 25.0 %	NC Stroke Rehabilitation Survey
<b>Objective 4.2:</b> Ensure primary care providers and rehabilitation professionals are receiving increased and appropriate reimbursement for transitional care.	Average reimbursement per patient for all rehabilitation/transitional care services by the Division of Medical Assistance (DMA) for Medicaid patients after a cardiovascular event.	TBD	Baseline + 25.0 %	Medicaid data from DMA State Health Plan data
<b>Objective 4.2:</b> See above.	Average reimbursement per patient for all rehabilitation/transitional care services by the State Health Plan for patients after a cardiovascular event.	TBD	Baseline + 25.0 %	Medicaid data from DMA State Health Plan data

**Telehealth Objective:** Increase the capacity for providing appropriate treatment and services via telehealth technologies for North Carolinians across the continuum of cardiovascular care.

Objective	Measure	Baseline (number/percentage)	2017 Target	Data Source
<b>Telehealth Objective:</b> Increase the capacity for providing appropriate treatment and services via telehealth technologies for North Carolinians across the continuum of cardiovascular care.	Number of active hub hospitals.	Four (4) active hub hospitals	Eight (8) active hub hospitals	NC Stroke Advisory Council (SAC) NCSCC/ CDC Hospital Inventory and updates
<b>Telehealth Objective:</b> See above.	Number of active network hospitals.	20 active network hospitals	30 active network hospitals	SAC NCSCC/ CDC Hospital Inventory and updates

## Appendix 3: Guidance and Resources

This section provides website locations for helpful information related to Goals 1 – 4 and their objectives. It is not a complete list of resources. Once the Plan is posted on the Start With Your Heart website, this section will be updated on a regular basis.

### General Website Resources

- North Carolina Department of Health and Human Services, Start With Your Heart  
<http://www.startwithyourheart.com/>
- North Carolina Department of Health and Human Services, NC Stroke Care Collaborative  
<http://www.ncstrokeregistry.com/>
- Centers for Disease Control and Prevention, Million Hearts  
<http://millionhearts.hhs.gov/index.html>
- Centers for Disease Control and Prevention, Heart Disease and Stroke Prevention  
<http://www.cdc.gov/heartdisease/>
- American Heart Association/American Stroke Association  
<http://www.heart.org/HEARTORG/>
- NC Institutes of Medicine  
<http://www.iom.edu/>
- Centers for Disease Control and Prevention, A Public Health Action Plan to Prevent Heart Disease and Stroke. pp. 44, 66  
[http://www.cdc.gov/dhdsp/action\\_plan/index.htm](http://www.cdc.gov/dhdsp/action_plan/index.htm)
- Association of State and Territorial Health Officials, *Stroke System of Care Plan for North Carolina Plan Development Process*  
<http://www.ncstrokeregistry.com/Default.aspx?pid=54>
- NC Stroke Care Collaborative: Health Literacy – A Manual for Clinicians  
[http://www.ncstrokeregistry.com/Default.aspx?pid=59#Health\\_Literacy](http://www.ncstrokeregistry.com/Default.aspx?pid=59#Health_Literacy)
- UNC Health Science Library, NC Health Info: Diseases and Conditions (Heart Disease and Stroke)  
[http://www.nchealthinfo.org/health\\_topics/index.cfm](http://www.nchealthinfo.org/health_topics/index.cfm)

## **Goal 1: Primary Prevention of Cardiovascular Disease through Healthy Living**

- American Heart Association Life's Simple 7  
<http://mylifecheck.heart.org/Multitab.aspx?NavID=3&CultureCode=en-US>
- Healthy North Carolina 2020  
<http://www.nciom.org/publications/?healthy-nc-2020>
- Eat Smart, Move More N.C.  
<http://www.eatsmartmovemorenc.com>
- NC Prevention Partners  
<http://http://www.ncpreventionpartners.org/>

**Objective 1.1:** By June 2016, increase the number of laws and/or policies that support reduction of cardiovascular risk factors (e.g., tobacco use and exposure, poor nutrition, and physical inactivity).

- Eat Smart, Move More NC – Click on “Policy” icon  
<http://www.eatsmartmovemorenc.com/ProgramsNTools/ProgramsNTools.html>
- Healthy North Carolina 2020 – Recommended public policies and health coverage for Tobacco Use (p. 9), Physical Activity and Nutrition (p. 11), Social Determinants of Health (p. 29), Chronic Disease (p. 31)  
<http://www.nciom.org/publications/?healthy-nc-2020>
- Diabetes Legislative Issues  
<http://www.ncdiabetes.org/legislativelssues/index.aspx>
- American Heart Association Policy Resources  
[http://www.heart.org/HEARTORG/Advocate/PolicyResources/Policy-Resources\\_UCM\\_001135\\_SubHomePage.jsp](http://www.heart.org/HEARTORG/Advocate/PolicyResources/Policy-Resources_UCM_001135_SubHomePage.jsp)
- NC General Assembly, An Act to Prohibit Smoking in Certain Public Places and Certain Places of Employment  
<http://www.ncleg.net/Sessions/2009/Bills/House/PDF/H2v10.pdf>
- NC General Assembly, A House Resolution Creating Awareness about the Benefits of Eliminating Excessive Dietary Sodium Intake and Related Supporting Measures Aimed at Decreasing Heart Disease and Stroke  
<http://www.ncleg.net/Sessions/2011/Bills/House/PDF/H670v2.pdf>
- U.S. Department of Health and Human Resources, Report to Congress: *National Strategy for Quality Improvement in Health Care* (Affordable Care Act); pp. 24, 25  
<http://www.healthcare.gov/law/resources/reports/nationalqualitystrategy032011.pdf>
- The National Aphasia Association: Aphasia and the Law  
[http://www.aphasia.org/naa\\_materials/aphasia\\_and\\_the\\_law.html](http://www.aphasia.org/naa_materials/aphasia_and_the_law.html)

**Objective 1.2:** By June 2016, decrease the percentage of North Carolinians who smoke and/or are exposed to secondhand smoke.

- CDC Smoking and Tobacco Use: Smoking and Tobacco Use, Heart Disease and Stroke [http://www.cdc.gov/tobacco/basic\\_information/health\\_effects/heart\\_disease/index.htm](http://www.cdc.gov/tobacco/basic_information/health_effects/heart_disease/index.htm)
- U.S. Department of Health and Human Services, *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General, U.S. Department of Health and Human Services. What Is Secondhand Smoke?* <http://www.surgeongeneral.gov/library/reports/secondhandsmoke/factsheet1.html>
- American Cancer Society, *Strategies for Promoting and Implementing a Smoke-free Workplace* [http://www.cancer.org/downloads/gahc/hp\\_strategies\\_for\\_promoting\\_and\\_implementing\\_smokefree\\_workplace.pdf](http://www.cancer.org/downloads/gahc/hp_strategies_for_promoting_and_implementing_smokefree_workplace.pdf)
- NC Department of Health and Human Services Tobacco Prevention and Control Branch:
  - Increasing the Price of Tobacco Products <http://www.tobaccopreventionandcontrol.ncdhhs.gov/youth/price.htm>
  - Tobacco Cessation <http://www.tobaccopreventionandcontrol.ncdhhs.gov/cessation/index.htm>

**Objective 1.3:** By June 2016, increase the proportion of North Carolinians who consume heart healthy diets and engage in recommended amounts of physical activity.

- Eat Smart, Move More N.C.:
  - Task Force on Preventing Childhood Obesity <http://www.eatsmartmovemorenc.com/ChildObesityTaskForce/ChildObesityTaskForce.html>
  - N.C.'s Obesity Prevention Plan <http://www.eatsmartmovemorenc.com/ESMMPlan/ESMMPlan.html>
  - Seven Target Behaviors <http://www.eatsmartmovemorenc.com/ESMMBehaviors/ESMMBehaviors.html>
  - Tools for Use in Preschools or Day Care <http://www.eatsmartmovemorenc.com/Preschool.html>
  - Tools for Use in Schools <http://www.eatsmartmovemorenc.com/School.html>
  - Physical Activity and Healthy Eating Policy <http://www.eatsmartmovemorenc.com/PhysicalActivityAndHealthyEatingPolicy/PhysicalActivityAndHealthyEatingPolicy.html>
  - *Eat Smart, Move More North Carolina Policy Strategy Platform 2012* <http://www.eatsmartmovemorenc.com/PolicyStrategy/Texts/2012%20ESMM%20NC%20Policy%20Strategy%20Platform%20FINAL%202012%203-9.pdf>
- The Dash Diet Eating Plan <http://dashdiet.org/>
- NC Prevention Partners, Be Active North Carolina



<http://www.beactivenc.org/>

- NC Cooperative Extension, Give Your Heart A Healthy Beat  
<http://www.ces.ncsu.edu/hhb/>

**Objective 1.4:** By June 2016, increase the proportion of adult North Carolinians who are reducing their consumption of dietary sodium by 20 percent.

- National Heart, Lung and Blood Institute, Reduce Salt and Sodium in Your Diet –Consumer oriented guide and tips  
<http://www.nhlbi.nih.gov/hbp/prevent/sodium/sodium.htm>
- North Carolina Division of Public Health, Sample Healthy Foods Policy  
<http://www.eatsmartmovemorenc.com/PhysicalActivityAndHealthyEatingPolicy/Texts/Sample%20Healthy%20Foods%20Policy.pdf>
- National Library of Medicine, Recommended Strategies that Focus on the Food Supply to Reduce Sodium Intake and to Monitor Their Effectiveness  
<http://www.ncbi.nlm.nih.gov/books/NBK50963/>
- Centers for Disease Control and Prevention, Americans Consume Too Much Sodium (Salt)  
<http://www.cdc.gov/features/dssodium/>

**Goal 2:** Increase the proportion of North Carolinians whose cardiovascular risk factors are identified, appropriately managed, and controlled.

- Centers For Disease Control and Prevention, *Prevention Works: CDC Strategies for a Heart-Healthy and Stroke-Free America*  
[http://www.cdc.gov/dhdsp/docs/Prevention\\_works.pdf](http://www.cdc.gov/dhdsp/docs/Prevention_works.pdf)

**Objective 2.1:** Decrease prevalence of high blood pressure and high cholesterol.

- Centers for Disease Control and Prevention:
  - High Blood Pressure  
<http://www.cdc.gov/bloodpressure/>
  - Getting Blood Pressure Under Control  
<http://www.cdc.gov/features/vitalsigns/hypertension/>
  - National Cholesterol Education Month  
<http://www.cdc.gov/features/CholesterolAwareness/>
  - About Heart Disease and Stroke  
<http://millionhearts.hhs.gov/about/hsd/prevention.htm>
  - National Heart Disease & Stroke Prevention Program. *Strategies for States to Address the “ABCS” of Heart Disease and Stroke Prevention*  
[http://www.cdc.gov/DHDSP/programs/nhdsp\\_program/docs/ABCS\\_Guide.pdf](http://www.cdc.gov/DHDSP/programs/nhdsp_program/docs/ABCS_Guide.pdf)
  - *Prevalence of Cholesterol Screening and High Blood Cholesterol Among Adults — United States, 2005, 2007, and 2009*  
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6135a2.htm>
  - *Partnering with Pharmacists in the Prevention and Control of Chronic Diseases*

[http://www.cdc.gov/dhdsp/programs/nhdsp\\_program/docs/pharmacist\\_guide.pdf](http://www.cdc.gov/dhdsp/programs/nhdsp_program/docs/pharmacist_guide.pdf)

- American Heart Association:
  - *National Study of Physician Awareness and Adherence to Cardiovascular Disease Prevention Guidelines*  
<http://circ.ahajournals.org/content/111/4/499.short>
  - Guideline Advantage  
<http://www.guidelineadvantage.org/TGA/>
- Consortium for Southeastern Hypertension Control  
<http://www.cosehc.org/V2/Home.aspx>
- U.S. Department of Health and Human Services, *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure*  
<http://www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.pdf>
- National Institutes of Health:
  - ATP III Classifications (Cholesterol)  
<http://www.nhlbi.nih.gov/guidelines/cholesterol/>  
At-A-Glance Quick Desk Reference  
<http://www.nhlbi.nih.gov/guidelines/cholesterol/atglance.pdf>
  - Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure JNC 7 Guidelines  
<http://www.nhlbi.nih.gov/guidelines/hypertension/>  
Reference card  
<http://www.nhlbi.nih.gov/guidelines/hypertension/phycard.pdf>
- North Carolina Office of State Personnel, Worksite Wellness  
<http://statehealthplan.state.nc.us/ncHealthSmart/workWellness/default.aspx>

**Objective 2.2:** By June 2016, increase the number of North Carolina worksites with environments and behavioral approaches that support detection and self-management of cardiovascular disease and the related risk factors for employees.

- North Carolina Institute of Medicine, Healthy NC 2020: A Better State of Health. Recommendations for worksites; pp. 9, 11, 31, 33  
<http://publichealth.nc.gov/hnc2020/docs/HNC2020-FINAL-March-revised.pdf>
- Centers for Disease Control and Prevention:
  - Employers Toolkit and Worksite Health Scorecard  
[http://www.cdc.gov/dhdsp/pubs/employer\\_worksite\\_tools.htm](http://www.cdc.gov/dhdsp/pubs/employer_worksite_tools.htm)
  - Healthier Worksite Initiative Toolkits  
<http://www.cdc.gov/nccdphp/dnpao/hwi/toolkits/index.htm>
- Physical Activity and Nutrition, Worksites  
<http://www.ncpanbranch.com/Worksites.html>

**Objective 2.3:** By June 2016, increase the number of community health workers in North Carolina addressing cardiovascular disease prevention and management.

- Centers for Disease Control and Prevention, *Addressing Chronic Disease through Community Health Workers: A Policy and Systems-Level Approach*  
[http://www.cdc.gov/dhds/docs/chw\\_brief.pdf](http://www.cdc.gov/dhds/docs/chw_brief.pdf)

**Objective 2.4:** By June 2016, increase the percentage of North Carolinians at a healthy weight.

- Eat Smart, Move More N.C.:
  - Eat Smart, Move More Weigh Less  
<https://esmmweighless.com/>
  - North Carolina's Obesity Prevention Plan  
<http://www.eatsmartmovemorenc.com/ESMMPlan/ESMMPlan.html>

**Objective 2.5:** By June 2016, increase the percentage of current smokers who receive evidence-based tobacco prevention and cessation services.

- Centers for Disease Control and Prevention:
  - Smoking Cessation  
[http://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/cessation/quitting/index.htm](http://www.cdc.gov/tobacco/data_statistics/fact_sheets/cessation/quitting/index.htm)
  - Coverage for Tobacco Use Cessation Treatments  
[http://www.cdc.gov/tobacco/quit\\_smoking/cessation/pdfs/reimbursement\\_brochure.pdf](http://www.cdc.gov/tobacco/quit_smoking/cessation/pdfs/reimbursement_brochure.pdf)
- QuitlineNC.com  
<http://www.quitlinenc.com/>
- American Lung Association, Stop Smoking  
<http://www.lung.org/stop-smoking/>

**Objective 2.6:** By June 2016, increase the percentage of patients for whom aspirin therapy is indicated and are complying with physicians' recommendations for aspirin therapy.

- Centers for Disease Control and Prevention:
  - Talk to Your Health Care Professional  
<http://millionhearts.hhs.gov/about/hs/prevention.html#HCP>
  - Strategies for States to Address the ABCS of Heart Disease and Stroke Prevention  
[http://www.cdc.gov/DHDS/programs/nhdsp\\_program/docs/ABCS\\_Guide.pdf](http://www.cdc.gov/DHDS/programs/nhdsp_program/docs/ABCS_Guide.pdf)

**Goal 3:** Increase the proportion of North Carolinians who have access to and receive appropriate integrated emergency and acute care for cardiovascular events.

- NCSCC, Data Linkages with EMS  
<http://www.ncstrokeregistry.com/Default.aspx?pid=61>

**Objective 3.1:** By June 2017, increase the number of state and local laws and/or policies that support strong, inclusive, and coordinated heart disease and stroke systems of care that improve the treatment of cardiovascular disease patients.

- NC Office of EMS, NC EMS Triage and Destination Plan Templates (STEMI & Stroke EMS Destination Plans)  
<http://www.ncems.org/triageanddestination.html>

**Objective 3.2:** By June 2017, increase the percentage of North Carolinians who recognize the warning signs and symptoms of heart attack and stroke and who know to immediately call 9-1-1.

- American Heart Association/Stroke Association, Warning signs of heart attack, stroke and cardiac arrest  
[http://www.heart.org/HEARTORG/Conditions/911-Warnings-Signs-of-a-Heart-Attack\\_UCM\\_305346\\_SubHomePage.jsp](http://www.heart.org/HEARTORG/Conditions/911-Warnings-Signs-of-a-Heart-Attack_UCM_305346_SubHomePage.jsp)

**Objective 3.3:** By June 2017, all patients with cardiovascular events who contact 9-1-1 will receive treatment by pre-hospital staff that is consistent with recognized protocols.

- NC Office of EMS:
  - Medical Protocol 33: Suspected Stroke  
<http://www.ncems.org/pdf2012/33SuspectedStrokeFinal2012.pdf>
  - EMS Policies – EMS Patient Care Related Operational Policies (#1 Air Transport Policy and #20 Transport Policy for Suspected Stroke and STEMI)  
<http://www.ncems.org/nceppolicies.html>
  - EMS Procedures – EMS Patient Care Procedure Documents for NC EMS Systems (#41 Reperfusion Checklist for Stroke and STEMI, #45 Stroke Screen LA Pre-hospital)  
<http://www.ncems.org/ncepprocedures.html>
  - NC EMS Triage and Destination Plan Templates (STEMI and Stroke EMS Destination Plans)  
<http://www.ncems.org/triageanddestination.html> -
- State of North Carolina, Updates from the NC 9-1-1 Board  
<https://www.nc911.nc.gov/>
- Centers For Disease Control and Prevention, State Heart Disease and Stroke Prevention Programs Address Pre-hospital Emergency Medical Response  
[http://www.cdc.gov/dhdsdp/data\\_statistics/fact\\_sheets/fs\\_state\\_prehospital.htm](http://www.cdc.gov/dhdsdp/data_statistics/fact_sheets/fs_state_prehospital.htm)
- Department of Emergency Medicine at the University of North Carolina at Chapel Hill, EMS Performance Improvement Center  
<http://www.emspic.org/>

**Objective 3.4:** By June 2017, 100 percent of N.C. acute care facilities will implement protocols for management of heart attack and stroke as defined by current clinical guidelines.

- Agency for Healthcare Research and Quality, DHHS, Guidelines by Topic – Cardiovascular Diseases  
<http://guidelines.gov/browse/by-topic-detail.aspx?id=4584&ct=1>
- American Heart Association/American Stroke Association, Scientific Statements and Practice Guidelines Topic List

[http://my.americanheart.org/professional/StatementsGuidelines/ByTopic/By-Topic\\_UCM\\_316895\\_Article.jsp](http://my.americanheart.org/professional/StatementsGuidelines/ByTopic/By-Topic_UCM_316895_Article.jsp)

- U.S. Department of Health and Human Services, Centers for Medicare & Medicaid, Hospital Compare  
<http://www.hospitalcompare.hhs.gov/>
- Heart Attack Guidelines for unstable angina/non–ST-elevation myocardial infarction:  
<sup>1</sup>Anderson JL, Adams CD, Antman EM, Bridges CR, Califf RM, Casey DE Jr, Chavey WE 2nd, Fesmire FM, Hochman JS, Levin TN, Lincoff AM, Peterson ED, Theroux P, Wenger NK, Wright RS. American Heart Association, 2011 ACCF/AHA focused update incorporated into the 2007 ACC/AHA guidelines for the management of patients with unstable angina/non–ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2011;123:e426–e579.  
<http://circ.ahajournals.org/content/123/18/2022.full.pdf>
- Stroke Guidelines for the early management of adults with ischemic stroke:  
Adams HP Jr, del Zoppo GJ, Alberts MJ, et al. *Guidelines for the early management of adults with ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council, Clinical Cardiology Council, Cardiovascular Radiology and Intervention Council, and the Atherosclerotic Peripheral Vascular Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups: the American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists*. *Stroke* 2007; 38:1655-1711.  
<http://stroke.ahajournals.org/content/38/5/1655.full.pdf+html>

**Objective 3.5:** By June 2017, standardize statewide protocols that improve coordination of and minimize delays in care for acute heart disease and stroke patients among 9-1-1 personnel, first responders, transport personnel, and destination hospitals.

- Pre-hospital Emergency Care. Mears GD, Pratt D, Glickman SW, et al. *The North Carolina EMS Data System: a comprehensive integrated emergency medical services quality improvement program*. 2010; 14:85–94  
<http://informahealthcare.com/doi/abs/10.3109/10903120903349846>
- American Heart Association/American Stroke Association, *EMS Models for Stroke Care: Best Practices from CT and Around the United States*  
<http://www.slideshare.net/romduck/ems-stroke-systems-of-care-in-the-us#btnPrevious>
- NCSCC, *A Link to Improve Stroke Patient Care: A Successful Linkage Between a Statewide Emergency Medical Services Data System and a Stroke Registry*  
[http://www.ncstrokeregistry.com/Default.aspx?pid=61#North\\_Carolina\\_Stroke\\_Care\\_Collaborative\\_and\\_EMS](http://www.ncstrokeregistry.com/Default.aspx?pid=61#North_Carolina_Stroke_Care_Collaborative_and_EMS)

**Objective 3.6:** By June 2017, adopt a statewide system for designating the stroke care capabilities of each hospital that is not a primary stroke center, to include elements of rehabilitation and secondary prevention.

- American Heart Association/American Stroke Association, *Recommendations for the Establishment of Stroke Systems of Care: Recommendations from the American Stroke Association's Task Force on the Development of Stroke Systems*.  
<http://circ.ahajournals.org/content/111/8/1078.full>

**Objective 3.7:** By June 2017, every hospital in NC will adopt a stroke plan that is comprehensive in scope.

- NCSCC, *North Carolina Stroke Care Collaborative Acute Stroke Capable Hospital Toolkit*  
[http://www.ncstrokeregistry.com/resources/Acute\\_Stroke\\_capable\\_toolkit\\_Final.pdf](http://www.ncstrokeregistry.com/resources/Acute_Stroke_capable_toolkit_Final.pdf)
- American Heart Association/American Stroke Association:
  - *Guidelines for Thrombolytic Therapy for Acute Stroke: A Supplement to the Guidelines for the Management of Patients with Acute Ischemic Stroke*  
<http://circ.ahajournals.org/content/94/5/1167.long>
  - *Recommendations for the Implementation of Telemedicine within Stroke Systems of Care*  
<http://stroke.ahajournals.org/content/40/7/2635.full>

**Objective 3.8:** By June 2017, develop and adopt a system or plan that assures public availability of information concerning acute stroke plans, stroke capabilities of hospitals, and NC Office of Emergency Medical Services (OEMS) triage plans and definitions.

- Association of State and Territorial Health Officials, *Stroke System of Care Plan for North Carolina: Summary of North Carolina's ASTHO Stroke System of Care Plan Development Process*  
<http://www.ncstrokeregistry.com/Default.aspx?pid=54>
- NC Office of EMS, NC EMS Triage and Destination Plan Templates (STEMI & Stroke EMS Destination Plans)  
<http://www.ncems.org/triageanddestination.html>

**Goal 4:** Increase the proportion of North Carolinians who receive appropriate coordinated management of post-acute transitional care following cardiovascular events.

**Objective 4.1:** By June 2016, increase the percentage of cardiovascular event patients who receive timely and appropriate rehabilitation and transitional care.

- NC Heart Disease and Stroke Prevention Branch, NC Stroke Rehabilitation Programs and Services Guide  
[http://www.startwithyourheart.com/resources/508SWYH\\_StrokeRehabGuide09\\_2.pdf](http://www.startwithyourheart.com/resources/508SWYH_StrokeRehabGuide09_2.pdf)
- National Association of Chronic Disease Directors, *Systems of Care Survey Results, Fall 2010*  
<http://www.nacddarchive.org/nacdd-initiatives/cardiovascular-health/about-the-council/practice-groups/stroke-practice-group/systems-of-care-survey-results-fall-2010/view>
- National Transitions of Care Coalition:

- *Cultural Competence: Essential Ingredient for Successful Transitions of Care*  
<http://www.ntocc.org/Portals/0/PDF/Resources/CulturalCompetence.pdf>
- *Improving Transitions of Care: Hospital to Home*; pp. 7-35  
[http://www.ntocc.org/Portals/0/PDF/Resources/ImplementationPlan\\_HospitalToHome.pdf](http://www.ntocc.org/Portals/0/PDF/Resources/ImplementationPlan_HospitalToHome.pdf)
- *Improving Transitions of Care: Emergency Department to Home*; pp. 8-33  
[http://www.ntocc.org/Portals/0/PDF/Resources/ImplementationPlan\\_EDToHome.pdf](http://www.ntocc.org/Portals/0/PDF/Resources/ImplementationPlan_EDToHome.pdf)
- *Improving Transitions of Care with Health Information Technology*; pp. 22-26; Dec. 2010  
<http://www.ntocc.org/Portals/0/PDF/Resources/HITPaper.pdf>

**Objective 4.2:** By June 2016, ensure primary care providers and rehabilitation professionals are receiving increased and appropriate reimbursement for transitional care.

- National Transitions of Care Coalition, *Improving Transitions of Care: The Vision of the National Transitions of Care Coalition*; pp. 22-25  
<http://www.ntocc.org/Portals/0/PDF/Resources/PolicyPaper.pdf>

**Goal 5: Enhance utilization of current data resources, expand/develop additional resources, extend their availability, and improve accessibility of information derived from evaluation and surveillance processes.**

- North Carolina Center for State Health Statistics  
<http://www.schs.state.nc.us/SCHS/>
- NCSCC, *A Link to Improve Stroke Patient Care: A Successful Linkage Between a Statewide Emergency Medical Services Data System and a Stroke Registry*  
[http://www.ncstroke registry.com/Default.aspx?pid=61#North\\_Carolina\\_Stroke\\_Care\\_Collaborative\\_and\\_EMS](http://www.ncstroke registry.com/Default.aspx?pid=61#North_Carolina_Stroke_Care_Collaborative_and_EMS)
- DHHS, DPH, *Healthy North Carolina 2020: A Better State of Health*  
<http://publichealth.nc.gov/hnc2020/>
- Healthy People 2020, Heart Disease and Stroke  
<http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicId=21>
- Centers for Disease Control and Prevention, *Heart Disease and Stroke Prevention Evaluation Resources*  
[http://www.cdc.gov/dhdsp/evaluation\\_resources.htm](http://www.cdc.gov/dhdsp/evaluation_resources.htm)
- National Association of Chronic Disease Directors, *Cardiovascular Health Epidemiology and Evaluation Resources*  
<http://www.nacddarchive.org/nacdd-initiatives/cardiovascular-health/professional-development/Epidemiology%20and%20Evaluation>
- American Stroke Association, *Translating Evidence into Practice: A Decade of Efforts by the American Heart Association/American Stroke Association to Reduce Death and Disability Due to Stroke*. pp. 9-11; published online February 24, 2010  
<http://www.mastertrain.8m.com/articles/Stroke%202010.pdf>



*Justus-Warren Heart Disease & Stroke Prevention Task Force*

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