



South Carolina Department of Health and Environmental Control  
Heart Disease and Stroke Prevention Division  
**2010 Edition**

**Heart & Stroke  
Disease & Prevention**  
Strengthening the Chain of Survival





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# The Burden Of Heart Disease And Stroke In South Carolina

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*“On July 13, 1996, I woke up between 6:30 a.m. and 7:00 a.m. I needed to scratch my right arm, and I tried to move my left arm, but it would not cooperate. I tried to sit up in bed, I couldn’t sit up, and I fell out of bed. Life has not been the same. I have made all kinds of adjustments and learned how to accept what I cannot change.”*

- Cassandra, Stroke Survivor

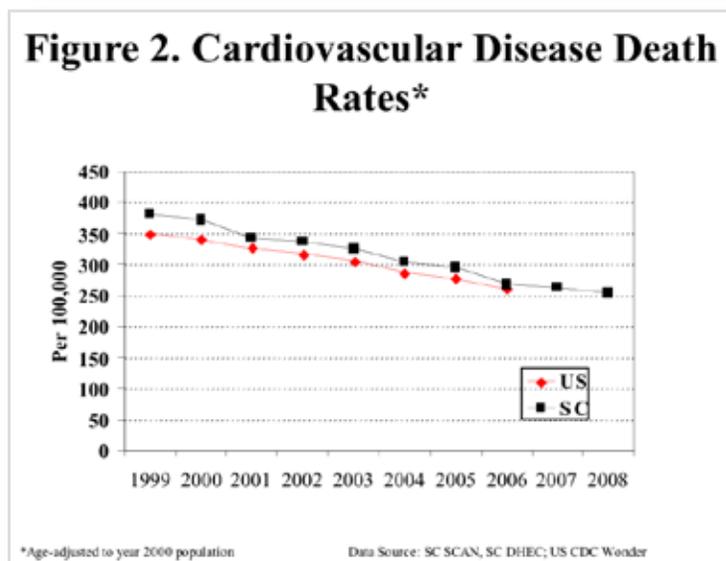
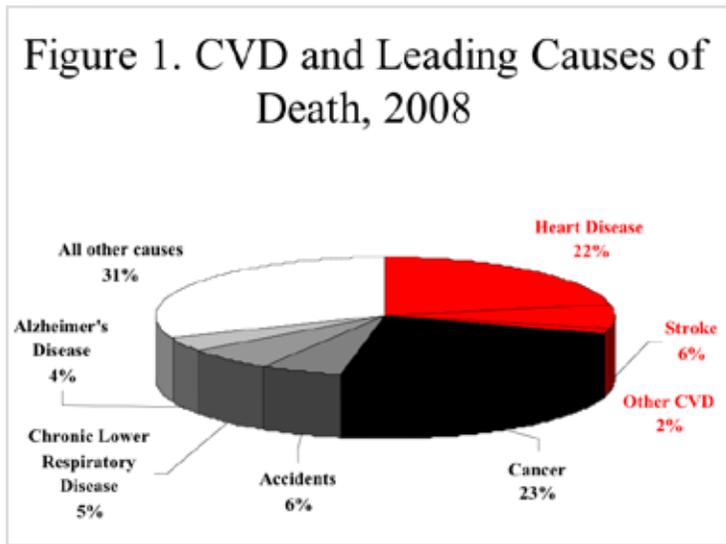


# Cardiovascular Disease

Cardiovascular disease (CVD) is the leading cause of death and disability in the United States and South Carolina. An estimated one-third of American adults have some form of cardiovascular disease.<sup>1</sup> In 2006, CVD caused 34 percent of all deaths in the United States.<sup>2</sup> The age-adjusted CVD death rate in the United States was 261<sup>2</sup> per 100,000 population.<sup>2</sup> Cardiovascular disease is defined as all diseases of the heart and blood vessels, including ischemic heart disease, hypertensive heart disease (together also called coronary

heart disease), cerebrovascular disease (stroke), congestive heart failure, atherosclerosis, diseases of the veins and rheumatic heart disease.<sup>1</sup> The economic costs of cardiovascular disease nationwide are staggering. For 2010, the American Heart Association estimated that the cost of cardiovascular diseases nationwide would be \$503.2 billion in direct and indirect costs; this figure includes hospitalizations, physician services, medications, and lost productivity.<sup>1</sup>

In 2008, CVD remained the leading cause of death in South Carolina (Figure 1). Cardiovascular disease caused 12,223 deaths, 30 percent of all deaths in that year.



Overall, cardiovascular disease mortality rates in South Carolina have dropped by 34 percent since 1999 (Figure 2). Even though South Carolina's cardiovascular disease mortality rate has been declining, it still remains higher than the national rate.

# Heart Disease

## OVERVIEW

Heart disease is any affliction that impairs the structure or function of the heart, such as atherosclerotic and hypertensive diseases, congenital heart disease, rheumatic heart disease, and other conditions. It includes coronary heart disease, heart failure, and other types of heart disease. Heart disease is one of a number of diseases of the circulatory system, and was the leading cause of death among women in South Carolina in 2008. It is primarily a disease of lifestyle, and is largely preventable through risk factor awareness and modification. Major modifiable risk factors include high blood cholesterol, high blood pressure (hypertension), type 2 diabetes, and overweight/obesity.

The most common type of heart disease, coronary artery disease, occurs when the arteries that supply blood to the heart become hardened and narrowed from fatty plaque buildup on the artery walls, a process called atherosclerosis. Plaque buildup can cause blood clots to form that block the arteries, can narrow the arteries so that less blood can flow to the heart (experienced as chest pain or angina), or can completely block the arteries and the flow of blood to the heart, causing a heart attack (myocardial infarction) and possible death. Lack of blood flow to the heart is referred to as ischemia (localized tissue anemia due to obstruction of the inflow of arterial blood). Over time, coronary artery disease can also weaken the heart muscle and contribute to heart failure (inability of the heart to pump blood to the rest of the body the way that it should), or to arrhythmias (changes in the normal rhythm of the heartbeats). In the literature, coronary artery disease, coronary heart disease, ischemic heart disease, and heart disease are often used interchangeably.

ST segment Elevation Myocardial Infarction (STEMI) is the most severe type of acute myocardial infarction that could result in high mortality without timely, active treatment. Although STEMI mortality has been reduced dramatically with the development of reperfusion strategies over the last two decades, it still remains a significant public health problem. There are very few state-specific studies on characteristics, management and outcome of patients with STEMI. Nationally, an estimated 500,000 STEMI cases per year represent 30 percent of all Acute Myocardial Infarction (AMI) events. Because this type of AMI has a specific pattern on the electrocardiogram (ECG) that is “ST elevation,” doctors use the term STEMI to describe this type of AMI. ST elevation in ECG is critical in diagnosing chest discomfort. Once it is found, no time can be spared in treating the patient with the blocked coronary artery. STEMI can be a life-threatening condition, that if recognized and treated promptly, the morbidity and mortality can be reduced.<sup>3</sup>

## MORBIDITY

The term morbidity rate can refer to either the incidence rate, or the prevalence of a disease or medical condition. This refers to the number of individuals in poor health or disability during a given time period, the incidence rate, or the prevalence rate, scaled to the size of the population.

# Heart Disease

## Prevalence

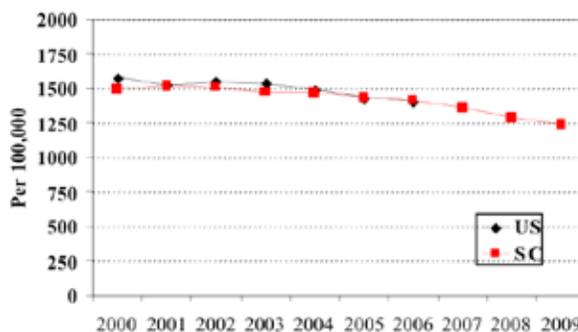
The data source for estimating prevalence of heart disease in South Carolina is limited to the Behavioral Risk Factor Surveillance System (BRFSS). Three questions pertaining to cardiovascular disease were asked in South Carolina. These three questions asked adults if they had ever been told they had angina or coronary heart disease (CHD), or if they had ever been told they had a heart attack or myocardial infarction.

- In 2009, the prevalence of CHD in the United States was 3.8 percent. That same year, it was estimated that 4.4 percent of adults in South Carolina, or approximately 150,000 adults, reported CHD.
- In 2009, the prevalence of heart attack in the United States was 4 percent, and in South Carolina it was 4.6 percent.

## Incidence

- Heart disease results in substantial morbidity and disability among South Carolinians and Americans in general.
- The incidence rates of heart disease hospital discharge have declined in SC since 2001 (Figure 3).
- More than 57,000 heart disease hospitalizations occur in SC each year.

**Figure 3. Heart Disease Hospitalization Rates**



Data Source: Hospital Discharge Database SC: SC Budget and Control Board, Office of Research and Statistics; US CDC NHDS

# Heart Disease

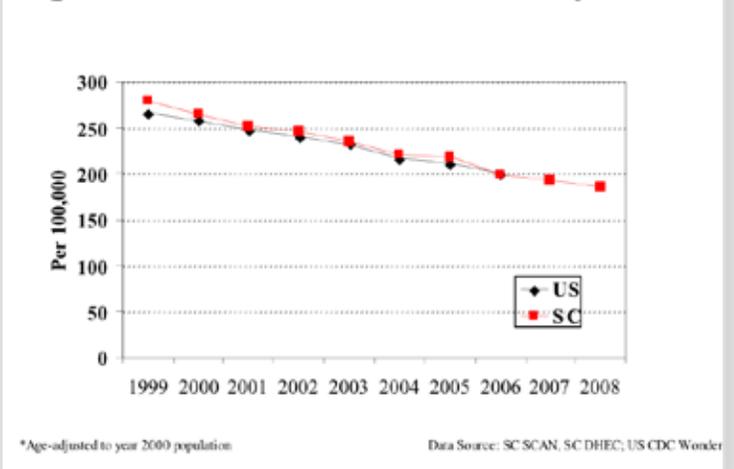
## MORTALITY

The mortality rate is a measure of the number of deaths (in general, or due to a specific cause) in some population, scaled to the size of that population, per unit time. Mortality rate is typically expressed in units of deaths per 1,000 individuals per year. For instance, a mortality rate of 9.5 in a population of 100,000 would mean 950 deaths per year in that entire population. Heart disease was the second leading cause of death in South Carolina behind cancer in 2008, and caused 22 percent of all deaths in South Carolina.

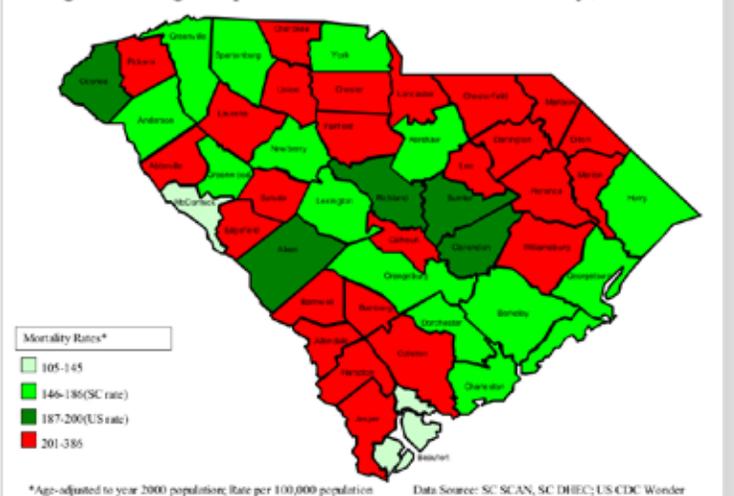
In 2008, heart disease caused 8,984 deaths among South Carolinians.

- South Carolina's age-adjusted heart disease death rate dropped from 280 in 1999 to 185.7 in 2008 (Figure 4). South Carolina's 2008 rate was below the national rate of 200.2 in 2006 (latest year available).
- A map of 2008 heart disease death rates by county in South Carolina shows that Beaufort and McCormick had the lowest rates and the majority of the counties were above the national rate (Figure 5).

**Figure 4. Heart Disease Mortality Rates\***



**Figure 5. Age-adjusted Heart Disease Mortality, 2008**



# Heart Disease

## KNOWLEDGE OF HEART ATTACK SYMPTOMS

The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based annual survey that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. For many states, BRFSS is the only available source of timely, accurate data on health-related behaviors.

BRFSS was established in 1984 by the Centers for Disease Control and Prevention (CDC); currently data are collected daily in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. More than 432,000 adults are interviewed each year, making the BRFSS the largest telephone health survey in the world. States use BRFSS data to identify emerging health problems, establish and track health objectives, and develop and evaluate public health policies and programs. Many states also use BRFSS data to support health-related legislative efforts.

Table 1 illustrates the South Carolina results for knowledge of heart attack symptoms.

- In 2009 (latest year available), most adults, 92.8 percent, recognized chest pain or discomfort as a symptom of a heart attack.
- Fewer adults, 55.4 percent, recognized pain in the jaw, neck or back as a symptom of heart attack.
- One-third of adults, 33.5 percent, incorrectly identified trouble seeing as a symptom of heart attack.
- Only 36.8 percent of South Carolina adults knew all of the signs and symptoms of a heart attack in 2009.

- 86.8 percent of adults indicated they would call 9-1-1 if someone were having a heart attack.
- Only 32.5 percent recognized all of the correct symptoms and would call 9-1-1.

# Heart Disease

**Table 1. Percentage of Adults Recognizing Heart Attack Symptoms by Selected Characteristics, SC BRFSS 2009**

Characteristic	Knew All Correct Symptoms (%)	Pain in jaw, neck or back (%)	Weakness, lightheaded, faint (%)	Chest pain/discomfort (%)	Trouble seeing with one or both eyes (incorrect symptom) (%)	Pain/discomfort in arm or shoulder (%)	Shortness of breath (%)
<b>Total</b>	36.8	55.4	62.8	92.8	33.5	87.7	86.5
<b>Gender</b>							
Males	29.7	46.2	61.8	92.2	35.6	85.1	85.6
Females	43.4	63.8	63.8	93.3	31.6	90.1	87.4
<b>Race/Ethnicity</b>							
White	41.9	62.2	65.4	95.4	32.8	92.1	89.5
African Americans	26.2	41.6	56.4	88.5	36.3	78.8	81.5
Hispanic	34.1	42.9	63.3	86.2	35.4	81.0	77.6
<b>Age (years)</b>							
18-24	23.0	42.3	63.6	90.8	47.7	77.0	82.9
25-34	29.0	41.3	68.9	96.1	40.5	86.5	89.0
35-44	36.5	51.9	64.5	95.7	33.5	92.1	87.8
45-54	42.7	62.4	64.0	94.8	30.1	91.1	89.0
55-64	46.8	68.2	64.0	92.1	29.9	90.4	87.6
65+	36.8	60.8	52.5	85.8	26.2	83.5	81.1
<b>Education</b>							
<High school	22.5	44.2	49.1	78.1	25.3	70.7	72.6
High school	31.1	48.6	59.2	92.1	36.7	85.6	85.1
Some college	40.5	59.0	65.0	95.2	36.5	92.0	89.0
College graduate	45.3	63.5	70.3	97.7	31.4	93.1	91.6

*“I suffered a sudden and massive heart attack while at work... Through exceptional circumstances and teamwork, I narrowly averted sure tragedy.”*

- Francisco, Heart Attack Survivor

# Heart Disease

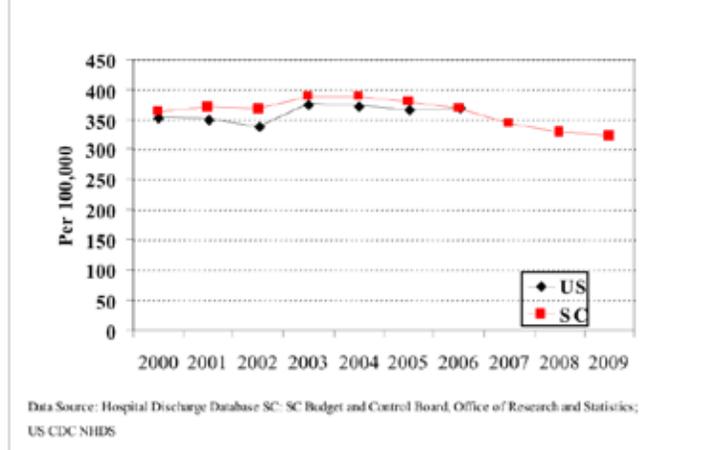
## HEART FAILURE

Heart failure, or congestive heart failure, is a condition in which the heart cannot pump enough blood to the body's other organs.

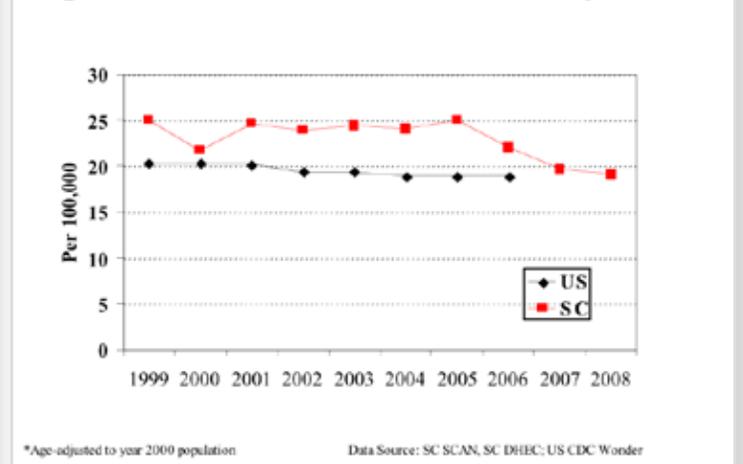
### Morbidity

- Since 2000, South Carolina has had a lower rate of hospitalizations for heart failure than the nation (Figure 6).
- Hospital discharges for heart failure rose from 13,076 in 1999 to 14,701 in 2009.

**Figure 6. Heart Failure Hospitalization Rates**



**Figure 7. Heart Failure Mortality Rates\***



### Mortality

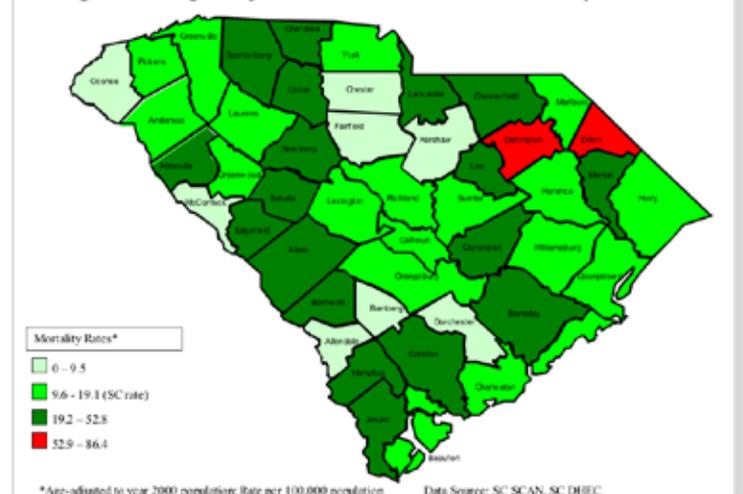
- In 2008, heart failure caused 919 deaths among South Carolinians.
- South Carolina's age-adjusted heart failure death rate remains slightly above the national average (Figure 7).

*"As far as I can tell, I have no residual effect of the heart attack... I have none of the risk factors for heart disease, other than bad genes."*

- Steven, Heart Attack Survivor

- Twenty-six counties in South Carolina had heart failure death rates lower than the state average, and all of these were lower than the national rate (Figure 8).

**Figure 8. Age-adjusted Heart Failure Mortality, 2008**



# Heart Disease

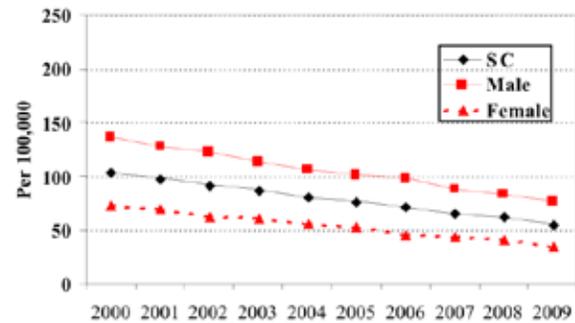
## STEMI

### Incidence

Using South Carolina hospital discharge data from 2000 to 2009, with primary diagnoses of AMI, we found:

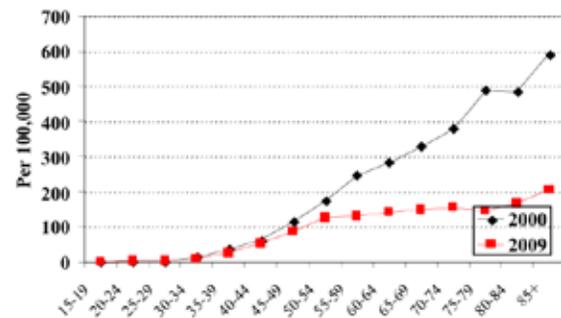
- The majority of the STEMI inpatient visits were comprised of South Carolina residents, age younger than 65 (63 percent), males (68 percent), and Whites (80 percent). From 2000 to 2009, the hospital inpatient visit rate decreased for South Carolina as a whole (Figure 9).
- The hospital inpatient visit rate by age reduced between 2000 and 2009 for almost all age groups, with larger differences among the age groups 50 years of age and above (Figure 10).

**Figure 9. STEMI Hospital Inpatient Visit Rates by Gender**



Data Source: Hospital Discharge Database SC; SC Budget and Control Board, Office of Research and Statistics;

**Figure 10. STEMI Hospital Inpatient Visit Rates by Age Group**



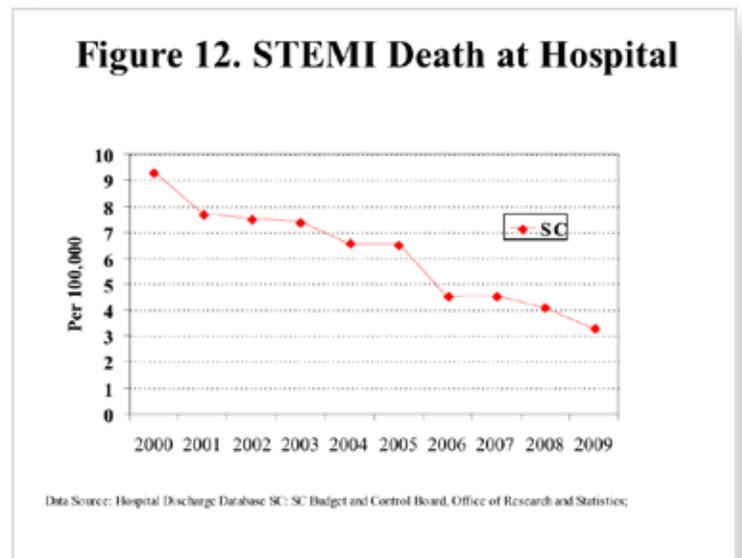
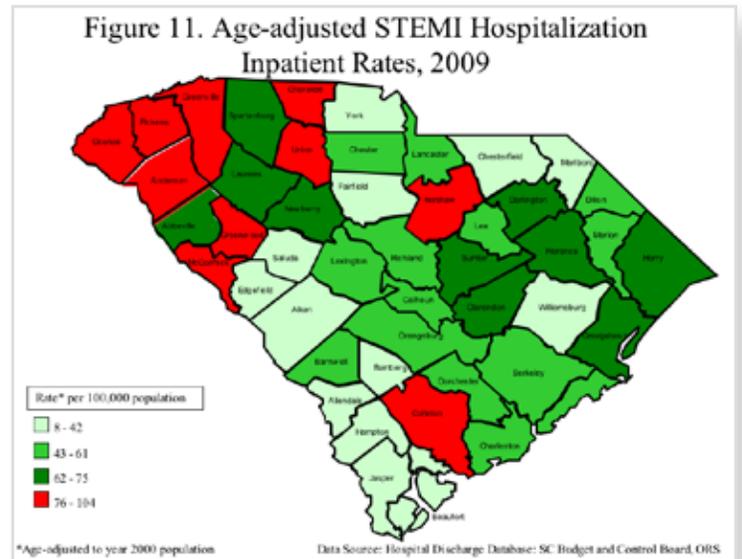
Data Source: Hospital Discharge Database SC; SC Budget and Control Board, Office of Research and Statistics;

# Heart Disease

- The age-adjusted rate for STEMI inpatient hospitalization was 61.4 per 100,000 population for 2009. Edgefield county had the lowest rate of 8.2, while Cherokee county had the highest rate of 103.5 in 2009 (Figure 11).

## Mortality

Although STEMI mortality has been reduced dramatically with the development of reperfusion strategies over the past three decades, it still remains a significant public health concern (Figure 12).



# Stroke

## OVERVIEW

A stroke, or “brain attack,” occurs when a blood clot blocks a blood vessel or artery in the brain (ischemic stroke), or when a blood vessel in the brain breaks or ruptures (hemorrhagic stroke). When a stroke occurs, brain cells die in the immediate area. These cells usually die within minutes to a few hours after the stroke starts.

The words stroke, brain attack, and cerebrovascular disease are used interchangeably throughout literature. They refer to abnormalities of the brain resulting from diseases of its blood vessels. Stroke is the most commonly diagnosed, but not the only form of cerebrovascular disease. The term cardiovascular disease is frequently used to encompass heart disease, stroke, and heart failure-disorders of the circulatory system.

An ischemic stroke can occur when a blood clot forms somewhere in the body and travels through the bloodstream to the brain. In the brain, the clot can lodge in a vessel too small for it, blocking the flow of blood to a specific area of the brain. Blood clot strokes can also happen as the result of a buildup of fatty deposits and cholesterol on the artery walls leading to or in the brain, a process called atherosclerosis. This process is identical to atherosclerosis in the coronary arteries that feed the heart, and can be prevented through a healthy, low-fat/high fiber diet, increased physical activity, and no tobacco use. Approximately 83 percent of all strokes are ischemic.

A hemorrhagic stroke is caused by the breakage or rupture of a blood vessel in the brain. Hemorrhages can be caused by a number of disorders that affect the blood vessels, including long-standing high blood pressure and cerebral aneurysms. An aneurysm is a weak or thin spot on a blood vessel wall. These weak spots are

usually present at birth. Aneurysms develop over a number of years and usually do not cause detectable problems until they break. Approximately 17 percent of all strokes are hemorrhagic.

When brain cells die, the individual suffers a loss of body function controlled by the stroke-affected areas of the brain. This includes functions such as speech, movement, and memory. The specific abilities lost or affected depend on where in the brain the stroke occurs and on the size of the stroke (i.e., the extent of brain cell death). Some people recover completely from less serious strokes, while other individuals lose their lives to very severe strokes.

In 2007, a total of 2,460 South Carolinians died from ischemic and hemorrhagic strokes, representing 6.2 percent of all deaths. Yet, the vast majority of strokes are preventable through healthy diet, increasing physical activity, and eliminating tobacco use.

Transient ischemic attacks (TIAs) are viewed as mini-strokes, and are brief conditions where blood is temporarily cut off from reaching the brain, often by an atherosclerotic condition. A TIA mimics many of a stroke’s symptoms, such as numbness, muscle weakness, and speech and language difficulties, but the symptoms usually last about an hour, or may persist up to 24 hours. About one third of those with a history of TIAs will suffer an acute stroke.

# Stroke

## MORBIDITY

Stroke results in substantial morbidity and disability among South Carolinians and Americans. Stroke is a leading cause of serious, long-term disability in the United States. The following are South Carolina statistics:

- Stroke hospital discharges have declined slightly in S.C. since 2000 (Figure 13).
- In 2009, there were 14,246 hospitalizations in SC for stroke.

## Prevalence

According to the 2009 S.C. BRFSS, 3.1 percent of adults, more than 100,000 people, have a history of stroke. This is slightly higher than the national estimate of 2.4 percent. Since this survey excludes people in long-term care facilities, this is likely to be an underestimate of the true prevalence of stroke.

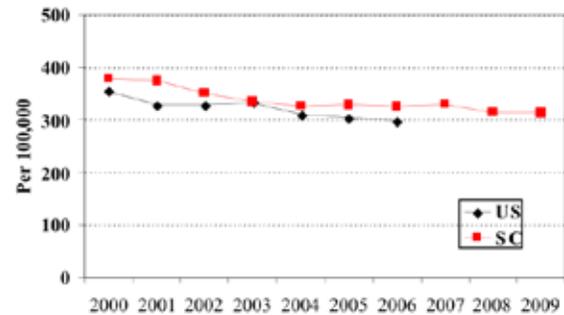
## MORTALITY

South Carolina is one of the states in the “Stroke Belt” and has had the highest or second highest mortality rate since 1983. However, in 2005<sup>a</sup>, South Carolina dropped to the 5th highest mortality rate in the nation, for all 51 states, including D.C. and excluding Puerto Rico. With the latest available data, S.C. had the 8th highest stroke mortality rate in 2006. South Carolina is now the lowest ranked it has been in the last three decades.

Stroke, or cerebrovascular disease, is the third leading cause of death in South Carolina, resulting in 2,387 deaths in 2008.

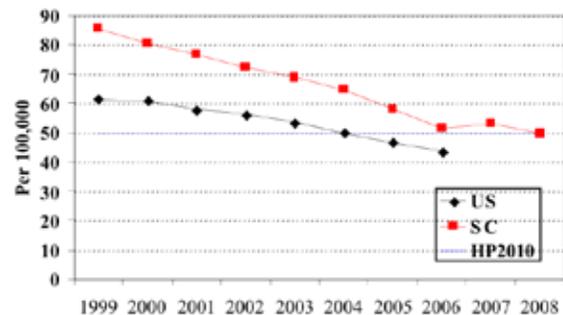
- Stroke mortality rates in South Carolina have decreased by 42 percent from 1999 to 2008 (Figure 14).

**Figure 13. Stroke Hospitalization Rates**



Data Source: Hospital Discharge Database SC; SC Budget and Control Board, Office of Research and Statistics; US CDC/NHDS

**Figure 14. Stroke Mortality Rates\***



\*Age-adjusted to year 2000 population

Data Source: SC SCAN, SC DHEC; US CDC Wonder

# Stroke

- In 2008, the age-adjusted stroke mortality rate for the state was 49.8 per 100,000 population. Though the rate has been decreasing, South Carolina remains above the national average. South Carolina has reached the Healthy People 2010 goal of 50 per 100,000 population in 2008.

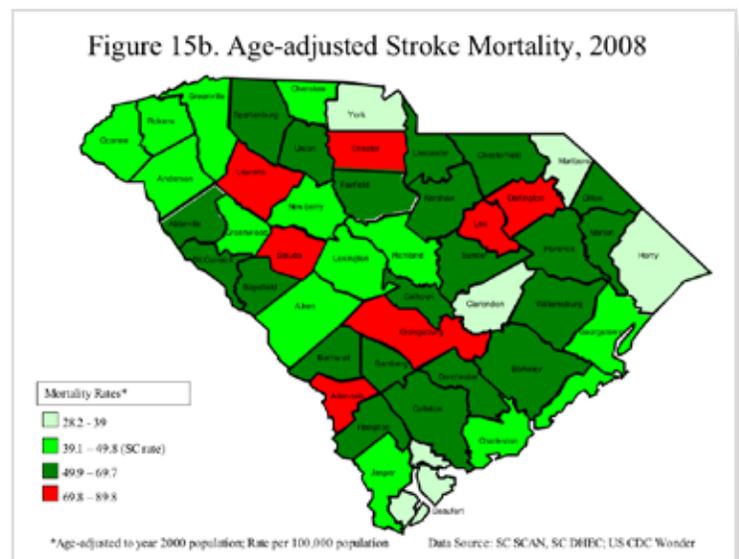
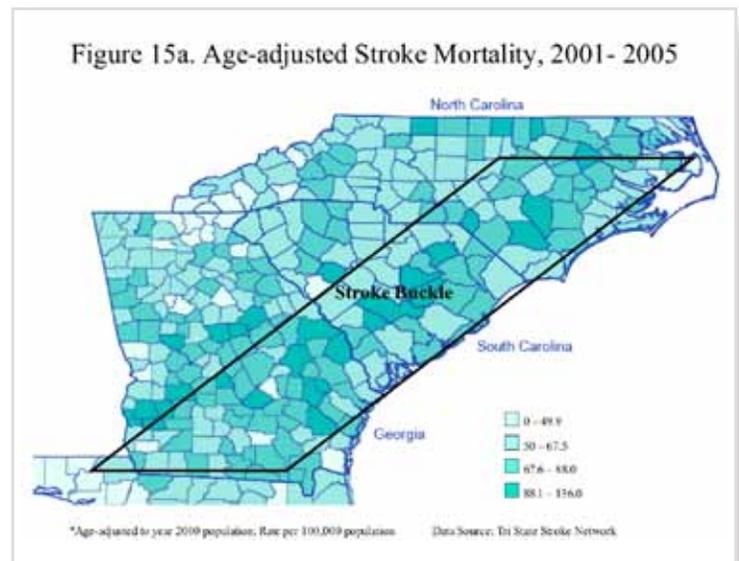
South Carolina is part of the Stroke Belt, a region in the southeastern part of the United States that has an unusually high incidence of stroke mortality and other forms of cardiovascular disease. The region includes Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

- Eastern counties in South Carolina, North Carolina, and Georgia are part of the Buckle of the Stroke Belt (Figure 15a). These residents historically have had the highest stroke death rates in the nation.
- A map of 2008 stroke death rates by county in South Carolina shows the higher stroke death rates along the eastern coastal counties (Figure 15b).

## KNOWLEDGE OF STROKE SYMPTOMS

Knowing the warning signs of a stroke and then immediately calling for emergency medical services is crucial in saving lives and improving health outcomes. Adults in South Carolina were asked about their knowledge of the signs and symptoms of a stroke and what would be their first action. Table 2 illustrates the stroke symptoms recognition by various demographics in 2009.

- Only 42.4 percent correctly identified all stroke symptoms AND said they would call 9-1-1 if they thought someone was having a stroke.



- 86.8 percent of S.C. adults say they would call 9-1-1 if they thought someone was having a stroke.
- However, when you take into account the knowledge of the wrong symptom (chest pain), only 17.9 percent of S.C. adults knew all five correct and knew the incorrect symptom and would call 9-1-1.

# Stroke

**Table 2. Percentage of Adults Recognizing Stroke Symptoms by Selected Characteristics, SC BRFSS 2009**

Characteristic	Knew All Correct Symptoms (%)	Confusion or trouble speaking (%)	Numbness, weakness (%)	Trouble seeing with one or both eyes (%)	Trouble walking, loss of balance (%)	Severe headaches (%)	Chest pain (incorrect symptom) (%)
<b>Total</b>	48.5	90.7	94.6	69.8	85.5	61.6	35.9
<b>Gender</b>							
<b>Males</b>	44.9	88.3	93.4	69.9	85.4	57.5	40.8
<b>Females</b>	51.9	92.8	95.7	69.3	85.6	65.4	31.3
<b>Race/Ethnicity</b>							
<b>White</b>	52.5	94.4	96.3	73.1	88.4	64.1	31.5
<b>African Americans</b>	42.4	85.4	93.2	62.6	80.8	58.9	47.0
<b>Hispanic</b>	29.4	72.2	90.4	68.2	79.0	39.0	32.7
<b>Age (years)</b>							
<b>18-24</b>	38.9	84.8	94.0	65.0	85.8	56.2	46.4
<b>25-34</b>	50.4	92.7	95.8	75.0	88.8	57.6	36.3
<b>35-44</b>	47.2	93.7	97.6	71.8	86.7	60.2	33.4
<b>45-54</b>	54.4	93.1	95.0	73.3	87.4	65.5	31.3
<b>55-64</b>	54.1	93.2	95.4	71.1	87.4	67.7	34.8
<b>65+</b>	42.3	83.5	89.3	59.2	77.1	60.4	38.5
<b>Education</b>							
<b>&lt;High school</b>	30.0	71.6	82.5	48.8	68.8	51.1	41.4
<b>High school</b>	40.2	88.4	94.2	64.4	83.9	55.5	42.5
<b>Some college</b>	54.8	94.6	97.7	75.6	88.3	65.7	33.9
<b>College graduate</b>	59.2	97.1	98.2	78.1	91.5	68.7	29.0

# Stroke

## SUCCESS STORY

### *Issue*

Ms. Willie S. Gerald, an 86-year-old church parishioner, knew exactly what to do when she experienced signs and symptoms of stroke at her home – call 9-1-1 fast! She later told family and friends, “Larry saved my life with a talk he gave at church.”

African Americans are particularly at high risk for stroke:

- Stroke is the third leading cause of death for African Americans in South Carolina, resulting in 713 deaths during 2008<sup>b</sup>;
- African Americans are more than 53 percent more likely to die from stroke than Caucasians in South Carolina; and
- Stroke resulted in 4,297 hospitalizations for African Americans in South Carolina during 2009.

### *Intervention*

In Horry and Marion County African Methodist Episcopal (AME) churches, congregations are receiving information on the signs and symptoms of stroke and the devastating effects in the African American community. The Chronic Disease Manager of the South Carolina Department of Health and Environmental Control (DHEC) Region 6, in collaboration with the AME Church’s Health Ministries Coordinator, gave presentations on the American Stroke Association’s Power to End Stroke (PTES) initiative. PTES is an educational program that teaches signs and symptoms of stroke. The following activities took place:

- A Power to End Stroke Ambassador trained church health coordinators;
- Educational workshops were held for AME Church congregations;
- Church members recited a “pledge” to recognize stroke signs, and vowed to call 9-1-1 if signs should occur;

- Church members signed and returned PTES pledge cards; and
- Stroke and other health-related materials were provided to the congregations.

### *Impact*

Reaching the target population through a faith-based setting proved quite successful. As a result of the DHEC Region 6 AME Church presentations, the following results have been achieved:

- Ten PTES Ambassadors were trained and given additional resources;
- Church members made commitments to monitor their vital signs for high blood pressure, diabetes, cholesterol and heart disease to prevent the onset or risks for stroke; and
- Potentially hundreds of AME Church members will receive PTES education in the Marion District.

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# Stroke

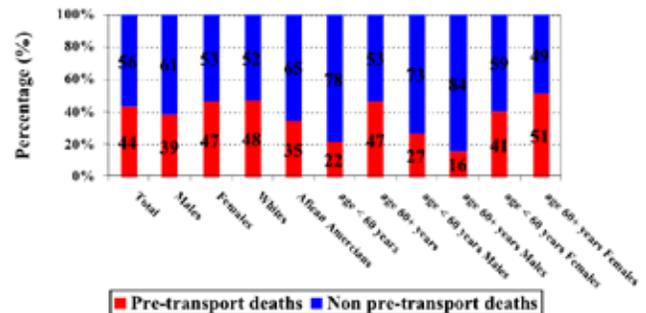
## PRE-TRANSPORT STROKE DEATHS

Pre-transport death occurs in a nursing home, residence, or any other place other than a hospital, clinic, or medical center. Analysis of pre-transport deaths provides an idea about the burden of deaths that occur before a person could reach a hospital and receive appropriate health care. Lack of awareness of signs and symptoms of coronary heart disease, stroke, and heart attacks results in delayed decisions to seek medical care. Pre-transport deaths reported in this document include all deaths that occurred in South Carolina among our state's residents. Among South Carolina residents, 2,025 stroke-related deaths occurred in South Carolina in 2008.

### Pre-transport stroke deaths:

- In 2008, less than half, 44 percent, of the total stroke deaths were pre-transport deaths (Figure 16).
- A larger percentage of female stroke deaths, 47 percent, were pre-transport, compared to male stroke deaths, 39 percent.
- More pre-transport deaths occurred among Whites, 48 percent, than among African Americans, 35 percent<sup>b</sup>.
- Not surprisingly, more pre-transport deaths occurred among the older population. Older females had the highest percentage of pre-transport deaths, 51 percent.

**Figure 16. Pre-transport Stroke Deaths, SC Occurrence Data 2008**



Data Source: SC Biostatistics, SC SHEC

Note: 2008 race specific information for 0.5% of mortality records are "unknown."

# Risk Factors

Studies have identified several factors that increase the risk of developing cardiovascular disease (CVD). Some of these risk factors can be modified or prevented. The most common modifiable risk factors for CVD are: high blood pressure, high cholesterol, tobacco use, poor nutrition, physical inactivity, overweight/obesity, and diabetes. The health-related behaviors that can be modified to lower the risks of developing cardiovascular disease are addressed in this section.

## HIGH BLOOD PRESSURE

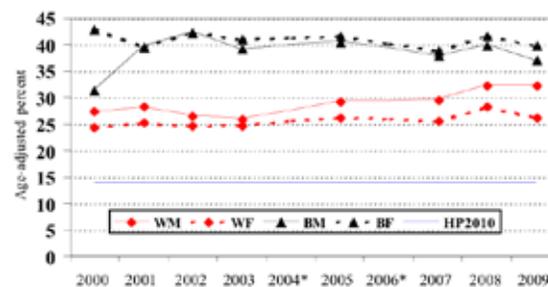
High blood pressure (hypertension) killed 56,561 Americans in 2006. People with uncontrolled high blood pressure have three to four times the risk of developing heart disease and as much as seven times the risk of suffering a stroke as those with normal blood pressure. Many people have hypertension for years without knowing they are at increased risk, increasing the likelihood of developing heart disease and stroke while their hypertension is uncontrolled.

- The overall age-adjusted prevalence of hypertension increased from 28.8 percent in 2000 to 31.7 percent in 2009.
- South Carolina's prevalence of hypertension is significantly greater than the Healthy People 2010 objective of 14 percent (Figure 17).
- African-American females continue to have the highest prevalence of hypertension in South Carolina.

## HIGH BLOOD CHOLESTEROL

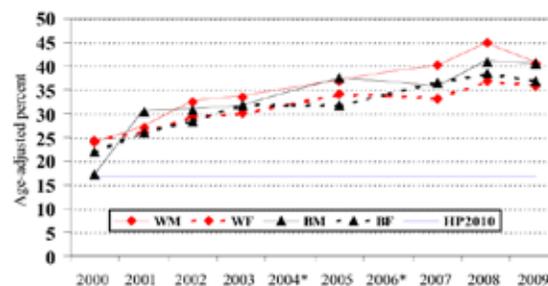
High blood cholesterol is a major risk factor for heart disease. In fact, the higher the blood cholesterol level, the greater the risk for developing heart disease or having a heart attack. Every 1 percent reduction in total cholesterol is linked to a 2 percent decrease in cardiovascular disease risk.

**Figure 17. Prevalence of Hypertension Among Adults Ages 20+ by Race and Gender**



Data Source: SC BRFSS, SC DHEC  
\*Data not available

**Figure 18. Prevalence of High Cholesterol Among Adults Ages 20+ by Race and Gender**



Data Source: BRFSS, SC DHEC  
\*Data not available

- The overall age-adjusted prevalence of high cholesterol increased from 23.3 percent in 2000 to 38 percent in 2009 among adults age 20 and older.
- White males have the highest prevalence of high cholesterol in South Carolina. None of the race and gender groups are making progress towards the Healthy People 2010 goal of 17 percent (Figure 18).
- Approximately 20.9 percent of South Carolina adults have not had their cholesterol checked within the past five years.

# Risk Factors

## TOBACCO USE

Cigarette smoking is the most important preventable cause of premature death in the United States, accounting for about 440,000 of the more than 2 million annual deaths. With evidence that smokers have two to four times the risk of developing coronary heart disease than nonsmokers and double the risk for a stroke, cigarette smoking is the most frequent cause of cardiovascular disease. Smoking cessation can reduce the risk of repeat heart attacks and death from heart disease by 50 percent or more.

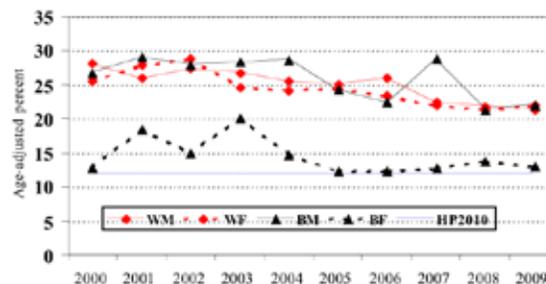
- The overall prevalence of current smokers has been slowly decreasing in the last several years for South Carolina.
- In South Carolina, 20.4 percent of adults are current smokers, which is slightly higher than the nationwide median of 17.9 percent in 2009.
- African American women have the lowest prevalence of current smoking and, in 2009, almost reached the Healthy People 2010 objective of 12 percent (Figure 19).

## POOR NUTRITION

A diet high in fat and cholesterol increases the risk for coronary heart disease, stroke, and diabetes.

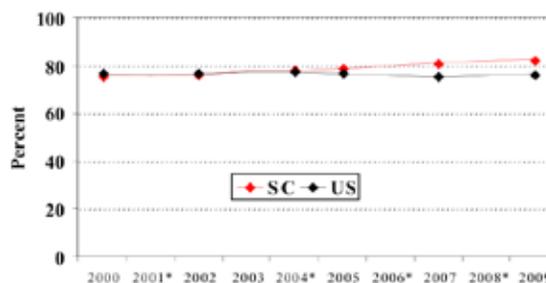
- In South Carolina, the percentage of adults who eat five servings of fruits and vegetables daily has remained approximately 25 percent over time.
- In 2009, approximately four out of five adults in South Carolina, 82.6 percent, did not eat the recommended amount of fruits and vegetables, which is higher than the nationwide prevalence rate of 76.6 percent (Figure 20).

**Figure 19. Prevalence of Current Smoking Among Adults by Race and Gender**



Data Source: BRFSS, SC DHEC

**Figure 20. Prevalence of Consuming Less Than Five Servings of Fruits or Vegetables a Day**



Data Source: BRFSS

\*Data not available

# Risk Factors

## PHYSICAL INACTIVITY

Physical inactivity is a term used to identify people who do not engage in any physical activity during their leisure time. Physically inactive people are twice as likely to develop coronary heart disease as physically active ones. Despite the well-publicized benefits of physical activity, current data shows little improvement in physical activity patterns among Americans over the past 20 years. The prevalence of physical inactivity among adults remains high in the U.S. and South Carolina.

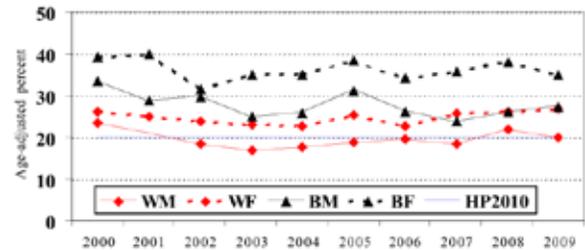
- The prevalence of physical inactivity has decreased from 28.1 percent in 1999 to 26.2 percent in 2009.
- Approximately one out of four adults in South Carolina were physically inactive (no leisure time physical activity) in 2009.
- African Americans, especially women, had a higher prevalence of physical inactivity than Whites (Figure 21).

## OVERWEIGHT AND OBESITY

Overweight is now recognized as a major contributor to cardiovascular diseases, and associated with considerable health risks and the prevalence of overweight and obesity has been constantly increasing nationwide since 1996. Adults with a Body Mass Index (BMI) of 25 or greater are considered as overweight; those who have a BMI over 30 or greater are considered obese. Today, more than six out of every 10 U.S. adults are overweight or obese, placing them at substantial risk of developing illnesses such as high blood pressure, high cholesterol, heart disease, stroke, and type 2 diabetes.

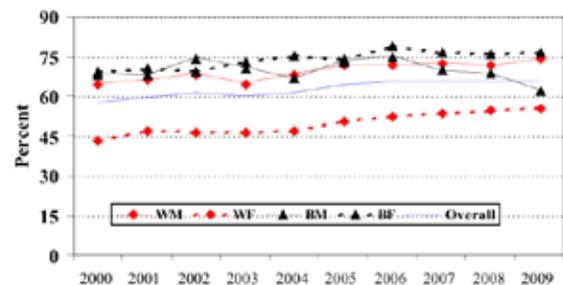
- The prevalence of overweight or obese in the state has increased from 57.9 percent in 2000 to 65.8 percent in 2009, which is higher than the nationwide median of 64 percent (Figure 22).

**Figure 21. Prevalence of No Leisure Time Physical Activity Among Adults by Race and Gender**



Data Source: BRFSS  
\*Data not available

**Figure 22. Prevalence of Overweight or Obese (based on BMI) by Race and Gender**



Data Source: SC BRFSS, SC DHEC

- In South Carolina, 35.8 percent of adults are overweight (BMI 25 – 29.9) and 30.1 percent of adults are obese (BMI 30+) in 2009.
- The prevalence of obesity is significantly higher for African Americans, 30.1 percent, compared to Whites, 27.3 percent, and the nationwide median, 26.9 percent.

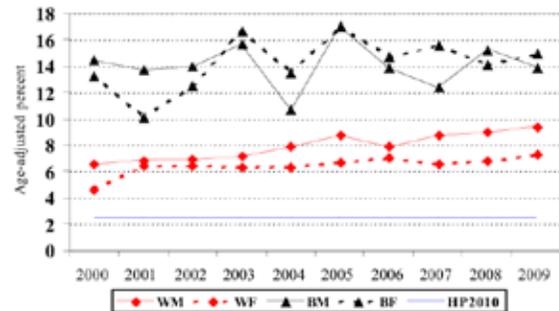
# Risk Factors

## DIABETES

South Carolina has one of the highest diabetes prevalence rates in the U.S. Approximately 344,771 adults in South Carolina have been diagnosed with diabetes and another 110,327 are not aware that they have the disease. According to the American Heart Association, clinical and statistical studies have found a strong correlation between high blood pressure, high cholesterol levels, and diabetes. These variables have always been major risk factors for stroke and are recognized as significant risk factors for coronary heart disease. Individuals with diabetes are at a twofold to fourfold increased risk of cardiovascular disease compared with individuals without diabetes. The American Heart Association concludes that diabetes is a cardiovascular disease.

- The prevalence of adults with diabetes in South Carolina has steadily increased over time.
- In South Carolina, approximately 10.4 percent of all adults reported having diabetes in 2009.
- The prevalence of diabetes in South Carolina is significantly higher for African Americans compared to Whites and to the U.S. prevalence rate for adults.
- African American females had the highest prevalence of diabetes (14.9 percent) among all race and sex groups for adults in 2009 (Figure 23).

**Figure 23. Prevalence of Diabetes Among Adults by Race by Race and Gender**



Data Source: BRFSS, SC DHEC

# Risk Factors

## RISK FACTOR CLUSTERING

Each risk factor can independently increase the risk of developing cardiovascular diseases as well as exacerbate other risk factors. This phenomenon is known as risk factor clustering, which greatly increases the risk of heart disease and stroke because the more risk factors a person has, the greater his or her chance of developing cardiovascular diseases (CVD) becomes.

Adults who had a history of CVD (i.e., answered “yes” to ever had a stroke, heart attack, or diagnosed with CHD) were compared to adults without a history of CVD on the prevalence of risk factors. The risk factors analyzed were tobacco use, high cholesterol, hypertension, poor nutrition, physical inactivity, overweight, and diabetes. These risk factors were categorized into none, only one, only two, only three, only four, and five risk factors or more.

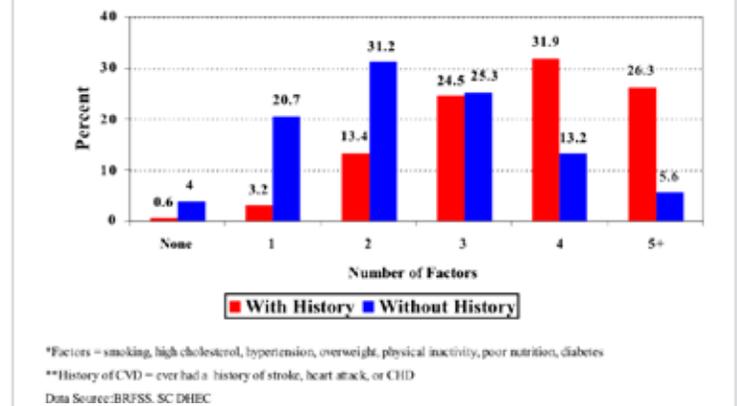
- In 2009, 8.7 percent of adults suffer from CVD (history of stroke, heart attack, or CHD).
- Adults with a history of CVD had more risk factors than those without a history of CVD. In fact, multiple risk factors are more common with adults suffering from CVD (Figure 24).
- Those with a history of CVD are more likely to have four or more risk factors than those without a history of CVD; in the past years, this has been increasing.

## ACTIONS TAKEN TO CONTROL HIGH BLOOD PRESSURE

Many South Carolinians with high blood pressure were advised by their doctors to adopt a healthy lifestyle.

- Of those with high blood pressure, 66.1 percent were advised to change their eating habits, 69.7 percent were told to cut down on

**Figure 24. Prevalence Rate of Adults with CVD Risk Factors\* by History of CVD,\*\* 2009**



salt, 29.7 percent were advised to reduce their alcohol intake, and 79.1 percent were advised of the importance of exercising (Table 3).

- Adults with high blood pressure were mostly following their doctors’ advice; 33 percent of South Carolina adults were advised by their doctor to eat more fruits and vegetables to lower their risk of developing heart disease or stroke.
- To lower their risk of developing heart disease or stroke, 63.7 percent of adults are eating fewer high fat or high cholesterol foods (BRFSS 2004 latest year available).
- Although the majority of adults in the state do not meet the NCI recommendations of 5-A-Day, 77.8 percent of South Carolina adults reported eating more fruits and vegetables to lower their risk of developing heart disease or stroke.
- 68.7 percent of adults reported being more physically active to reduce their risk.

# Risk Factors

One in five adults, 22.9 percent, were advised by their doctor to eat fewer high fat or high cholesterol foods.

<b>Table 3. Advice and Actions of Adults to Lower Their High Blood Pressure*, SC BRFSS 2009</b>		
<b>Health Professional Advice</b>	<b>Received Advice (%)</b>	<b>Are Changing (%)</b>
<b>Change eating habits</b>	66.1	83.6
<b>Cut down on salt</b>	73.1	92.1
<b>Reduce alcohol consumption</b>	44.9	80.4
<b>Exercise</b>	79.1	72.7

*\* Of those reported having been told by a doctor that they have high blood pressure*

*“My biggest accomplishment is when I learned to walk again.”*

*- Michelle, Stroke Survivor*

# Disparities

## RACE & ETHNICITY

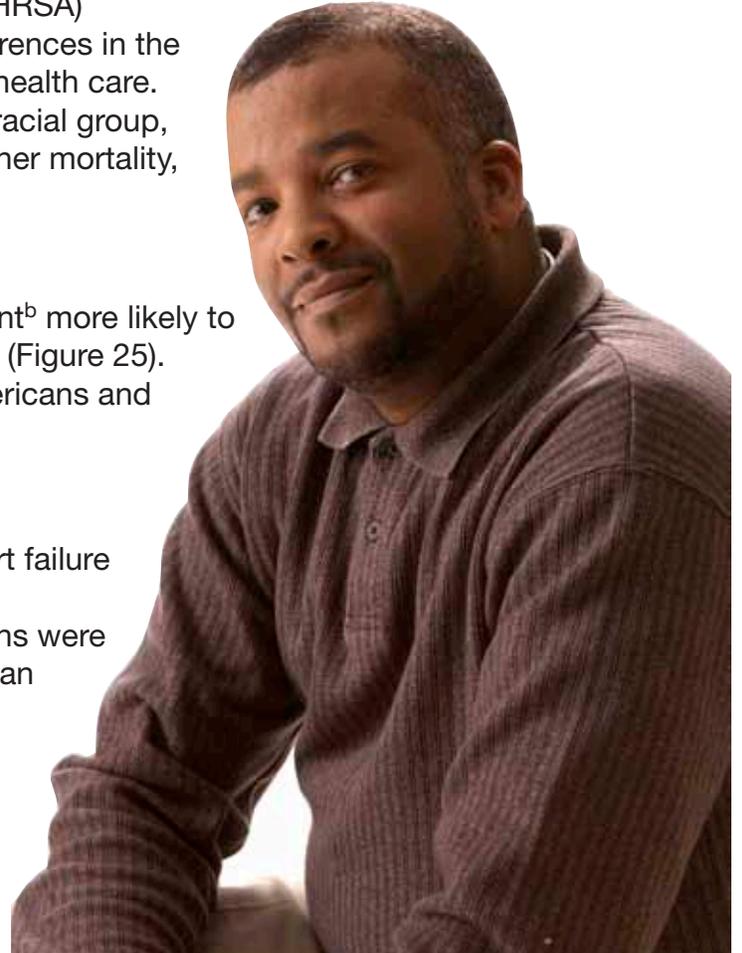
The Health Resources and Services Administration (HRSA) defines health disparities as population-specific differences in the presence of disease, health outcomes, or access to health care. When compared to Whites, African Americans, as a racial group, experience higher incidence of chronic diseases, higher mortality, and poorer health outcomes in the following areas:

### Heart Disease

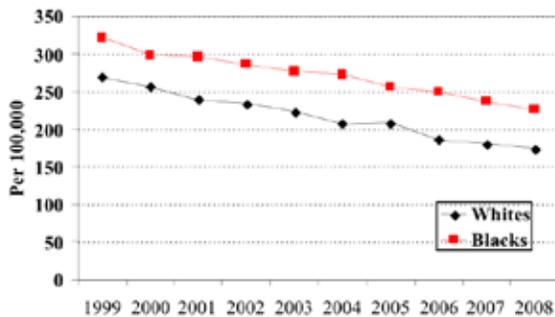
- African Americans in South Carolina are 30 percent<sup>b</sup> more likely to die from heart disease than the White population. (Figure 25).
- This disparity in death rates between African Americans and Whites has persisted over time.

### Heart Failure

- African Americans are more likely to die from heart failure than White South Carolinians (Figure 26).
- In recent years, African American South Carolinians were 23 percent<sup>b</sup> more likely to die from heart failure than their White counterparts.

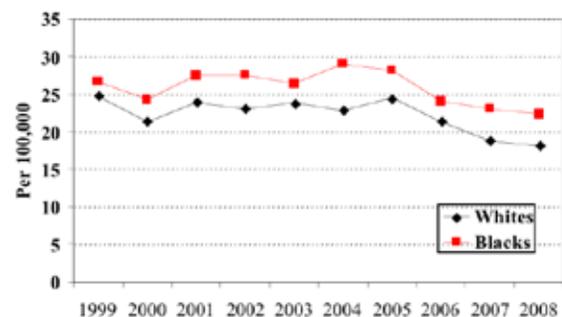


**Figure 25. Heart Disease Age-adjusted Mortality Rates\* by Race**



\*Age-adjusted to year 2000 population  
Data Source: SC SCAN, SC DHEC  
Note: 2008 race specific information for 0.5% of mortality records are "unknown."

**Figure 26. Heart Failure Age-adjusted Mortality Rates\* by Race**

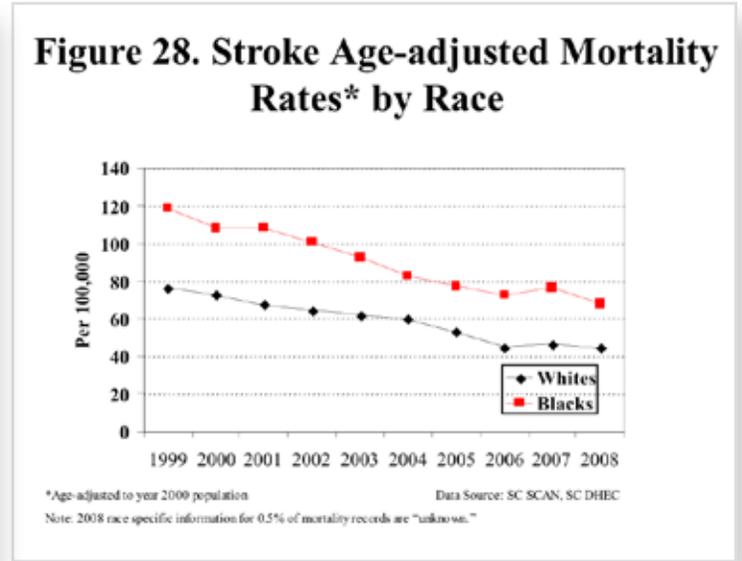
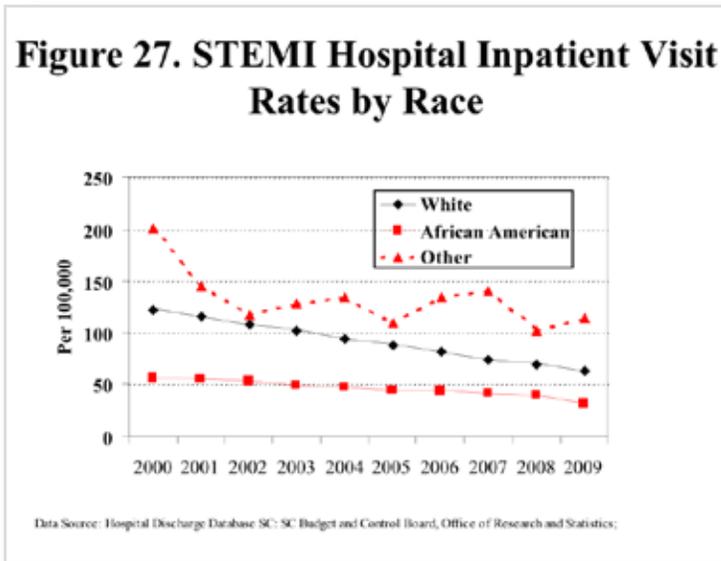


\*Age-adjusted to year 2000 population  
Data Source: SC SCAN, SC DHEC  
Note: 2008 race specific information for 0.5% of mortality records are "unknown."

# Disparities

## STEMI

- The hospital inpatient visit rate decreased in African Americans and other race groups over the last ten years (Figure 27).



## Stroke

- African-American South Carolinians have higher stroke death rates than do White South Carolinians (Figure 28). In fact, African Americans in South Carolina are 53 percent<sup>b</sup> more likely to die from stroke than the White population.
- The disparity in death rates has persisted over time.

## GENDER

- Heart disease is the number one killer for women and is second for men in South Carolina.
- Stroke is the 3rd leading cause of death for women, behind heart disease and cancer. It is the 5th leading cause of death for men, behind accidents and chronic lower respiratory disease.
- The total number of heart disease deaths is higher among men than women. However, the total number of stroke deaths is higher among women than men in South Carolina (Table 4).

	Number of Deaths	Age-Adjusted Rate*
<b>Males</b>		
Heart Disease	4,796	238.2
Stroke	979	50.3
<b>Females</b>		
Heart Disease	4,188	144.3
Stroke	1,408	48.4

\* Age-adjusted to year 2000 population  
Data Source: Vital Statistics, S.C. DHEC

# Disparities

## Heart Disease

- In South Carolina, heart disease death rates are higher among men than women (Figure 29); heart disease death rates remain 40 percent higher for men than women.
- Heart disease death rates have declined for men and women at about the same rate within the last ten years.

## Heart Failure

- In South Carolina, heart failure death rates are higher among men than among women. In 2008, the heart failure death rate was 20.7 among men and 17.9 among women (Figure 30).

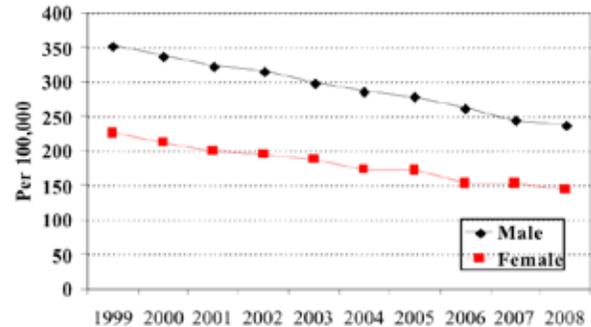
## STEMI

- There have been more males admitted to the S.C. hospitals for STEMI than females for more than a decade (see previous Figure 9).

## Stroke

- Historically, in South Carolina, stroke death rates have been higher in men than in women (Figure 31).
- Both groups have been declining at about the same rate in the last ten years.

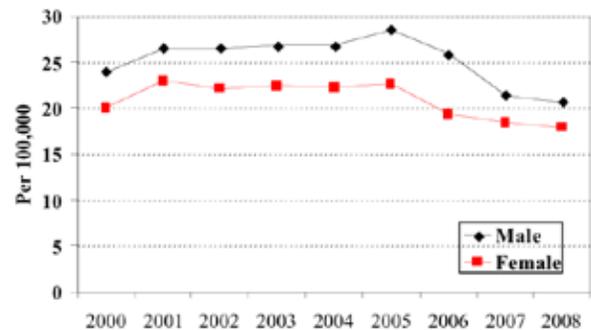
**Figure 29. Heart Disease Age-adjusted Mortality Rates\* by Gender**



\*Age-adjusted to year 2000 population

Data Source: SC SCAN, SC DHEC

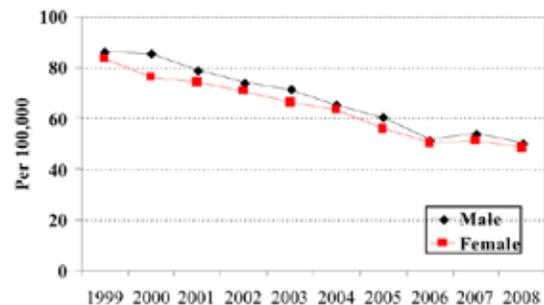
**Figure 30. Heart Failure Age-adjusted Mortality Rates\* by Gender**



\*Age-adjusted to year 2000 population

Data Source: SC SCAN, SC DHEC

**Figure 31. Stroke Age-adjusted Mortality Rates\* by Gender**



\*Age-adjusted to year 2000 population

Data Source: SC SCAN, SC DHEC

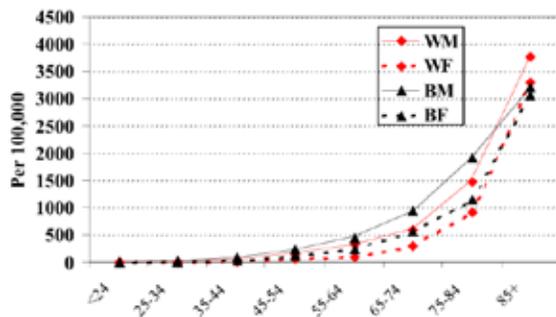
# Disparities

## AGE

### Heart Disease and Stroke

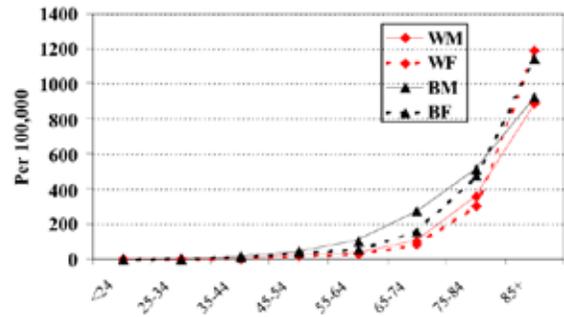
- African-American men have the highest age-specific mortality rates for both heart disease and stroke up to age 85 (Figures 32 & 33).
- African-American men are more likely to die from heart disease and stroke 10 years before White women.

**Figure 32. Age-specific Heart Disease Mortality Rates by Race and Gender, 2008**



Data Source: SC SCAN, SC DHEC  
 Note: 2008 race specific information for 0.5% of mortality records are "unknown."

**Figure 33. Age-specific Stroke Mortality Rates by Race and Gender, 2008**

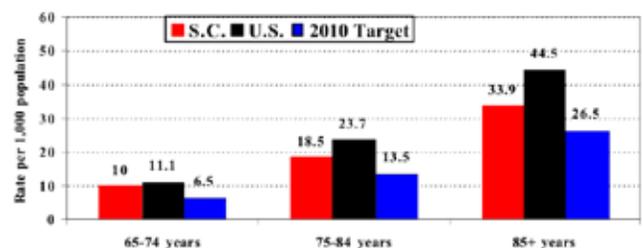


Data Source: SC SCAN, SC DHEC  
 Note: 2008 race specific information for 0.5% of mortality records are "unknown."

### Heart Failure

- Heart failure is the leading cause of hospitalization for South Carolinians over the age of 65.
- South Carolina's rates were lower than the corresponding U.S. rates for all the three heart failure Healthy People 2010 objectives (Figure 34).
- South Carolina still needs to make substantial declines in heart failure hospitalizations to reach the Healthy People goals. To reach the 2010 targets, S.C. will need to achieve a 35 percent decrease in the rate for the 65-74 year age group, a 27 percent decrease for the 75-84 year age group, and a 22 percent decline in the 85+ year age group.

**Figure 34. Heart Failure Hospitalization Rates for S.C., U.S. & Healthy People 2010 Target**



Data Source: SC 2009 Hospital Discharge Database SC, SC Budget and Control Board, Office of Research and Statistics; US 2005 CDC NHIS

## SOCIO-ECONOMIC STATUS

### Heart Disease and Stroke

Self-reported history of coronary heart disease and stroke among S.C. adults generally decreases with increasing education and income. The highest prevalence is in the less than high school education and less than \$15,000 income level.

# Disparities

**Table 5. Prevalence of Heart Disease and Stroke by Socio-economic Groups, SC BRFSS 2009**

History of	Education				Income				
	Less than H.S.	H.S. Grad	Some College	College Grad	<\$15,000	\$15,000-24,999	\$25,000-34,999	\$35,000-49,999	\$50,000+
<b>Heart Disease</b>	7.8%	3.8%	5.5%	2.9%	6.4%	5.6%	6.1%	2.8%	3.4%
<b>Stroke</b>	7.0%	3.4%	2.6%	1.7%	6.9%	4.8%	4.7%	2.3%	1.2%

## Risk Factors

The prevalence of risk factors is the highest among the less educated and poorest adults in South Carolina. This relationship is significantly shown in the prevalence of diabetes, in which the less educated and poorest adults in the state have twice the prevalence of diabetes.

**Table 6. Prevalence of Risk Factors by Socio-economic Groups, SC BRFSS 2009**

Risk Factor	Education				Income				
	Less than H.S.	H.S. Grad	Some College	College Grad	<\$15,000	\$15,000-24,999	\$25,000-34,999	\$35,000-49,999	\$50,000+
<b>High Blood Pressure</b>	49.1%	32.6%	30.3%	28%	49.5%	38.2%	37.8%	31.4%	24.7%
<b>High Cholesterol</b>	58.8%	38.4%	42.1%	39%	47%	44.8%	40.5%	39%	39.8%
<b>Tobacco Use</b>	39.3%	24%	19.9%	9.1%	32.5%	30%	24%	19.4%	12.2%
<b>Poor Nutrition</b>	89.2%	86.6%	81.8%	76.5%	83.7%	87.2%	84.9%	83.4%	78.7%
<b>Physical Inactivity</b>	42.2%	30.8%	24.7%	16.1%	42.1%	36.7%	30.5%	22.2%	17.3%
<b>Overweight and Obesity</b>	67.5%	65.2%	69.6%	62.9%	66%	72.6%	66.5%	67.7%	66.6%
<b>Diabetes</b>	20.6%	9.2%	10.3%	7.6%	19.1%	14.9%	14.2%	7.6%	6.2%

*“I think about that day when I had my stroke often, making me sad and depressed for a short period of time. Then I bounce back, because I know life is good. I’ve been where I could not do anything for my 2-year-old son or myself... going to the bathroom, bathing, washing clothes, dressing, or preparing meals.”*

- Cassandra, Stroke Survivor

# Economic Costs

The economic costs of cardiovascular disease are staggering. The estimated economic cost of cardiovascular diseases in the United States for 2010 is \$503.2 billion, including health care costs and loss of productivity resulting from illness and death. Sudden death due to cardiac arrest, while not as costly as lingering illnesses caused by CVD, can be financially and emotionally devastating to surviving families. The average cardiac arrest victim is approximately 60 years old, an age at which many people are still quite productive. Medical care for hospitalized patients suffering from cardiovascular disease imposes a heavy direct economic burden in South Carolina.

## HEART DISEASE

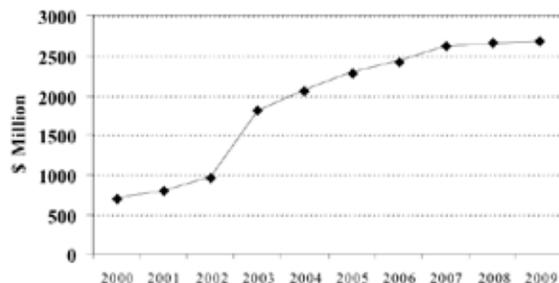
In 2008, heart disease was responsible for hospital charges totaling more than \$2.6 billion (primary diagnosis).

- Total hospital charges for treatment of heart disease patients more than tripled from 2000 to 2009 (Figure 35).
- The average cost for treating a heart disease patient was \$47,480 in 2009.

Who paid for the hospitalization of patients suffering from heart disease?

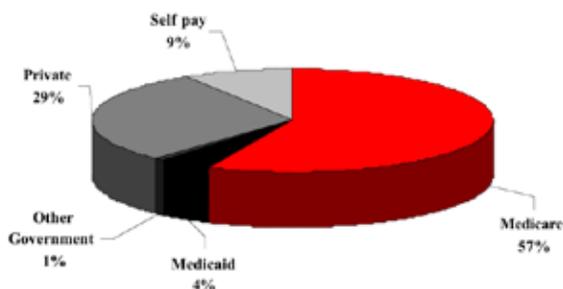
- In 2009, Medicare and Medicaid paid 61 percent of the \$2.6 billion in total hospital charges for cardiovascular diseases (Figure 36).

**Figure 35. Total Hospital Charges for Heart Disease Patients**



Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

**Figure 36. Primary Payer Total Hospital Charges for Heart Disease, 2009**



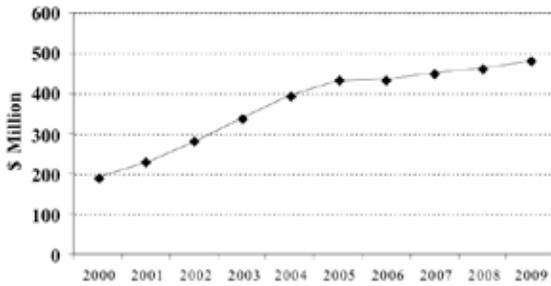
Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

# Economic Costs

## Heart Failure

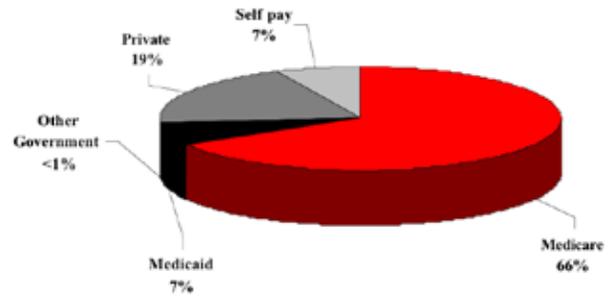
- In South Carolina, total charges for heart failure have more than doubled between 2000 and 2009 (Figure 37).
- In 2009, Medicare paid for 69 percent of the \$480 million in total hospital charges for heart failure (Figure 38).

**Figure 37. Total Hospital Charges for Heart Failure Patients**



Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

**Figure 38. Primary Payer Total Hospital Charges for Heart Failure, 2009**

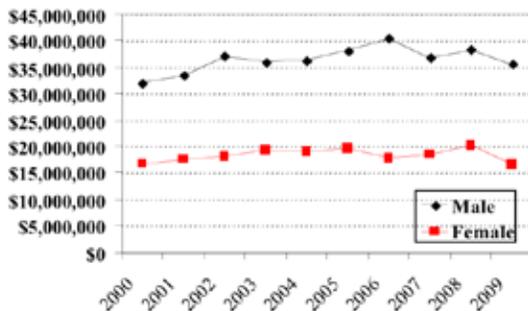


Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

## STEMI

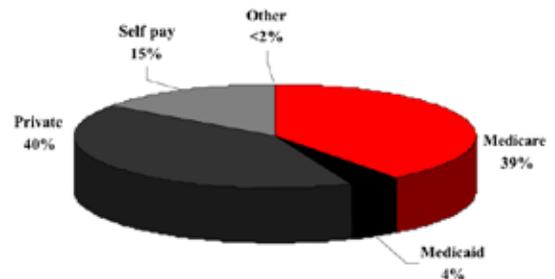
- In 2009, STEMI hospitalization charges rose to \$195 million (Figure 39). When calculated in the constant dollar, the trend for total charges remained increasing, despite the fact that the number of hospital admissions has diminished significantly.
- The public sector has been burdened with most of the hospital charges for STEMI patients. However, 40 percent of all charges were to commercial insurance and HMOs providers (Figure 40).

**Figure 39. STEMI Total Charges by Gender in Constant Dollar (Base Period: 1982-84=100)**



Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

**Figure 40. Primary Payer for STEMI Hospitalization Charges in 2009**



Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

# Economic Costs

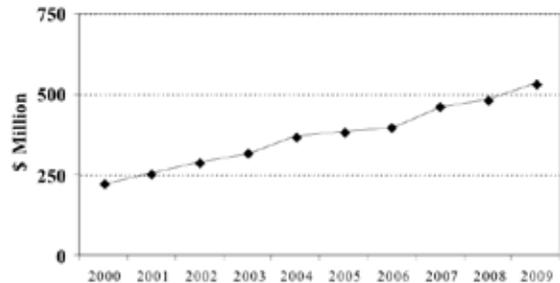
## STROKE

- In 2007, stroke was responsible for hospital charges totaling more than \$461 million (primary diagnosis).
- Total hospital charges for treatment of stroke patients increased by 37 percent from 1998 to 2007 (Figure 41).
- The average cost for a stroke patient was \$31,749 in 2007.

Who paid for the hospitalization of patients suffering from stroke?

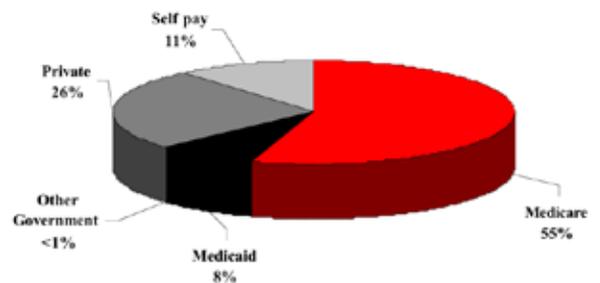
- In 2007, Medicare and Medicaid paid 66 percent of the \$461 million in total hospital charges for stroke (Figure 42).
- The distribution of payer sources was similar between stroke and heart disease patients.

**Figure 41. Total Hospital Charges for Stroke Patients**



Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

**Figure 42. Primary Payer Total Hospital Charges for Stroke, 2009**



Data Source: Hospital Discharge Database SC Budget and Control Board, Office of Research and Statistics

# Policy

## OVERVIEW

The U.S. Department of Health and Human Services *Public Health Action Plan to Prevent Heart Disease and Stroke* recommends the development of policies for preventing heart disease and stroke at the national, state and local levels to assure effective public health action. Health care systems, state and local governments, and workplaces have important and distinct roles to play in improving cardiovascular health.

As a state, we are addressing these challenges through policy implementation and environmental change in a variety of areas to ensure our state's citizens can secure high quality of care, feel safe and live a longer, healthier life.

## Legislation

The South Carolina Stroke Study Committee was established by our state legislature in 2009 to develop recommendations for creating a more organized system of care for stroke patients in our state. This multi-disciplinary committee, under the direction of DHEC, submitted their final report and recommendations to the legislature in December 2010. The full report may be viewed by [clicking here](#).

## Health Care

Health care organizations implement systems to better monitor and manage cardiovascular conditions in accordance with national guidelines. In support of statewide hospital and pre-hospital systems of care, the Heart Disease and Stroke Prevention Division supports and coordinates sustainable quality improvement strategies within the domain of health care organizations through:

- **Get With The Guidelines**—the American Heart Association/American Stroke Association's (AHA/ASA) premier hospital-based quality improvement initiative. This initiative helps ensure that a hospital treats heart failure and stroke with the most current scientific guidelines and evidence-based treatments and therapies.
- **Advanced Stroke Life Support**—a comprehensive course curriculum offered as a train-the-trainer, as well as secondary trainings, for emergency medical technicians and emergency department providers, serving to strengthen the stroke system of care in South Carolina.

## Worksite

Businesses are being continuously targeted to adopt policies supportive of a healthy work environment. Worksites adopting the Heart Disease and Stroke Prevention Worksite Wellness Toolkit will be provided resources to establish wellness initiatives within their companies. Future plans include collaboration with small- to medium-sized companies within at-risk employee populations to promote healthy lifestyles, and provide a primary care home for employees without insurance through partnerships with the South Carolina Primary Health Care Association.

# Policy

## Community

Other areas of policy and systems work include:

- Hypertension – for example, coverage/reimbursement for prescription drugs required for individuals in need of anti-hypertensive medications
- Sodium reduction – for example, lower sodium food procurement policies, menu labeling, and education and awareness
- Coalition/Alliance building – for example, policy promotion and environmental change at the community level, and advocacy for improved access to care

## SUCCESS STORY

### Turning Guidelines into Lifelines for Treatment of Cardiovascular Disease

#### *Issue*

Imagine yourself sitting in a hospital bed. You suddenly feel disoriented, can't speak clearly, and the drink of water you just took rolls out of your drooping mouth. Your nurse witnesses these symptoms, then immediately activates the stroke intervention team; you're whisked to the CT scan, given Tissue Plasminogen Activator (tPA) medication, and a thrombectomy is performed. Thanks to this team's fast response and adherence to medical guidelines, that same evening you were able to move and speak clearly! This real life success story took place in a S.C. hospital that has been designated as a Joint Commission on Accreditation of Healthcare Organizations Stroke Center. The alternative...

- Stroke resulted in 14,062 hospitalizations in S.C. during 2008;
- Hospitalization costs of stroke totaled more than \$484 million in 2008 for S.C.; and
- Stroke is the third leading cause of death in S.C., resulting in 2,387 deaths during 2008.

Every patient deserves the right care every time. To ensure that every patient receives the highest quality of care, the necessary tools are needed to remove physician practice bias, eliminate errors and omissions, and promote standard evidence-based treatment protocols.

#### *Intervention*

Get With The Guidelines (GWTG) is the American Heart Association/American Stroke Association's (AHA/ASA) premier hospital-based quality improvement initiative. This initiative helps ensure that a hospital's treatment of heart failure (HF) and stroke is aligned with the most current scientific guidelines and evidence-based treatments and therapies. Through a partnership between the S.C. Department of Health & Environmental Control (DHEC) and AHA/ASA, with support from the S.C. Hospital Association, hospitals have recognized improved outcomes through the GWTG initiative. Quality improvement intervention is accomplished through providing an interactive assessment and reporting system, formation of quality improvement teams led by physician and nurse champions, regular collaboration and educational opportunities through workshop events, and ongoing technical assistance.

- The DHEC Heart Disease and Stroke Prevention Division provides support to S.C. hospitals utilizing 35 of the HF and stroke GWTG modules, through licensure of the patient management tool and support which enables the implementation of the GWTG quality improvement initiative; and

# Policy

- Ongoing GWTG Workshops address delivery of scientific guidelines and the practice of evidence-based medicine, data sharing and dissemination, and collaboration with prospective and participating GWTG hospitals.

## ***Impact***

Hospitals that have implemented GWTG as policy in managing their HF and stroke patients have significantly improved their overall compliance with treatment protocols, resulting in improved patient outcomes. The following have been accomplished:

- Ongoing clinical educational workshops have been held to provide introduction to the GWTG initiative and to provide support to the GWTG hospitals in their quality improvement initiatives;
- To date, 40 percent of S.C. acute care hospitals have implemented at least one GWTG module for hospital quality improvement for cardiovascular disease; and
- Nine out of eleven certified Primary Stroke Centers in S.C. are participating GWTG Stroke hospitals and have used the module in preparation for primary stroke certification, further improving the quality of care and strengthening the chain of survival for stroke patients in our state.

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*“I didn’t want to be dependent. Besides, I have bills to pay and I needed to get back to work.”*

- Ron, Stroke Survivor

# Glossary

**Acute myocardial infarction (AMI):** See heart attack.

**Blood cholesterol:** The blood concentration of a family or lipid or “family” molecular compounds obtained directly from the diet or produced in the body from fatty dietary components. Subtypes of cholesterol differ in their relation to CVD risk; high-density lipoprotein (HDL) cholesterol is considered “good,” and low-density (LDL) cholesterol is considered “bad.”

**Body mass index (BMI):** A measurement of the relative percentages of fat and muscle mass in the human body, in which weight (in kilograms) is divided by height (in meters); the result is used as an index of obesity.

**Cardiac arrest:** The sudden stopping of heartbeat and cardiac function due to electrical malfunction of the heart, resulting in the loss of effective circulation.

**Cardiovascular disease(s) or CVD:** May refer to any of the disorders that can affect the circulatory system, but often means coronary heart disease (CHD), heart failure, and stroke, taken together.

**Cardiovascular health (CVH):** A combination of favorable health habits and conditions that protects against the development of cardiovascular diseases.

**Coronary heart disease (CHD):** Heart disease caused by impaired circulation in one or more coronary arteries, often manifesting as chest pain (angina pectoris) or heart attack.

**Diabetes (or diabetes mellitus):** A metabolic disorder resulting from insufficient production or utilization of insulin, which commonly leads to cardiovascular complications.

**Health disparities:** Differences in the burden and impact of disease among different populations, defined, for example, by sex, race, or ethnicity, education, income, disability, place of residence, or sexual orientation.

**Healthy People 2010:** A document that presents health-related goals and objectives for the United States to be achieved by the year 2010.

**Heart attack:** An acute event in which the heart muscle is damaged because of a lack of blood flow from the coronary arteries, typically accompanied by chest pain and other warning signs, but sometimes occurring with no recognized symptoms (i.e., “silent heart attack”).

**Heart disease:** Any affliction that impairs the structure or function of the heart (e.g., atherosclerotic and hypertensive diseases, congenital heart disease, rheumatic heart disease, cardiomyopathies).

# Glossary

**High blood pressure:** A condition in which the pressure in the arterial circulation is greater than desired and is associated with increased risk for heart disease, stroke, chronic kidney disease, and other conditions; blood pressure is considered “high” when systolic pressure (measured at the peak of contraction of the heart) is  $\geq 140$  mm Hg or when diastolic pressure (measured at the fullest relaxation of the heart) is  $\geq 90$  mm Hg.

**Hypertension:** See high blood pressure.

**Incidence:** Incidence is the frequency with which something, such as a disease, appears in a particular population or area. In disease epidemiology, the incidence is the number of newly diagnosed cases during a specific time period. The incidence is distinct from the prevalence, which refers to the number of cases alive on a certain date.

**Morbidity:** The total number of cases of disease present in a population at a given time.

**Mortality rate:** Rate of death expressed as the number of deaths occurring in a population of a given size within a specified time interval (e.g., 265 annual deaths from heart disease per 100,000 U.S. Hispanic women, 1991-1995).

**Policy and environmental change:** An intervention approach to reducing the burden of chronic diseases that focuses on enacting effective policies (e.g., laws, regulations, formal and informal rules) or promoting environmental change (e.g., changes to economic, social, or physical environments).

**Prevalence:** Prevalence is the proportion of individuals in a population having a disease. It is a statistical concept referring to the number of cases of a disease that are present in a particular population at a given time.

**Risk factor:** An individual characteristic associated with increased frequency of specified health problems; for example, high LDL cholesterol, high blood pressure, and diabetes are all associated with CVD.

**Stroke:** Sudden interruption of blood supply to the brain caused by an obstruction or the rupture of a blood vessel.

*“Don’t take life for granted. Your life is on the line and everything could change in one day.”*

- Michelle, Stroke Survivor

# References

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2. Centers for Disease Control and Prevention, National Center for Health Statistics. Compressed Mortality File 1999-2006. CDC WONDER On-line Database, compiled from Compressed Mortality File 1999-2006 Series 20 No. 2L, 2009. Accessed at <http://wonder.cdc.gov/cmfile.html> on Sep 22, 2009 9:47:25 AM.
3. David O. Williams: "Treatment Delayed Is Treatment Denied" *Circulation* 2004; 109; 1806-1808.

## NOTES

- a. Decrease in deaths classified as due to Cerebrovascular diseases (ICD-10 codes I60-I69) starting in 2005 may partly reflect the change in standardized coding of some deaths from Cerebrovascular disease to Multi-infarct dementia (ICD-10 code F01.1). See National Vital Statistics Reports, Deaths: Final Data for 2005, Volume 56, Number 10, [http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56\\_10.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56_10.pdf)
- b. 2008 race specific information for 0.5% of South Carolina's mortality records were "unknown."



# Appendix A

<b>County Age-Adjusted Rates (per 100,000 population) 2007</b>				
<b>County</b>	<b>Heart Disease Mortality</b>	<b>Heart Failure Mortality</b>	<b>STEMI Hospitalizations</b>	<b>Stroke Mortality</b>
South Carolina	185.7	19.1	61.4	49.8
Abbeville	202.6	33	62.9	67.9
Aiken	188.5	27.7	25.8	49.1
Allendale	232.6	0	19.2	83.7
Anderson	171.8	14.7	82.4	49.6
Bamberg	206.7	5.2	39.0	68.4
Barnwell	220.4	36.7	57.5	69.4
Beaufort	105.7	17.6	39.6	28.2
Berkeley	150.4	26.5	56.8	58
Calhoun	255.3	16.4	56.8	65
Charleston	157.2	14.9	46.7	46.3
Cherokee	262.6	20.5	103.5	47.9
Chester	248.9	5.7	53.3	81.4
Chesterfield	222.1	19.8	33.7	59.1
Clarendon	193.7	19.9	74.5	35.1
Colleton	250.1	35.2	83.0	58.6
Darlington	264.2	86.4	69.0	70.1
Dillon	303.9	52.8	52.4	68.9
Dorchester	177.8	9.5	56.9	56.6
Edgefield	217.2	27.4	8.2	68.2
Fairfield	248.3	6.9	41.5	61.7
Florence	283.7	18.1	64.0	56.3
Georgetown	156.5	12.4	73.2	42.8
Greenville	174.4	17.2	79.0	48.5
Greenwood	171.8	12.5	92.5	47.5
Hampton	268.5	19.6	38.1	59.3
Horry	156.9	13.1	74.9	38.2
Jasper	217.5	27.3	25.4	46.1
Kershaw	157.3	7.5	89.0	56.4
Lancaster	214.6	32	43.9	58.7
Laurens	206.6	16.1	68.5	74.5
Lee	248.8	29.5	57.7	70.1
Lexington	166.3	18.4	61.3	48.3
McCormick	115.4	6	97.9	55.9
Marion	292.6	37.1	53.2	69.7
Marlboro	385.8	15.7	42.6	38.2
Newberry	181.9	30.8	65.5	45.3
Oconee	196.2	8.2	76.0	48.4
Orangeburg	183.6	15.1	60.4	74.5
Pickens	218.9	16.9	83.9	44.2
Richland	195.3	16	52.0	42.9
Saluda	204.2	42.1	37.8	89.8
Spartanburg	179.3	20.7	71.0	52.6
Sumter	188.3	14.2	70.1	59
Union	238	33.3	87.9	63.4
Williamsburg	228.9	17.4	31.1	54.4
York	167.8	16.7	42.3	34.2

# Appendix B

## Heart Disease Mortality Rates by County (Age-Adjusted)

### OVERALL

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	280.0	264.9	251.8	245.9	235.0	221.2	218.2	199.7	192.7	185.7
Abbeville	220.8	219.8	217.8	297.5	235.9	192.7	159.8	223.2	187.2	202.6
Aiken	256.5	254.6	254.6	242.4	233.4	189.6	197.8	177.8	188.0	188.5
Allendale	265.9	293.6	325.0	290.7	315.4	258.8	339.9	311.9	280.3	232.6
Anderson	296.5	259.1	270.1	250.8	264.8	243.7	234.0	191.9	195.7	171.8
Bamberg	306.1	331.9	225.6	195.6	270.8	231.1	209.2	209.6	283.8	206.7
Barnwell	354.0	253.5	257.7	306.3	269.6	216.6	240.8	216.7	216.3	220.4
Beaufort	194.5	166.0	163.4	179.6	139.0	136.0	134.6	123.0	107.9	105.7
Berkeley	276.3	232.9	245.1	234.8	189.9	180.5	202.2	158.7	193.6	150.4
Calhoun	287.3	250.4	223.7	279.6	172.6	220.2	224.2	198.0	215.3	255.3
Charleston	229.5	233.2	236.1	238.9	194.6	187.6	190.0	174.4	141.9	157.2
Cherokee	286.3	293.1	344.6	299.0	248.7	264.9	230.1	224.8	249.4	262.6
Chester	327.3	304.9	334.7	281.7	307.9	302.7	260.9	277.1	256.9	248.9
Chesterfield	335.7	334.7	309.5	322.1	297.6	275.4	278.5	215.5	248.0	222.1
Clarendon	233.3	189.9	204.5	220.9	213.3	169.0	205.7	213.5	187.4	193.7
Colleton	346.4	299.5	248.8	266.8	245.6	245.3	252.1	231.5	291.0	250.1
Darlington	338.6	318.5	295.4	287.8	322.4	278.7	267.7	266.0	215.5	264.2
Dillon	328.9	287.5	342.7	351.3	315.2	337.5	289.0	320.4	253.8	303.9
Dorchester	302.6	271.5	241.6	234.9	272.0	235.2	201.3	191.0	211.0	177.8
Edgefield	334.8	309.8	322.0	304.3	282.1	261.6	268.6	247.1	230.3	217.2
Fairfield	337.7	516.7	349.7	346.7	339.0	317.5	267.0	363.8	256.8	248.3
Florence	374.2	355.2	295.2	315.3	311.1	315.3	298.1	265.3	292.9	283.7
Georgetown	267.7	234.5	218.5	244.4	184.1	200.0	180.4	170.6	207.0	156.5
Greenville	276.8	240.1	217.3	209.8	218.6	196.5	194.5	177.5	177.5	174.4
Greenwood	285.5	262.6	241.0	213.7	230.3	220.7	205.3	208.9	185.2	171.8
Hampton	344.5	367.6	337.7	292.4	249.9	310.7	157.5	183.8	223.1	268.5
Horry	276.6	272.3	236.4	223.8	229.7	199.5	209.9	178.9	158.1	156.9
Jasper	385.5	230.0	188.0	277.9	232.0	268.3	238.5	210.1	201.2	217.5
Kershaw	254.6	278.6	302.2	227.3	235.2	207.3	210.6	195.0	172.6	157.3
Lancaster	393.0	328.9	341.5	307.6	291.9	280.2	256.4	251.7	223.9	214.6
Laurens	327.9	275.1	314.0	285.5	279.1	289.7	273.4	265.4	252.0	206.6
Lee	241.5	283.4	297.5	243.6	268.4	267.5	248.9	240.8	195.2	248.8
Lexington	257.6	248.8	244.4	223.3	211.2	217.2	215.5	188.1	184.5	166.3
McCormick	245.7	214.2	232.3	234.7	210.8	202.5	245.6	220.9	243.2	115.4
Marion	354.2	348.4	340.5	352.2	344.7	253.6	316.9	325.0	305.1	292.6
Marlboro	430.7	437.8	444.6	396.3	396.8	402.6	446.5	384.1	341.7	385.8
Newberry	239.1	220.3	228.9	228.7	238.0	215.9	208.0	184.0	244.1	181.9
Oconee	255.5	229.0	216.7	202.8	232.6	227.8	217.8	201.6	182.1	196.2
Orangeburg	309.5	255.4	248.8	271.3	243.4	198.0	197.1	198.3	197.8	183.6
Pickens	239.3	267.7	239.0	219.3	223.6	211.7	238.1	209.0	185.0	218.9
Richland	270.6	250.4	228.8	241.7	231.7	210.0	223.9	204.5	213.4	195.3
Saluda	404.1	345.0	293.9	280.3	302.3	264.4	268.3	237.7	221.0	204.2
Spartanburg	291.9	287.8	261.3	249.9	230.3	228.9	214.7	199.8	176.3	179.3
Sumter	251.1	260.8	239.1	254.1	228.8	237.5	242.5	225.4	237.2	188.3
Union	286.6	347.7	296.8	262.4	271.2	280.8	318.0	316.0	236.7	238
Williamsburg	313.1	269.8	302.7	305.2	264.6	278.5	275.7	241.5	217.4	228.9
York	271.1	268.3	253.4	238.6	214.3	217.1	189.7	163.3	151.7	167.8

# Appendix B

## Heart Disease Mortality Rates by County (Age-Adjusted)

### AFRICAN AMERICANS

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	321.6	297.4	295.9	286.5	276.5	271.9	256.3	249.5	236.5	225.8
Abbeville	246.9	238.7	194.2	252.7	254.6	204.8	205.5	246.9	157.8	129.8
Aiken	254.1	231.1	358.1	226.6	275.3	213.6	224.6	210.9	197.6	215.2
Allendale	302.3	207.3	339	311.9	312.8	299.1	362.7	410.8	361.7	209.3
Anderson	348.7	325.7	323.6	291.8	312.4	346.4	280.6	288.5	199.4	237.5
Bamberg	342.8	285.9	208.6	197.5	224.2	265	176.7	221.3	304.6	187
Barnwell	488.6	369.2	345	400.9	306.9	319	260.4	300.4	272.3	318.9
Beaufort	209.8	209.5	201.3	236.9	239	192.3	185.5	208	146.3	152.3
Berkeley	219.4	243.1	247.2	220	205.1	181.8	234	206.8	225.6	178.7
Calhoun	259.9	308.5	204.2	346.2	178.3	224.4	352.2	184.6	324.5	285.7
Charleston	283.2	255.3	302.3	265.9	232.4	251.6	229.1	222.8	180.5	194.9
Cherokee	322.2	296.4	476.1	263.8	309.4	251.4	307.2	172.5	240.1	212.4
Chester	348.6	291.6	438.6	305.5	347	479	290	284.7	263.6	263.3
Chesterfield	386.4	256.9	339.1	324.4	278.1	319.7	294.1	256.9	303.5	255.3
Clarendon	274.3	265.3	210	237.3	220	204.5	226.2	232.1	205.7	198.9
Colleton	287.1	346.2	238.6	239.6	256	240.5	284.4	253.6	409.7	221.7
Darlington	372.8	330	262.9	319	380.5	293.1	239.4	297.1	248.2	270.8
Dillon	527.8	291.1	409.5	455.6	309.6	429.8	329	320.5	265.6	399.5
Dorchester	284.1	333.2	319.3	223.1	292.5	337.1	204.7	224.4	272.2	234.5
Edgefield	467.4	262.6	528.6	290	372.6	319.7	306.8	313.4	276.6	227
Fairfield	420.9	575	383.4	371.8	406.9	293.3	327.3	490.1	285.9	285.4
Florence	389.9	397.6	329.5	343.4	353.8	359.6	323	276.3	329.2	308.8
Georgetown	199	250.9	209.5	318	228.3	254.9	211.6	221.8	271.2	192.1
Greenville	344.5	279.4	279.3	272.1	257.6	216.2	257.6	205.6	196.3	205.8
Greenwood	327.3	268	285.9	265.4	231.3	246.9	280.8	258	246.6	190.2
Hampton	307.1	405.8	396.6	302.2	284.6	389.6	191	182.4	270	276.6
Horry	255.9	355.2	334.5	206.7	242.5	279.5	255.1	237.4	177.9	191.9
Jasper	406.8	263.1	216.2	338.8	301.7	324.4	202.6	223	223.7	223.8
Kershaw	263.9	335.5	379.2	339.3	258.3	269.3	253.4	253.4	213.7	210.4
Lancaster	445.8	385.9	401.5	353	340.6	309.4	348.9	237.8	287.9	253.6
Laurens	373.9	352.2	243.2	296.1	304.2	212.5	293.6	348	296.3	301.9
Lee	259.1	304	285.8	212.9	225.4	308.9	296.6	195.4	195.2	224.9
Lexington	242.3	259.7	264.9	243.4	230.8	269.4	209	243	222	122.8
McCormick	276.1	270	207.2	397.8	325.8	255.9	307.4	296.4	291.9	148.6
Marion	436.8	346.6	378.3	388.3	386.8	260.7	367.5	293.2	357.6	311.7
Marlboro	502.5	489.2	522.8	429.4	462.4	434.1	441.2	409.3	354.8	398.7
Newberry	289.3	150	184.5	305.9	282	258.6	307.2	244.9	362.1	206
Oconee	494.5	234.6	197	169.5	244.4	342.1	225.7	272.2	106.2	239.2
Orangeburg	346.3	276.6	280.3	286	240.6	229.7	181.2	198.9	202.8	212.5
Pickens	297.2	304.9	302.5	345.2	227.2	358	359.5	277.6	230.5	271
Richland	347.4	307.5	260.1	304.2	287.7	266	255.8	268.5	237.4	238.9
Saluda	516.1	381.4	411.2	120.5	268.9	245.4	385.3	272.2	265.5	134.5
Spartanburg	344.2	304.4	271.9	298.6	310.9	275.7	233.1	256.1	226.8	191.7
Sumter	279.9	237.6	232.5	250.8	242.3	282.9	259.4	253.2	246.2	204.9
Union	360.3	360.5	310	268.8	331.5	253	365.9	412.5	221.8	217.4
Williamsburg	317.6	258.2	298.1	331	263.4	293	256.1	268	247.3	257.4
York	350.1	346.6	338.9	276.7	275.8	234.1	204.3	194.6	188.4	229.1

# Appendix B

## Heart Disease Mortality Rates by County (Age-Adjusted)

### WHITES

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	268.4	255.7	239.2	234.2	223	206.5	208	185.8	180.3	173.5
Abbeville	217	216.1	218.9	309.2	231.3	187.3	144.8	214.9	194.5	224.2
Aiken	257.3	263.9	231.2	246.5	225.4	184.3	191.5	172.3	186.3	179.1
Allendale	221.5	414.4	307.7	266.5	315.7	211.7	291	181.5	165.8	257.5
Anderson	291.1	248.6	262.9	244.1	258.8	230.2	227.8	176.2	195.9	161.4
Bamberg	276.2	362.2	239.3	180.7	302.1	202.6	236.8	196.5	257.5	220.6
Barnwell	305.7	197.3	216.1	267.1	248.4	168.8	224.5	176.2	188.5	171.5
Beaufort	199.8	160.8	155	167.9	119.6	126.9	127.6	110.6	100.4	97.3
Berkeley	308.6	239	256.3	252.8	194.5	181.4	195.7	144.2	187.7	144.8
Calhoun	309.8	216.6	244.9	226.6	165.8	209.3	132.3	205.1	137.9	238.1
Charleston	207.1	223	208.1	228.6	178	162.5	175.1	156.1	127	142.9
Cherokee	282.8	293	327.6	305.7	235.6	263.9	217.8	236.2	254.9	274.2
Chester	329.5	308.1	293.6	274.7	289.1	235.3	243.5	271.5	248.4	237.2
Chesterfield	318.1	365.3	304.1	324.3	311.4	262.5	279.7	205.7	221.6	211.4
Clarendon	198.1	128.9	206.9	201	207.8	147.9	191	197.9	183.8	187.9
Colleton	389	276.8	256.5	285.5	242.3	256.1	236.6	223.4	229.6	260
Darlington	319.2	310.3	309.4	275.3	292.6	268.8	285.4	255.6	199.2	259
Dillon	243.3	284.6	317.7	287.7	314.1	291	268.4	321.1	245.1	259.9
Dorchester	314.2	257.8	220.2	243.6	271.3	211.1	206	185.4	197	164.7
Edgefield	267.1	334.1	221.1	318.8	238.4	228.1	247.6	222	210.1	215
Fairfield	264	467.2	318.7	314.3	279.6	334.6	214.6	292.1	238.5	207.5
Florence	365.4	333.4	276.3	302.3	286.4	292.5	289	257.5	274.3	262.8
Georgetown	302	229.6	222.3	217.9	172.8	177	174.2	152.3	183.7	143.6
Greenville	265.1	233.5	207.1	200.2	212.1	192	185.1	173.1	175.5	169.2
Greenwood	275	255.5	226.1	197.1	229.1	206.9	180.7	196	162.6	165
Hampton	384	345.1	300.9	281.3	237.1	256.7	125.4	183.1	174.8	260
Horry	278.4	263	229	228.4	231.6	190.7	206.4	173.6	154.2	151.8
Jasper	393.7	189.8	160	212.9	163.7	212.1	293.2	215.3	176.2	224.6
Kershaw	251.5	266.8	282.4	196.4	228.8	188.7	200.3	179.3	162.3	142.8
Lancaster	377.8	317.4	330.6	299.9	283.6	271.4	236	255.9	209.5	204.8
Laurens	315.5	255.1	329.7	280.6	270.9	312.1	268.7	240.5	237.8	180.2
Lee	213	246.3	313.9	270	316.4	219.2	214.4	284.2	187.6	266.5
Lexington	260.8	248	242.3	220.9	211.4	212.6	218.8	184.8	180.8	170.5
McCormick	224.5	183.5	250	143.2	147.2	170.5	221.3	185.7	212.9	91.7
Marion	284.6	347.1	301.9	332.7	320.8	248.1	285.4	351.2	255.6	277.2
Marlboro	395.2	412	396.7	380.7	358.9	358	457	341.8	339.9	354.5
Newberry	223.3	238.3	238.3	199.2	222.8	201.9	180.8	162.6	209.2	172.5
Oconee	237.9	230.4	216.6	205.8	236	222.8	217.4	194	186.2	193.1
Orangeburg	275.8	233.8	211.7	256.7	249.9	166.3	216.2	192.4	195.9	159.7
Pickens	234.6	266.5	234.7	211.8	222.9	201.5	231.8	206.4	182.9	216.2
Richland	240.5	221.5	209.2	207.6	198.9	178.7	201.9	171.5	200	167
Saluda	371.5	328.5	262	328	313.6	271.7	237	220.7	202.7	219.6
Spartanburg	282.2	285.8	259.2	241	215.8	221.2	212.6	189.8	166.4	174.8
Sumter	233.1	280.7	246.5	259.2	223.3	206	232.6	205.7	230.2	178.1
Union	276.8	346.3	297.6	261.6	254.7	292.4	299	292.2	240.9	243.7
Williamsburg	309	291.3	309.9	263.5	254.9	266.5	304.6	210.3	179.9	194.6
York	260.7	257.1	240.7	231.5	204.4	216.1	186.3	158.7	145.4	156.9

# Appendix B

## Heart Disease Mortality Rates by County (Age-Adjusted)

### FEMALES

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	225.6	212.2	199.6	194.9	188	173.5	172.5	152.9	152.1	144.3
Abbeville	151.6	149.3	136.9	201.3	204.2	146	105.1	160.3	181.3	150.7
Aiken	217.8	203.7	213.5	202.1	201.9	159.6	168.4	140.4	147.4	143.9
Allendale	191.5	210.1	327.5	293.3	219.1	251.8	293.6	176.9	248.4	217.7
Anderson	238.1	190.4	210.1	171.5	199.6	180.4	155.9	144.1	131	123.4
Bamberg	300.3	302.3	201.4	158.1	281.9	170.4	151.7	132.7	210.8	182.2
Barnwell	266.6	234.1	198.3	252.9	196.4	218.8	235.8	147.4	154.5	180.6
Beaufort	162	156.2	128.9	140.5	119.9	102.4	96.3	104.1	80.3	81.6
Berkeley	202.4	197.7	199.1	187.4	167.2	140.7	144.7	129	138.6	110
Calhoun	319.4	170.6	155.2	250.4	104.4	107.9	193.7	120.9	195.6	197.4
Charleston	180.2	180	193.2	197.9	164.1	148.5	144.7	136	115.1	120.9
Cherokee	241.5	236	233.2	212.7	188.5	200.3	161.3	148.9	216.3	169.8
Chester	225.1	204.3	278.3	202.6	233.4	257.9	231.9	224.6	183.5	186.8
Chesterfield	283.7	240.2	245.1	256.8	208.9	198.8	218.8	144.1	201.1	154.4
Clarendon	215.2	172.1	172.2	165.6	188.8	146.8	180.4	208.5	146.1	130.9
Colleton	232.7	274.9	215.3	221.5	234	211.6	199.6	134.3	210.8	163.3
Darlington	284.2	255.1	224.5	215.9	262.3	207.1	214.8	206.1	176	203.7
Dillon	239.4	198.9	238.8	255.2	214.4	255.2	231.4	257.9	220.7	242
Dorchester	292.2	230	215.3	190.3	220.5	198.3	163.3	147.7	184	141.4
Edgefield	279	251.8	217.9	290.5	248.7	217.4	207.1	177.6	168.6	215.1
Fairfield	315.1	469	275	274.5	277.8	198.6	241.5	283.9	170.3	181.3
Florence	306.6	301.1	236.8	242.5	263.9	264.2	225	196.8	231.6	223.9
Georgetown	216.5	215.4	172.6	220.5	141	177.2	151.3	141.2	187.1	107.8
Greenville	230.7	192.8	162.5	167	173.4	158.8	150.3	128.1	135.9	141.9
Greenwood	227.5	201.1	199	157.9	193.6	142.6	191.2	146.9	164.3	129.6
Hampton	259.4	341.3	275.8	289.5	227.7	276.5	102.6	159.8	212.6	199.8
Horry	196.3	193	184.3	184.6	182.9	136	165.6	128.8	124.9	109.7
Jasper	263	261.2	120.7	175.8	231.5	235.9	239.6	149.8	217.4	167.1
Kershaw	185.8	223.4	215.1	199	161.9	161.1	160.1	139.9	155	125.2
Lancaster	340	250.2	264	238.9	259.3	235	212.6	191.4	180.7	183
Laurens	281.8	235	250.1	205.9	219.6	238.6	236.7	230.2	193.7	147.5
Lee	187.8	222.7	193.5	180.4	165.3	187.8	253.8	218.8	155.1	140
Lexington	213.9	184.1	188.4	175.7	173.2	147.3	179.5	153.2	140.9	130.9
McCormick	203	161.2	214.6	167.2	196.1	184.8	138.4	186.7	206.1	112.1
Marion	292.5	267.7	281.9	298.8	209.2	193.4	252.5	239.7	191.9	259.6
Marlboro	343	374.9	292.4	293.7	254.2	352	313.9	283.6	283.8	300.9
Newberry	182.4	172.7	160.2	188.4	191.9	154.5	133	115.2	195.6	131.8
Oconee	218.6	218.3	184.7	156.8	189.4	168.3	170.3	169.3	123.9	146.3
Orangeburg	245.1	222.7	226.8	193.9	206.4	152.5	166.8	148.9	137.1	149.9
Pickens	176.7	194.1	181.2	159.7	157.4	162.4	195.8	157.9	162.8	176
Richland	208	195.9	180.5	199.3	171.2	160	180.8	158	165.9	148.9
Saluda	313.7	292.4	233.3	239.6	226.4	225.8	210.1	181.5	219.2	176.5
Spartanburg	224.6	223.3	220.6	200.3	176.8	183.6	164.9	144.2	135.2	141.9
Sumter	209.1	212.5	176.6	208.7	180	182.9	186.4	189.2	199.9	150.7
Union	237.6	262.8	227.1	197	209.6	247.7	262.6	253.2	185.5	194.7
Williamsburg	236.9	220.7	255.2	236.4	180.6	251.9	220.9	202.5	134.8	211
York	227.7	230.3	209.1	183.2	182.8	175.6	150.1	125.4	123.4	136.6

# Appendix B

## Heart Disease Mortality Rates by County (Age-Adjusted)

### MALES

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	352.3	337.2	322.7	316.2	298.4	286.2	278.5	261.1	243.9	238.2
Abbeville	327	307.1	341	421.1	274.3	249.1	240	303.3	186	284.4
Aiken	307.5	318	306	298.6	267.8	227.1	234.6	218.6	236.3	246.4
Allendale	356.6	443.6	355.8	240.1	477.8	250.8	402.2	481.7	334.1	228.1
Anderson	374.2	346.7	359.5	359.2	358.3	332.1	350.7	260.5	286	235.7
Bamberg	306.1	393.2	238.3	252.8	245.6	288.9	295	320.9	369.8	227.3
Barnwell	479.6	291.1	347.6	396.9	442.6	191.4	243.1	304.8	305.5	272.5
Beaufort	236.1	173.3	201.7	227.9	161.8	171.8	181	143.3	140.2	132.6
Berkeley	379	269	310.5	296.2	217.3	234.9	275.9	193.6	260.4	198.5
Calhoun	234.8	334.4	271.6	290.2	272.1	388.2	301.3	307.3	234.1	341.2
Charleston	308.3	312.2	293.3	294.9	233.8	241.6	253.9	224.8	171.3	207.2
Cherokee	356.7	366.1	512.6	439.4	348.2	362.5	348.9	321.1	303.3	380.2
Chester	451	452.1	428.6	377.1	405.1	357.2	301.1	349.6	354.7	314.5
Chesterfield	390.5	462.6	416.7	422.8	435.7	414	351.3	325.5	295.3	316.9
Clarendon	238.1	224.3	240	278.7	242.4	204.4	229.3	224.9	230.7	281.7
Colleton	501.4	329.4	285.8	318.1	252.5	297	310.7	352.4	403.6	371.9
Darlington	420.5	403.6	408.3	400.5	403.5	374.4	339.2	344.4	262.2	342.3
Dillon	453.7	428.1	474.3	561.6	473	469.7	366.9	462.1	304.3	379.7
Dorchester	311.7	324.8	278.5	281.2	332.6	270.7	255.2	249.9	236.5	222.9
Edgefield	371.6	377.1	456.8	314.8	377.5	300.9	345.8	330.3	317.8	221.2
Fairfield	366.7	541.8	444.6	450.6	422	471.1	292.7	476.7	358.8	327.4
Florence	491.4	427.5	388.8	422.6	369	391	402.5	357.3	384.7	365.8
Georgetown	340.9	254.9	267.4	273.5	256.6	229.5	208.6	206.6	228.3	214.2
Greenville	336.4	301.2	293.6	263.3	276.4	254.3	253	245.4	231.6	218.6
Greenwood	350.8	375.5	300.7	287.4	290.6	342.2	227.3	295.1	208	231.1
Hampton	463.5	458.7	404.4	274.6	281.4	333.7	263.3	200.2	245.1	362.7
Horry	367	375.6	291.4	273	283.7	282.5	258.4	240.6	196.7	209.7
Jasper	542.5	176.5	273.6	405.8	222	325.9	227.6	262.4	169.7	279
Kershaw	359.1	359.3	415.2	275.7	318.8	271.7	278.3	276.1	196	188.7
Lancaster	451	472.6	467.4	426.7	340.8	354.7	310.9	319.9	290.6	251.2
Laurens	384.9	342.2	426.2	388.7	354.5	353.7	325.4	314.9	337.2	289
Lee	270.1	370.3	419.8	327.4	402.8	378.5	218.1	263.6	245.3	376.9
Lexington	315.8	345.9	319.4	296.4	264.8	320.1	262.1	234.9	241.6	215.6
McCormick	278.4	273.7	253.9	321.7	217.1	234.1	371.9	249.3	290.7	124.5
Marion	439.8	458.6	416.5	489.8	549.9	354.5	424.3	443.4	483.6	341.2
Marlboro	540.4	516	667.2	570.7	607.3	470	689	513.8	421.1	513.9
Newberry	317.7	285.4	338.2	279.3	291.9	316.5	317.4	290.4	296	241.1
Oconee	295.6	251.8	239.8	258.1	286.9	298.5	272.6	236.7	256.8	253.1
Orangeburg	394.5	303.7	284	378.8	301.6	266	239.6	270.6	282.9	233.1
Pickens	319.6	369	312.6	314	318.1	272.8	288.4	273.6	212.2	270.5
Richland	361.5	333	299.3	308.2	322.6	280.1	284	273.4	281.3	257.5
Saluda	531.6	424.3	404	332.3	432.3	283	339.6	307.5	216	225.7
Spartanburg	385	382.7	313.9	320.3	313.6	290.3	278.9	284.2	228.9	226.6
Sumter	309.9	313.4	333.3	335.5	298.8	329.6	326.3	276.9	284.5	244.5
Union	349.1	484.3	397	330.4	351.5	331.7	394.6	419.6	307.6	276.3
Williamsburg	445.8	345.8	355.6	409.9	381.9	334.6	385.1	293.2	317.6	254.8
York	324.2	316.6	316.6	316.3	258.8	272	239.2	213.7	189.8	208.7

# Appendix B

## Stroke Mortality Rates by County (Age-Adjusted)

### OVERALL

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	85.5	80.6	76.9	72.5	68.8	64.8	58.3	51.5	53.3	49.8
Abbeville	75.1	76.5	69.3	50	67.9	51.6	51.6	27.9	67.1	67.9
Aiken	70.4	58.1	66.2	53.5	71.3	60.1	35.5	45.4	48.3	49.1
Allendale	61.5	70.2	99	83.9	91.3	59	51.4	60.7	111.4	83.7
Anderson	72.4	78.2	60.4	58.3	64.1	55	53.8	49.6	51.1	49.6
Bamberg	190.4	130.6	63.3	143.2	86.1	52.8	121.4	87	81.8	68.4
Barnwell	152	84.3	107.4	70.7	50	35.4	68.4	32.4	99.3	69.4
Beaufort	74.8	59.4	76.8	48.9	48.5	46.4	39.1	33.2	25.2	28.2
Berkeley	90.1	94.1	79.3	69.8	54.8	70.2	65.6	61.6	51.5	58
Calhoun	100.2	44.1	45.9	60.5	70.4	42.1	38.5	46	32.3	65
Charleston	77.8	89.2	88	83.4	83.1	76	62.5	50.7	53.8	46.3
Cherokee	70.5	70.5	65.4	82.6	73.7	71.4	70.8	63.5	64.6	47.9
Chester	82	84.8	61.8	64.7	56.3	73.9	76.8	27.4	39.9	81.4
Chesterfield	80.3	54.4	30.7	75.8	69	51.4	58.1	75.1	45.9	59.1
Clarendon	142.9	102.1	134.5	96.4	127.1	119.9	83	47.5	44.6	35.1
Colleton	58.1	65.8	84.4	75.3	86.2	57.8	34.5	62	51.6	58.6
Darlington	124.2	105.7	114.3	104.5	89.5	84.2	89.1	57.2	64.3	70.1
Dillon	63.9	92.5	52.8	130.1	74.6	104.4	66	69	62.4	68.9
Dorchester	156.5	130.5	119.4	80.1	89	66	83.1	68.2	71.4	56.6
Edgefield	22.1	54.6	34.9	29.4	28	81.3	35.4	56.8	55.5	68.2
Fairfield	80.5	89.3	48.5	80.7	68.1	53.7	55.8	59.4	50.2	61.7
Florence	103.6	95	80.8	96.2	75.4	92.1	71.2	64.6	62.9	56.3
Georgetown	61.7	72.5	101.1	80.7	74	55.6	47.5	73.7	55.6	42.8
Greenville	60.8	64.8	65.1	65.7	57.3	57.3	49.9	43.3	51.6	48.5
Greenwood	65.5	76.5	95.3	89.9	74.8	72.7	64.9	41.2	51.7	47.5
Hampton	52.1	100.1	87.5	64.2	104.7	52.4	63.1	45.9	64.9	59.3
Horry	84.5	76.1	67.4	58.8	66.9	62.1	54.8	50.2	50.7	38.2
Jasper	127.4	65.4	60.5	79.7	74.4	69.3	22.8	33.7	27.7	46.1
Kershaw	84.7	87.2	46.4	76.5	56.3	70.3	63.7	54.6	58.7	56.4
Lancaster	69.8	72.2	73.6	50.4	41.7	67.4	62.5	40.8	35.2	58.7
Laurens	119.5	78.4	78.2	78.7	59.9	62.7	59.9	54.6	70.3	74.5
Lee	99.5	67.6	107	102.7	45.5	107.9	70	77.6	59.9	70.1
Lexington	85.1	79.5	64.3	66.7	59.3	54.7	56.9	48.1	52.1	48.3
McCormick	53.8	48.8	61.3	76.5	36.5	46.6	44.6	29.6	34.4	55.9
Marion	118.1	91.2	72.2	136.8	87.7	49.9	77.5	48.7	57.1	69.7
Marlboro	85.4	46.8	74.8	56.1	47.1	77.7	44.9	47.6	51.5	38.2
Newberry	77.2	73.4	80.2	88.2	66.1	40.4	59.8	48	57.1	45.3
Oconee	57.3	70.5	80.2	65.9	67.6	40.6	52.7	54.8	58.5	48.4
Orangeburg	143.4	117.8	81.4	88.8	106.8	84.7	84	91	90.6	74.5
Pickens	75.6	85.1	88.7	60.2	50.8	61	62.7	38.8	43.9	44.2
Richland	86.1	79.4	75.1	61.2	53.4	58.2	54.2	50.5	48.3	42.9
Saluda	72.2	50.3	75.2	92.1	75.1	86	125.1	51.1	49.9	89.8
Spartanburg	100.9	97.7	89.6	76.3	83.1	74.5	62.6	46.2	54.6	52.6
Sumter	147.4	135.9	119.7	105.1	118.4	83.7	65.1	70.3	61.2	59
Union	86.2	79.5	78	66.7	72.1	107	57.5	56.7	58	63.4
Williamsburg	107	84.6	86.7	97.6	101.1	81.7	69.9	78.3	96.2	54.4
York	61.2	50.2	58.1	65.9	47.6	44.8	47.5	48.7	42.6	34.2

# Appendix B

## Stroke Mortality Rates by County (Age-Adjusted)

### AFRICAN AMERICANS

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	118.6	108.2	108.6	100.6	92.5	82.9	77.1	72.6	76.5	67.9
Abbeville	109.5	102.3	113	40.7	95.4	38	95	63.6	81	47.2
Aiken	104.9	87.4	100.7	61.2	117.5	72	33.2	83.1	78.4	54.4
Allendale	109.2	106.1	135.6	119.2	108.6	91.1	55.3	63.4	131.5	108
Anderson	68.5	102.7	57.8	90.6	80.1	69.1	38.1	88.9	88.1	59.2
Bamberg	283.8	128.9	66.4	141.7	66.7	50.9	78.8	104.8	82.6	99.7
Barnwell	194.1	128.7	139.3	94.8	44.1	69.2	90	0	148.5	97.4
Beaufort	84.8	60.5	134.5	76.7	67.5	103.6	51.7	29.8	35.7	39.9
Berkeley	134.1	133.1	90.3	76.9	58.9	94.7	78.1	70.4	100.7	88.9
Calhoun	84.9	30.4	100.9	113.1	64.6	43.3	14.4	98.5	48.3	49
Charleston	101.6	106.3	135.6	100.5	95.2	91.2	79.5	61.9	73.8	60.3
Cherokee	60.4	98.7	119.1	68.7	71	82.2	74.4	95	90.7	58.4
Chester	132.2	128.4	55.6	94.6	61	129.7	141.7	42.8	70.2	115.3
Chesterfield	126.6	62.8	35.5	115.5	53.8	74.1	53.7	133.4	54	83.3
Clarendon	189.8	117.5	153.2	111.8	175	198.4	94	94.2	44.1	22.8
Colleton	43.6	86.1	103.8	97.5	137.3	77.9	64.5	100.9	60.4	46.6
Darlington	154.1	117	153.2	138.9	119.2	95.4	100.1	88.7	98.2	63.6
Dillon	79.3	124	48.1	159.6	47.2	135.5	104.5	91.8	94.6	118
Dorchester	139	181.5	164.4	87.8	115.7	55.4	94.7	73.8	69.2	88.4
Edgefield	27.9	78.8	29.7	27.5	24	115.6	0	53.7	89.6	100.6
Fairfield	142.6	136.7	71.4	121.1	96.3	42.2	105	65.7	77	96.1
Florence	126.1	127.5	118.3	141.3	109	98.5	104.7	65.9	79.8	53.1
Georgetown	99.2	85.2	131.5	126.9	112	87.6	97	112.3	72.3	64
Greenville	72.3	83.8	106.7	96.5	100.3	61.4	54.6	55.3	85.2	97.5
Greenwood	121.5	69.5	125.5	93.4	117.3	67.7	81.4	50.7	91.4	97.4
Hampton	37.4	125.5	89.1	100.4	165.6	57.1	96.7	76.9	82.8	101.6
Horry	118.5	125.6	106.1	86	124.8	71.1	103.4	108.7	81.3	48.5
Jasper	127.7	82.7	71.2	116.7	80.7	91.3	36.3	28.8	55.9	58.7
Kershaw	111.2	115.2	81.9	101.2	75.5	74	133	100.6	83.8	112.1
Lancaster	114.7	106.8	163	96.2	74.5	42.5	124	70.6	49.7	88
Laurens	141.7	95.7	100.5	90.4	88	65	74.9	56.3	80.9	127
Lee	182.8	82.6	172.6	111	58.4	123.2	76.4	107.6	59.8	64
Lexington	152.1	145.8	80	118.3	63	85.8	93.7	29.7	79.4	71.4
McCormick	66.4	119.6	41.4	87.6	51.7	105.7	65.8	60.4	67	123.8
Marion	133.6	103.9	98	171.5	104	89.3	111.1	63.9	92.8	61.1
Marlboro	145.9	72.4	72.4	46.7	59.1	94.4	51.4	61.3	71.1	57.9
Newberry	109.7	149.8	137.9	126.4	157.4	16.3	134.2	79.1	116.4	83.3
Oconee	122.3	76.3	18.9	107.8	97.5	86.2	36.5	69.3	133.2	146.7
Orangeburg	155.1	130.3	71	87.6	93.8	66.4	82.7	103.8	78.5	74.6
Pickens	169.4	135.3	87	130.8	49.3	83.3	71.4	18.1	26.1	59.3
Richland	114.2	105	103.9	85.4	57.5	74.6	72.6	65.1	70.4	58.3
Saluda	161	36.1	161.7	96.7	86.5	104.7	85	44.3	80.9	105.7
Spartanburg	144.2	145.3	147.1	92.5	116.9	130.6	81.1	66.1	46.2	56.8
Sumter	150.8	141.4	144.6	122.7	104.9	60.2	55.5	74	75.1	61
Union	147.1	39.2	131.9	79.3	69.9	157.8	61.9	71.2	131.4	99.5
Williamsburg	133.3	97.5	88.3	127.6	122.3	91.3	86.3	98.8	95.4	51.1
York	99.9	67.3	81	116.9	55.3	58.5	48.1	84.4	70.3	14.3

# Appendix B

## Stroke Mortality Rates by County (Age-Adjusted)

### WHITES

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	76.2	72.5	67.6	64.3	61.7	59.6	52.8	45	46.4	44.4
Abbeville	65.2	67.7	54.9	51.8	58.4	55.6	38.4	15.6	60.7	75.3
Aiken	63.1	50.2	59	51.4	59.9	58.6	35.6	37.1	40	45.4
Allendale	14.9	17.4	42.9	33.5	69.4	16.5	38.2	64	79	53.3
Anderson	73.2	74.2	61	53.4	61.3	52.8	56.6	43.3	45.8	48.5
Bamberg	122.2	133.8	55.8	139.9	107.5	55.3	164.9	67.2	85.5	31.5
Barnwell	137.3	60.4	80.6	55.9	50.8	16.4	54.9	47.4	70.6	57
Beaufort	75.2	59.1	66.4	43.4	45.2	37.9	36.3	33.7	23.5	24.3
Berkeley	77.6	78.8	76.3	65.9	53.7	62.7	60.4	56.5	36.1	47.7
Calhoun	114.1	53.6	11	18.9	70.2	40.9	52	9.3	20	67.3
Charleston	68.1	82.7	68.8	75.6	78.4	70.2	56	46.6	45.6	41.1
Cherokee	72.3	63.8	57.9	85.1	72.5	70.2	71.3	56.8	61.7	47.9
Chester	66.4	70	66.6	53.8	54	53.9	52.4	21.4	23.4	73.9
Chesterfield	61.8	52.8	29.5	68.3	77.2	45.7	60.6	49.5	42.1	50.2
Clarendon	108.5	90.8	119.9	84	91.8	58.2	70.3	15.2	45.9	45.7
Colleton	65.5	53.9	73.9	64.1	57.7	47.2	17	36.9	49.1	61.7
Darlington	111.5	101.7	97.2	89.1	75.5	79.1	85	40.7	49.2	72
Dillon	58.7	73.9	56.2	112.9	90	87	48.1	60.9	34.7	45.5
Dorchester	165	113.9	108.2	79.6	81.5	72	82.1	66.3	74.1	49.2
Edgefield	15.7	43.5	37.6	31.4	28.7	63.9	54	57.4	38.3	53.7
Fairfield	34.2	51.1	30.5	45.3	44.3	60	15.1	57.5	26.8	35.6
Florence	93.1	81.3	64.3	75.8	60.7	89.7	56.5	63.3	54.6	56.6
Georgetown	43	68	92.2	63	60.7	45.3	32.5	60.3	52.5	35.6
Greenville	59.5	61.5	58.8	61.6	49.9	56.6	49	41.4	47	40.7
Greenwood	51.7	79.7	85	84.6	61.6	72.3	59.3	38.3	39.8	33.4
Hampton	68	69.8	94.2	33.9	52.2	49.6	33.6	29.1	49	26.4
Horry	80.6	70.6	63	55.7	61.1	62.2	49.3	44.4	47.6	36.7
Jasper	136.8	48.8	47.9	42.2	67.3	46.5	10	41.9	0	36
Kershaw	76.5	77.6	32.2	70.4	50.5	70.6	43.9	41.3	51.8	41.8
Lancaster	59.4	65	54.7	39.8	34.4	72.3	47.2	34.3	30.7	53.1
Laurens	109.1	72	72.1	75.2	51.3	62.1	55.6	54.4	68.1	59.1
Lee	18.6	54.5	53.4	91.7	29.5	87.7	55.4	48	56.9	61.2
Lexington	79.9	74.6	62.9	63.3	59	52.3	53.1	49.8	49.3	45.8
McCormick	42.2	14.3	69	72.2	28.2	20.2	51.6	9	29.3	31.1
Marion	105.6	83.7	51.1	108.2	72.8	18.1	52.2	34.6	29.6	70.7
Marlboro	49.6	23.9	78.2	64.8	40.2	57.3	42.6	30.7	37.1	18.5
Newberry	66.3	51.7	61.5	74.1	36.6	45.3	40.5	35.6	42.7	34.5
Oconee	52.1	70.2	85.4	62.2	65.3	36	53.8	53.6	53.5	41.4
Orangeburg	129.7	104.4	86.3	87.6	118.9	97.1	83.8	74.8	101.5	72.6
Pickens	69.8	82.2	88.9	55.8	51.1	59.9	62.4	40.2	44.9	43.6
Richland	74.2	65.9	59.8	50.8	49.4	48.9	42.2	41.1	36.4	34.7
Saluda	54.7	52.3	52.8	90.3	73.6	80.6	136.4	53.5	39.8	78.5
Spartanburg	94.3	89.3	80	73	77.9	64.7	58.9	41.7	53.2	52
Sumter	148.6	133.3	104.4	90.9	129.9	103.1	73	67.4	52.1	55.9
Union	68.4	92.6	64.1	59.4	70.3	89.6	51	51.8	37.3	54.5
Williamsburg	73.2	66.8	83.8	54.2	75.5	62.1	47.2	50.4	96.4	62
York	55	48	54	57.4	45.3	43.1	47.3	42.2	37.9	36.7

# Appendix B

## Stroke Mortality Rates by County (Age-Adjusted)

### FEMALES

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	83.5	76.1	74.1	70.8	66.3	63.5	55.9	50.4	51.1	48.4
Abbeville	64.3	67.3	60	37	56.3	44.6	64.2	10.9	48.4	48
Aiken	69.1	62.8	69.3	56.7	68.3	67.3	35.8	39.5	51.9	53.9
Allendale	70.1	14.4	97.6	67.6	70.1	67.6	38.7	36.3	145	97.1
Anderson	67.7	74.9	58.9	54.3	65.2	53.5	51.8	45.8	52.3	42.7
Bamberg	200.4	104.8	47.6	145.6	83.6	69.2	95.8	65	69.7	70.3
Barnwell	217.4	68.5	89	74.9	47.5	45.8	86.8	45.4	64.3	82
Beaufort	64.2	49.1	74.4	52.5	54.1	46.4	41.9	34.9	28.5	31.4
Berkeley	90.9	106	75	69.5	56.6	64.7	75.4	49.8	47.3	59
Calhoun	115	53.4	38.1	44	59.8	58.2	49.4	59.7	20.2	69
Charleston	74.3	89.7	84.5	83.8	78.6	74.9	60.3	49.4	47.1	51.1
Cherokee	67.2	85.1	65.7	86.4	72.3	60.6	62.5	77.5	76.3	55.3
Chester	74.2	61.6	66	67.8	54.5	44.1	77.4	23.5	33.2	62.8
Chesterfield	81.5	37.2	24.1	73.7	56.1	56.8	25.1	70.1	46.3	55.6
Clarendon	156.5	75.4	121.6	109.9	134.5	108.6	64	42	36.1	38.5
Colleton	59.8	56.9	90.1	72.8	73.5	40.7	20.8	41.8	13.7	51.5
Darlington	133.4	109.3	113.5	75.3	86.3	89	96.7	67.5	58.4	78.5
Dillon	62.9	115.7	50	120.6	86.8	107.5	75.9	63.4	65.1	60.4
Dorchester	152.2	139.2	103.4	78.5	102	62.5	83.3	84.8	61.2	62.5
Edgefield	8	54.6	47.5	43.7	16.2	70.9	43.5	63.6	54	58
Fairfield	96.5	68.4	41	92.1	60.2	53.3	47.7	46.9	40.2	52.9
Florence	87.8	79.8	73.9	89.9	61.3	91.1	56.8	64.1	59.8	47
Georgetown	57.9	72.2	95.4	82.4	61.7	59.4	34.2	73.6	55.2	36.9
Greenville	58.1	63.9	62.7	64.5	62.2	59.2	48.4	44.5	48.7	48.5
Greenwood	65.4	67.1	76.3	70.1	65.8	61.9	67.6	36	62	43.4
Hampton	49.3	76.6	82.4	59.9	67.5	62.5	43.7	40.3	68.4	70.8
Horry	83.7	66.2	78.2	56.1	68.9	70.9	57.4	52.4	49.7	38
Jasper	154.8	95	49.5	83.2	73.2	98.7	14.1	43.2	31.9	41.9
Kershaw	83	70.1	25	79.1	58.1	75.5	63.8	49.2	43	45.9
Lancaster	62.9	83.5	77.9	45.3	45.9	59.7	68	42.1	31.6	60.6
Laurens	116.3	62.6	76	73.6	59.6	59.3	53.8	49.1	53.3	68.9
Lee	80	64.5	90.9	94.6	25.1	54.2	33.7	79.1	58	94.3
Lexington	91.2	71.5	64.1	63.6	53.6	56.2	56.1	45.7	51.6	48.2
McCormick	37.4	49.4	71	93.1	39.1	24.6	68.2	42.3	50.2	68.4
Marion	118.9	52.8	72.2	137.4	64.8	51.7	53.1	34.5	41.2	59.2
Marlboro	61.9	38.4	51.3	61.1	27.4	50.2	45.5	44.7	53.7	33.4
Newberry	76	60.8	89.7	78	62.5	27.4	48.8	52.7	49.7	41
Oconee	56.8	77.6	74.2	70.8	73.8	34.5	56	55.5	66.8	52.3
Orangeburg	137.7	111.6	78.6	82.9	104.3	81.3	83.4	90.8	98.9	71.5
Pickens	79.4	87.5	90.7	65.5	53.1	59	57.7	34.7	50.7	39.1
Richland	83.2	64.6	70.6	60.8	46.5	52.5	49.5	49.3	44.7	45.9
Saluda	80	27.2	54.7	95.2	91.5	67.3	113.8	57.2	51	64.8
Spartanburg	100	94.4	89.8	70.6	79.8	79.2	62.5	44.5	53.2	45.7
Sumter	140.4	131.1	111.1	99.7	110.8	74.7	55.8	60.7	58.9	57.1
Union	74.8	82	94.4	64.9	76.8	107.4	46.4	58.5	26	59.9
Williamsburg	93.8	92.7	75.5	90.9	82.9	43.2	50.5	78	100.3	33.5
York	57.2	47.2	58.4	69.3	44.5	42.3	44.7	49.9	41.7	22.7

# Appendix B

## Stroke Mortality Rates by County (Age-Adjusted)

### MALES

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
South Carolina	86.3	85.3	79.1	74.1	71.4	65.3	60.3	51.6	53.9	50.3
Abbeville	98.3	85.1	86.4	62.5	85.7	60.3	42.4	55.4	91.3	108.6
Aiken	67.6	44.7	55.2	48.9	71.7	47	36	52.6	43.5	41.4
Allendale	45.7	157.9	95.9	126.7	176.3	39.6	55.9	83.6	70.7	55.4
Anderson	74.4	83.2	59.8	64.4	58.8	58	57.1	52.6	46.5	59.4
Bamberg	184.3	187.6	90.3	124.7	92	25.7	149.4	104.5	113.3	59.9
Barnwell	46.1	99.8	140.6	64.3	53.4	17.7	42	13.6	134.2	47.3
Beaufort	91.3	71.4	79.5	42	39.2	45.9	33.9	31.8	20.1	24.7
Berkeley	88.1	76.7	75	69.7	48.6	74.5	50	76.2	54.9	53.1
Calhoun	65.6	12.5	57	92.7	100.9	17.5	16.9	21.6	44.8	48.1
Charleston	85.9	87.8	90	78.4	90.1	75.9	66.8	51.9	61.8	36
Cherokee	76.3	43.1	57.7	85.4	84.3	88.9	84.2	42.3	40.5	44.3
Chester	87	127	49.9	56	54.4	120	73.2	31.4	45.4	113.6
Chesterfield	73.8	81	38.7	70.1	75.5	44	102	78.8	39.7	66
Clarendon	124	137.8	159.8	77.6	103.2	133.8	105.4	51	58.3	22.8
Colleton	58.8	69.9	74.7	87.8	101.2	81.2	50.6	95.5	104	70.3
Darlington	96.3	98.1	124.4	150.4	87.7	71.4	72.2	41.5	67.9	56.2
Dillon	62.5	51.1	53.3	148.7	49.6	99.7	39	66	54.9	68.2
Dorchester	149.3	110.8	145.6	85.8	63.6	66.5	78.3	35.4	82.9	46.9
Edgefield	40	43.2	18.5	0	51.9	87.2	19.2	49.2	50.1	83.2
Fairfield	49.4	118.4	52.6	53.2	83.9	52	69.5	80.8	63.7	69.2
Florence	130.5	119.1	94.5	108.7	112.5	92.3	89.3	61.6	70.8	69.6
Georgetown	62.6	77.1	108.4	68.8	92.5	46.4	64.7	70.8	54	49.9
Greenville	65.7	61.9	70.4	67.4	49.9	53.3	49.5	38.2	51.6	46.4
Greenwood	66.5	97.7	120.8	122.3	84.7	87.8	60.3	49.2	28.9	53.9
Hampton	56.4	151.9	91.1	65.6	158.4	39.7	81.2	45.9	58.9	39.5
Horry	73.5	85.4	43.1	65.4	62.4	49.1	49.8	46.3	50.6	37.4
Jasper	103.4	19.9	73.4	73.5	74.6	18.5	31.8	22.4	25.3	46.6
Kershaw	78.9	121.1	85.3	68.6	49.5	62.4	60.5	65	78.9	66.5
Lancaster	77	53.5	57.3	52.4	35.2	94.3	52.1	39.5	34.9	56.8
Laurens	126.7	102.5	68.2	74.8	55.2	68.2	65.9	66.8	99.4	83.8
Lee	134.2	64.9	139.2	113.4	83.1	176.3	126.3	73.1	63.8	27.9
Lexington	69.4	96.9	65	74.5	65.1	48.5	58.6	50.8	49.8	48.6
McCormick	82	57.7	42.3	56.8	30.4	79	23.8	14.1	13.3	36.8
Marion	113.1	163.6	75.6	142.4	122.1	43.6	115.3	65.4	78.5	82
Marlboro	121.8	56.1	101.4	66.1	78.3	128.4	39.8	56.2	42.2	49.9
Newberry	78.2	80.3	73.4	108.2	77.1	55.3	74.8	37.4	63.1	45.7
Oconee	49.7	52.1	85.4	62	54.2	47.9	50	57.2	41.5	45.2
Orangeburg	143.6	108.9	86.5	106.1	112.3	85.3	83.9	88.8	74.9	79.6
Pickens	70.3	73.4	85.2	47.4	48.7	65.2	69.7	40.1	30.6	53.4
Richland	92.3	103.3	84.3	58.7	60.7	67.3	61.3	52	52.8	36.7
Saluda	48.6	102.6	86.1	76.4	40.7	126.2	145.2	38.9	39.2	128.3
Spartanburg	102.6	100.3	85.8	89	89.6	66.9	59	45.8	54.6	61.3
Sumter	155.4	141.8	124.8	105.6	127.1	92.4	81	89.1	62.5	57.2
Union	108.9	68.2	47.3	66.5	68	100.2	66.8	50	105.3	63
Williamsburg	122.7	66.4	98.1	99.5	129.2	140	101.4	83.2	90.7	85.6
York	67.3	55.3	57.9	59.2	52.7	47.3	49.7	45.7	40.4	49.5

# Appendix B

## STROKE 3 Year-Average Mortality by County (Age-Adjusted)

### AFRICAN AMERICANS

County	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008
South Carolina	111.6	105.7	100.4	92	84.1	77.4	75.4	72.3
Abbeville	109.5	85	83.4	58	76.3	65.2	79	64.5
Aiken	98.1	82.5	92.6	83.1	73.5	63.3	65.5	71.3
Allendale	118.3	119.4	118.5	107.1	85.9	69	83.6	101.4
Anderson	76.3	83.4	76.3	80.3	62.4	65.6	71.9	78.4
Bamberg	151.5	113.2	91.2	84.5	65.7	79	89.1	96.2
Barnwell	150.8	122.4	95.7	69.9	67.5	52.2	79.2	83.2
Beaufort	91.8	90.7	92.4	82.8	74.2	60.3	38.9	35
Berkeley	118.5	99.3	74.6	77.3	77.1	81	83.5	86.6
Calhoun	71.3	81.5	93.6	76.3	41.6	52.6	54.6	65.2
Charleston	114.6	113.9	109.9	95.5	88.2	77.4	71.9	65.3
Cherokee	93	95.1	86.9	74.9	76.5	85	87.1	80.7
Chester	105	92.4	70.1	94.7	110.8	104.1	85.6	76
Chesterfield	72.3	71.2	68.3	81.3	61.3	86.6	79.8	90
Clarendon	152.9	127.4	146.6	161.9	154.3	128.3	77.2	52.8
Colleton	77.8	95.4	112.4	104.2	93.2	81	75.3	69
Darlington	140.7	136.3	136.4	117.6	105	94.3	95.2	83.1
Dillon	83.5	110.4	84.7	112.1	92.8	108.3	98.7	102.8
Dorchester	162.2	143.7	121.8	86.3	89.2	74.6	79.1	77.2
Edgefield	46.5	45	26.9	55.5	46.3	55.3	47.5	80.8
Fairfield	115.1	109.1	95.6	86.2	81.5	70.9	82.2	79.9
Florence	125.2	129	122.8	116	104.2	89.3	83.1	66.1
Georgetown	104	114.8	122.5	108.3	99.2	99.3	93.6	82.7
Greenville	88.4	95.6	101	86.2	71.9	57	65.4	79.8
Greenwood	106.2	97	113.1	92.7	88.6	66.4	74.5	80
Hampton	85.4	105.2	118.3	108.5	107.6	77.2	84.8	87.2
Horry	116.8	104.6	105.1	93.2	99	93.8	97	77.8
Jasper	92.8	90.4	89.4	96.1	69.4	51.8	40.7	47.8
Kershaw	102.2	98.8	85.6	83.6	94.4	102	104.8	98.8
Lancaster	128.3	120.6	108.6	71.3	81.3	79.4	79	69.7
Laurens	112.4	95.8	92.9	80.9	76	65.4	70.5	88.2
Lee	144.5	122.5	114.6	96.9	85.1	102.1	81.2	77.7
Lexington	124.2	114.8	87.4	88.9	81.6	68.4	67.1	60.8
McCormick	75	82.6	58.1	80.7	72.5	76.7	64.5	84.4
Marion	111.6	123.7	123.2	118.7	101.3	88.2	88.7	72.4
Marlboro	95.5	63	58.8	66.3	68.4	69	61.9	63.5
Newberry	132.3	138.2	140.4	99.7	102.9	76.8	109.7	93.3
Oconee	78	69.2	76.5	97.9	74.4	63.7	80	116.9
Orangeburg	115.6	96.5	84.6	82.3	80.9	84.4	88.3	85.3
Pickens	130.8	116.4	87.1	86.5	67.7	57.2	38.3	35.6
Richland	107.3	98	81.9	72.5	68.3	70.5	69.3	64.6
Saluda	116.5	98.4	114.6	94.6	91.1	76.6	69.5	77
Spartanburg	145.3	128	118.9	113.8	109.5	92.3	63.8	56
Sumter	145.7	135.9	123.2	96.1	73.6	63.3	68.4	69.7
Union	106.3	83.4	93.7	102.5	96.4	96.5	88.1	100.8
Williamsburg	105.1	104.4	113	114.6	100	92.4	93.6	81.3
York	83.2	89	84.5	76.7	53.7	64	68.1	55.1

# Appendix B

## STROKE 3 Year-Average Mortality by County (Age-Adjusted)

### WHITES

County	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008
South Carolina	72	68	64.4	61.8	57.9	52.2	48	45.3
Abbeville	62.3	58.5	55.4	55.3	50.8	36.2	38.4	50.9
Aiken	57.2	53.5	56.8	56.7	51	43.4	37.6	40.9
Allendale	25.3	31.2	49.9	40.1	42.1	39.6	61.3	64.8
Anderson	69.3	62.6	58.5	55.8	56.9	50.8	48.3	46
Bamberg	104.1	111.2	102.4	101.8	109.9	96.2	106.3	63.3
Barnwell	91.4	65.3	62	41	41.5	40.4	57.7	58.2
Beaufort	66.2	55.5	50.6	42	39.5	35.8	30.8	27
Berkeley	77.8	73	64.6	60.9	58.9	59.5	50.7	46.6
Calhoun	56.1	26.4	33.2	43.1	54.4	33.7	26.5	32.3
Charleston	73.2	75.6	74.2	74.7	67.8	56.9	49.3	44.4
Cherokee	64.6	68.8	71.9	75.9	71.3	66.1	63.3	55.4
Chester	67.7	62.2	57.4	54.1	53.3	42.4	32.4	39.5
Chesterfield	48.1	50.4	58.8	63.6	61.3	51.9	50.7	47.4
Clarendon	106.8	97.6	98.2	78	73	46.3	42.9	36.1
Colleton	64.9	64.4	65.8	56.3	40.4	33.5	34.7	49.6
Darlington	103.4	96	87.2	81.2	79.6	67.4	57.5	54.3
Dillon	62.7	81.3	85.8	95.9	75.4	65.3	48.6	47.5
Dorchester	127.5	100.5	89.5	77.7	78.8	73.8	73.8	62.9
Edgefield	33.4	37.5	32.2	41	49	58.8	49.7	49.9
Fairfield	38.7	42.3	39.9	51.1	39.9	43.4	33	40
Florence	79.1	73.9	67	75.3	68.9	69.8	58.2	58.2
Georgetown	68.2	73.8	70.3	55.8	45.7	46.3	48.5	49.3
Greenville	60	60.6	56.6	55.9	51.8	48.8	45.8	43
Greenwood	72	83.2	77	72.8	64.4	56.2	45.4	37.2
Hampton	77.5	64.6	58.1	45.8	44.4	37	37.3	35.1
Horry	71	62.8	59.8	59.8	57.2	51.2	47	42.7
Jasper	78.6	46.2	52.4	52.1	40.7	32.2	16.7	25.6
Kershaw	61.3	60	51.3	64.1	55	51.4	45.7	45.1
Lancaster	59.8	52.9	42.5	49.1	51.5	51.1	36.9	39.8
Laurens	83.6	73	66.2	63	56.4	57.1	59.2	60.6
Lee	41.9	66.4	57.1	69.1	58	63.4	53.6	56.1
Lexington	71.5	66.8	61.6	58.1	54.8	51.7	50.7	48.3
McCormick	40.9	52.3	55.5	40	33.1	26.6	29.7	23.7
Marion	80.8	81.1	77.2	65.2	47.6	35.1	38.4	45.1
Marlboro	50.7	55.7	60.8	54	46.6	43.2	36.6	28.7
Newberry	59.6	62.6	57.5	51.8	40.8	40.4	39.5	37.7
Oconee	68.7	72.2	70.5	54.3	51.5	47.8	53.6	49.5
Orangeburg	106.8	92.8	97.6	101.1	100	84.4	85.7	82.7
Pickens	80	75.2	64.8	55.5	57.7	53.9	49	42.9
Richland	66.8	58.7	53.2	49.6	46.7	44	39.8	37.4
Saluda	52.9	65.8	72.5	81.8	96.8	90.4	76.3	57.4
Spartanburg	87.7	80.7	76.9	71.8	67.1	54.7	51.1	49
Sumter	128.7	109.5	108.4	108.1	101	80.2	63.7	58.4
Union	74.9	72	64.4	72.9	70.6	64.6	46.8	47.9
Williamsburg	72.7	67	69.2	64.3	61.6	53.8	64.8	69.1
York	52.1	53.2	52.1	48.4	45.3	44.3	42.3	38.8

# Appendix B

## STROKE 3 Year-Average Mortality by County (Age-Adjusted)

### FEMALES

County	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008
South Carolina	77.8	73.6	70.3	66.8	61.8	56.4	52.4	49.9
Abbeville	64.2	54.6	51.2	45.9	54.9	39.5	41.4	36.2
Aiken	67	62.8	64.7	64.2	56.8	47.3	42.5	48.4
Allendale	59.9	59.2	77.3	68.9	58.5	47.2	72.6	92.9
Anderson	67	62.4	59.4	57.7	56.8	50.3	50	46.9
Bamberg	115.7	99.8	91.8	98.7	83.3	77.2	76.5	68.2
Barnwell	123	77.5	70.3	56	60.1	59.6	65.3	64
Beaufort	62.4	58.5	59.8	50.9	47.2	40.7	34.7	31.4
Berkeley	91	82.8	66.5	63.6	65.4	62.7	57.5	52.1
Calhoun	67	44.1	47.1	53.6	55.9	55.9	43	49.1
Charleston	82.9	85.9	82.2	79.1	70.9	61	52.2	49.2
Cherokee	72.5	78.5	74.7	73.2	65.1	66.9	72.2	69.6
Chester	67.4	65	62.4	55.6	58.9	48.5	44.7	39.8
Chesterfield	46.7	45.4	51.8	62.3	46	50.7	47.3	57.3
Clarendon	116.6	101.9	122.2	117.7	101.2	70.5	47.2	39.1
Colleton	69.5	73.3	79.2	62.5	44.9	34.3	25.3	35.8
Darlington	118.5	99.2	91.5	83.5	90.5	83.9	73.8	68.1
Dillon	76.4	95.7	85	103.5	89.6	81.8	68.6	63.2
Dorchester	130.7	106.7	94.7	81.1	82.8	77.6	76.1	69.2
Edgefield	37.7	48.7	35.5	43.2	43.4	59.6	53.8	58.6
Fairfield	67.9	66.8	63.7	68	53.6	48.7	44.5	46.6
Florence	80.7	81.3	75	80.5	69.6	70.5	60.2	56.9
Georgetown	75.3	83.4	78.2	66.9	51.5	55.6	54.1	54.9
Greenville	61.8	63.7	63.1	61.9	56.6	50.6	47.2	47.3
Greenwood	69.6	71.2	70.8	65.9	65.1	54.6	55	47.1
Hampton	69.6	73.3	69.7	63.8	57.9	48.7	50.6	60.4
Horry	75.8	66.3	67.4	65.5	65.4	59.5	52.9	46.3
Jasper	98.2	75.6	68.9	85.2	62.3	51.9	30.1	38.5
Kershaw	57.9	58.2	54.4	71	65.7	62.5	52	46.2
Lancaster	74.8	68.3	55.7	50.4	58	56.5	46.3	45.1
Laurens	83.8	70.7	69.8	64.4	57.7	53.9	51.7	57.2
Lee	78	83.9	70.6	57.7	37	55.3	56.7	77.3
Lexington	73.8	66.4	60.3	57.7	55.3	52.5	51.1	48.5
McCormick	52.6	72.1	67.5	52.6	43.5	44.9	53.6	54.5
Marion	81.2	87.6	91.1	83.2	56.6	46.7	42.6	44.9
Marlboro	50.8	49.9	46.3	46.3	41	46.9	48	43.7
Newberry	75.4	76.2	76.6	56	46.1	43	50.3	47.8
Oconee	69.2	73.8	72.8	59.5	54.5	48.5	59.5	58.4
Orangeburg	108	91	88.8	89.5	89.7	85.1	91	86.8
Pickens	85.7	80.9	69.5	59.2	56.5	50.2	47.6	41.5
Richland	72.7	65.3	59.1	53.2	49.4	50.4	47.8	46.7
Saluda	52.5	60.1	80.8	85.1	90.3	79.1	73.6	57.9
Spartanburg	94.6	84.8	80	76.6	73.8	61.7	53.2	47.8
Sumter	127.6	113.7	107	95	79.9	63.4	58.4	58.8
Union	83.8	80.3	78.2	82.7	77.1	71.1	43.7	48.3
Williamsburg	86.8	85.6	82.6	72.6	58.7	57.7	76.7	70.3
York	54.2	58.5	57.2	51.7	43.8	45.8	45.4	37.7

# Appendix B

## STROKE 3 Year-Average Mortality by County (Age-Adjusted)

### MALES

County	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008
South Carolina	83.5	79.3	74.7	70.1	65.5	58.8	55.1	51.9
Abbeville	89.1	78.5	78.3	69.3	63	52.6	63	85.6
Aiken	55.4	50	58.8	55.8	51.1	45.5	44.2	45.6
Allendale	105.1	125.4	131.8	108.9	89.7	61	73.6	70.2
Anderson	72.4	68.8	61.1	60.5	58	55.7	51.6	53
Bamberg	154.3	133.9	103.3	81.3	89.8	94.6	123.5	93.3
Barnwell	95.4	100.6	85.5	45.5	38.4	25.4	63.5	64.8
Beaufort	79.6	62.7	51.4	42.4	39.4	36.9	28.3	25.3
Berkeley	79.7	73.6	64.1	64.3	57.7	66.8	60.3	61
Calhoun	42.9	54.3	83.1	71.2	48.1	18.1	27.2	37.7
Charleston	87.7	85.3	86.2	81.6	77.4	64.4	60.1	49.7
Cherokee	60.1	63.5	76.7	85.8	85.7	71.3	55.2	42.5
Chester	87.1	76.3	53.6	77.2	81.4	73.2	49.8	64
Chesterfield	64.7	63.3	61.9	62.8	74	75.2	72.8	61.3
Clarendon	140.4	124.4	113.1	105.6	113.7	94.3	71.2	44.2
Colleton	68.1	78.8	88.5	89.5	77.6	76.2	84.4	89.6
Darlington	106.1	124.6	120.8	103.2	78	61.2	60.1	55.3
Dillon	55.9	84.2	83.9	99	62	67.3	56.2	65.2
Dorchester	134.7	114	96.4	70.4	69.5	59.2	65.1	55.3
Edgefield	33.6	20.1	23.3	46.2	52.3	52.5	40.4	60.6
Fairfield	72.7	75	64.8	64.1	68.1	66.7	71.1	71
Florence	115.1	107.4	105.3	103.7	97	80.8	73.8	67.6
Georgetown	83	83.1	88.6	69	67.3	61.2	63	58.3
Greenville	66	66.6	62.1	56.7	50.8	46.6	46.4	45.5
Greenwood	94.7	114.3	109.5	98.1	77.6	65.5	45.7	44
Hampton	101	98.2	101	87.8	93.4	56	62.8	48.7
Horry	66.9	65	58.1	58.4	53.5	48.2	49	44.5
Jasper	61.7	56.8	73.9	55.7	41.2	24.1	26	31.2
Kershaw	95.9	90.9	67.2	60.4	57.9	62.7	68.4	70.1
Lancaster	63.2	54.5	48.3	61.4	60.3	60.6	41.3	44.1
Laurens	98.8	81.6	66.1	66.3	63.2	66.8	77.6	83.4
Lee	110.7	104.4	110.8	123.7	129.3	123.9	86.8	55.8
Lexington	77.3	78.5	68.2	62.6	57.4	52.7	52.6	49.8
McCormick	60.9	51.8	42.5	55.6	42.6	37.2	17.1	21.7
Marion	118.4	127.5	111.8	99.9	93.7	74.7	85.4	74.9
Marlboro	93.5	74.5	82.2	90.7	81.6	73.1	46.2	49.5
Newberry	77.1	88.5	87	80.5	69.2	56	58.1	48.9
Oconee	61.3	66.7	66.5	54.3	50.7	52	49.2	47.9
Orangeburg	112.7	101.7	102	100.8	94	86.1	82	80.8
Pickens	75.9	68.3	59.9	54	61.3	58	46.2	41.6
Richland	93.2	81.5	67.7	62.4	63.1	59.9	55.2	47
Saluda	79.4	88	68	84.3	107.9	101.9	72.8	69.3
Spartanburg	96.3	91.6	88.1	81.4	71.5	56.8	53	54
Sumter	140.1	123.9	119.1	108.5	99.6	87.6	77.1	69.2
Union	73.8	60.8	61.2	78.5	78.9	72.9	74.2	72.6
Williamsburg	94.7	88.4	108	122.5	123.1	108.1	91.2	86
York	60.1	57.6	56.5	52.7	49.7	47.7	45.1	45.3



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