

# Health Profile of North Carolinians: 2011 Update

## September 2011



State Center for Health Statistics  
1908 Mail Service Center  
Raleigh, NC 27699-1908  
[www.schs.state.nc.us/SCHS](http://www.schs.state.nc.us/SCHS)





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mission statement for DHHS:

*The Department of Health and Human Services,  
in collaboration with our partners, protects the health and safety of  
all North Carolinians and provides essential human services.*

## Vision

*All North Carolinians will enjoy optimal health and well-being.*



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### **Photo Credits**

The front cover photo of the African American couple is from the Centers for Disease Control and Prevention's Public Health Image Library (CDC PHIL), Cade Martin photographer.

The photo on page 19 is also from the CDC PHIL, James Gathany photographer.

All other photos are from [www.morguefile.com](http://www.morguefile.com), a website dedicated to Dorothy, Dennis, and Jean Marie Connors. We would like to thank the artists who have generously contributed their photos for use in projects and publications such as this one.

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# EXECUTIVE SUMMARY

**E**arlier this year, the Healthy North Carolina 2020 health objectives were released, aimed at creating a better state of health for North Carolina. To do this, the N.C. Division of Public Health will monitor progress toward meeting the objectives. This biennial report is created to help state legislators and health agencies identify trends in mortality, illness, and injury, as well as the factors that may lead to these events. In a rapidly changing health care environment, this information can facilitate the targeting of health programs to improve the health status of North Carolinians.

## Chronic Diseases

Cancer, heart disease, stroke, and chronic lung disease are the leading causes of death in North Carolina. Chronic diseases account for 60 percent of all deaths in the state. There have been dramatic increases in diabetes and obesity in the past decade; these conditions exacerbate many other health problems. In 2009, 35 percent of adult North Carolinians were overweight and another 30 percent were obese. Behavioral risk factors for obesity and overweight include physical inactivity, and eating unhealthy foods. According to the Behavioral Risk Factor Surveillance System (BRFSS) survey, only 21 percent of North Carolina adults report consuming five or more servings of fruits and vegetables daily and more than half of adults (54%)

do not meet current physical activity recommendations.

## Infant, Child, and Adolescent Health

Infant mortality in North Carolina has decreased by almost a third since 1989, though in the past couple of years the rate has shown a moderate increase. North Carolina still ranks among the 10 worst states in the nation in infant mortality and large racial disparities persist. According to the 2009–10 North Carolina School Health Services Report, 17 percent of students have chronic health conditions. In 2008–09, approximately 11 percent of children ages birth to 18 did not have health insurance. Teen pregnancy rates have declined markedly since 1990 and racial disparities in teen pregnancy between whites and minorities have also been reduced. In 2003, the North Carolina General Assembly funded a plan to expand school nurse services in the state and progress is being made in reducing nurse-to-student ratios in the state. The overall school nurse-to-student ratio in the state has improved from 1:2047 (2001–2002) to 1:1185 (2009–2010).

## Mental Health and Substance Abuse

The problems that North Carolina faces with regard to mental health are difficult to document due to inadequate data on the prevalence of

specific mental disorders. According to the 2009 Behavioral Risk Factor Surveillance Survey, 33 percent of North Carolina adults reported that there were one or more days during the past month when their mental health was not good (due to stress, depression, or emotional problems). More than one in 10 North Carolinians reported engaging in binge drinking in the past month (defined as having five or more drinks on one occasion). During 2009, there were 60,887 inpatient hospitalizations in North Carolina with mental illness listed as the primary diagnosis, resulting in more than \$653 million in hospital charges.

## Injury and Violence

In 2009, 5,881 North Carolinians died from injury or violence, including 1,394 deaths from motor vehicle injuries, 2,764 deaths from other unintentional injuries, 1,161 deaths from suicide, and 562 deaths from homicide. Injury or poisoning accounted for 77,739 hospitalizations, resulting in \$2.6 billion in hospital charges. The number of deaths from unintentional poisonings has risen dramatically in the state in recent years, increasing from 228 deaths in 1997 to 1,306 deaths in 2009.

## Communicable Diseases

Overall, North Carolina's HIV death rates have steadily declined since 1995. In 1995, the unadjusted HIV

death rate was 14.1 per 100,000 population compared with 3.8 in 2009. During the 2005–2009 period, the age-adjusted mortality rate for HIV was 15.7 per 100,000 population for North Carolina’s non-Hispanic African Americans and 3.1 for Hispanics, compared with an age-adjusted death rate of 1.1 among non-Hispanic whites. In general, North Carolinians experience a higher rate of many sexually transmitted diseases when compared with the rest of the country. In 2009, North Carolina had the seventh highest gonorrhea rate, the 12<sup>th</sup> highest syphilis rate, and the 15<sup>th</sup> highest chlamydia rate in the United States.

The North Carolina Division of Public Health continues to prepare for a pandemic flu outbreak and for other public health emergencies. North Carolina’s preparations were tested in 2009 when a new H1N1 influenza (flu) virus spread throughout the globe and the World Health Organization (WHO) announced a flu pandemic. During the official pandemic period June 2009 through August 2010, there were a total of 107 flu-associated deaths reported in North Carolina, all of which were associated with pandemic H1N1 influenza. However, this figure is likely an underestimate because it only includes deaths in which the decedents were tested for the influenza virus.

### Minority Health and Health Disparities

African Americans\* have higher death rates from HIV, homicide,

cancer, diabetes, kidney disease, cerebrovascular disease (stroke), and heart disease, compared to whites. The African American infant mortality rate is more than twice the rate for whites. Despite relatively low socio-economic status and delayed prenatal care services, Latina women—especially first generation Latinas from Mexico—typically have birth outcomes that are equivalent to non-Hispanic whites. Spanish-speaking Hispanics are significantly more likely to be uninsured compared with English-speaking Hispanics, whites, and African American residents. North Carolina’s American Indian population has elevated death rates from heart disease, diabetes, kidney disease, homicide, and unintentional motor vehicle crashes, as well as a substantially higher infant death rate, compared to non-Hispanic whites. These higher death rates for American Indians reflect their high percentage living in poverty, lack of insurance, and access to health care.

### Disability

According to the 2009 North Carolina BRFSS survey, 20.2 percent of North Carolina adults ages 18 and over reported that they have activity limitations due to physical, mental, or emotional health problems or limitations. This is roughly comparable to the U.S. rate of 18.7 percent. Using a more restrictive definition, 7.8 percent of North Carolina adults reported that they have a health problem which requires the use of special equipment, such as a cane, wheelchair, special bed, or

special telephone. Disability status is associated with a number of health and behavioral risk factors for North Carolina residents. According to the 2009 BRFSS survey, adults with disabilities were much more likely to rate their health as poor, report depression, report being physically inactive, smoke, and be obese than non-disabled adults.

### Health Risk Factors

Many deaths in North Carolina are preventable and involve risky behaviors or lifestyles. Among the leading causes of preventable death are tobacco use, unhealthy diet and/or physical inactivity, alcohol misuse, firearms, sexual behavior, motor vehicles, and illicit drug use. Together, these causes are estimated to comprise approximately half of all deaths in the state. Compared with national rates, North Carolina adults are somewhat more likely to smoke, have sedentary lifestyles, and be obese.

### Health Care Access

More than 1.5 million North Carolina residents, or 19 percent of the population, were without health insurance during 2008–2009. Approximately 32 percent of North Carolina adults did not visit a dentist within the last year; with Hispanics and American Indians being the most likely not to receive dental care. According to 2010 estimates from the United States Department of Agriculture, approximately 30 percent of North Carolina’s population lives

\* *Technical note regarding Race/Ethnicity Reporting:* In this report the term “African American” and “Black” will be used interchangeably and “Hispanic” and “Latino/Latina” will be used interchangeably.

in rural areas, compared with 17 percent nationwide. The geographic availability of physicians and the distance to hospitals pose unique issues for North Carolina's rural residents. Problems in access to health care are especially acute among North Carolina's poor, rural, and minority populations.

### **Occupational and Environmental Health**

According to the North Carolina Department of Environment and Natural Resources, ozone levels have risen in recent years due to increased traffic, industry, and warmer weather. According to the U.S. Environmental Protection Agency (EPA), ground-level ozone impacts not only those with respiratory problems, but the health and well-being of healthy children and adults

as well. Children, the elderly, those who vigorously exercise outdoors, and those with respiratory diseases and compromised immune systems are particularly susceptible to the effects of ozone. Achievement of EPA standards for particulate matter could reduce any potential negative health consequences which might be associated with or exacerbated by ozone in North Carolina.

North Carolina is the second largest pork producing state in the nation, with many "Concentrated Animal Feeding Operations" (CAFOs). North Carolina residents living near swine farms have reported a variety of respiratory, gastrointestinal, and mental health symptoms.

In 2009, the North Carolina Lead Screening Program screened more than 129,000 children ages 1 to 2

years old, or approximately half (49.5%) of all children in this age group. Of all children screened, 583 (0.5%) were found to have elevated blood lead levels.

According to the U.S. Bureau of Labor Statistics, there were 129 fatal occupational injuries in North Carolina in 2009. Transportation accidents accounted for 40 percent of all occupational deaths and 19 percent were due to assaults and violent acts in the workplace. Ninety-two percent of the occupational injuries in 2009 occurred among males. The industry associated with the most fatal occupational injuries was construction which accounted for 17 percent of all occupational fatalities in North Carolina in 2009.



# INTRODUCTION

Since 1914, when deaths were first centrally recorded in North Carolina by the state Vital Records program, data obtained from birth and death certificates have been analyzed by the State Center for Health Statistics in order to classify and determine the root causes behind public health threats such as birth defects, heart disease, SIDS, and cancer. Additionally, as the availability of public health data has expanded, information regarding illness and injuries collected from hospital discharge data, registries, and health surveys can give us a more thorough idea of the prevalence and scope of public health problems such as asthma, osteoporosis, and mental illness. Through a combination of vital statistics, incidence, and health care utilization data, a portrait of the overall health of North Carolinians can emerge.

Earlier this year, the 2020 health objectives were released, aimed at creating a better state of health for North Carolina. To do this, the N.C. Division of Public Health will monitor progress toward meeting the objectives. This biennial report is created to help state legislators and health agencies identify trends in mortality, illness, and injury, as well as the factors that may lead to these events. In a rapidly changing health care environment, this information can facilitate the targeting of health programs to improve the health status of North Carolinians.

In 2009, there were more than 9.3 million residents of North Carolina. Approximately 1.1 million residents were age 65 or older, or about 13 percent of the total population.<sup>1</sup> This represents an increase from 602,762, or 10 percent, of our population in

this older age group in 1980.<sup>2</sup> North Carolina's popularity as a retirement destination and the aging of North Carolina's population have resulted in an increase in some health problems, particularly chronic diseases, and there has been an associated rise in deaths and medical care costs for these problems. North Carolina has a higher unadjusted mortality rate than the rest of the country. In 2009, 820 residents died in North Carolina per 100,000 population compared to 794 nationally in 2009. North Carolina's overall age-adjusted death rate of 800 deaths per 100,000 for 2009 was also considerably higher than the national rate of 741 per 100,000 population in 2009.<sup>3,4</sup>



## Life Expectancy and Years of Life Lost

The life expectancy at birth for North Carolinians in 2009 was 77.9 years.<sup>5</sup> This is about three years more than the life expectancy at birth in 1990 and four years more than the life expectancy in 1980.<sup>6,7</sup> Residents of our state now have a life expectancy which is comparable to the U.S. average of 78.2 in 2009.<sup>4</sup>

Despite impressive improvements in life expectancy, premature mortality continues to affect individuals and their families as well as the state's productivity. **Table 1** shows the total years of life lost and the average years of life lost (prior to the state's life expectancy of 77.9) for the leading causes of death.

In 2009, North Carolinians who died lost an average of 10.5 years of life due to early death and a total of 805,458 total years of life. Motor vehicle injuries—which disproportionately involve younger people—had the highest average number of years of life lost per death (36.7 years).<sup>8</sup>

**Table 1.**  
**2009 North Carolina 10 Leading Causes of Death:**  
**Total Deaths and Years of Life Lost\***

Rank	Cause	Total Deaths	Average Years of Life Lost	Total Years of Life Lost
1	Cancer	17,476	10.2	177,504
2	Heart disease	17,133	7.3	124,791
3	Stroke	4,391	5.4	23,695
4	Chronic lower respiratory diseases	4,324	5.6	24,363
5	Other unintentional injuries	2,764	21.9	60,561
6	Alzheimer's disease	2,645	0.6	1,643
7	Diabetes	2,107	9.7	20,349
8	Nephritis, nephrotic syndrome, nephrosis	1,827	6.4	11,760
9	Pneumonia & influenza	1,719	6.3	10,772
10	Motor vehicle injuries	1,394	36.7	51,114
<b>Total Deaths—All Causes</b>		<b>76,948</b>	<b>10.5</b>	<b>805,458</b>

\* Prior to North Carolina's 2009 life expectancy of 77.9 years.

# CHRONIC DISEASES

Chronic diseases are responsible for more than 60 percent of all deaths in North Carolina or almost 50,000 deaths each year.<sup>8</sup> Many of the leading causes of death for North Carolinians—including heart disease and diabetes—can be prevented or forestalled by changing health behaviors.

## Cardiovascular Disease

In 2009, cardiovascular diseases (heart disease, stroke, and atherosclerosis) accounted for almost one-third of all deaths in the state (29%). As shown in **Table 1**, heart disease was the second leading cause of death in North Carolina in 2009, with 17,133 resident deaths, or approximately 22 percent of all deaths in the state.<sup>8</sup> North Carolina's 2009 age-adjusted heart disease rate of 177.9 deaths per 100,000 population was just below the national age-adjusted death rate of 179.8 per 100,000 in 2009. However, the state's 2009 age-adjusted stroke death rate of 46.1 was higher than the national rate of 38.9 in 2009.<sup>3,4</sup> Cardiovascular and circulatory diseases were also the leading cause of hospitalization in North Carolina in 2009, accounting for more than 160,000 hospitalizations and over \$5.2 billion in hospital charges.<sup>9</sup>

According to the Kaiser Family Foundation, North Carolina has the seventh highest stroke death rate in the United States. Only Arkansas, Alabama, Tennessee, Oklahoma,

South Carolina, and Mississippi have higher stroke mortality rates than North Carolina.<sup>10</sup> North Carolina is part of what is known as the “Stroke Belt,” an area in the Southeastern part of the United States with the highest stroke rates. Within the Stroke Belt, North Carolina is one of three states (known as the “Stroke Buckle”) with death rates significantly higher than the national average. In an effort to augment stroke research and prevention in this region, North Carolina began participating in the “Tri-State Stroke Network” in 2000 along with Georgia and Tennessee.<sup>11</sup> In 2004, North Carolina began receiving federal funds to create an Acute Stroke Registry in the state. Data from the registry are used to measure quality of care for acute stroke patients and aid in developing quality improvement strategies to address premature mortality due to stroke.<sup>12</sup> In addition, in late 2006, the state legislature mandated the formation of the North Carolina Stroke Advisory Council, charged with developing a statewide system of improved stroke care.<sup>13</sup>

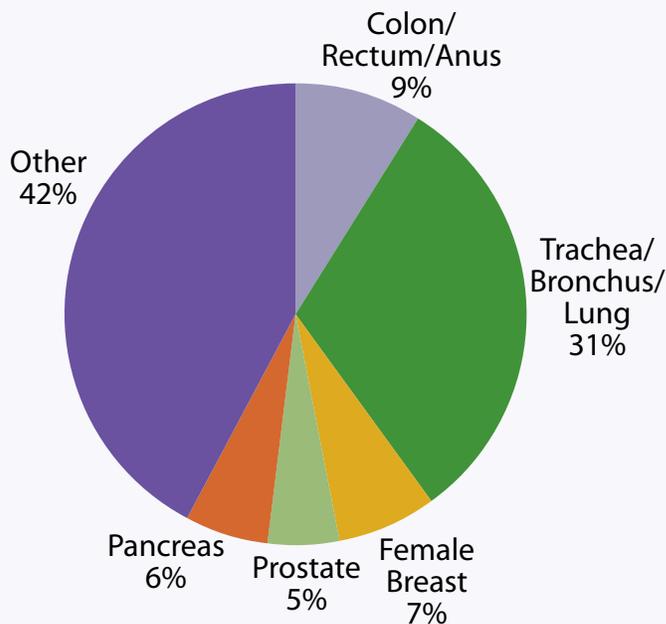
According to the 2009 North Carolina BRFSS survey, almost one in 10 adult respondents (8.7%) indicated that they had a history of cardiovascular diseases (heart attack, coronary artery disease, or stroke). However, despite the prevalence of cardiovascular disease in North Carolina, only 22 percent of BRFSS respondents were able to identify all symptoms of a stroke and only 14 percent were able to identify all symptoms of a

heart attack.<sup>14</sup> Research suggests that delays in seeking treatment for acute coronary and stroke symptoms limits effective treatment options.<sup>15</sup>

## Cancer

The first leading cause of death in North Carolina is cancer, which resulted in 17,476 deaths in 2009 (see **Table 1**). The state's 2009 age-adjusted death rate for cancer of 178.5 was higher than the national rate of 173.6 per 100,000 population in 2009.<sup>3,4</sup> The leading causes of cancer death in 2009 were trachea/bronchus/lung cancer (5,375 deaths), cancer of the colon, anus, and rectum (1,513 deaths), breast cancer (1,188 deaths), cancer of the pancreas (1,011 deaths), and prostate cancer (849 deaths).<sup>8</sup> Cancer deaths for 2009 by site are presented in **Chart 1**. According to North Carolina Central Cancer registry estimates, 40 percent of North Carolinians will develop cancer during their lifetime.<sup>16</sup> More than 51,000 North Carolinians are projected to receive a cancer diagnosis in 2011, which equates to approximately 141 new cases each day.<sup>17</sup> The latest cancer incidence data reveals an age-adjusted cancer incidence rate of 488.2 new cancer cases per 100,000 population in 2008. The age-adjusted cancer incidence rate for males of 564.2 is higher than the rate for females of 436.8. By race, the overall age-adjusted cancer incidence rate for white residents (484.7) is slightly higher than that of minorities (480.9).

**Chart 1.  
2009 North Carolina Cancer Deaths,  
Percentages by Sites**



Examining age-adjusted cancer incidence rates by race and sex reveals that minority males, with a rate of 593.6 per 100,000 population have the highest incidence rates and minority females have the lowest cancer incidence rate (406.3).<sup>18</sup>

Deaths from many cancers can be reduced if the cancer is diagnosed at an early stage. Breast, cervical, and colon/rectal cancer deaths, in particular, could be reduced with regular screening. North Carolinians have slightly higher cancer screening rates than the national averages. According to the North Carolina BRFSS survey, 67 percent of North Carolina adults over age 50 report ever having had a sigmoidoscopy or colonoscopy (compared to a U.S. rate of 62%). The percentage of North Carolina women age 18 and older who reported having had a

pap test within the past three years was 87 percent, compared with the United States rate of 83 percent. The percentage of women age 50 and over who reported having a mammogram within the past two years (82%) was slightly higher for North Carolina than for the United States as a whole (79%).<sup>19</sup>

### Chronic Lung Disease

Chronic lower respiratory diseases are the fourth leading cause of death in North Carolina, accounting for more than 4,300 deaths in 2009 (see **Table 1**). North Carolina had a higher age-adjusted death rate due to chronic lung diseases in 2009—45.4 per 100,000 population compared with a rate of 42.2 nationally in 2009.<sup>3,4</sup> Age-adjusted chronic lung disease death rates for 2005–2009 were highest among North Carolina’s non-Hispanic whites (51.2 per

100,000 population). Hispanics had the lowest age-adjusted death rates from chronic lung diseases (10.7).<sup>20</sup> During the period 2005–2009, North Carolina males had a much higher age-adjusted death rate from chronic lung diseases (57.1 per 100,000 population) than females (41.0).<sup>21</sup>

In 2009, approximately 6 percent of North Carolina adults reported that they had been diagnosed with chronic obstructive pulmonary disease (COPD), emphysema, or chronic bronchitis. Chronic respiratory diseases were more frequently reported among respondents with a disability, veterans, the elderly, and those with lower incomes and lower levels of education. Among respondents reporting a chronic respiratory disease, more than one in 10 (13.8%) reported that they had an overnight hospital stay related to shortness of breath, COPD, or an emphysema flare in the past year. Additionally, another 8 percent of North Carolina adults reported that they currently had asthma in 2009.<sup>14</sup>

### Diabetes

Diabetes is a major cause of death and disability in North Carolina and the nation. With a greater prevalence of obesity and an increasing elderly population, diabetes is approaching epidemic proportions in North Carolina. According to the BRFSS survey, the prevalence of diagnosed diabetes in North Carolina increased from 6.4 percent of the adult population in 1998 to 9.6 percent in 2009, an increase of 50 percent in the last decade. An additional 7 percent of North Carolina respondents indicated that they had been diagnosed with borderline or pre-diabetes.<sup>14,19</sup> The

actual prevalence may be twice as high given that it is estimated that there is one undiagnosed case of diabetes for every 2.7 cases that are diagnosed.<sup>22</sup> In 2009, 38.6 percent of North Carolina adults responding to the BRFSS survey indicated that they had not had a blood test for diabetes within the last three years.<sup>14</sup>

In 2009, diabetes was the seventh leading cause of death in North Carolina and was listed as the primary cause of more than 2,100 deaths. North Carolina's 2009 age-adjusted diabetes death rate of 21.6 per 100,000 population is slightly higher than the 20.9 rate found nationally in 2009.<sup>3,4</sup> Diabetes also significantly contributes to other causes of death, such as heart disease, stroke, and kidney failure. In 2009, 6,567 additional North Carolinians died with diabetes mentioned on the death certificate as a contributing condition. In total, more than one in 10 North Carolina resident deaths in 2009 (11.3%) had diabetes mentioned as an underlying or contributing cause of death.<sup>8</sup>

Diabetes is the leading cause of non-traumatic lower limb amputation, kidney disease, and blindness in

the state. In addition, people with diabetes are two to four times more likely to develop cardiovascular disease.<sup>23</sup> As presented in **Table 2**, diabetes was directly responsible for over 16,600 hospitalizations in North Carolina in 2009, and contributed to or complicated a total of 190,442 hospitalizations. Diabetes was mentioned as a contributing condition in nearly one out of every five hospitalizations in 2009 (18%). The total hospital charges in 2009 for hospitalizations involving any diagnosis of diabetes were more than \$4.4 billion. In addition, 2009 North Carolina hospital discharge data reveal that diabetes was associated with 9,075 hospitalizations involving renal dialysis or transplant and 2,468 discharges involving lower limb amputation.<sup>9</sup>

### Kidney Disease

Kidney disease has consistently ranked among the leading causes of death in North Carolina since mortality records have been maintained in the state.<sup>24</sup> While some cases of kidney disease appear at birth, most occur as a result of long-standing chronic illness or acute

health conditions that decrease or damage the kidney's ability to filter waste from the body. Regardless of cause, if detected early, kidney failure can often be avoided.<sup>25</sup>

According to the NC BRFSS, approximately 2 percent of North Carolina adults report that they have been told by a doctor that they have kidney disease. Reported prevalence of kidney disease increases with age. Among respondents over the age of 65, 3.6 percent reported being diagnosed with kidney disease.<sup>14</sup> Chronic kidney disease is frequently associated with other chronic health conditions such as high blood pressure, high cholesterol, and diabetes.<sup>26</sup> Among NC BRFSS respondents with a history of cardiovascular disease (CVD) or diabetes, 6.2 percent reported kidney disease, compared with 1.5 percent of those without CVD or diabetes. Among adults reporting diabetes, the rate of kidney disease was 5.9 percent, compared to 1.5 percent of those without diabetes.<sup>14</sup> Kidney disease consistently ranks among the 10 leading causes of death in North Carolina. In 2009, kidney disease resulted in 1,827 resident

**Table 2.**  
**2009 North Carolina Resident Hospital Discharges Related to Diabetes**

	Total Discharges	Total Charges	Average Charge	Average Length of Stay
Principal Diagnosis of Diabetes	16,665	\$318,709,157	\$19,127	4.7
Any Diagnosis of Diabetes	190,442	\$4,484,236,889	\$23,550	4.7
Lower Limb Amputation	2,468	\$100,834,453	\$40,857	9.7
Cardiovascular disease and diabetes	41,833	\$1,234,930,437	\$29,523	4.2
Renal dialysis/transplant and diabetes	9,075	\$277,688,008	\$30,599	6.3

\* Note: Provisional 2009 North Carolina Hospital Discharges Files were used.

deaths and was the eighth leading causes of death in the state.<sup>8</sup> North Carolina's 2009 age-adjusted kidney disease death rate of 19.1 per 100,000 population was higher than the national rate of 14.8 in 2009.<sup>3,4</sup> The majority of kidney disease deaths occur among the elderly, with 80 percent of all deaths occurring to residents over age 65.<sup>3</sup>

The Network VI Southeastern Kidney Council collects and reports statistics on patients with irreversible kidney failure, known as end-stage renal/kidney disease (ESRD), receiving dialysis treatments in Georgia, North Carolina, and South Carolina.

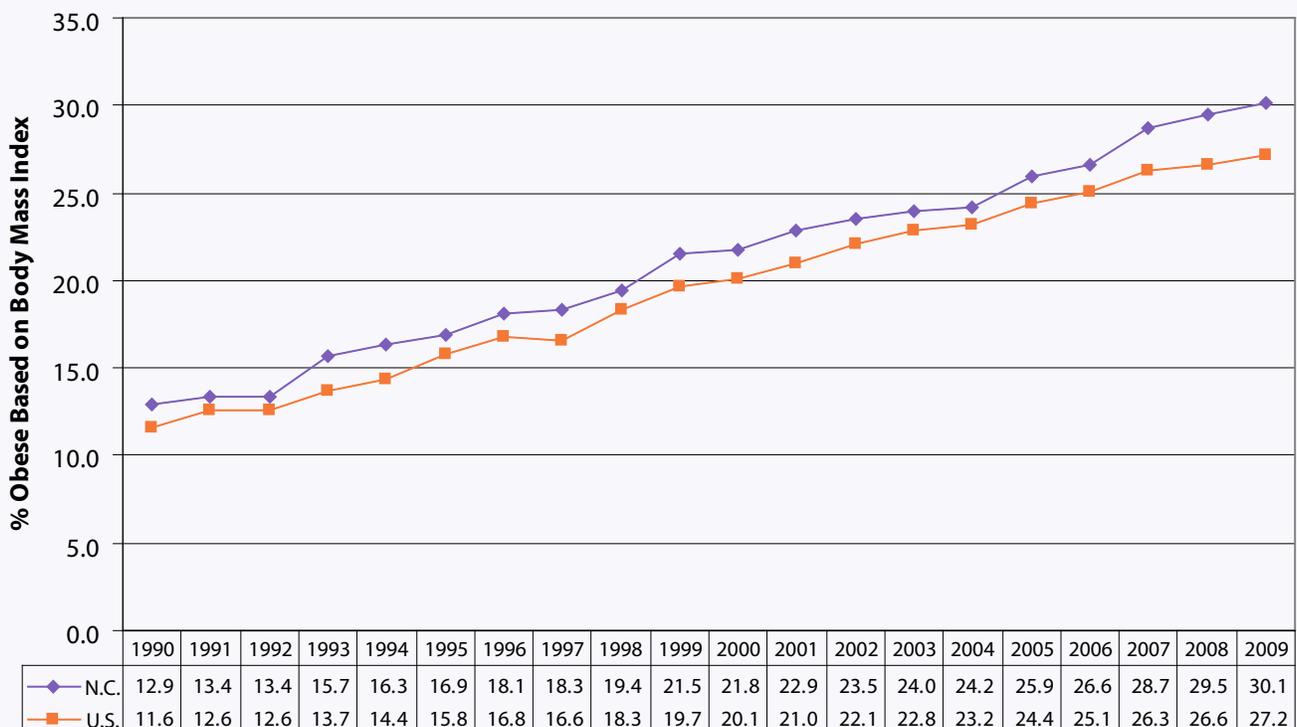
According to the Council, there were 3,442 residents of North Carolina newly diagnosed with end-stage-kidney disease in 2009. Most (78%) were diagnosed after age 50. Among patients newly diagnosed with kidney disease, the most common diagnoses associated with it were diabetes (46%) and hypertension (27%). In total, there are currently 13,721 North Carolina residents living with ESRD and on dialysis. Among those living with ESRD and receiving dialysis treatment, the majority are African American (63%) and 34 percent are white. In 2009, there were a total of 539 kidney transplant operations performed on North Carolina

residents and a total of 2,418 patients were awaiting a kidney transplant.<sup>27</sup>

### Overweight/Obesity

Overweight and obese individuals are at increased risk for a host of physical ailments including hypertension, Type II diabetes, coronary heart disease, stroke, osteoarthritis, respiratory problems, and some types of cancer.<sup>28</sup> The percentage of North Carolina adults who are obese has doubled from approximately 13 percent in 1990 to 30 percent of the population in 2009. North Carolina's obesity rate consistently remains slightly higher than the national

**Chart 2.**  
**1990–2009 Prevalence of Obesity,**  
**North Carolina and United States**



Source: 1990–2009 Behavioral Risk Factor Surveillance System (BRFSS)



average, with the 12<sup>th</sup> highest obesity rate in the U.S. **Chart 2** presents obesity percentages from 1990 through 2009 for North Carolina and the nation.<sup>19</sup> The rate of obesity among North Carolina African Americans (43.2%) is significantly higher than that of whites (27.5%). By age, the highest rates of obesity (34%) occurred among residents between the ages of 45 and 64. In all, more than six in 10 North Carolina BRFSS survey respondents (65%) indicated that they were overweight or obese based on their body mass

index (calculated from reported height and weight) in 2009.<sup>14</sup> Behavioral risk factors for obesity and overweight include physical inactivity and eating unhealthy foods.<sup>29</sup> According to BRFSS, only 21 percent of North Carolina adults report consuming five or more servings of fruits and vegetables daily and more than half of adults (54%) do not meet current physical activity recommendations.<sup>14</sup>

According to America's Health Rankings, North Carolina's obesity-

related healthcare costs are estimated to be an average of \$4.3 billion by 2013. This equates to an average per capita cost of \$620 annually.<sup>30</sup> According to the researchers, the state could save billions of dollars a year if adults were to lose weight and adopt healthier lifestyles.<sup>31</sup> If current trends continue, it is projected that approximately half of all U.S. adults could be obese by 2030.<sup>32</sup>



# INFANT, CHILD, AND ADOLESCENT HEALTH

## Child and Infant Mortality

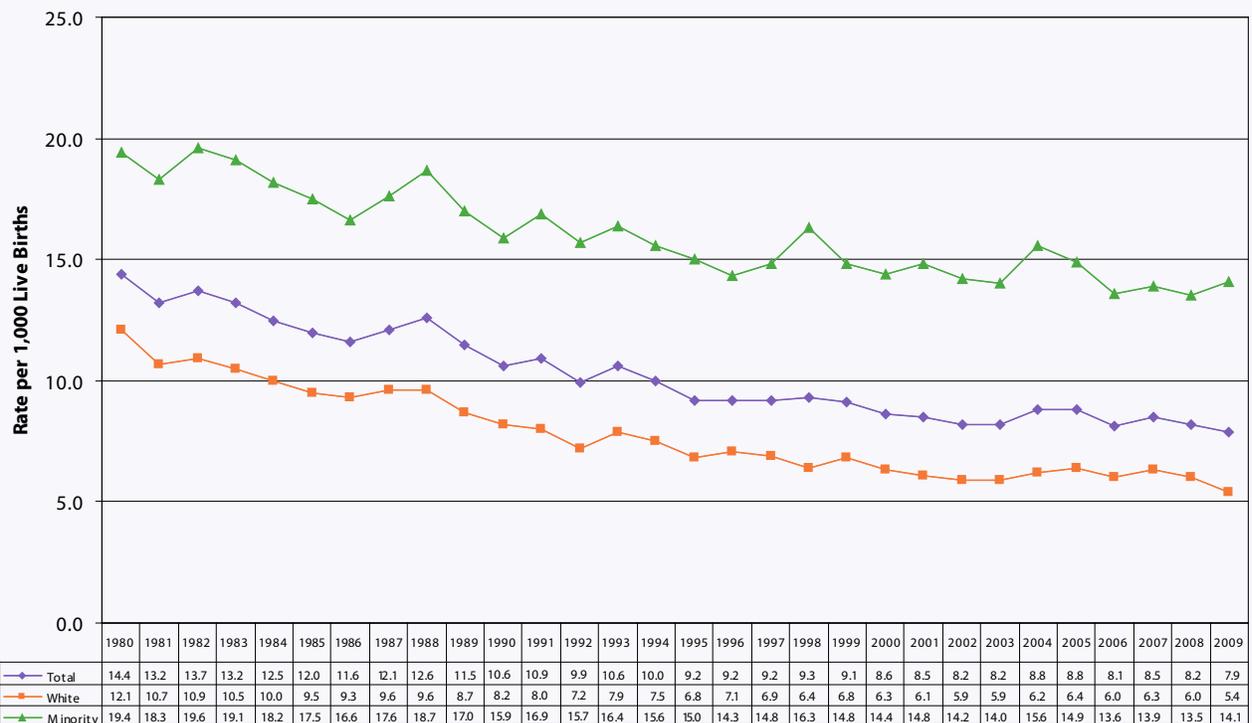
The rate of child deaths (ages birth–17 years) in North Carolina has decreased significantly since 1990. In 1990, the child death rate was 105.2 deaths per 100,000 children, and by 2009 the rate had declined to 67.0.<sup>33</sup> Much of this decline can be attributed to a substantial reduction in infant mortality. As shown in **Chart 3**, the infant mortality rate in North Carolina has declined from 14.4 infant deaths per 1,000 live births in 1980 to 7.9 in 2009—a reduction of 45 percent.<sup>34</sup> Yet, despite this

progress, North Carolina’s infant mortality rate remains one of the highest in the country. According to the America’s Health Rankings 2010 report, North Carolina ranked among the 10 worst in the nation for infant mortality, with a rank of 44<sup>th</sup>.<sup>35</sup> In addition, the gap between minority and white infant mortality is increasing in North Carolina. In 1980, minorities had an infant mortality rate 1.6 times higher than whites. In 2009, the white infant mortality rate was 5.4 per 1,000 live births, compared with a minority rate

of 14.1; giving minorities a 2.6 times higher infant mortality rate.<sup>34</sup>

Some birth-related measures appear to be improving. During 1987–1991, the percentage of women receiving late or no prenatal care was 24 percent. By 2005–2009, this percentage was down to 17 percent. The percentage of women who reported smoking during pregnancy has also declined. During 1988–1991, approximately one in five births in North Carolina (21%) involved a mother who had smoked during

**Chart 3.**  
North Carolina Resident Infant Mortality Rates, 1980–2009



pregnancy, compared with 11 percent during 2005–2009. Unfortunately, in recent years, other birth outcome measures appear to be headed in the wrong direction. In 2005–2009, the percentage of North Carolina births classified as low birth weight (weighing less than 2,500 grams) was 9.1 compared with 8.1 in 1987–1991.<sup>36,20</sup>

### Identifying Infants with Special Health Care Needs

Infants with special health care needs who are diagnosed early and have early treatment have markedly better outcomes than children who are diagnosed later in infancy or childhood. The state has three programs for identifying infants with special needs: newborn metabolic screening, newborn hearing screening, and birth defects monitoring.

North Carolina has been a pioneer in the screening of newborns. In 1967, North Carolina first initiated a public health screening program for newborns. Every day, the State Laboratory for Public Health collects blood specimens from all newborns and screens them for more than 30 metabolic and genetic disorders. Metabolic disorders are genetic defects that impair the way foods are digested or absorbed. Symptoms of metabolic abnormalities are often subtle, but without proper diagnosis the disorders can result in mental retardation or even death. If an abnormality is found, the lab notifies the hospital and the hospital can then direct the parents to the appropriate doctors for treatment. With appropriate treatment these children can grow and live a long and healthy

life. In 2009, 126,278 newborns were screened and 250 newborns with metabolic disorders were identified.<sup>37</sup>

All North Carolina birthing facilities are now participating in Universal Newborn Hearing Screening. In calendar year 2009, 99.2 percent of infants born in North Carolina received a newborn hearing screening. Infants who do not receive hearing screening prior to discharge, who are not born in birthing facilities, or who require additional screening are identified so that screening services can be provided within 30 days of birth. In 2009, 199 infants were reported to the Newborn Screening program with confirmed hearing loss. Also, 194 infants were referred to the Early Intervention Program for Children who are Deaf or Hard of Hearing (EIDHH); 107 of these were infants under 6 months of age.<sup>38</sup>

In 1995, the North Carolina General Assembly passed legislation creating the North Carolina Birth Defects Monitoring Program (NCBDMP). With funds from the state, the March of Dimes, and the Centers for Disease Control and Prevention (CDC), this legislation provides for trained NCBDMP staff to access and review hospital medical records and discharge reports to ensure more complete, accurate, and timely information for active birth defects surveillance. Each year, NCBDMP staff investigates over 4,000 North Carolina resident infants with birth defects such as neural tube defects (approximately 100 cases per year), cleft lip and palate (200 cases per year), cardiovascular defects (1,500 cases per year), and chromosomal defects (200 cases per year). Many

of the state's infant deaths can be attributed to birth defects. About 30 percent of infants that die within the first year of life had a diagnosed birth defect. Some of these birth defects can be detected through prenatal testing, ultrasound, amniocentesis, and genetic testing. The NCBDMP is a collaborator on the North Carolina Center for Birth Defects Research and Prevention which, along with eight other study sites, is participating in the National Birth Defects Prevention Study (NBDPS). The NBDPS is a CDC-sponsored nationwide effort to determine the causes of birth defects.<sup>39</sup>

### Early Intervention

Early Intervention is a system of services designed to support children ages birth through 5 years who have or are at risk for disabilities. The North Carolina Infant-Toddler Program (ITP) provides services for children from birth to three years of age and their families. Parents/caregivers, physicians and others can refer a child to the ITP if there are concerns about the child's development. In state fiscal year (SFY) 2008–09, 19,662 referrals were made to this program and 17,606 children (4.4 percent of the population) were enrolled in the program. The average age of the child at the time of referral to the Infant-Toddler program was 16 months. The state lead agency for the North Carolina Infant Toddler Program is the Department of Health and Human Services through the Division of Public Health, Early Intervention Branch.<sup>40</sup>

The 18 Children's Developmental Services Agencies (CDSAs) of the Early Intervention Branch are the



local lead agencies for the North Carolina Infant Toddler Program. Anyone can refer children to the CDSA network and access the Infant Toddler Program, which is available in all 100 counties in North Carolina. When a child is referred for early intervention, the family of the child is contacted. Families receive a brief description of the program at this contact, and are offered an initial evaluation of the child. Some families decline the program and the initial evaluation. If the family decides to pursue eligibility and enrollment of their child, the early intervention program must evaluate the child, offer enrollment if the child is eligible, and develop an initial service plan within 45 calendar days from the date of referral. Services are also authorized by the CDSAs to be provided by appropriately qualified community based early intervention service providers.<sup>40</sup>

The Child Service Coordination (CSC) program is an additional program available through local health departments. Children

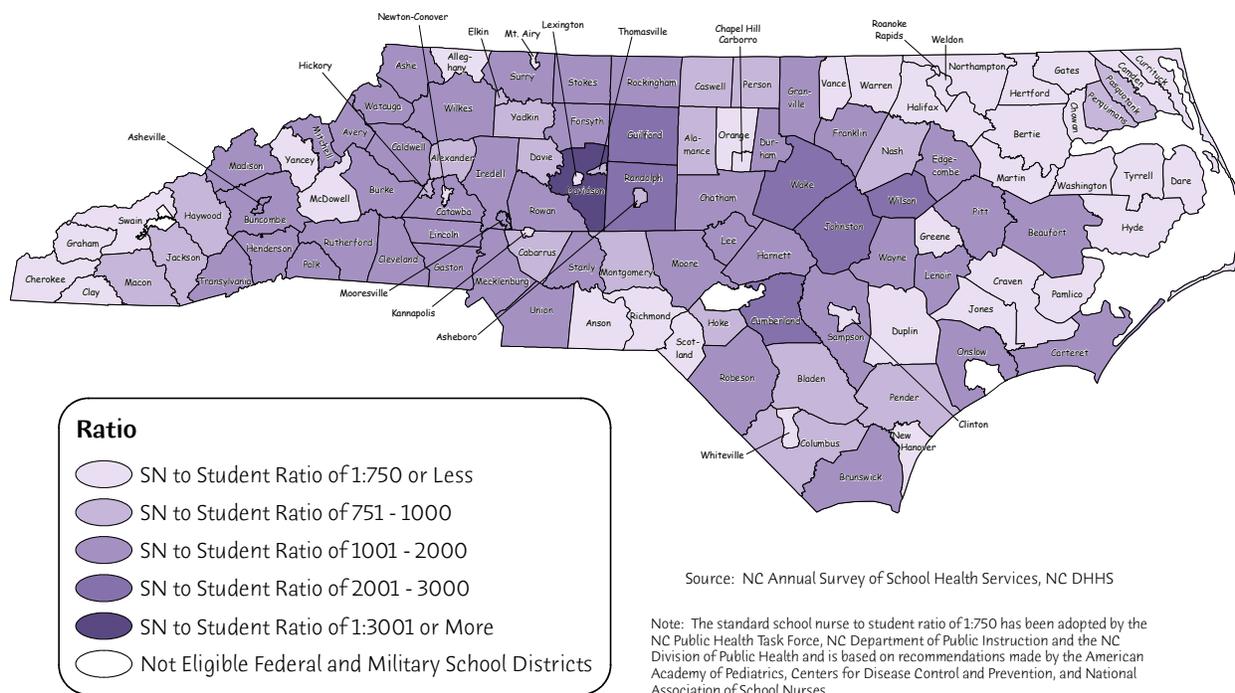
birth to age 3 who are at risk for developmental delay or disability, long-term illness and/or social, emotional disorders and children ages 3 to 5 who have been diagnosed with developmental delay or disability, long-term illness and/or social, emotional disorder are eligible for the program. CSC works with families to obtain necessary preventive, specialized, and support services. The CSC program served 27,000 children under the age of 5 years during state fiscal year 2009 and delivered 529,041 services.<sup>41</sup> Beginning in March of 2011, the CSC program transitioned to a new service program called “Care Coordination for Children” (CC4C). In addition to the community-based interventions for children to maximize health outcomes, the CC4C program will target the highest risk and highest cost children for care management.<sup>42</sup>

### School Health

The number of North Carolina public school students who have

chronic health conditions is on the rise. According to the School Health Services Report, a total of 240,528 public school students (17%) were identified as having chronic health conditions in school year 2008–2009, compared with just 8 percent in 1998–1999. Asthma, Attention Deficit/Hyperactivity Disorder, and severe allergies were among the most common chronic conditions reported. Approximately 2 percent of the total student population (29,814 students) received daily medications at school in 2008–2009. Since 1999, the number of students receiving daily medications has declined almost 50 percent, while more students are now receiving longer-acting, intermittent medications. In 2008–09, 3.5 percent of students (49,456 students) received intermittent (non-daily) medications at school. In addition to oversight of medications, school nurses also reported performing a variety of health care procedures including Epi-pens, glucagon injections, nebulizer treatments, rectal diazepam (for seizures), tube feedings, bladder catheterizations, shunt care, and stoma care. During school year 2008–09, 20,932 injuries were reported which required emergency response or immediate care by a physician or dentist and loss of a half day or more of school. The most common injuries reported include sprains/strains (24%), fractures (12%), lacerations (11%), head injuries (10%), and respiratory emergencies (8%). Among the serious injuries, 27 percent occurred on the playground, 27 percent happened during physical education class, 25 percent took place in the classroom, and the remainder occurred in other school areas such as the hallways, restrooms, or lunchrooms.<sup>43</sup>

## Chart 4. School Nurse/Student Ratio SFY 2009-2010



Source: NC Annual Survey of School Health Services, NC DHHS

Note: The standard school nurse to student ratio of 1:750 has been adopted by the NC Public Health Task Force, NC Department of Public Instruction and the NC Division of Public Health and is based on recommendations made by the American Academy of Pediatrics, Centers for Disease Control and Prevention, and National Association of School Nurses.



A one to 750 nurse-to-student ratio was a Healthy People 2010 objective for the United States. As a result, in 2003 the North Carolina General Assembly Special Provision Budget Bill created a plan to expand school nurse services to help the state reach the 1:750 school nurse ratio by 2014. The 2004 House Bill 1414 resulted in 80 new permanent school nurse positions and 65 two-year positions to be allocated based on need throughout the state. The 2006 budget made the 65 time-limited school nurse positions permanent. Overall, at the end of school year 2009–10, the state had 1,183 fulltime equivalent (FTE) school nurses employed in

North Carolina public schools. The number of school districts meeting the one to 750 nurse-to-student ratio at the end of 2009–2010 was 41 (out of a total of 115 school districts) and the overall average school nurse-to-student ratio in North Carolina has increased from 1:2047 (2001–2002) to 1:1185 (2009–2010).<sup>44</sup> **Chart 4** presents a map with FY 2009–2010 school nurse-to-student ratios by school district.

### Chronic Diseases of Childhood

The Child Health Assessment and Monitoring Program (CHAMP)

survey was developed by the State Center for Health Statistics in the fall of 2004 and implemented in 2005. CHAMP is the first survey of its kind in North Carolina to measure the health characteristics of children ages birth to 17. Eligible children for the CHAMP survey are drawn each month from the BRFSS telephone survey of adults, ages 18 and older. All adult respondents with children living in their households are invited to participate in the CHAMP survey. CHAMP serves as a comprehensive resource for assessing chronic disease prevalence among children in North Carolina.<sup>45</sup>

## Asthma

Asthma is one of the most prevalent chronic diseases in our state, particularly among children. According to the School Health Services Report, a total of 75,576, or approximately 6 percent of North Carolina public school students, were reported to have asthma in 2008–2009. This represents a decrease of 10,861 students over the prior school year.<sup>43</sup> The 2009 CHAMP survey shows that 15.5 percent of parents reported that a doctor had ever diagnosed their child with asthma and 10.1 percent of parents reported that their child currently had asthma. Of those who reported that their child had asthma, nearly one in four (23.3%) reported

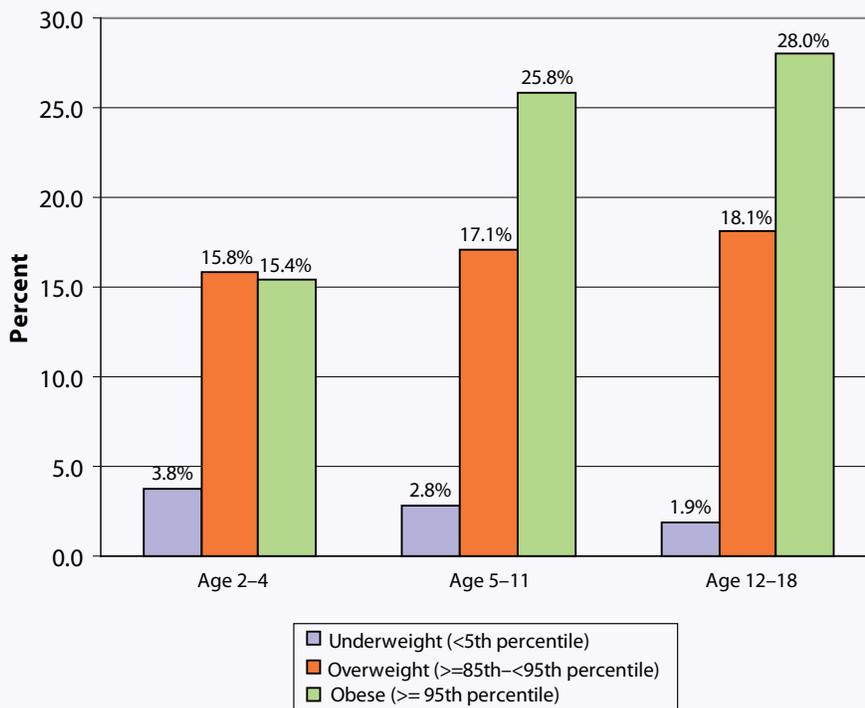
that their child had to visit a hospital emergency room or urgent care clinic in the last year because of their asthma and one in five (19.6%) reported that their child had missed one or more weeks of school or day care in the last year due to asthma. Almost half (44.6%) of children with asthma had never received an asthma management plan from a doctor or health professional.<sup>45</sup>

## Overweight

In many ways, children mirror the behaviors of their parents. Like adults, a high percentage of North Carolina children are overweight. The North Carolina Nutrition and Physical Activity Surveillance

System (NC-NPASS) maintains a repository of data collected on children seen in North Carolina Public Health sponsored Women, Infants, and Children (WIC) nutrition programs, child health clinics, and some school-based health centers. As shown in **Chart 5**, 2009 NC-NPASS data shows that 15 percent of children ages 2–4, 26 percent of children ages 5–11 and 28 percent of children ages 12–18 were obese based on their Body Mass Index (BMI). Further, an additional 15 to 18 percent more children in each age group were overweight based on their BMI-for-age.<sup>46</sup> According to the 2009 Youth Risk Behavior Survey (YRBS), 13.4 percent of all high school students

**Chart 5.**  
**Body Mass Index for Age Percentiles by Age Group,**  
**North Carolina Nutrition and Physical Activity**  
**Surveillance System (NC-NPASS) Data 2009**



have a BMI that places them in the obese category and another 15 percent are overweight based on their current BMI.<sup>47</sup>

High rates of overweight may be attributed to physical inactivity and poor nutritional habits among North Carolina youth. In the 2009 CHAMP survey, three-quarters of North Carolina parents who were surveyed (75%) reported that their child does not typically consume the recommended five or more servings of fruits and vegetables each day. In addition, one in three parents (32.9%) reported in 2009 that their child eats fast food two or more times per week. Sedentary lifestyles can contribute to obesity among North Carolina's children. According to the 2009 CHAMP survey, most parents report that their child is physically active. Over half of parents (52%) report that, on average, their child spends one to two hours per day on physically active play; with 38 percent reporting that they spend more than two hours per day. However, almost half (46%) of parents reported that their child watches more than two hours of television on a typical day.<sup>45</sup>

Schools can be another catalyst for teaching children the benefits of physical fitness and nutrition. In the last few years, new plans have been initiated to help reduce the rates of childhood obesity in the state through transformations in the school system. Since 2004, North Carolina's Division of Public Health and Department of Public Instruction have collaborated to produce reports outlining recommended standards for both physical activity and nutrition in schools. In 2005, they published

“Move More School Standards.”

To meet the “superior” standard for physical activity, schools must provide more than the minimum 30 minutes each day of physical activity that is now required by the Healthy Active Children policy adopted by the N.C. State Board of Education in April 2005.<sup>48</sup>

In recent years, more attention has been directed towards regulating nutrition standards in North Carolina's public schools. The Youth Risk Behavior Survey (YRBS) shows that 41 percent of middle school students and 47 percent of high school students reported that they bought food and/or drinks from vending machines at school one or more times a week in 2007.<sup>49</sup> According to the CDC's School Health Profiles report, more than a third of North Carolina secondary schools (39.1%) do not allow students to purchase candy, high fat snacks, soda, sports drinks, non-fruit-based drinks, or high fat milk from vending machines or at the school store or snack bar.<sup>50</sup> In an effort to improve health and reduce childhood obesity, the United States Department of Agriculture (USDA) released upgraded nutritional standards for school meals in 2010. The standards include adding more fruits, vegetables, whole grains, fat-free and low-fat milk to school meals. The new guidelines would also restrict the levels of saturated fat, sodium, calories, and trans fats in meals offered at school.<sup>51</sup>

### *Diabetes*

Diabetes is a chronic disease that is projected to become increasingly common among North Carolina

children in the future due to high rates of overweight. The CDC predicts that one in three children will develop diabetes in his or her lifetime.<sup>52</sup> According to the School Health Services Report, 3,407 North Carolina public school students had diagnosed Type I diabetes and another 1,177 had Type II diabetes in 2008–2009.<sup>43</sup> In 2002, North Carolina's Care for School Children With Diabetes Act was signed into law. This law helps ensure that diabetic students receive the care they need during the school day.<sup>53</sup> In school year 2008–2009, 3,548 North Carolina students monitored their blood glucose, 2,101 students received insulin injections, and 1,544 managed insulin pumps at school.<sup>43</sup>

### *Oral Health*

In school year 2008–2009, the state's Oral Health Section screened 96,303 kindergarten and 85,988 fifth grade children in the state. Among the kindergarten children screened, 17 percent had untreated dental decay. Among fifth graders who were screened, 4 percent were found to have untreated tooth decay.<sup>54</sup> For children at high risk for tooth decay, dental sealants can help prevent cavities from forming on teeth. According to the state's Oral Health program, from 1996 to 2009, the number of fifth-grade children with preventive dental sealants has increased from 21 percent to 44 percent. The goal in North Carolina is for 50 percent of fifth-grade children to have dental sealants.<sup>55</sup>

According to the 2009 CHAMP survey, almost one in five North Carolina parents (18.3%) reported

that their child did not have a regular dentist or dental clinic. Similarly, 18 percent of parents reported that it had been more than one year since their child had last seen a dentist. Of these, 12 percent reported that their child had never visited a dentist.<sup>45</sup>

### Health Insurance

According to 2009 North Carolina CHAMP survey data, 6.7 percent of parents reported that their child did not have health insurance at some point in the past 12 months. Among African American children, one in 10 (9.7%) reported a lack of health insurance sometime in the past year.<sup>45</sup> The Current Population Survey (CPS) of the U.S. Census Bureau estimates that 11 percent of North Carolina children ages birth to 18 did not have health insurance during 2008–2009.<sup>56</sup> For children living in poverty during 2008–2009, 19.5 percent were estimated to be without health insurance.<sup>57</sup> Children without health insurance are less likely to receive routine checkups and are more likely to seek care through emergency departments. The 2009 North Carolina CHAMP survey reports that among children without health insurance, more than one in three parents (37.3%) reported that they do not have someone they would consider as their child's personal doctor and 16 percent of children



without health insurance receive their sick care through the emergency department or urgent care.<sup>45</sup>

Medicaid coverage is available to children in some families in poverty. According to the Division of Medical Assistance, in 2009, more than half (59%) of all Medicaid recipients in the state were ages birth to 20 years.<sup>58</sup> Beginning in October 1998, families who made too much money to qualify for Medicaid but too little to afford rising health insurance premiums were able to get free or reduced price comprehensive health care for their children through the North Carolina Health Choice (NCHC) for Children program. NCHC is a fee-for-service program providing free or low-cost health insurance for children and teens up to their 19<sup>th</sup> birthday. The benefits

covered by NCHC are the same as coverage provided for the children of state employees and teachers, plus vision, hearing, dental, and special needs coverage.<sup>59</sup>

While many states were less successful in enrolling children in programs like Health Choice, North Carolina was one of several states that exceeded its projected enrollment goals during the first years of operation. As a result, Health Choice was forced to freeze enrollments in 2001 due to inadequate funding to meet the unanticipated need. After the program was reopened in late 2001, enrollment grew at more than 5 percent per month before enrollment had to be frozen again in 2002. The General Assembly appropriated additional non-recurring funds in order to avoid capping the program

again.<sup>60</sup> The program continued to increase by 1 percent to 3 percent per month and by September 2009, there were over 136,000 children enrolled in the program. From FY2008 to FY2009, membership in the program rose 7 percent. Almost six in 10 (58%) of Health Choice children are ages 6 to 12 years old, with 41 percent ages 13 to 18 years. In fiscal year 2009, nearly half (48%) of Health Choice members were white, a third (32%) were African American, and 11 percent were Hispanic.<sup>61</sup>

Because outreach for both the Health Choice and Medicaid programs target the same populations and the application forms for Medicaid and Health Choice can be combined in one form, significantly more children

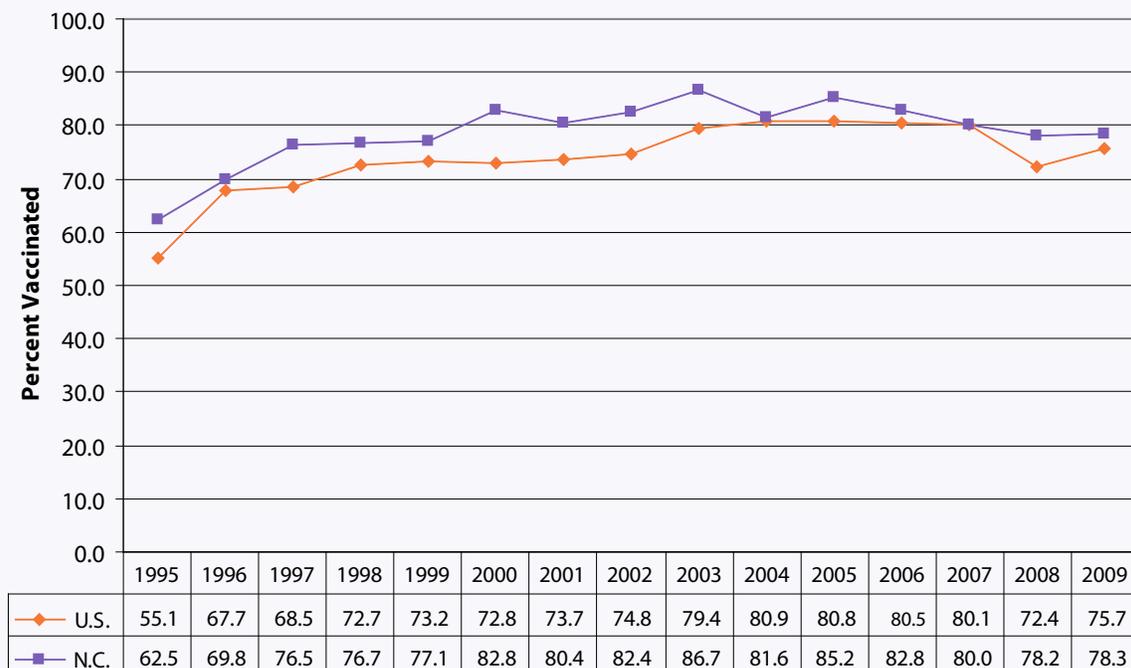
have also been added to the state's Medicaid program since 1998. In 2006, the General Assembly passed legislation requiring NCHC children between the ages of 5 and 18 years be linked to a primary care provider or "medical home" through the Community Care of North Carolina (CCNC) program. By February 2011, more than 122,000 NCHC children (90%) were linked with a CCNC provider. It is hoped that having a stable, consistent primary care provider will reduce inappropriate utilization of healthcare services.<sup>62</sup>

### Immunization

North Carolina has made a concerted effort to ensure that all children receive age-appropriate

immunizations. As shown in **Chart 6**, an estimated 78.3 percent of children ages 19–35 months were appropriately immunized in 2009, which was above the national average of 75.7 percent.<sup>63</sup> Unfortunately, in recent years, the United States has begun to see a return of both children and adults falling ill from immunizable conditions such as measles and whooping cough. Complications from these conditions can be severe for children—resulting in hospitalization, disability, and even death. Many recent cases have been associated with parents intentionally rejecting vaccines out of religious beliefs or concerns that some immunizations might be linked to autism and other disorders.<sup>64</sup> In 2011, a controversial 1998 British

**Chart 6.**  
**Estimated Vaccination Coverage Among Children**  
**19–35 Months of Age: 1995–2009\***



\*1995-2008=4:3:1:3:3; 2009=4:3:1:3:3:1-5

study which attempted to link autism disorders with childhood vaccines was discredited as fraudulent.<sup>65</sup> Public health officials will continue to monitor trends in vaccination rates to determine if childhood immunization rates improve following this finding.

From 1994–2010, North Carolina children were eligible to receive all vaccines required to enter the public school system at no cost through the North Carolina Immunization Program (NCIP). Through this program, vaccines were purchased by the state and distributed to providers at no charge. Providers could not charge their patients for the vaccine, regardless of insurance status. For eligible low-income children, federal “Vaccines for Children” (VFC) program funds covered these vaccine costs, while the state supported the vaccine costs for all other children.<sup>66</sup> Since the state’s universal, free vaccine program began in 1994, the vaccination rate among 2-year-olds increased by more than 30 percent.<sup>63</sup> Beginning July of 2010, state funding for vaccines was phased out for children with health insurance. Now only those children who are eligible for the federally-funded program will receive vaccinations free of charge.<sup>66</sup>

To facilitate better reporting and surveillance of childhood immunizations, the Division of Public Health continues to expand the North Carolina Immunization Registry (NCIR). The electronic registry is designed to have a single consolidated immunization record for each child in the state, regardless of



how many immunization providers have seen the child. This system allows providers to look up the immunization status of a child and determine what additional immunizations may be needed. It also provides quick access in the event of an outbreak, vaccine recall, or other situation that requires rapid identification of immunizations administered. Currently, all local public health departments are participating in the North Carolina Immunization Registry. In addition, more than 600 private medical providers are participating. Overall, 50 percent of all immunization providers have fully implemented the system.<sup>67</sup>

### Child Abuse and Neglect

In 2009, the North Carolina Division of Social Services reported that 125,665 children received assessments for child abuse and neglect. Of those cases, a total of 10,961 children were found to have

substantiated cases, 25,590 were recommended for services, and 5.6 percent of cases represented a recurrence of maltreatment.<sup>68</sup> If warranted, social workers are able to immediately engage families to ensure the safety of the child. Under the Multiple Response System, the Division of Social Services employs practices such as child and family teams, more coordination with law enforcement, and a “family assessment” to replace investigations when children are obviously not in imminent danger. These pilot programs help some families to receive needed services, even if child abuse or neglect is not substantiated.<sup>69</sup>

In 2009, 17 North Carolina children died as a result of homicide by a parent or caregiver—a decrease from 33 child abuse deaths confirmed in 2008. According to the North Carolina Child Fatality Prevention Team, 76 percent of child abuse deaths occurred to children ages 4



Among youth ages 10–17, suicide was the second leading cause of death in 2009, resulting in 35 deaths.<sup>3</sup> According to the 2009 North Carolina Youth Risk Behavior Survey (NC YRBS), more than one in 10 high school students (13.2%) reported that they had seriously considered attempting suicide in the past 12 months. Female high school students were more likely to report suicidal feelings (16.1%) compared with males (10.3%). Among middle school students, nearly one in five (19.2%) reported that they had seriously considered killing themselves. Again, female middle school students were more likely to have suicidal thoughts, with about one in five (22.4%) reporting

and under and more than half were a result of abusive trauma to the head (65%).<sup>70</sup>

### Unintentional Injuries and Suicide

According to North Carolina resident death certificates, unintentional injuries resulted in a total of 206 deaths to children ages 0–17 in 2009. More than half of these deaths (55%) involved motor vehicle injuries.<sup>33</sup> Research shows that children who are restrained in a seatbelt or properly installed child safety seat are less likely to die or be injured in a car accident.<sup>71</sup>

The 2009 North Carolina CHAMP survey reveals that 5 percent of parents of children ages 8 years and over report that their child does not always wear a seatbelt when they ride in a vehicle. Among parents of children ages 7 years and under, 6 percent report that their child does not always ride in a child safety seat.<sup>45</sup> Other causes of unintentional injury deaths among youth include drowning (14%), poisonings (7%), and fire (4%).<sup>33</sup> According to the 2009 CHAMP survey, approximately 10 percent of parents report that their child was injured in the past year to the extent that they missed one or more days of school.<sup>45</sup>

that they seriously considered killing themselves, compared with 16 percent of males.<sup>47</sup> The North Carolina School Health Services Report reveals that there were a total of 422 suicide attempts known or reported to the public school system and 15 deaths from suicide reported in school year 2008–2009. Most of the reported suicide attempts (70%) and suicides (93%) occurred among high school students.<sup>43</sup>

### Sexual Activity and Teen Pregnancy

According to the 2009 CHAMP survey, approximately 17 percent of parents of adolescents ages 14–17

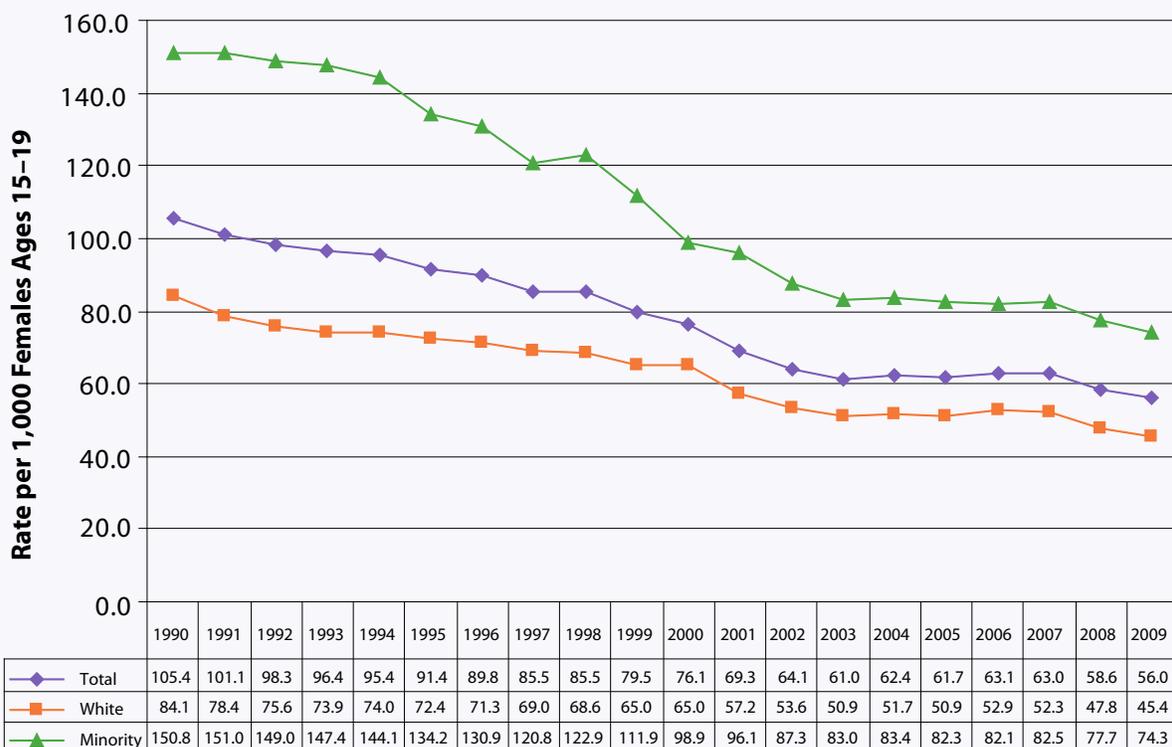
believe that their child is sexually active.<sup>45</sup> However, according to the 2009 North Carolina Youth Risk Behavior Survey (YRBS), over half (51.1%) of high school students report having had sexual intercourse, with 7.5 percent reporting their first sexual intercourse occurred before age 13. Additionally, 16 percent of students reported that they had sexual intercourse with four or more people in their life. Approximately one in five (19.3%) of the students who had sex during the past three months reported that they drank alcohol and/or used drugs prior to their last sexual experience.<sup>47</sup>

Multiple sexual partners and drug and alcohol use are known to place individuals at risk of contracting sexually transmitted diseases.<sup>72,73</sup> The North Carolina HIV/STD Prevention and Care Branch annual report reveals that among North Carolina youth ages 13–19, there were 88 newly reported cases of HIV disease, and among youth ages 10–19 there were 16,168 cases of chlamydia, 4,288 cases of gonorrhea, and 42 cases of syphilis reported to the state in 2009.<sup>74</sup> According to the CHAMP survey, more than one in 10 North Carolina parents of children ages 12 and older (13.5%) have not discussed

information with their child regarding reducing the chances of getting HIV or sexually transmitted diseases (STDs).<sup>45</sup>

As shown in **Chart 7**, North Carolina’s teen pregnancy rates have declined substantially (47%) since 1990. In 1990, there were 105.4 pregnancies per 1,000 girls ages 15 to 19. In 2009, the teen pregnancy rate was 56.0 per 1,000 girls ages 15–19. Of the more than 18,000 reported North Carolina resident teen pregnancies in 2009, 78 percent resulted in live births, 22 percent resulted in abortions, and approximately 1 percent

**Chart 7.**  
**1990–2009 North Carolina Resident Teen Pregnancy Rates, Ages 15–19**



resulted in fetal deaths. Racial disparities in white and minority teen pregnancy rates persist, but are showing signs of narrowing. Minority teen pregnancy rates have fallen dramatically since 1990, with a rate of 74.3 per 1,000 in 2009, compared with a white rate

of 45.4.<sup>75</sup> According to the School Health Services Report, there were 4,660 known pregnancies occurring among North Carolina public school students in 2008–2009, representing a 5 percent decrease from 2007–2008 figures.<sup>43</sup> The vast majority of teen pregnancies

are unintended. Figures from the North Carolina Pregnancy Risk Assessment Monitoring System (NC PRAMS) survey reveal that, among new mothers under age 20, approximately seven in 10 (70.3%) reported that their pregnancy was unintended.<sup>76</sup>



# MENTAL HEALTH AND SUBSTANCE ABUSE

The problems that North Carolina faces with regard to mental health are difficult to document due to inadequate data on the prevalence of specific mental disorders. In 2009, 4,098 North Carolinians who died had a mental health or substance abuse diagnosis listed as the underlying cause of death. These figures included 3,480 deaths attributed to unspecified dementia (not including Alzheimer's, which is classified as a disease of the nervous system) and 184 deaths attributed to the use of alcohol (not including accidental alcohol overdose).<sup>77</sup> According to National Survey on Drug Use and Health (NSDUH) estimates, 7.5 percent of North Carolinians ages 18 and older reported illicit drug use in the past month, with 6 percent reporting marijuana use in the past month, 3 percent reporting cocaine use and 4 percent reporting non-medical use of pain relievers in the past year. Alcohol use was more widespread, with approximately half (49%) reporting alcohol consumption in the past month and nearly one in four (23%) reporting binge alcohol use (five or more drinks on one occasion) in the past month. Alcohol dependence or abuse was reported by 7 percent of respondents.<sup>78</sup>

The North Carolina BRFSS telephone survey also asks general questions related to mental health, alcohol, and substance use. In 2009, nearly one in three North Carolina adults who

responded to this survey (33.7%) reported that there were one or more days during the past month when their mental health was not good (due to stress, depression, or emotional problems). More women than men reported mental health disturbances, with 39.4 percent of female adults reporting that their mental health was not good, compared to 27.5 percent of males. More than one in 10 North Carolinians (12.8%) reported engaging in binge drinking in the past month (defined as having five or more drinks on one occasion). Among men, 18.3 percent of BRFSS respondents admitted to binge drinking in the past month, compared with 7.7 percent of women.<sup>14</sup>

The Division of Mental Health, Developmental Disabilities, and Substance Abuse Services maintains information on patients who receive mental health services in state-operated facilities. The Division reports that 7,188 people were served in state psychiatric hospitals during state fiscal year 2010.<sup>79</sup> Another 4,483 people were served in North Carolina Alcohol and Drug Treatment Centers and 332,796 people were treated by Local Management Entities (LMEs).<sup>80,81</sup>

It is not possible to fully document the number of people receiving mental health treatment in the private sector, except for inpatient hospitalizations in non-federal hospitals in the state. During

2009, there were 60,887 inpatient hospitalizations in North Carolina with mental illness listed as the primary diagnosis, resulting in more than \$653 million in hospital charges. In addition, there were 11,151 inpatient hospital discharges with alcohol or drug abuse listed as a primary diagnosis, resulting in over \$108 million in hospital charges.<sup>9</sup> According to 2008 North Carolina emergency department data, psychiatric disorders represented 8.7 percent of all ED visits and substance abuse/dependence and alcohol intoxication/withdrawal accounted for another 2.8 percent.<sup>82</sup>

Despite rapid population growth in North Carolina over the last decade, the state's supply of psychiatrists has remained unchanged. According to the University of North Carolina Cecil B. Sheps Center for Health Research, North Carolina had a limited number of psychiatrists available statewide in 2009—a total of 1,019 or just 1.1 psychiatrists per 10,000 population. In 2009, there were 33 North Carolina counties with no psychiatrists. The supply of psychologists is slightly better, with 1,917 psychologists operating in the state in 2009, equating to 2.0 per 10,000 population. In addition, there were 934 psychology associates working in North Carolina in 2009.<sup>83</sup>



# INJURY AND VIOLENCE

In 2009, 5,881 North Carolinians died from injury or violence, including 1,394 deaths from motor vehicle injuries, 2,764 deaths from other unintentional injuries, 1,161 deaths from suicide, and 562 deaths from homicide.<sup>8</sup> In 2009, there were 77,739 inpatient hospitalizations with injury or poisoning (intentional or unintentional) listed as the primary diagnosis, resulting in over \$2.6 billion in hospital charges, with an average charge of \$34,074 per hospitalization.<sup>9</sup> According to emergency department (ED) data, injuries represented 25 percent of all

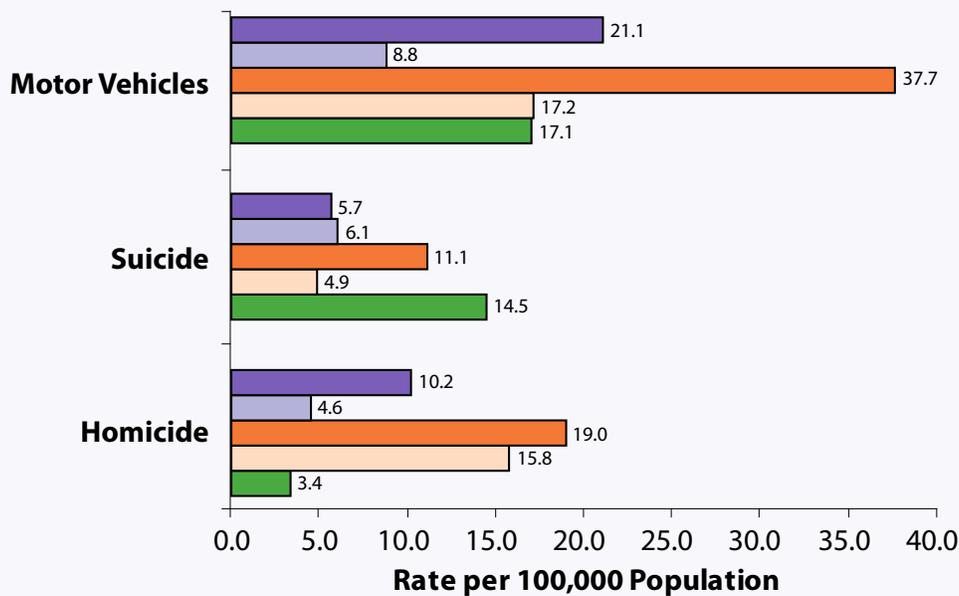
emergency department (ED) visits in the state in 2008. Fall and motor vehicle traffic injuries represented nearly one in three injuries resulting in an ED visit in 2008.<sup>82</sup> **Chart 8** presents 2005–2009 age-adjusted death rates for three injury and violence categories (motor vehicle, suicide, and homicide) by race and ethnicity.<sup>20</sup>

## Motor Vehicle Injuries

In 2009, for every motor vehicle injury death that occurred there was a loss of approximately 37 years of

life (see **Table 1**). This represents the highest average years of life lost of any of the major causes of death. Overall, motor vehicle injuries are the 10<sup>th</sup> leading cause of death in the state, resulting in a total of 1,394 resident deaths. Motor vehicle injuries were the seventh leading cause of death for North Carolina males in 2009 (based on the number of deaths), but not one of the 10 leading causes of death for females. In 2009, motor vehicle injuries were the leading cause of death for North Carolina youth, ages five through 24 years, amounting to approximately one-third of all deaths

**Chart 8.**  
2005–2009 North Carolina Resident Age-Adjusted Death Rates for Injury and Violence by Race and Ethnicity



■ Latino/Hispanic   ■ Non-Hispanic, Other   ■ Non-Hispanic, American Indian   ■ Non-Hispanic, African American   ■ Non-Hispanic, White

in this age group. Motor vehicle deaths were among the 10 leading causes of death for all racial groups except African Americans in 2009. With regard to ethnicity, motor vehicle injuries were the second leading cause of death among Hispanics in 2009, while it was ranked as the 10<sup>th</sup> leading cause of death among non-Hispanics.<sup>8</sup> This is largely a reflection of the younger age-distribution of the Latino population in North Carolina, putting them at greater risk for motor vehicle accidents. After adjusting for age, Non-Hispanic American Indians had the highest age-adjusted rate of motor vehicle deaths—with an age-adjusted rate of 37.7 per 100,000 population during 2005–2009 (see **Chart 8**).<sup>20</sup> Alcohol contributes to many motor vehicle deaths and injuries in North Carolina. According to the University of North Carolina Highway Safety Research Center, one in every 18 car crashes involved alcohol in 2008. Among fatal car crashes, one in three involved alcohol. In addition, injury was 1.6 times more likely in reported car crashes where alcohol was involved.<sup>84</sup>

## Unintentional Poisonings

Fatal poisonings occur from the damaging effects of ingestion, inhalation, or other exposure to a range of pharmaceuticals, illicit drugs, and chemicals including pesticides, heavy metals, gases like carbon monoxide, and household substances such as bleach and ammonia. Since 1997, the number of deaths from unintentional poisonings has almost quadrupled in the state, whereas the number of deaths from intentional poisonings has remained relatively constant. In 1997, there were 228 fatal unintentional poisonings in the state.

By 2009, that number had swelled to 1,036 and unintentional poisoning is now the second leading cause of accidental injury deaths in the state (after motor vehicle deaths).<sup>3</sup> In North Carolina, much of the increase appears to be explained by the abuse or misuse of prescription narcotics to treat severe pain, such as methadone (and to a much lesser degree, hydrocodone and oxycodone), and abuse of cocaine.<sup>3</sup> In response, public health officials, substance abuse professionals, and law enforcement officials are working together to oversee statewide initiatives to prevent unintentional drug overdoses in North Carolina. In 2004, the N.C. Department of Justice/ Department of Health and Human Services Leadership Committee on Unintentional Drug Deaths was established to monitor unintentional drug overdoses and to develop programs and policies to reduce drug-related deaths. The joint committee is working with law enforcement, medical care providers, and substance abuse professionals to increase awareness of the role of prescription drugs in the annually increasing number of fatal drug overdoses in the state. In 2005, the committee helped enact legislation that established a controlled substances reporting system that detects the illicit use of prescription narcotics and assist medical care providers in the referral of patients in need of pain management and substance abuse treatment.<sup>85</sup>

## Homicide

In 2009, there were 562 homicides in North Carolina, which represent less than 1 percent of all deaths in the state.<sup>8</sup> North Carolina's age-adjusted homicide rate of 6.0 is higher than the

national age-adjusted rate of 5.5 per 100,000 population.<sup>3,4</sup> While homicide is not a leading cause of death in general, it was the third leading cause of death among residents ages 15 to 24 years in 2009 and comprised 14 percent of all deaths in this age group. In addition, homicide was the sixth leading cause of death for North Carolina Hispanics, accounting for 6 percent of all Hispanic deaths in 2009.<sup>8</sup> The high number of homicides is likely attributable to the younger demographics of the Hispanic population. After adjusting for age, North Carolina's non-Hispanic African American and American Indian populations had the highest homicide rates in 2005–2009 when compared with other racial and ethnic groups (see **Chart 8**).<sup>20</sup>

## Suicide

In 2009, 1,161 North Carolina residents died from suicide, accounting for 1.5 percent of all resident deaths in that year. Suicide was the fourth leading cause of death to North Carolina residents ages 15–24 years (131 deaths), the fourth leading cause of death to residents ages 25–44 years (415 deaths), and the eighth leading cause of death for ages 45–64 years (431 deaths). Suicide was the eighth leading cause of death for North Carolina males, while it did not appear as one of the leading causes of death for women in 2009.<sup>8</sup> As shown in **Chart 8**, during 2005–2009, non-Hispanic whites had an age-adjusted suicide rate (14.5) twice as high as most other racial/ethnic groups.<sup>20</sup> North Carolina's 2009 age-adjusted suicide rate of 12.1 is comparable to the latest available U.S. age-adjusted rate of 11.7.<sup>3,4</sup> Reliable data on suicide attempts is not available. However,

information regarding the number of emergency department visits for self-inflicted injury in the state is reported. In 2008, there were 10,806 emergency department visits for self-inflicted injury among North Carolina residents. Of these, 68 percent were poisonings and 23 percent were cut/pierce injuries.<sup>82</sup>

### **Sexual Assault, Physical Assault, and Emotional Abuse**

According to statistics compiled by the State Bureau of Investigation, there were 22,586 cases of aggravated assault and 2,230 cases of rape reported in North Carolina in 2009. From 2008 to 2009, the reported rape rate remained virtually unchanged, but the aggravated assault rate decreased by 11 percent.<sup>86</sup> It is known that many victims of rape, assault, and abuse do not report the crime to authorities. According to the 2009 North Carolina BRFSS survey, 4.1 percent of women ages 18 and over reported that a stranger had forced them to have sex or engage in sexual acts. Among women with a disability, 6.8 percent reported a history of sexual assault from a stranger. Sexual assault may also occur at the hands of a partner or someone the victim knows. In 2009, 6.5 percent of adult women reported that a partner or ex-partner had forced them to have sex or engage in sexual acts. Another 4.7 percent of women reported that someone they knew, who was not a partner had forced them to have sex or to do sexual things.<sup>14</sup>

The North Carolina Council for Women/Domestic Violence Commission distributes state funds to local domestic violence programs in all 100 North Carolina counties.

In 2009–2010, the domestic violence programs in the state served 66,320 clients and received 120,666 crisis calls. Over half (53%) of the clients served were ages 35–54, approximately 22 percent were ages 55 and over, and another 19 percent were ages 34 or younger. The majority (85%) of the clients served by domestic violence programs were females. Whites comprised more than half (56%) of the clients served by county domestic violence programs. In 2008–2009, 6,047 children ages birth to 17 years and 7,466 adults ages 18 and over received domestic violence shelter services. The North Carolina Council for Women also distributes state funds to county programs for victims of sexual assault. During 2009–2010 the local sexual assault programs received 22,141 crisis calls and served 13,392 clients. Women accounted for 90 percent of their clients, with 10 percent of their clients being male. Of the sexual assaults reported in 2009–2010, approximately one in four were child sex offenses (26%),

one in four (23%) were cases of adult rape, 8 percent were incest, 8 percent involved marital rape, and 7 percent involved date rape. Where the relationship to the offender was reported to the N.C. Council for Women, the majority of clients (92%) reported that the offender was known to them—either a relative, acquaintance, or a boy/girlfriend.<sup>87</sup>

According to the 2008 North Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) survey, 5 percent of new mothers reported that they had been physically abused during their pregnancy. Physical abuse during pregnancy was more common among women who were not married (8.3%), had less than a high school education (8.8%), were enrolled in Medicaid (7.5%), or who had incomes less than \$15,000 per year (8.3%). Among 2008 PRAMS respondents, more than half (59.6%) reported that their prenatal health care provider discussed physical abuse by their husband or partner during their prenatal care visits.<sup>76</sup>





# COMMUNICABLE DISEASES

## HIV/AIDS

According to the HIV/STD Prevention and Control Branch, 1,710 new HIV disease cases were reported to the state in 2009. Since reporting began 36,906 HIV disease cases have been reported to the state through 2009. Of these, 12,658 residents died or have an unknown vital status. By the end of 2009, the total number of people living with HIV disease and reported to the Communicable Disease Branch was 24,248. Many more individuals do not yet have symptoms and are living with HIV disease without knowing it. The HIV/STD Branch estimates that if these individuals are taken into account, the true prevalence of individuals living with HIV/AIDS would be approximately 35,000.<sup>88</sup>

In 2009, African Americans represented 66 percent of all HIV disease cases, with a rate of 69.7 per 100,000 adults and adolescents. The 2009 adult HIV disease rate for African American males was 106.3 per 100,000 persons, compared with a rate of 13.1 for white males. African American females had an adult HIV infection rate of 38.7 per 100,000 population, compared with 2.7 for white females. While men who have sex with men accounted for approximately half (54%) of all new HIV disease cases reported to the state in 2009, 42 percent indicated heterosexual transmission and intravenous drug use was indicated in 3 percent of cases. Among adolescent and adult females, heterosexual

contact accounted for 96 percent of all HIV disease reports.<sup>88</sup> Given that people of all sexual orientations and lifestyles are at risk for contracting HIV disease, new efforts such as the “Get Real, Get Tested” campaign have been launched to encourage the general public to get tested for HIV. In 2006–2008 over 3,000 people were tested and 34 cases of HIV and 30 cases of syphilis were identified through this community campaign.<sup>89</sup> In addition, beginning in 2008, the state began partnering with the North Carolina Department of Correction to test prison inmates for HIV.<sup>90</sup>

Despite impressive advances in drug treatment regimes for individuals living with HIV/AIDS, there are still many deaths due to HIV disease. During 2005–2009, 1,934 North Carolina residents died of HIV disease.<sup>8</sup> In 2009, HIV was the seventh leading cause of death for residents ages 25–44.<sup>8</sup> Overall, North Carolina’s HIV death rates have steadily declined since 1995. In 1995, the unadjusted HIV death rate was 14.1 per 100,000 population compared with 3.8 in 2009.<sup>8,91</sup> During the 2005–2009 period, the age-adjusted mortality rate for HIV was 15.7 per 100,000 population for North Carolina’s non-Hispanic African Americans and 3.1 for Hispanics, compared with an age-adjusted death rate of 1.1 among non-Hispanic whites.<sup>20</sup>

Drug treatments have dramatically improved both morbidity and

mortality associated with HIV infections. However, antiretroviral drugs continue to be costly and consequently many low-income North Carolinians may not be able to reap their benefits. Due to increasing need and limited availability of funding, in 2010 the state’s AIDS Drug Assistance Program (ADAP) began only accepting new enrollees whose incomes were at or below 125 percent of the federal poverty level and reduced the non-HIV drugs that are covered by the program. Applications are being accepted for ADAP for those between 126 and 300 percent of the federal poverty level, however, they are being placed on a waiting list.<sup>92</sup> In fiscal year 2009–10, North Carolina’s ADAP enrolled 6,321 clients.<sup>88</sup> As of April 2011, there were 138 residents with HIV/AIDS on the ADAP waiting list.<sup>93</sup>

## Other Sexually Transmitted Diseases

In addition to HIV disease, a total of 16 other sexually transmitted diseases are considered reportable STDs in North Carolina.<sup>88</sup> In general, North Carolinians experience a higher rate of many sexually transmitted diseases when compared with the rest of the country. In 2009, North Carolina had the seventh highest gonorrhea rate, the 14<sup>th</sup> highest syphilis rate, and the 15<sup>th</sup> highest chlamydia rate in the United States.<sup>94</sup>

Public health efforts such as the North Carolina Syphilis Elimination Project resulted in dramatic decreases in syphilis rates from 1998–2003.<sup>95</sup> However, as shown in **Chart 9**, North Carolina’s primary and secondary syphilis rate of 6.3 is now higher than the latest national primary and secondary syphilis rate of 4.6 cases per 100,000.<sup>94</sup> This increase in syphilis may also lead to increases in new HIV infections in North Carolina. In 2009, 45 percent of males were already infected with HIV when diagnosed with syphilis.<sup>95</sup> Consistent with gonorrhea rates across the South, North Carolina’s gonorrhea rate has been on the decline over the last decade, with a rate of 246.5 in 1998 and 150.4 in 2009. Even with this decline, North Carolina’s gonorrhea

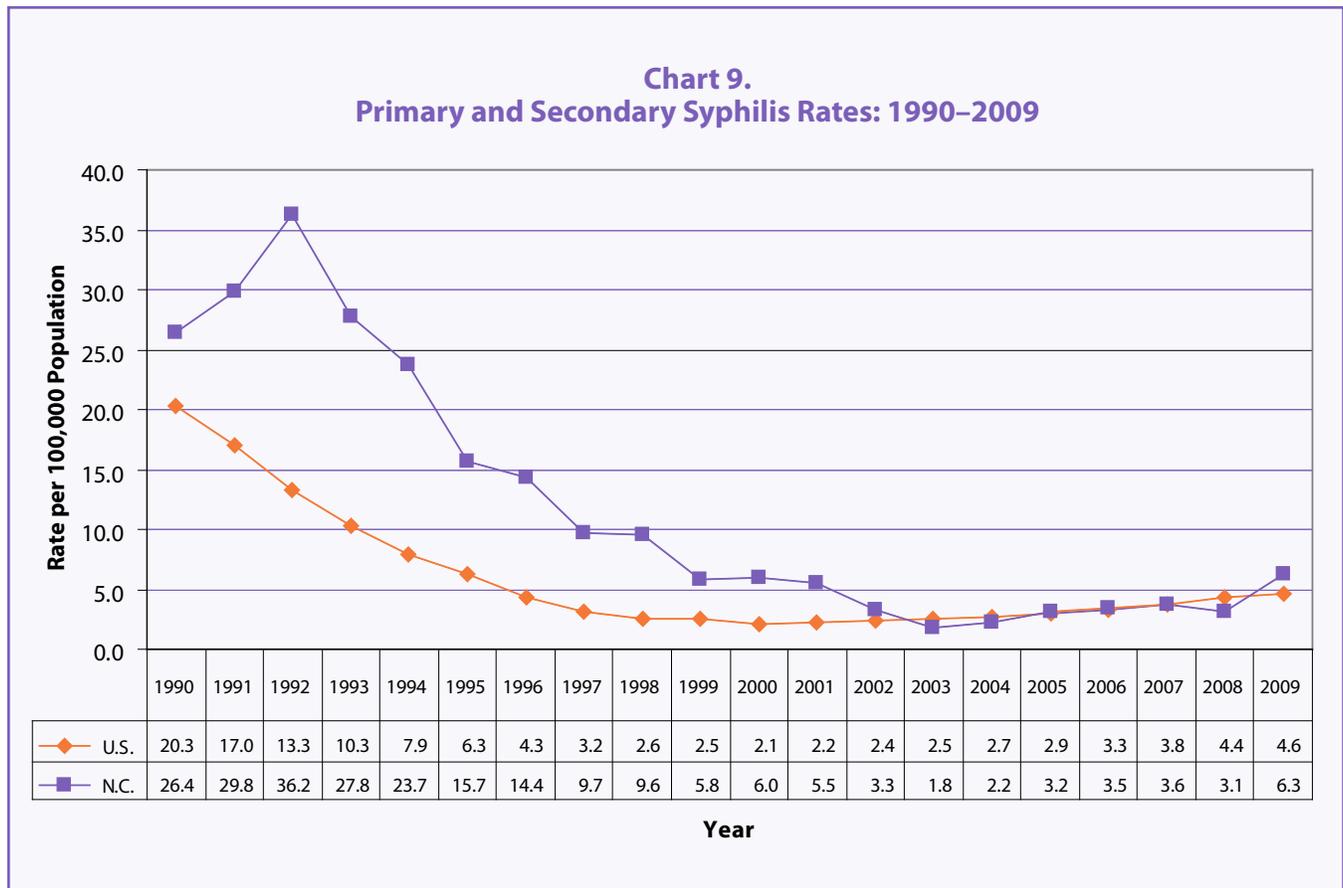
rate remains substantially higher than the national rate of 99.1 cases per 100,000 population.<sup>94</sup> Chlamydia is the most prevalent STD in the state. In 2009, North Carolina had a chlamydia rate of 445.1 new infection cases per 100,000 population. The North Carolina chlamydia rate is higher than the 2009 national rate of 409.2.<sup>94</sup> The increase in chlamydia rates in recent years may be attributed to better screening practices and more accurate diagnostic tests that are finding and treating more cases of this STD.

A number of other common STDs are not reportable in North Carolina, including genital herpes, bacterial vaginosis, trichomoniasis, and the human papilloma virus (HPV).<sup>88</sup> In

2006, the FDA approved a vaccine to prevent known strains of the HPV that can cause certain types of cervical cancer. Because this is not an STD that is currently tracked in North Carolina, the Division of Public Health does not have reliable estimates for HPV incidence in the state. However, national estimates suggest that more than one in four women ages 14–59 are currently infected with HPV.<sup>96</sup>

### Other Communicable Diseases

North Carolina also faces health threats related to other emerging and re-emerging communicable diseases. Some of these diseases have posed dangers for centuries, while others surfaced only recently.



## Tuberculosis

North Carolina tuberculosis (TB) cases and rates have been declining for many years; however, the disease has not been eliminated. In 1950, North Carolina had 89.9 cases of TB for every 100,000 people.<sup>97</sup> By 2009 a total of 250 cases were reported to the state, resulting in an overall rate of 2.7 cases per 100,000 population—a decrease of 25 percent from 2008. Despite the fact that North Carolina’s TB rate was lower than the national rate of 3.8, North Carolina’s TB case rate ranked 26<sup>th</sup> highest in the nation in 2009. Tuberculosis is more common among men than women, with males comprising 63 percent of all TB cases in the state in 2009. TB is also more common among adults ages 25–64, who comprise 64 percent of all TB cases reported in the state. Tuberculosis rates are substantially higher for North Carolina’s Asian population. In 2009, the North Carolina TB incidence rate was 16.1 per 100,000 population for Asians, compared with a rate of 1.5 for whites and 5.3 for African Americans. There are disparities by ethnicity as well, with a 2009 Hispanic TB case rate of 7.8, compared with a non-Hispanic rate of 2.2 per 100,000 population. Foreign-born TB cases account for a large percentage of all cases, representing 37 percent of all TB cases reported in North Carolina. The largest percentage of the state’s foreign-born cases in 2009 were from Mexico (36%), followed by Vietnam (11%), Guatemala (8%) and India (6%).<sup>98</sup>

## Influenza

The threat of an influenza (flu) pandemic is a chief concern for public health officials nationwide and



in North Carolina. The epidemiology and ecology of the influenza virus are such that several times in a century, a new genetic variant is born capable of causing severe and deadly illness in widespread global pandemics. In 2005, the North Carolina Division of Public Health’s Communicable Disease Control Branch released a comprehensive Pandemic Influenza Response Plan in an effort to proactively prepare for a widespread flu outbreak. This plan is updated as new information becomes available so that members of the public health community, medical providers, and others can be ready to respond if an influenza pandemic strikes.<sup>99</sup>

North Carolina’s preparations were tested in 2009 when a new H1N1 influenza (flu) virus spread throughout the globe and the World Health Organization (WHO) announced a flu pandemic. Beginning in September of 2009, the North Carolina Division of Public Health’s Communicable Disease Branch expanded reporting of

flu deaths to cover all deaths related to influenza, whether seasonal flu or pandemic H1N1 flu.<sup>100</sup> According to the WHO, the flu pandemic ended in August 2010, although the pandemic virus continues to circulate.<sup>101</sup> During the official pandemic period June 2009 through August 2010, there were a total of 107 flu-associated deaths reported in North Carolina, all of which were associated with pandemic H1N1 influenza. However, this figure is likely an underestimate because it only includes deaths in which the decedents were tested for the influenza virus.<sup>102</sup> Other more virulent and deadly flu variants, such as H5N1, continue to pose a threat globally.

Pneumonia and influenza continue to be a leading cause of death in North Carolina, even during non-pandemic periods. From 2005–2009, 8,632 North Carolina residents died of pneumonia and influenza. Pneumonia and influenza were the ninth leading cause of death in North Carolina in 2009 and the seventh leading cause

of death among residents over 65.<sup>8</sup> It is known that people who receive flu shots greatly reduce their chances of getting the flu and infectious complications of the flu. According to the BRFSS survey, 40.9 percent of North Carolina adults 18 and over received a flu shot in 2009. The elderly are most vulnerable to dying due to complications from the flu. Among North Carolina adults ages 75 and over, 78.2 percent reported receiving the influenza vaccine in 2009. In addition to the flu shot, the pneumonia vaccine is recommended for most adults ages 65 and over. According to the 2009 BRFSS survey, 62.5 percent of respondents ages 65–74 and 79.4 percent of those ages 75 and over reported having ever had a pneumonia shot.<sup>14</sup>

Other emergent communicable diseases such as Severe Acute Respiratory Syndrome (SARS), tick-borne bacterial and viral diseases like Lyme disease, Rocky Mountain Spotted fever, and ehrlichiosis, and mosquito-borne arboviruses such as West Nile virus, Eastern equine encephalitis, and La Crosse encephalitis are being closely monitored by the North Carolina Communicable Disease Branch and the CDC in an effort to safeguard the public against infection.

## **Foodborne Illness**

Recent foodborne illness outbreaks related to alfalfa sprouts, eggs, spinach, cookie dough, and peanut butter products have heightened public attention to this problem in North Carolina and across the nation. It is well recognized that foodborne illness is underreported as many individuals

who suffer from gastroenteritis never seek medical care. Even among those who do, health care professionals may only treat the symptoms.<sup>103</sup> The CDC estimates that one in six Americans gets sick from foodborne illnesses each year. Foodborne illness results in approximately 48 million cases each year, more than 128,000 hospitalizations, and approximately 3,000 deaths.<sup>104</sup> In 2008, North Carolina reported a total of 15 foodborne illness outbreaks to the CDC; 10 of which were unique to North Carolina.<sup>105</sup> A recent analysis of CDC foodborne illness reports revealed that from 1998–2007, North Carolina reported a total of 156 outbreaks to the CDC and 76 of the outbreaks were solved.<sup>106</sup> The Pew Institute estimates that there are 2.4 million cases of individual foodborne illness in North Carolina each year, with a per capita cost of \$495 per resident.<sup>107</sup> In 2001, the North Carolina Food Safety and Defense Task Force was formed to increase communication and collaboration between local, state, and federal regulatory agencies, as well as academia and industry. This Task Force has sponsored four large tabletop exercises to help ensure North Carolina is ready for any accidental or deliberate attacks on the food chain, and has several active committees working on commodity-specific issues. Members of the Task Force serve on many federal-level food safety and defense committees.<sup>108,109</sup>

## **Healthcare-Associated Infections**

In 2010, a deadly hepatitis outbreak at a North Carolina assisted living facility highlighted the need for infection control in our state's

healthcare settings.<sup>110</sup> Healthcare-associated infections (HAIs) include funguses, viruses, and bacterial infections acquired during the course of medical care. Examples of HAIs include device-related infections (e.g., ventilators, urinary catheters, central lines), surgical site infections, and antibiotic-associated diarrhea.<sup>111</sup> The CDC estimates that there are more than 1.7 million hospital-associated infections each year, resulting in total estimated direct medical costs of at least \$28.4–33.8 billion annually.<sup>112</sup>

In 2007, in an effort to assess and address HAIs in North Carolina, the General Assembly established the Joint Study Committee on Hospital Infection Control and Disclosure. The committee recommended implementation of a mandatory, statewide and state-operated hospital-acquired infections surveillance and reporting system.<sup>113</sup> In 2009 and 2010, the North Carolina HAI Prevention Program was established within the Epidemiology Section to coordinate HAI reporting, surveillance, and prevention activities. Since that time, a state plan has been developed and a multidisciplinary HAI Advisory Group has been established.<sup>114,115</sup> Legislation requiring all North Carolina hospitals to report selected HAIs was passed during the 2011–12 legislative session.<sup>116</sup>

In addition to surveillance and reporting activities, the N.C. HAI Prevention Program is working with the North Carolina Center for Hospital Quality and Patient Safety and other partners to promote and expand HAI prevention initiatives to healthcare facilities statewide. The

state has also funded efforts to reduce healthcare-associated infections in North Carolina, such as the Statewide Program for Infection Control and Epidemiology (SPICE). The SPICE program, operated out of the University of North Carolina-Chapel Hill School of Medicine, provides training, education, and consultation to medical facilities to prevent and control healthcare-associated infections in the state.<sup>117</sup>

### **Public Health Preparedness & Response**

In 2002, North Carolina created the Office of Public Health Preparedness

and Response (PHP&R). PHP&R works to assist the system of state agencies and 85 Local Health Departments in their preparedness activities in order to respond to public health emergencies. The North Carolina Health Alert Network was created. This system provides secure, tiered health alerts to North Carolina's state and local health departments, hospital emergency departments, and law enforcement officials through the simultaneous use of phone, fax, e-mail, and pagers to communicate urgent health information. The North Carolina Division of Public Health also increased and updated its

technological capacity to facilitate electronic disease reporting. Coordinated by the CDC through the National Electronic Disease Surveillance System, this effort fosters the electronic exchange of health data among federal, state, and local health agencies.<sup>118</sup>

In 2004, the North Carolina Division of Public Health and the North Carolina Hospital Association established a new partnership to improve the state's ability to recognize and respond to acts of bioterrorism, disease outbreaks and emerging infections, and other public health emergencies.



The North Carolina emergency department database electronically collects, reports, monitors, and investigates emergency department and hospital clinic data in near real-time from all participating hospitals in the state. The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) and the North Carolina Electronic Disease Surveillance System (NC-EDSS) are components of the North Carolina Public Health Information Network (PHIN). NC DETECT is the early event detection system and uses information from several data streams: hospital emergency department data, data

from the Carolina's Poison Control Center, data from ambulance runs, NCSU vet school lab data, and animal health data from the Piedmont Wildlife Consortium. This syndromic surveillance system allows early detection of disease outbreaks and other public health threats.<sup>119</sup>

The North Carolina Electronic Disease Surveillance System (NC EDSS) allows local health departments, laboratories, hospitals, and individual health care providers to notify the N.C. Division of Public Health electronically whenever a case of a reportable disease or

condition occurs in the state. The NC EDSS significantly improves the timeliness, reliability, and accuracy of reportable disease data in North Carolina. NC EDSS is being fully integrated with the state's Public Health Information Network (PHIN). NC EDSS is part of the Health Alert Network (HAN), a CDC initiative designed to move states to web-based communicable disease surveillance and reporting systems.<sup>120</sup>

# MINORITY HEALTH AND HEALTH DISPARITIES

Many health status measures are worse for minority populations compared to whites, both in North Carolina and nationally. North Carolina's higher than average proportion of minorities partly accounts for the relatively low national ranking of North Carolina on many health measures. The 2009 life expectancy figures for North Carolina indicate that while the life expectancy at birth for North Carolina's white population is 78.6 years, the life expectancy for African Americans is only 74.7 years. Minority males fare even worse. Life expectancy is only 71.3 years for African American males, compared to 77.8 years for African American females.<sup>3</sup>

## African Americans/Blacks

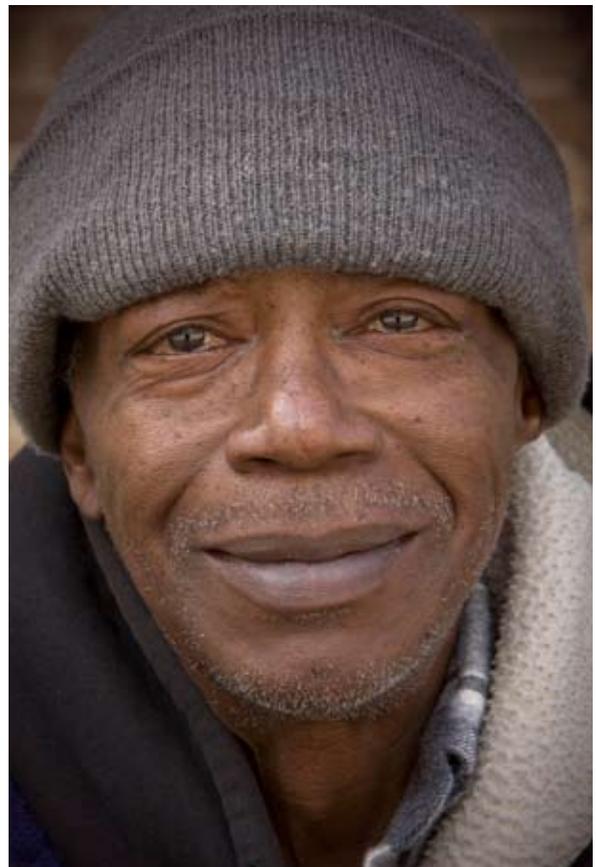
According to 2010 Census figures, approximately 21 percent of North Carolina's population is African American/Black. This compares with only 12 percent of the population nationally. Between 2000 and 2010, the African American population of North Carolina increased 17.9 percent.<sup>121</sup> North Carolina's African Americans are more likely to live in poverty (33%) and more likely than whites to have no health insurance (21%).<sup>122,123</sup> Poverty and a lack of access to health care are two main reasons North Carolina's African Americans are generally in poorer health than whites and other racial and/or ethnic minorities based on

mortality and disease incidence patterns. As shown in **Table 3**, North Carolina's African Americans have a much higher infant mortality rate than do whites (14.8 deaths per 1,000 live births for African Americans compared to 6.0 for non-Hispanic whites in 2005–2009). African Americans also have higher death rates from HIV, homicide, cancer, diabetes, kidney disease, cerebrovascular disease (stroke), and heart disease, compared to whites.<sup>20</sup> According to the 2009 North Carolina BRFSS, African Americans are more likely to be obese, have high blood pressure, have diabetes, be physically inactive, and have a disability.<sup>14</sup>

## Hispanics/Latinos

According to Census estimates, the total Hispanic/Latino population of North Carolina was 800,120 in 2010, representing approximately 8 percent of the total population.<sup>121</sup> Although the percentage of North Carolinians that are Hispanic is much lower than the national average of 16.3 percent, North Carolina's Hispanic population growth was the sixth highest in the nation between 2000–2010,

increasing 111 percent compared with an average national rate of growth for the Hispanic population of 43 percent.<sup>124</sup> Moreover, because North Carolina's Hispanic population is disproportionately young and most of the female Hispanic newcomers are in their peak childbearing years, the potential for continued growth of the state's Hispanic population is great. Seventy percent of North Carolina's 2009 Hispanic population is under age 35 whereas only 46 percent of the state's non-Hispanic population is in this age range.<sup>125</sup> According to the U.S. Census Bureau's 2005–2009 American Community Survey, the



**Table 3.**  
**North Carolina Minority Rates and Risk Factor Percentages**  
**by Race and Ethnicity**

	White, Non-Hispanic	African American, Non-Hispanic	American Indian, Non-Hispanic	Other Races, Non-Hispanic	Latino/ Hispanic	TOTAL
<b>Mortality Rates,<sup>1</sup> 2005–2009</b>						
Infant deaths per 1,000 live births <sup>2</sup>	6.0	14.8	13.0	5.4	6.1	8.2
Heart disease	186.3	231.0	196.0	79.0	60.0	191.7
Cerebrovascular disease (Stroke)	46.7	70.1	47.8	33.3	19.7	50.5
Diabetes	18.6	49.2	43.9	13.6	10.5	23.6
Nephritis, nephrosis, and nephrotic syndrome	15.1	37.0	23.0	10.8	8.1	18.7
Chronic lower respiratory diseases	51.2	30.3	33.7	9.2	10.7	47.0
HIV	1.1	15.7	3.2*	0.9*	3.1	4.2
Total Cancer	181.7	219.4	163.2	93.5	80.6	185.6
• Lung cancer	58.5	55.4	53.9	19.7	15.5	57.0
• Colorectal cancer	15.4	23.1	12.2	7.3	6.8	16.5
• Breast cancer	22.0	31.5	20.4	7.3	10.3	23.5
• Prostate cancer	20.6	58.8	32.2	7.3*	9.5	25.7
Unintentional motor vehicle injury	17.1	17.2	37.7	8.8	21.1	17.6
Other unintentional injuries	31.5	21.9	30.0	7.1	14.0	28.6
Homicide	3.4	15.8	19.0	4.6	10.2	7.0
Suicide	14.5	4.9	11.1	6.1	5.7	12.0
<b>Behavioral Risk Factors<sup>3</sup> (percentages) 2009</b>						
Adults with high blood pressure	31.4	40.8	36.3	23.1	13.3	31.6
Adults who smoke	20.1	20.2	36.7	22.8	18.2	20.4
Adults who are obese	27.6	42.9	33.1	27.0	23.3	30.2
Adults who engage in no leisure time physical activity	24.4	35.1	33.0	19.6	26.4	26.5
Adults in fair/poor health	15.5	24.2	21.5	13.7	29.4	18.1
Adults diagnosed with diabetes	8.5	15.6	12.7	7.1	4.9	9.6

<sup>1</sup> Except for the infant death rate, mortality rates are age-adjusted and expressed per 100,000 population. Denominators for the mortality rates (except for infant deaths) are based on the 2009 National Center for Health Statistics Bridged Population Estimate files.

<sup>2</sup> The infant mortality data are derived from the consolidated infant death file which matches all infant deaths to their live birth records. Figures presented here may not match those published in other reports due to the use of the matched infant death file.

<sup>3</sup> Latest available data from the North Carolina Behavioral Risk Factor Surveillance System (NC BRFSS).

\* Rate may be unreliable because it is based on fewer than 20 cases.

median age of the state's Hispanic population was 24.3 years, compared to 40.2 years for the white non-Hispanic population of the state.<sup>126</sup> As a result of the younger age distribution of the Hispanic population, there are unique health issues for this group.

The leading causes of death among North Carolina Hispanics are

consistent with the young age of the population. Approximately 28 percent of North Carolina's 851 Hispanic deaths in 2009 were due to injuries—intentional and unintentional. However, cancer topped the list of leading causes of death in 2009, representing 17 percent of all Hispanic deaths (147 deaths). Motor vehicle injuries (97

deaths), heart disease (90 deaths), and other unintentional injuries (59 deaths) were the second, third, and fourth leading causes of death, respectively, and comprised another 29 percent of all Hispanic deaths in 2009. Homicide was the sixth leading cause of death, resulting in 50 Hispanic deaths in 2009. Suicide was the eighth leading cause of

death among Hispanics in 2009 (35 deaths).<sup>8</sup>

Despite relatively low socio-economic status and delayed prenatal care services, Latina women—especially first generation Latinas from Mexico—typically have birth outcomes as good as non-Hispanic whites.<sup>127</sup> In 2005–2009, 30 percent of Hispanic mothers received prenatal care after the first trimester or no prenatal care, compared with 10 percent of white, non-Hispanic mothers. However, despite these prenatal care deficiencies, during 2005–2009, Hispanic mothers were less likely to deliver a low birthweight baby (6.3%) compared with 7.7 percent of non-Hispanic white and 14.5 percent of non-Hispanic African American mothers.<sup>20</sup>

The Pew Institute estimates that there are approximately 325,000 illegal immigrants in the state, representing 3 percent of the total undocumented United States

population and 5 percent of North Carolina’s labor force.<sup>128</sup> In many instances, undocumented immigrants lack health insurance; therefore, their preventive health care needs are not met.<sup>129</sup> Spanish-speaking Hispanics in North Carolina may have elevated risks of poor health outcomes due to a lack of health insurance.<sup>129</sup> According to 2009 NC BRFSS survey results, 84 percent of North Carolina’s Spanish-speaking Hispanics reported a lack of health coverage compared to only 22 percent of English-speaking Hispanics.<sup>14</sup>

The lack of health coverage among Spanish-speakers could lead to an excess burden of chronic disease and morbidity as that population ages.<sup>130</sup> A study of North Carolina emergency Medicaid recipients concluded that by the time these immigrants seek health care, it often involves an acute health emergency. If health insurance coverage and adequate preventive care were offered to this population, the costs of emergency care could be reduced.<sup>131</sup>

## American Indians

North Carolina has one of the largest American Indian populations in the country. In 2010, the American Indian population of North Carolina was estimated to be more than 184,000, or approximately 1.9 percent of the population in the state. The American Indian population in the state increased 39.7 percent from 2000 to 2010.<sup>121</sup> As with other minority populations, North Carolina’s American Indian population is generally in poorer health than whites. As shown in **Table 3**, North Carolina’s American Indian population have elevated death rates from heart disease, diabetes, kidney disease, homicide, and unintentional motor vehicle crashes, as well as a substantially higher infant death rate, compared to non-Hispanic whites. During 2005–2009, American Indians had higher percentages of women who smoked during pregnancy (23.6%) and women with late or no prenatal care (21.3%) compared to non-Hispanic white women.<sup>20</sup> Many of the poor health outcomes for this population are likely related to the fact that American Indians have a high poverty rate (26%) and a high rate of persons who are uninsured (29%).<sup>132,133</sup> North Carolina BRFSS data for 2009 reveal that American Indians were significantly more likely to report being in poor health (8.8%) and more likely to report being unable to see a doctor in the past year due to cost (24.1%) than whites.<sup>14</sup>





# DISABILITY

**D**etermining the prevalence of disability in North Carolina is complicated by the fact that there are no universal definitions of what constitutes a disability. The spectrum of disability ranges from mild to severe, and may encompass physical, emotional, sensory, and/or cognitive impairments. Given the range of definitions, in order to capture estimates of the population of disabled persons, we must turn to multiple data sources compiled from national and state surveys, as well as administrative and Census estimates. National and state-level surveys typically define disability based on self-perceived limitations on daily activities—such as working at a job, using a phone, or going outside the home. A person is considered to have a disability if he or she needs help to perform the activity, uses special equipment, or requires standby help. Using activity limitation-based definitions of disability results in a broad definition of disability that includes some disabilities present from birth, and others coming later in life as a consequence of injury, chronic disease, or aging.<sup>134</sup>

The BRFSS survey has two questions on disability in the core set of questions that are asked by all participating states. The two questions pertain to activity limitations and the use of special equipment. According to the 2009 BRFSS survey, 20.2 percent of North Carolina adults ages 18 and

over reported that they have activity limitations due to physical, mental, or emotional health problems or limitations. This is roughly comparable to the U.S. rate of 18.7 percent.<sup>19</sup> Using a more restrictive definition, 7.8 percent of North Carolina adults reported that they have a health problem which requires the use of special equipment, such as a cane, wheelchair, special bed, or special telephone.<sup>14</sup> The percentage reporting that they need special equipment is higher among African Americans (11.5%), American Indians (15.0%), those with less than a high school education (14.5%), those ages 75 and older (26%), those making less than \$15,000 per year (17%), and veterans (12.8%). The North Carolina BRFSS survey also includes two additional state-specific questions related to disability. The first question asks the respondent to indicate whether or not he or she has a disability and the second asks if the respondent has any trouble learning, remembering, or concentrating due to an impairment or health problem. When the results of the two core BRFSS disability questions are combined with the state-added disability questions, nearly one in three (31%) of North Carolina adults indicate that they have some type of disability.<sup>14</sup>

The BRFSS survey does not sample individuals in institutional settings, therefore, the sample excludes many of the state's most severely disabled

populations. The health of adults with intellectual and developmental disabilities is also not likely to be captured by the BRFSS because many of these adults do not have the opportunity to respond to telephone surveys. In order to gather state-level surveillance data on the health conditions, risk factors, and access to health care of adults with intellectual disabilities and other developmental disabilities, health questions are incorporated into a survey that is conducted by the Division of Mental Health, Developmental Disabilities, and Substance Abuse Services: The Core Indicators Project. The 2008–2009 National Core Indicators survey was conducted in 20 participating states. The survey uses face-to-face interviews with adults with intellectual and developmental disabilities (I/DD) residing in the community and state developmental centers. According to the survey, 66 percent of I/DD adults in North Carolina reported that they felt that they got the services they needed, compared with the 86 percent average for all states. Nearly one in three I/DD respondents (29.6%) said that they have a job in the community. Of those I/DD adults without a job, most (62%) would like to have one.<sup>135</sup>

The American Community Survey (ACS) also provides estimates on disability status. According to the 2009 ACS, more than 1.1 million North Carolinians currently have a disability, which equates to

approximately 13 percent of the state population. Disability prevalence increases with age. The 2009 ACS estimates that less than 10 percent of North Carolina residents under 18 have a disability, compared with 11 percent of adults ages 18–64 and 39 percent of adults ages 65 and over. Mobility-related (ambulatory) disabilities were the most commonly reported type, affecting over half (55%) of all disabled persons ages 5 and over.<sup>136</sup>

Disability status is associated with a number of health and behavioral risk factors. Responses to the 2009 North Carolina BRFSS survey indicate that those who were disabled were more likely to rate their health as poor (15%) compared with non-disabled respondents (0.6%). Disabilities can sometimes make it difficult for adults to maintain adequate levels of physical activity. Approximately one in four North Carolinians with a disability reported being physically inactive (23.2%), compared with less than one in 10 (9.0%) non-disabled respondents. In addition, adults with disabilities were more likely to be obese based on their Body Mass Index (BMI). More than one in three respondents with disabilities had BMIs that placed them in the obese category (37.2%) compared with a little over one in four non-disabled adults (27.5%). Smoking

is more common among adults with disabilities, with 27 percent of disabled respondents reporting that they were current smokers, compared with 17 percent of non-disabled BRFSS adults. Mental health is also a concern for adults with disabilities. According to the 2009 BRFSS,

respondents with disabilities were also more likely to report that they were dissatisfied or very dissatisfied with their lives (12.9%) compared with non-disabled adults (2.8%).<sup>14</sup>



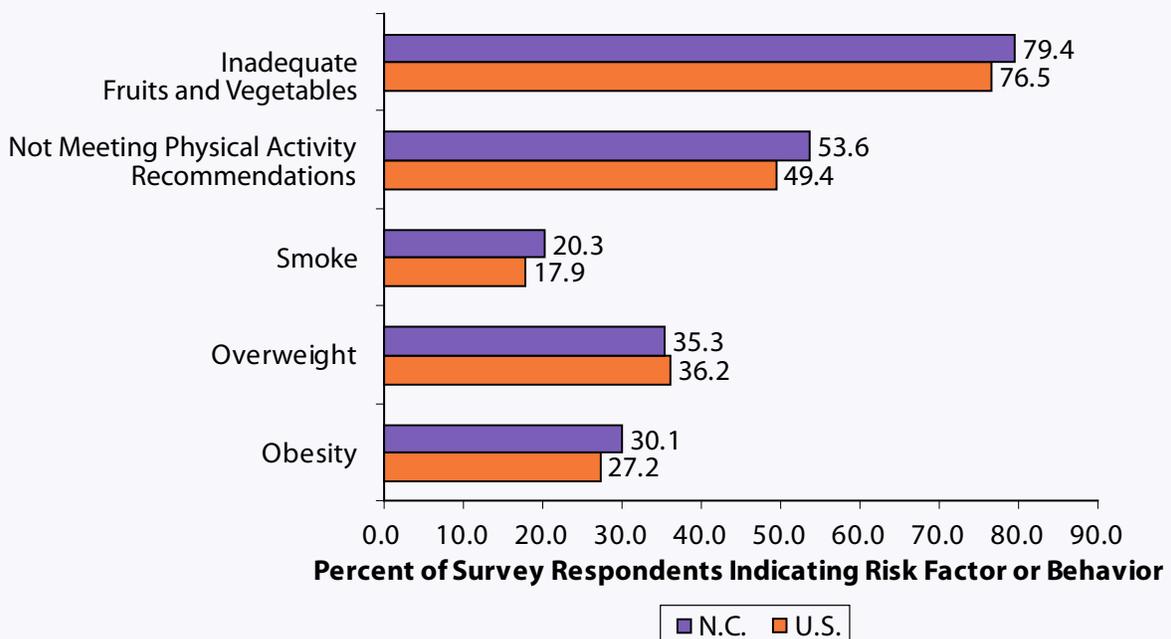
# HEALTH RISK FACTORS

It is estimated that approximately half of all U.S. deaths are preventable. Most of the leading causes of preventable deaths in North Carolina involve risky behaviors or lifestyles. As shown below in **Chart 10**, North Carolina adults are somewhat more likely to smoke, have sedentary lifestyles, and be obese, compared with all U.S. adults.<sup>19</sup> Among the leading causes of preventable death are tobacco use, unhealthy diet and/or physical inactivity, alcohol misuse, firearms, sexual behavior,

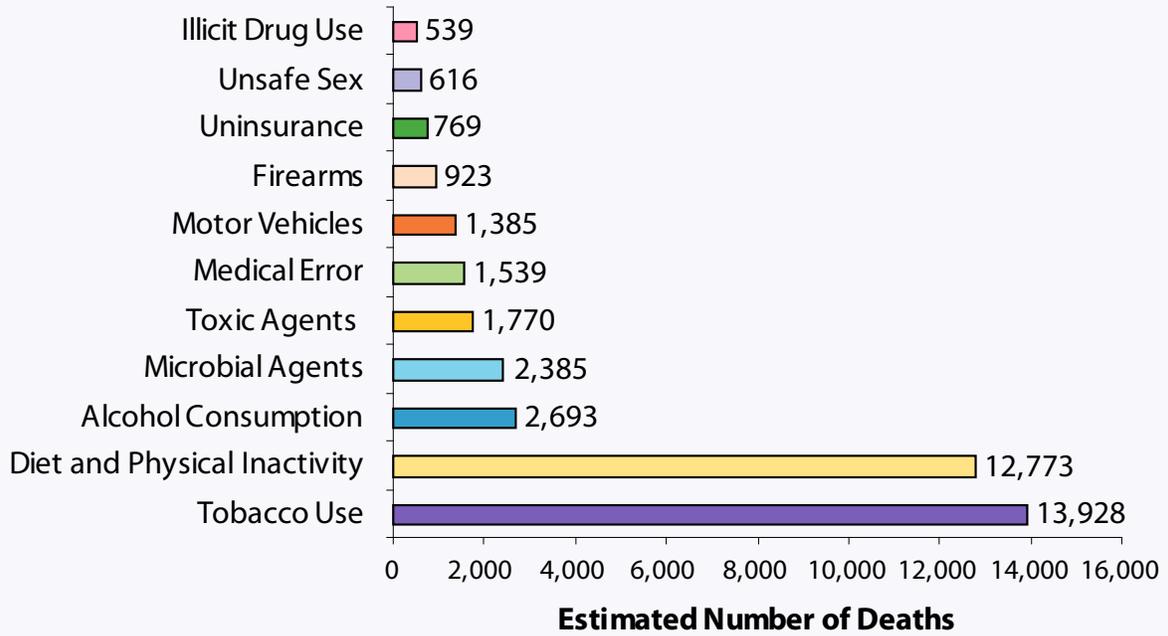
motor vehicles, and illicit drug use. Using methods outlined by prior research, **Chart 11** presents the estimated number of North Carolina deaths due to preventable causes in 2009.<sup>3,137,138</sup> The annual economic costs associated with unhealthy lifestyles are estimated at \$57.4 billion in North Carolina, with \$11.9 billion attributable to lack of physical activity, \$15.5 billion due to excess weight, \$3.1 billion associated with inadequate fruit and vegetable consumption, and \$3.7 billion related to adult-onset (Type II) diabetes.<sup>31</sup>



**Chart 10.**  
**2009 North Carolina Behavioral Risk Factor Surveillance System (NC BRFSS) Data for Adverse Health Outcomes**



**Chart 11.**  
**Preventable Causes of Death in North Carolina, 2009**



# HEALTH CARE ACCESS

## Poverty

An individual's socio-economic status has a strong link to overall health status. Individuals living in poverty have higher death rates and more health problems than individuals with higher socio-economic status. In 2008–09, approximately one in five North Carolina residents (19.7%) were living in poverty, which is comparable to the U.S. (20.1%). As shown in **Chart 12**, North Carolina's 2008–09 poverty rates are also comparable to the national average for children, adults, and the elderly. During the

same period, the poverty rate for North Carolina African Americans (33%) and Hispanics (40%) were all more than twice that for non-Hispanic whites (13%).<sup>139</sup>

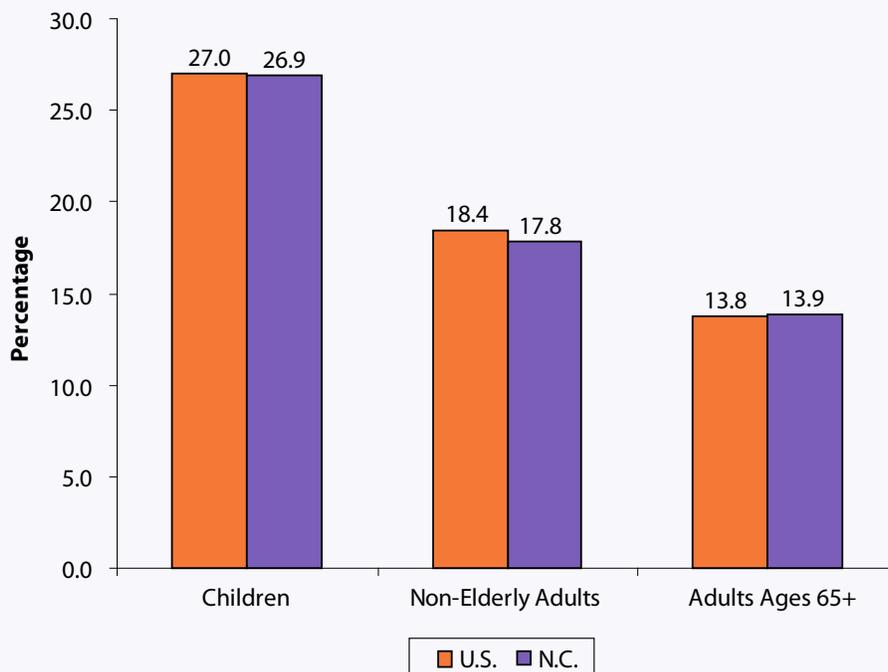
## Health Insurance Coverage

North Carolinians living without health insurance experience greater difficulty accessing effective primary and specialized health care. Popular belief is that the uninsured are a relatively young and healthy population. However, a recent study using National Health and Nutrition

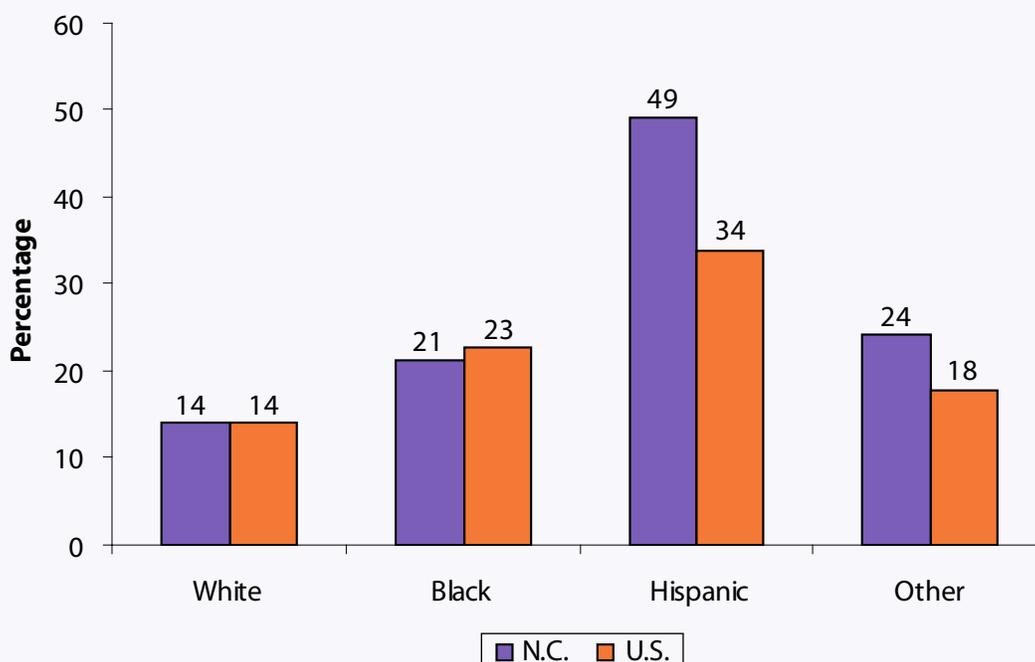
Examination Survey (NHANES) data found that nearly one third (31.3%) of the non-elderly uninsured reported suffering from chronic health conditions such as cardiovascular disease, hypertension, diabetes, cancer, chronic lung disease, and high cholesterol.<sup>140</sup> Without access to timely primary care, when the uninsured do seek treatment they are typically in a later, more dangerous and costly stage of their illness.

According to the Current Population Survey, more than 1.5 million North Carolina residents, or 19 percent of

**Chart 12.**  
**Percentage of Population Living Below Poverty**  
**by Age, 2008–2009**



**Chart 13.**  
**2008–2009 Percentage of Non-Elderly Uninsured,**  
**North Carolina and United States**



the population were without health insurance during 2008–2009. The percentage of North Carolinians without health insurance has been similar to the national rate for at least two decades. Racial and ethnic minorities are significantly more likely to be uninsured. As shown in **Chart 13**, while 14 percent of non-elderly North Carolina whites were without health insurance during 2008–2009, 21 percent of African Americans and approximately half of all Hispanics lacked health insurance during this same time period. The North Carolina Hispanic uninsured rate of 49 percent is significantly higher than the national Hispanic uninsured rate of 34 percent in 2008–2009. The percentage of uninsured

children in North Carolina is 11 percent, approximately the same as the percentage for children nationally (10%).<sup>139</sup> North Carolina’s rate of uninsured children may be lower than some other states due to its successful implementation of the State Child Health Insurance Program (SCHIP), known as Health Choice.

The Medicaid program is a joint federal, state, and county program that provides medical coverage to residents who meet certain income and need-based eligibility requirements. North Carolina was one of the last states to initiate a Medicaid program, which was accomplished in 1970. Largely as a result of the Medicaid eligibility

expansions for children and pregnant women adopted in the late 1980s, there has been a substantial increase in the number of Medicaid enrollees.<sup>141</sup> As shown in **Chart 14**, between state fiscal year 1988–89 (the first year of major expansions) and state fiscal year 2009–10, the average monthly Medicaid enrollment climbed from 344,260 to 1,417,358.<sup>142</sup> The Division of Medical Assistance estimates that 16 percent of North Carolinians were enrolled in the state’s Medicaid program as of June 2009.<sup>143</sup> Families and children comprise the largest percentage of Medicaid recipients by eligibility category, accounting for approximately 60 percent of all Medicaid recipients in 2010.<sup>144</sup>

## Rural Health

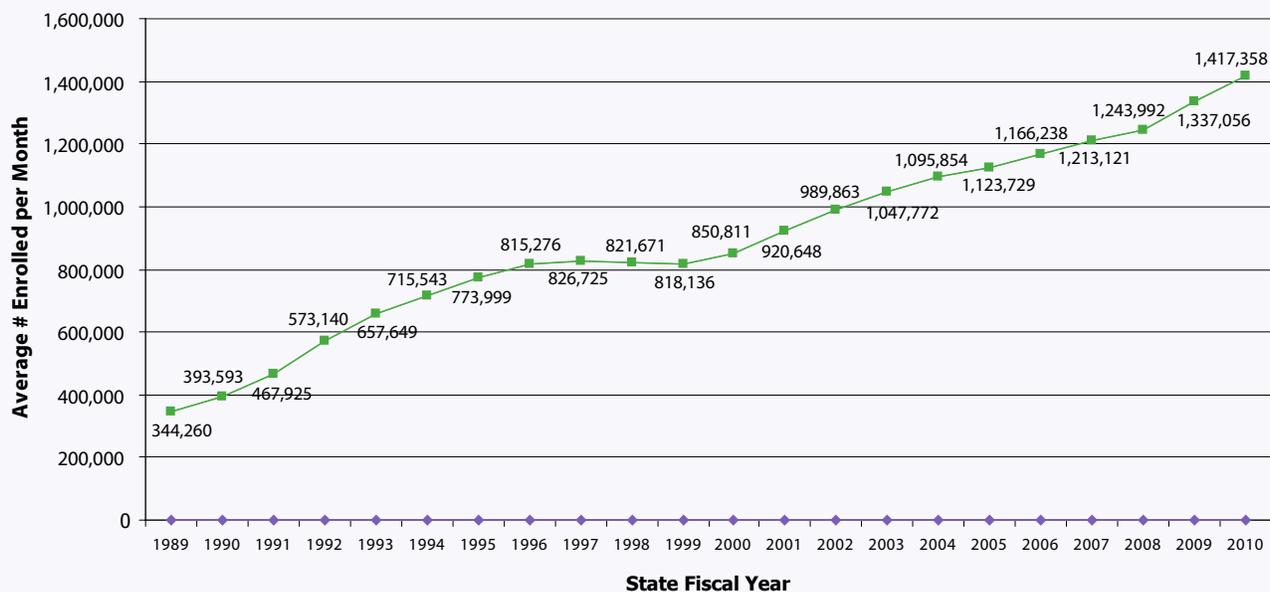
According to 2010 estimates from the United States Department of Agriculture, approximately 30 percent of North Carolina's population lives in rural areas, compared with 17 percent nationwide. The poverty rate for non-metropolitan areas of North Carolina is 19 percent, compared with 15 percent for metropolitan areas of the state. Additionally, rural areas of the state have lower per capita incomes and higher rates of unemployment than urban areas of North Carolina.<sup>145</sup> Populations living in North Carolina's rural areas face more barriers to accessing health care, due in part to a lack of health care providers in close proximity to their home. North Carolinians living in rural areas are more likely to be living in poverty

than those in urban areas, and they are less likely to have access to transportation. This is particularly true for rural racial minority and Hispanic populations. The geographic availability of physicians and the distance to hospitals pose unique problems for North Carolina's rural residents. Almost half of the state's population lives in a county with just one hospital (60 counties) and there are 17 North Carolina counties without hospitals.<sup>146</sup> Lack of access to obstetrical and pediatric care in rural areas is a continual problem. According to the 2009 North Carolina Health Professions Data System, almost a third of North Carolina counties (29 counties) did not have a single gynecologist/obstetrician and 19 percent of counties did not have a pediatrician practicing in their county in 2009.<sup>83</sup>

## Oral Health

According to the 2008 North Carolina BRFSS survey, approximately 33 percent of North Carolina adults reported not having visited a dentist within the last year. The lack of dental care is especially acute among North Carolina's poor and minority populations. Approximately 40 percent of American Indians, Asians, and African Americans reported that they had not visited the dentist in the past year. Approximately half (55%) of Hispanics reported that they did not visit the dentist in the past year and nearly one in three Hispanics (28.2%) reported that they had never visited a dentist or that it had been five or more years since their last dental visit. Among respondents making less than \$15,000 a year, 59 percent reported not having an annual dental check-up, compared

**Chart 14.**  
**Average Monthly Medicaid Enrollees**  
**in North Carolina, Fiscal Year 1989–2010**



with 14 percent of those making more than \$75,000 a year. Almost half (48%) of North Carolina adults report having lost one or more teeth because of tooth decay or gum disease. Full tooth loss was reported by 6.1 percent of North Carolina adults. Among respondents ages 65 and over, approximately one in five (21.3%) have had all their natural teeth extracted.<sup>14</sup>

The availability of dentists can be one factor explaining why some residents forgo routine dental care. In 2009, there were 4.4 dentists and 5.5 dental hygienists per 10,000 residents in North Carolina. Four North Carolina counties had no practicing dentists or

dental hygienists in 2009.<sup>83</sup> Access to dental care can be especially difficult for low income residents. A lawsuit against the Division of Medical Assistance was settled in 2003 that resulted in increased reimbursement rates for dental procedures and improved Medicaid participation by dentists throughout the state.<sup>147</sup> In 2009, only four counties in the state did not have a dentist that accepted Medicaid (these counties are without a dentist of any kind).<sup>148</sup>

The U.S. Surgeon General maintains that water fluoridation continues to be the most safe, effective, and inexpensive way to prevent tooth decay in a community. Fluoridation

benefits North Carolinians of all ages and socio-economic status. According to the CDC, 88 percent of all North Carolina populations on public water systems are receiving optimally fluoridated water, compared to a 69 percent nationwide average.<sup>149</sup>



# OCCUPATIONAL AND ENVIRONMENTAL HEALTH

**E**nvironmental health concerns are gaining more attention in North Carolina and the nation. However, North Carolina data on adverse health effects associated with poor air and water quality are scarce and difficult to obtain.

## Ozone

According to the North Carolina Department of Environment and Natural Resources, ozone levels have risen in recent years due to increased traffic, industry, and warmer weather. According to the U.S. Environmental Protection Agency (EPA), ground-level ozone impacts not only those with respiratory problems, but the health and well-being of healthy children and adults as well.<sup>150</sup> Ozone levels vary depending on the season, the time of day, and the locale. Summer afternoons are typically when ozone levels reach their peak in North Carolina. Children, the elderly, those who vigorously exercise outdoors, and those with respiratory diseases and compromised immune systems are particularly susceptible to the effects of ozone.<sup>151</sup> Ozone may also have an impact on maternal and infant health. A U.S. study found that mother's exposure to air pollution was associated with a higher risk of having a small-for-gestational-age baby.<sup>152</sup> In general, determining causal associations between air pollutants and health

effects is challenging due to difficulties in quantifying and measuring exposure.<sup>153</sup> However, the achievement of EPA standards for particulate matter could reduce any potential negative health consequences which might be associated with, or exacerbated by, ozone in North Carolina.

## Concentrated Animal Feeding Operations

Environmental concerns from other sources, such as large livestock operations, may also have a detrimental health impact on North Carolinians. Many of the animal feeding operations in the state are industrial-scale facilities known as "Concentrated Animal Feeding Operations" (CAFOs). The Environmental Protection Agency regulates manure handling at CAFOs depending on their size, the number of animals, and the potential for manure discharge to result in significant levels of pollution.<sup>154</sup> According to the National

Association for Local Boards of Health, manure-related discharges from CAFOs may result in fine particulate pollution as well as soil and water contamination which can have health impacts on farm workers and populations residing downwind of CAFOs.<sup>155</sup>

North Carolina is the second largest pork producing state in the nation, and there are many swine-related CAFOs in the state.<sup>156</sup> North Carolina residents living near swine farms have reported a variety of respiratory and gastrointestinal symptoms.<sup>157</sup> A study of North Carolina middle school students attending school in close proximity to swine facilities found that asthma and asthma-like symptoms were more prevalent among students with the most exposure to airborne pollutants from swine facilities.<sup>158</sup> In addition, the odor that North



Carolina swine operations place on surrounding communities has also been found to have a negative mental health impact on surrounding communities—resulting in more reports of depression, tension, anger, and fatigue among residents exposed compared with controls who were not exposed.<sup>159,160</sup> In an effort to regulate the environmental impact of hog industry expansion, in 2007, the North Carolina legislature passed new waste standards for hog farms. Beginning in 2009, new or expanding hog facilities were required to install manure waste disposal systems that reduce odors, emissions, and discharge of animal waste into waterways and groundwater.<sup>161</sup>

Research suggests that environmental health hazards vary by race and socioeconomic status. For example, many of North Carolina’s large-

scale hog operations are heavily concentrated in regions with high poverty and a high percentage of non-white residents.<sup>162</sup> A 2008 report published by the Children’s Environmental Health Initiative at Duke University found that low income and minority communities were more likely to be adversely impacted by EPA rulings.<sup>163</sup> Often these areas of high poverty and minority populations are also the same areas of the state with the highest chronic disease rates and with less access to medical care.

### Lead Poisoning

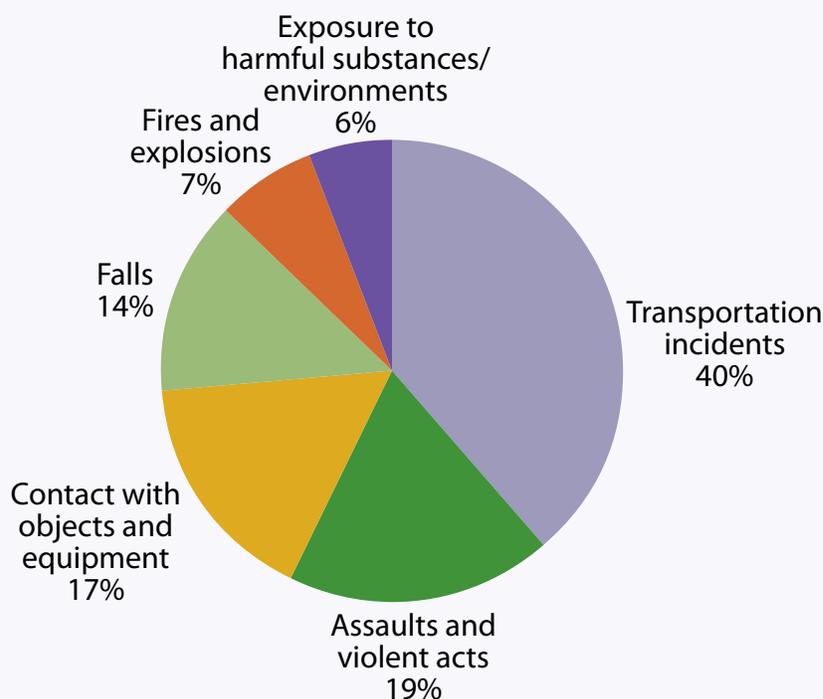
Lead poisoning is an environmental health hazard that is preventable. In 1997, the North Carolina General Assembly adopted the Childhood Lead Exposure Control Act establishing a voluntary program designed to reduce

childhood lead exposure in pre-1978 rental housing.<sup>164</sup> In 2009, the North Carolina Lead Screening Program screened more than 129,000 children ages one to two, or approximately half (49.5%) of all children in this age group. Of all children screened, 583 (0.5%) were found to have elevated blood lead levels.<sup>165</sup> To better facilitate lead poisoning surveillance, North Carolina’s Children’s Environmental Health Branch has begun collecting lead testing results through a new statewide monitoring system, known as NC LEAD. NC LEAD is a module within North Carolina’s Electronic Disease Surveillance System (NCEDSS) which collects lead and environmental data and can notify providers immediately of children in need of clinical and environmental follow-up.<sup>166</sup>

### Occupational Health

Occupational exposures and hazards also pose health threats to North Carolinians. Occupational health threats can include traumatic injuries as well as exposure to toxic substances such as silica, asbestos, and lead. The U.S. Bureau of Labor Statistics (BLS) maintains detailed information regarding all occupational injuries, illnesses, and fatalities recorded in the United States. In 2009, the BLS estimates that there were 106,400 cases of nonfatal occupational injuries and illnesses in North Carolina. Approximately 52,000 of these cases resulted in days away from

**Chart 15.**  
**Fatal Occupational Injuries in North Carolina, 2009**





work, job transfer, or restriction. According to the BLS, there were 129 fatal occupational injuries in North Carolina in 2009.<sup>167</sup> As shown in **Chart 15**, 40 percent of occupational-related fatalities were attributable to transportation incidents. Assaults and violent acts in the workplace accounted for 19 percent of all occupational deaths in 2009. Falls, contact with objects/equipment, exposure to

harmful chemicals/environments, and fires account for the remainder of these deaths. Most occupational injuries in 2009 occurred among males (92%), with transportation injuries comprising 40 percent of their occupational deaths. The industry associated with the most fatal occupational injuries was construction, which accounted for 17 percent of all occupational fatalities in North Carolina in 2009.<sup>168</sup> The

North Carolina Division of Public Health recently received funding from the National Institute for Occupational Safety and Health to build state capacity for occupational health surveillance. Plans include the collection of additional occupational injury data, examination of trends, and linking research findings to prevention activities.<sup>169</sup>



# CONCLUSION

As outlined in this report, the health of North Carolinians is compromised by poverty, risky behaviors, environmental problems, and insufficient access to adequate health care. However, despite these challenges, the state has already achieved many health goals that once were thought impossible. In 1988, North Carolina's infant death rate was the worst in the nation, at 12.6 per 1,000 live births. Since that time, the state has reduced the infant death rate to 7.9, resulting in a 37 percent reduction. The state teen pregnancy rate has been nearly cut in half—from 105 pregnancies per 1,000 in 1990 to 56.0 in 2009 (a 47 percent reduction). In 1980, North Carolina's age-adjusted heart disease death rate was 401.7, and by 2009 had been reduced to 177.9 per 100,000 residents, representing a 55 percent reduction. North Carolina has also been tremendously successful in expanding insurance coverage

to uninsured children over the last decade with the implementation of North Carolina Health Choice. While there is always room for improvement, the state's success in these and other areas should reaffirm that with collaborative efforts across federal, state, and local boundaries, North Carolina can tackle even the most complex health problems.

The recently released Healthy North Carolina 2020 goals are intended to galvanize state and local partners to continue to improve the health of North Carolinians over the course of the next decade and ensure that all residents have an equal opportunity to be healthy. Healthy NC 2020 is a statewide campaign that involves collaboration between state, local, and regional partners to improve population health. The initiative focuses on prevention using evidence based strategies and surveillance to gauge progress in meeting the

state's key health objectives and goals.<sup>170</sup> Through innovative efforts such as Healthy NC 2020, North Carolina can demonstrate that despite limited state and federal resources, a strong commitment to public health initiatives can result in better health for the citizens of our state.





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