

# Madison County Community Health Assessment

December 3

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# MADISON COUNTY COMMUNITY HEALTH ASSESSMENT

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Key:

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## EXECUTIVE SUMMARY

### Overview of CHA Purpose and Process

Community Health Assessment (CHA) is the foundation for improving and promoting the health of Madison County residents. The role of the CHA is to identify factors that affect the health of Madison County residents and determine the availability of resources within the county to adequately address those factors. The process involves the collection and analysis of a large range of secondary data as well as primary data and involves a team composed of representatives from a broad range of health and human service and other organizations as well as community partners and residents.

Local Health Departments are required to conduct a comprehensive community health assessment at least every four years. In Madison County the last assessment was conducted in 2011. Now as a part of the Affordable Care Act, non-profit hospitals are also required to conduct a community health needs assessment at least every three years. In order to better meet both health department and hospital needs and to align with both requirements, Madison County Health Department decided to submit another complete CHA in 2012. This means that the 2012 CHA is taking place only one year after the last CHA was submitted. This involved requesting an extension on action planning until 2013. For this reason, the 2012 CHA has involved the examination of the 2011 priority areas and the engagement of a smaller number of community leaders rather than re-creating the extensive process that took place in 2011.

Madison County is included in Mission Hospital's community for the purposes of community health improvement and investment, and as such Mission Hospital was a key partner in the 2012 local level assessment process.

Madison County Health Department and Mission Hospitals are also part of a larger partnership in Western North Carolina (WNC). This partnership is called WNC Healthy Impact. WNC Healthy Impact has supported the regional CHA effort through consultation, data collection, and technical assistance. See [www.WNCHealthyImpact.com](http://www.WNCHealthyImpact.com) for more details about the purpose and participants of this region-wide effort.

As part of WNC Healthy Impact, a regional data workgroup of public health and hospital representatives and regional partners, with support of a consulting team, made recommendations to the steering committee on the data approach and content used to help inform regional data collection. From data collected as part of this core dataset, the consulting team compiled secondary data for each county in the region. This data was then compared to the data collected in the 2011 Madison County CHA to look for similarities and differences.



In addition, primary data was also collected in a community health survey of the 16-county region via telephone. Two hundred community members completed the random-sample survey.

The Madison County community was engaged in the health assessment process via local data interpretation and priority setting.

## List of Health Priorities

The priority areas selected during the 2011 Madison County Community Health Assessment process were; Chronic Disease, Child Health, and Mental Health/Substance Abuse. Keeping in mind how poverty and access to care affect each of these areas. After careful review of the 2012 Madison Community Health Assessment findings it was determined that our priority areas did not change. However, a few clarifications were made to the areas to create a clearer focus. Our priority areas for 2012 are: Improve access to preventive care and treatment for chronic disease, improve child health outcomes, and improve access to mental health services. Poverty continues to play a major role in these areas.

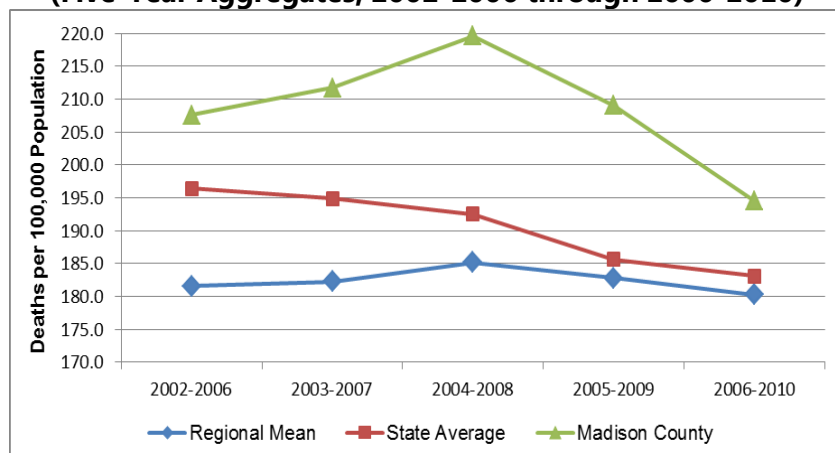
## General Review of Data and Trends

The following key data and trends helped support the determination of each of the three health priorities. This is only a snapshot of each area, more detail can be found in the full report.

### 1. Improve access to preventive care and treatment for chronic disease

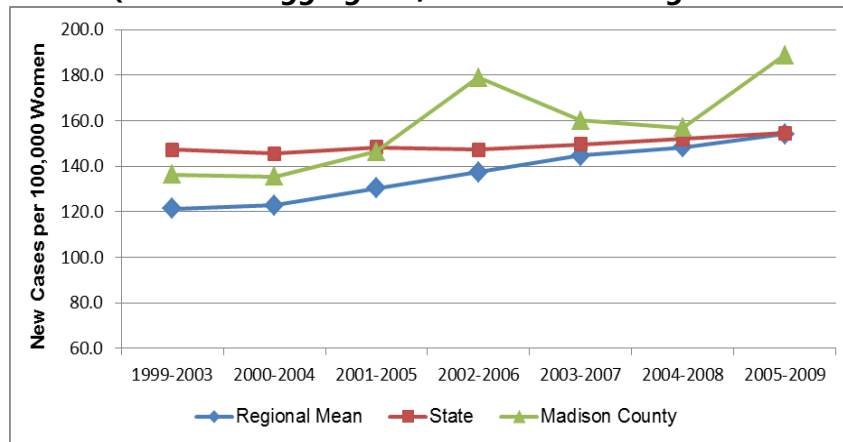
Cancer is the leading cause of death in Madison County. The total cancer mortality rate in Madison County is higher than the regional and state rates.

**Total Cancer Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



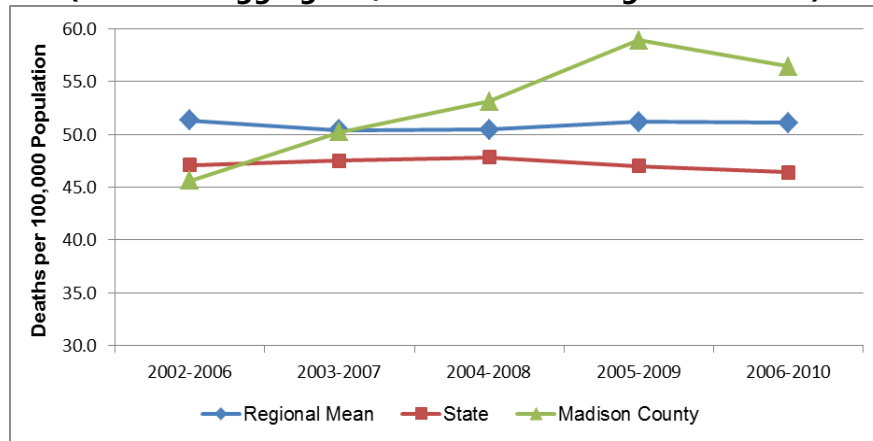
In Madison County incidence rates for breast, prostate, and lung cancer are above the comparable incidence rates for WNC, and the county incidence rates for breast cancer and lung cancer are also higher than the comparable NC rates. The breast cancer incidence rate has been increasing in all three jurisdictions over the past several years, but at the fastest pace in Madison County. The BCCCP at the health department provides some resources for patients to have clinical breast exams and mammograms. However, funding always runs out before all are served. MCHD has sought funding through other sources in the past to supplement state funds. In addition, there are no diagnostic resources in Madison County for patients to receive mammograms. Patients must go out of the county for this service, which presents a barrier for some (i.e. transportation, time off from work, etc.)

**Breast Cancer Incidence, New Cases per 100,000  
Women (Five-Year Aggregates, 1999-2003 through 2005-2009)**



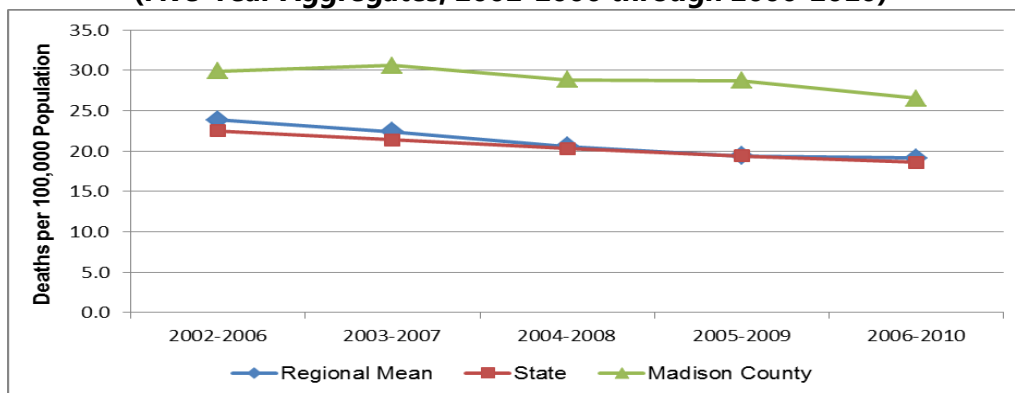
Chronic Lower Respiratory Disease (CLRD) mortality rate in Madison County is higher than the WNC and NC rates. CLRD ranks third among the top three leading causes of death in the 40-64 age group for Madison County. Something not seen in WNC or NC. Lower respiratory disorders ranked third highest in emergency department visits for Madison County residents in 2010 and was the second leading cause of hospitalizations.

**CLRD Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



The pneumonia and influenza mortality rate in Madison County is also higher than the WNC and NC rates.

**Pneumonia and Influenza Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Heart Disease is the second leading cause of death in Madison County. Chest pain/ischemic heart disease ranked second highest in emergency department visits for Madison County residents in 2010 and cardiovascular/circulatory diseases was the leading cause of hospitalizations. We believe there to be a tobacco connection, but also issues around poverty which affects access to preventive care and treatment as well as isolation, either from the point of geographic landscape and/or related to the culture.

24.1% of people currently smoke in Madison County compared to 20.6% in WNC and 19.8% in NC. Also, 11.3% of people currently use smokeless tobacco in Madison County compared to 5.2% in WNC and 2.8% in NC. The high percentage of tobacco use may contribute to the high rates of cancer, in particular lung cancer, and the higher rates of respiratory disease in Madison County. The only tobacco cessation resource available to Madison County residents is the Quitline, which is in jeopardy due to funding.

## 2. Improve child health outcomes

The percentage frequency of smoking during pregnancy in Madison County was higher than the comparable mean percentages for WNC in every period except 2004-2008.

### Births to Mothers Who Smoked During the Prenatal Period (Five-Year Aggregates, 2001-2005 through 2005-2009)

Geography	2001-2005		2002-2006		2003-2007		2004-2008		2005-2009	
	#	%	#	%	#	%	#	%	#	%
Madison County	258	24.2	245	23.4	227	22.1	209	20.8	205	21.4
Regional Total	7,496	22.4	7,442	22.1	7,361	21.7	7,106	21.2	6,919	20.6
State Total	76,712	12.9	74,901	12.4	73,887	11.9	72,513	11.5	70,529	11.0

In Madison County 76% of grandparents living with their minor grandchildren also are the party responsible for their grandchildren's care. Compared to WNC and NC at around 51%.

### Grandparents Responsible for Grandchildren, 5-Year Estimate (2006-2010)

Geography	Family Composition		
	# Grandparents Living with Own Grandchildren (<18 Years)*	Grandparent Responsible for Grandchildren (under 18 years)	
		Est. #	%
Madison County	437	332	76.0
Regional Total	13,470	6,971	51.8
State Total	187,626	95,027	50.6

The average number of decayed, missing, or filled teeth discovered among kindergarteners screened in Madison County was 8% higher than the mean percentage for WNC and 57% higher than the state average. In addition, the ratio of Dentists to population is lower in Madison County than in WNC, NC, and the US.

## 3. Improve access to mental health services

28% of persons surveyed in 2011, expressed concern about finding or using mental health care/counseling services. And 27% of persons have been told they have depression/anxiety. In addition, the highest frequency of emergency department visits for Madison County residents (21.52%) in 2010 were psychiatric disorders.

## Poverty and Access

Poverty is clearly the greatest disparity to health in Madison County. The poverty rate for all ages in Madison County was higher than the comparable rates in both WNC and NC. Also, 31.3% of those surveyed in Madison County report lack of health insurance. In Madison County the number and percent of Medicaid-eligible persons increased every year since 2005, and the percent of Medicaid-eligible Madison County residents was higher than the comparable figures for WNC and NC for each year shown.

Contributing to poverty is the cost of housing and annual wage amounts. For example, in Madison County, WNC, and NC as a whole, a higher proportion of renters than mortgage holders spend 30% or more of household income on housing costs. And the annual wage per employee in Madison County is lower than the comparable figure for employees region-wide and statewide. **The annual wage during 2011 in Madison County was the second lowest for the 16 county WNC region.**

Poverty contributes to access to quality health care. 15.3% of persons surveyed in Madison County said they were unable to get needed medical care at some point in the past year, compared to 10.8% in WNC. The main reason being cost/no Insurance (74.7%). In Madison County 19.8% of those surveyed also reported not being able to get a prescription filled in the past year.

The ratio of health professionals to population is lower in all categories for Madison County than in WNC, NC, or the US which contributes to access to care issues as well.

## Next Steps

The 2012 Madison County Community Health Assessment will be shared with the Madison County Board of Health and Madison County Board of Commissioners. The Madison Community Health Consortium, a Healthy Carolinians Task Force, and Mission Hospital will be instrumental in reviewing the report and assisting with development of action plans to address the identified health priorities over the next four years.

In addition, Madison County, along with our partners in WNC Healthy Impact, will move forward with information in this Community Health Assessment to collaborative action planning and determining how we can most effectively impact health in western North Carolina. Including the possibility of creating a Community Health Improvement Plan (CHIP) to coordinate action and target resources in order to inform our action planning process.

Dissemination of this CHA report will include making all reports publicly available on the Madison County Health Department website, the WNC Healthy Impact website, and local libraries.

## CHAPTER 1 - INTRODUCTION

### Purpose of Community Health Assessment (CHA)

Community health assessment (CHA) is the foundation for improving and promoting the health of county residents. **Community-health assessment is a key step in the continuous community health improvement process.** The role of CHA is to identify factors that affect the health of a population and determine the availability of resources within the county to adequately address these factors.

A community health assessment (CHA), which refers both to a process and a document, investigates and describes the current health status of the community, what has changed since a recent past assessment, and what still needs to change to improve the health of the community. The *process* involves the collection and analysis of a large range of secondary data, including demographic, socioeconomic and health statistics, environmental data, as well as primary data such as personal self-reports and public opinion collected by survey, listening sessions, or other methods. The *document* is a summary of all the available evidence and serves as a resource until the next assessment. Together they provide a basis for prioritizing the community's health needs, and for planning to meet those needs.



Because it is good evidence-based public health practice, local health departments (LHDs) across North Carolina (NC) are required to conduct a comprehensive community health assessment at least every four years. It is required of public health departments in the consolidated agreement between the NC Division of Public Health and local public health departments. Furthermore, it is required for local public health department accreditation through the NC Local Health Department Accreditation Board (G.S. § 130A-34.1). As part of the Affordable Care Act, non-profit hospitals are also now required to conduct a community health (needs) assessment at least every three years.

The local health department usually conducts the CHA as part (and usually the leader) of a team composed of representatives from a broad range of health and human service and other organizations within the community. Community partners and residents are part this process as well.

### **Definition of Community**

Community is defined as "county" for the purposes of the North Carolina Community Health Assessment Process. In western North Carolina, hospitals define their community as one or more counties for this process. Madison county is included in Mission Hospitals community for the purposes of community health improvement and investment, and as such Mission Hospital was a key partner in this local level assessment process.

## **WNC Healthy Impact**

WNC Healthy Impact is a partnership between hospitals and health departments in North Carolina to improve community health. As part of a larger, and continuous, community health improvement process, these partners are collaborating to conduct community health (needs) assessments across western North Carolina. See [www.WNCHealthyImpact.com](http://www.WNCHealthyImpact.com) for more details about the purpose and participants of this region-wide effort.

The regional work of WNC Healthy Impact is supported by a steering committee, workgroups, local agency representatives, and a public health/data consulting team. In addition, for this data collection phase of our regional efforts, a survey vendor (PRC – Professional Research Consultants, Inc.) was hired to administer a region-wide telephone survey. Various partners, coalitions, and community members are also engaged at the local level. The template for this CHA report, a core set of secondary and survey (primary) data, and analysis support, were made available through this collaborative regional effort.

## **Data Collection Process**

### **Core Dataset Collection**

As part of WNC Healthy Impact, a regional data workgroup of public health and hospital representatives and regional partners, with support from the consulting team, made recommendations to the steering committee on the data approach and content used to help inform regional data collection. The core regional dataset was informed by stakeholder data needs, guidelines, and requirements. From data collected as part of this core dataset, the consulting team compiled secondary (existing) data and new survey findings for each county in the 16-county region. This assessment includes data integrated from the secondary data efforts as well as the community health survey for our county. See [Appendix A](#) for details on the data collection methodology.

### **Criteria for selecting “highlights”**

The body of assessment data supporting this document is wide-ranging and complex. In order to develop a summary of major findings, the consultant team applied three key criteria to nominate data for inclusion in this report. The data described in this report was selected because:

- County statistics deviate in significant ways from WNC regional data or NC statistics;
- County trend data show significant change—positive or negative—over time; or
- County data demonstrate noteworthy age, gender, or racial disparities.

Supplementary to this report is the *WNC Healthy Impact Secondary Data Workbook (Data Workbook)* that contains complete county-level data as well as the state and regional averages and totals described here. Data contained in the *Data Workbook* is thoroughly referenced as to source. Readers should consult the *Data Workbook* to review all of the secondary data comprising the regional summaries.

Unless specifically noted otherwise, all tables, graphs and figures presented in this report were derived directly from spreadsheets in the *Data Workbook* or survey data reported by the survey vendor (PRC).

## Definitions & Data Interpretation Guidance

Reports of this type customarily employ a range of technical terms, some of which may be unfamiliar to many readers. This report defines technical terms within the section where each term is first encountered.

Health data, which composes a large proportion of the information included in this report, employs a series of very specific terms which are important to interpreting the significance of the data. While these technical health data terms are defined in the report at the appropriate time, there are some data caveats that should be applied from the onset. [See Appendix A](#) for additional details and definitions.

## Community Engagement

In the random-sample survey that was administered in our county as part of this community health assessment, 200 community members completed a questionnaire regarding their health status, health behaviors, interactions with clinical care services, support for certain health-related policies, and factors that impact their quality of life. In addition, in our county, community members and partners were involved in data interpretation and priority setting.

## Priority Setting

Details on our county's priority setting process and outcomes are included in [Chapter 9](#) of this document.



## CHAPTER 2 – DEMOGRAPHIC AND SOCIOECONOMIC PARAMETERS

### Location and Geography

Madison County offers 288,800 scenic acres (452 square miles) of beautiful mountains and fertile valleys. With whitewater rafting, snow skiing, the Appalachian Trail, scenic byways and a hot natural mineral spring, Madison County is rich in outdoor recreational opportunities. Nearly 73% of the county is forest land and nearly 25% of the county acreage is managed by the U.S. Forest Service. Madison, ranking 53 in size among North Carolina's 100 counties, is located 15 miles north of Asheville on the North Carolina/Tennessee border of the Smoky Mountains of Appalachia. The terrain is steep to gently rolling, with elevations ranging from 1,280 feet to 5,516 feet, the lowest running along the French Broad River into Tennessee. The diverse topography of Madison County, with several peaks over 5,000 feet in elevation and the low French Broad River Valley, provides for spectacular scenic visits. More than 15,000 acres of the county are located in the Pisgah National Forest.

The Appalachian Trail runs along much of the northern border of the county. In addition to the natural beauty, Madison County is defined by its rural nature. There are a little more than 20,000 residents and no McDonalds in the county. Approximately 79% of the roads throughout the county are paved at this time. Nine miles of Interstate 26 follows the eastern side of the county into Tennessee. This was the first stretch of interstate in North Carolina to be designated a scenic byway.

**Table 1 Driving Times**

<i>Driving Times From</i>	
Asheville, N.C.	20 minutes
Charlotte, N.C.	3 hours
Raleigh, N.C.	4.5 hours
Knoxville, Tenn.	1.5 hours
Johnson City, Tenn.	1 hour
Columbia, S.C.	3 hours

There are three municipalities located in the county:

- Mars Hill, population 1,798
- Marshall, the county seat, population 828
- Hot Springs, population 635.

Mars Hill is home to Mars Hill College which is one of the few colleges in the nation to have a competitive clogging team that offers scholarships. Due to the presence of the college, residents of the town and county enjoy a variety of cultural, intellectual and entertainment offerings than would usually be found in a town of its size.

The county seat of Marshall is experiencing a revitalization effort that has led to extensive renovations of old buildings and a greater appreciation for the uniqueness of its architecture. The Madison County Arts Council sponsors many programs and events throughout the year. Buildings that housed Marshall Elementary and Marshall High School, public schools that were erected on an island in the French Broad River, have been renovated for artists, their studios and galleries.

Hot Springs is the smallest town in the county. It is located in the Pisgah National Forest where the Appalachian Trail intersects with the French Broad River. Outdoor recreation is abundant in the area with activities such as rafting, kayaking, and backpacking. In addition, Hot Springs boasts the Hot Springs Resort and Spa which is known for its natural, mineral-rich springs and offers private tubs for soaking.

Madison County has a single public school system that is comprised of four elementary schools, one middle school and one high school, both of which are located in Marshall. There are approximately 2600 students in the school system. Mars Hill College, a private Liberal Arts College, was founded in 1856 and is the oldest college in western North Carolina. The college has reorganized into three schools: Education and Leadership; Business and Community Service; and Arts and Science. The Madison Campus of Asheville-Buncombe Technical Community College, located in Marshall, offers training in tailored trade and technical classes, and industrial training.

## History

In 1783 the newly formed Government of the United States of America opened the land west of the Blue Ridge Mountains. Most of the land was granted to veterans of the Revolutionary War. One of the first known settlers to Madison County was Samuel Davidson in 1784. He was soon killed by the Cherokee Indians. A number of the early settlers were from Scotland and chose this place because it was more like their homeland. Many of their ways and customs still thrive in these beautiful mountains.

At first, they followed the Indian trails and the many streams that line the hollows. Later, they moved along the wagon road from Virginia and Tennessee over Sams Gap and along the old gravel stagecoach road by the French Broad River, known as the Buncombe Turnpike.

The Buncombe Turnpike was completed along the French Broad River through Hot Springs (called Warm Springs at the time) in 1828, connecting Tennessee and Kentucky to the east coast. It was the superhighway of the South at the time. Madison County is home to some of the finest fiddlers and "pickers" and is known for its traditional mountain music. It is also a center for handmade arts and crafts and is rich in historical sites. Many of the sites are located along the former Drovers Trail, the primary route from Tennessee farms to South Carolina markets. Farmers drove thousands of horses, cattle, hogs, and other livestock to markets in Charleston and Augusta on the Turnpike and stopped in Hot Springs to take the waters along the way until the railroad first appeared in 1882.

The advent of the railroad ended this trade, but built up Hot Springs as a resort for the wealthy seeking cool mountain air and restoration in the mineral baths. Recognizing the potential for tourism, James Patton of Asheville bought the springs in 1831 and by 1837 had built the 350-room Warm Springs Hotel with thirteen tall columns commemorating the first colonies. Because of its size and grandeur, it was called Patton's White House. Its dining room could seat 600 people. In the hotel's ballroom, the second largest in the state, Frank Johnson, son of President Andrew Johnson, met his bride, Bessie Rumbough, daughter of the hotel owner. In 1884, the hotel burned.

Rebuilt in 1886, the Mountain Park Hotel was one of the most elegant resorts in the country during its heyday. It consisted of the 200-room hotel, a barn and stables, a spring house, and a bath house of sixteen marble pools, surrounded by landscaped lawns with croquet and tennis courts. The Mountain Park Hotel established the first organized golf club in the Southeast with a nine-hole course. This hotel burned in 1920, never to be rebuilt.

The railroad also opened up the county to logging companies, and several communities such as Runion and Stackhouse, had flourished during the days of the lumber mills. These communities are now long gone.

The large area of land that is now Madison County was a part of Rutherford and Burke counties. Buncombe was carved off partly from these counties in 1792 and covered what is now eleven counties. These counties were sliced off from Buncombe a few at a time. Between 1792 and 1851, Madison was a part of Buncombe County.

Madison County was formed in 1851 and was named for President James Madison. The county seat of Marshall (originally called Lapland) was named for U.S. Chief Justice John Marshall. Mars Hill College was founded in 1856 and is the oldest college in Western North Carolina on its original site. The college's name (which became the town's name) comes from "Mars' hill" mentioned in the Bible, in Acts 17:22. On this site, Paul preached to the Athenians about Jesus and the resurrection.

Some of the pioneer families of Madison County include: Absolem Buckner; Garrett Ramsey; David and Rachel Davis; Thomas Ramsey; Colston Hagan; and James Marion Payne. These mountain people were proud people, free and self-sufficient. Their word was their bond and they disliked government handouts. They cultivated a strong sense of family and the importance of a hard day's work. These attributes have carried over to the present. A couple of mountain sayings include: "Beware of the man whose overalls show more wear on the seat than the front"; and "A man's never so tired he can't lift a hand to wave 'hello'".

When the railroad lost ground to automobile transportation, Madison County settled back into isolation from the forces developing the rest of the United States. The state found it too expensive to build roads in the mountains until the early 1960s, when road building in Appalachia received greater priority. Recently, major road improvements were made along several routes, including improvements on Highway 25-70 and the upgrading of U.S. Highway 23 to Interstate I-26.

As Madison County changes, it is important to preserve the mountain traditions, culture and environment. This can be a challenge as young people move away from this rural county and non-natives relocate here instead. Fortunately, many individuals recognize the need and work hard to promote our strong mountain values and culture.

## Population

Understanding the growth patterns and age, gender and racial/ethnic distribution of the population in Madison County will be keys in planning the allocation of health care resources for the county in both the near and long term.

### **Current Population (Stratified by Gender, Age, and Race/Ethnicity)**

According to data from the 2010 US Census, the total population of Madison County is 20,764. In Madison County, as region-wide and statewide, there is a slightly higher proportion of females than males (50.5% vs. 49.5%).

**Table 1. Overall Population and Distribution, by Gender (2010)**

Geography	Total Population (2010)	# Males	% Males	# Females	% Females
Madison County	20,764	10,273	49.5	10,491	50.5
Regional Total	759,727	368,826	48.5	390,901	51.5
State Total	9,535,483	4,645,492	48.7	4,889,991	51.3

In Madison County 17.7% of the population is in the 65-and-older age group, compared to 19.0% region-wide and 12.9% statewide (Table 2). The median age in Madison County is 49.5, while the regional mean median age is 44.7 years and the state median age is 37.4 years (Table 2).

**Table 2. Median Age and Population Distribution, by Age Group (2010)**

Geography	Median Age	# Under 5 Years Old	% Under 5 Years Old	# 5-19 Years Old	% 5-19 Years Old	# 20 - 64 Years Old	% 20 - 64 Years Old	# 65 Years and Older	% 65 Years and Older
Madison County	49.5	939	4.5	3,890	18.7	12,269	59.1	3,666	17.7
Regional Total	44.7	40,927	5.4	132,291	17.4	441,901	58.2	144,608	19.0
State Total	37.4	632,040	6.6	1,926,640	20.2	5,742,724	60.2	1,234,079	12.9

In terms of racial and ethnic diversity, Madison County is less diverse than either WNC or NC as a whole, except for a larger population of Native Hawaiian or Other Pacific Islanders (0.3%). In Madison County the population is 96.5% white/Caucasian and 3.5% non-white. Region-wide, the population is 89.3% white/Caucasian and 11.7% non-white. Statewide, the comparable figures are 68.5% white and 31.5% non-white (Table 3). The proportion of the population that self-identifies as Hispanic or Latino of any race is 2.0% in Madison County, 5.4% region-wide, and 8.4% statewide (Table 3).

The racial and ethnic diversity within the 16 counties that compose the region is quite varied, and readers should consult the *Data Workbook* to understand those differences.

**Table 3. Population Distribution, by Racial/Ethnic Groups, as Percent of Overall Population (2010)**

Geography	White	Black or African American	American Indian, Alaskan Native	Asian	Native Hawaiian, Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any race)
Madison County	96.5	1.2	1.2	0.2	0.3	0.5	1.3	2.0
Regional Total	89.3	4.2	1.5	0.7	0.1	2.5	1.8	5.4
State Total	68.5	21.5	1.3	2.2	0.1	4.3	2.2	8.4

### **Population Growth Trend**

Between the 2000 and 2010 US Censuses the population of Madison County grew by 5.4% and the population of WNC grew by 13.0% (Table 4). The rate of growth in the county is projected to double over the next 10 years before slowing to half of that rate of growth in the decade following 2020. The overall 30-year growth rate for Madison County (25.7%) is lower than the comparable growth rates for both the region (38.2%) and the state (44.5%).

**Table 4. Decadal Population Growth Rate (2000 to 2030)**

Geography	% Total Population Growth			
	2000 to 2010	2010 to 2020	2020 to 2030	2000 to 2030
Madison County	5.4	11.5	6.6	25.7
Regional Total	13.0	11.6	9.6	38.2
State Total	15.6	11.3	9.6	44.5

The growth rate of a population is a function of emigration and death rates on the negative side, and immigration and birth rates on the positive side. As illustrated by the data in Table 5, the birth rate in Madison County, lower than the comparable mean WNC and NC rates to begin with, decreased steadily from 10.4 to 9.1 births per 1,000 persons over the five aggregate periods between 2002-2006 and 2006-2010 (Table 5). Region-wide the birth rate was stable at around 10.8 for several years before falling recently to 10.5. Statewide, the birth rate, stable for several years around 14.2, fell recently to 13.8.

**Table 5. Birth Rate, Five 5-Year Aggregate Period (2002-2006 through 2006-2010)**

Geography	2002-2006	2003-2007	2004-2008	2005-2009	2006-2010
Madison County	10.4	10.1	9.8	9.3	9.1
Regional Arithmetic Mean	10.8	10.8	10.8	10.7	10.5
State Total	14.2	14.2	14.2	14.1	13.8

### **Older Adult Population Growth Trend**

As noted previously, the age 65-and-older segment of the population represents a larger proportion of the overall population in Madison County and WNC than in the state as a whole. In terms of future health resource planning, it will be important to understand how this segment of the population, a group that utilizes health care services at a higher rate than other age groups, is going to change in the coming years. Table 6 presents the decadal growth trend for the age 65-and-older population, further stratified into smaller age groups, for the decades from 2010 through 2030. These data illustrate how the population age 65-and-older in the county is going to increase over the coming two decades. Calculated from the figures in Table 6, the percent increase anticipated for each age group in Madison County between 2010 and 2030 is 43.0% for the 65-74 age group, 76.4% for the 75-84 age group, and 40.9% for the 85+ age group. In WNC as a whole, the 65-74 age group is projected to grow by 24.0%, the 75-84 age group by 52.5%, and the 85+ age group by 40.0% over the same period of time.

**Table 6. Population Age 65 and Older (2010 through 2030)**

Geography	2010 Census Data				2020 (Projected)				2030 (Projected)			
	<i>Total % Age 65 and Older</i>	<i>% Age 65-74*</i>	<i>% Age 75-84</i>	<i>% Age 85+</i>	<i>% Age 65 and Older</i>	<i>% Age 65-74</i>	<i>% Age 75-84</i>	<i>% Age 85+</i>	<i>% Age 65 and Older</i>	<i>% Age 65-74</i>	<i>% Age 75-84</i>	<i>% Age 85+ *</i>
Madison County	17.7	10.0	5.5	2.2	23.4	14.1	6.8	2.5	27.1	14.3	9.7	3.1
Regional Total	19.0	10.4	6.1	2.5	23.5	13.2	7.4	2.9	25.7	12.9	9.3	3.5
State Total	12.9	7.3	4.1	1.5	16.6	9.9	4.9	1.8	19.3	10.6	61.8	2.2

### **Composition of Families with Children**

Data in Table 7 illustrates that the percentage of households with children headed by a married couple is slightly smaller in Madison County than in WNC (17.0% vs. 17.2%) but smaller than the comparable figure for NC as a whole (17.0% vs. 20.1%).

**Table 7. Composition of Family Households, 5-Year Estimate (2006-2010)**

Geography	Family Composition						
	# Total Households*	Family Household** Headed by Married Couple (with children under 18 years)		Family Household Headed by Male (with children under 18 years)		Family Household Headed by Female (with children under 18 years)	
		Est. #	%	Est. #	%	Est. #	%
Madison County	8,002	1,361	17.0	111	1.4	432	5.4
Regional Total	318,280	54,822	17.2	5,322	1.7	17,134	5.4
State Total	3,626,179	729,708	20.1	78,051	2.2	282,131	7.8

\* A household includes all the people who occupy a housing unit. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people who share living arrangements.

\*\* A family consists of a householder and one or more other people living in the same household who are related to the householder by birth, marriage, or adoption. All people in a household who are related to the householder are regarded as members of his or her family. A family household may contain people not related to the householder, but those people are not included as part of the householder's family in tabulations.

\*\*\* Family composition percentages are based on total number of households. Numerator is number of family households (headed by male, female or married couple) with children under 18 years; denominator is total number of households.

In Madison County, 76.0% of grandparents living with their minor grandchildren also are the party responsible for their grandchildren's care. In WNC as in NC as a whole, the comparable figure is about 51% (Table 8).

**Table 8. Grandparents Responsible for Grandchildren, 5-Year Estimate (2006-2010)**

Geography	Family Composition		
	# Grandparents Living with Own Grandchildren (<18 Years)*	Grandparent Responsible for Grandchildren (under 18 years)	
		Est. #	%
Madison County	437	332	76.0
Regional Total	13,470	6,971	51.8
State Total	187,626	95,027	50.6

\* Grandparents responsible for grandchildren - data on grandparents as caregivers were derived from American Community Survey questions. Data were collected on whether a grandchild lives with a grandparent in the household, whether the grandparent has responsibility for the basic needs of the grandchild, and the duration of that responsibility. Responsibility of basic needs determines if the grandparent is financially responsible for food, shelter, clothing, day care, etc., for any or all grandchildren living in the household. Percent is derived with the number of grandparents responsible for grandchildren (under 18 years) as the numerator and number of grandparents living with own grandchildren (under 18 years) as the denominator.



### **Military Veteran Population**

Military veterans compose a higher proportion of the total civilian population in WNC than in either NC or the US as a whole. Calculating from figures in Table 9, veterans make up 10.9% of the civilian population in Madison County, compared to 12.4% in the WNC region, 10.8% statewide, and 9.9% nationally. In Madison County, approximately 44% of the veteran population is 65 years of age or older; the comparable proportions are 49% for the WNC mean, 36% for NC statewide, and 40% nationwide.

**Table 9. Population of Military Veterans, 5-Year Estimate (2006-2010)**

Geography	Civilian Population 18 years and over			% Veterans by Age				
	Total	Veterans	Nonveterans	18 to 34 years	35 to 54 years	55 to 64 years	65 to 74 years	75 years and over
Madison County	16,448	1,785	14,663	2.4	28.2	25.5	20.7	23.2
Regional Total	593,603	73,783	519,820	n/a	n/a	n/a	n/a	n/a
Regional Arithmetic Mean	n/a	n/a	n/a	3.6	19.3	28.1	24.1	24.9
State Total	6,947,547	747,052	6,200,495	8.7	30.0	25.7	17.9	17.8
National Total	228,808,831	22,652,496	206,156,335	7.8	26.3	25.4	19.0	21.4

## **Education**

It is helpful to understand the level of education of the general population, and with what frequency current students stay in school and eventually graduate.

### **Educational Attainment**

Table 10 provides data on the proportion of the population age 25 and older with one of three levels of educational attainment: high school or equivalent, some college, and a bachelor's degree or higher. In these terms, in 2006-2010, Madison County had a higher proportion (34.2%) than WNC as a whole (32.2%) of residents age 25 or older possessing a high school diploma or its equivalent, and a higher proportion than NC as a whole (28.2%). On the other hand, the overall proportion of the Madison County population with *more* than a high school diploma or equivalency is smaller than for WNC or NC as a whole. The county has a 21% lower proportion of persons age 25 and older with some college than does the region (16.2% vs. 20.5%), and a 22% lower proportion than does the state (16.2% vs. 20.9%). At the bachelor's degree level and greater the proportional attainment in the county (19.2%) is 5% smaller than the comparable mean regional figure (20.2%) and 26% smaller than statewide figure (26.1%).

Table 10. Educational Attainment of Population Age 25 and Older,

**Table 10. Two 5-Year Estimates (2005-2009 and 2006-2010)**

Geography	2005-2009				2006-2010			
	Total Population Age 25 Years and Older	% High School Graduation Rate (Includes equivalency)	% Some College	% Bachelor's Degree or Higher	Total Population Age 25 Years and Older	% High School Graduation Rate (Includes equivalency)	% Some College	% Bachelor's Degree or Higher
Madison County	14,038	33.4	16.3	19.4	14,375	34.2	16.2	19.2
Regional Total	511,076	n/a	n/a	n/a	532,838	n/a	n/a	n/a
Regional Arithmetic Mean	31,942	32.2	19.6	19.9	33,302	32.2	20.5	20.2
State Total	5,940,248	28.6	20.4	25.8	6,121,611	28.2	20.9	26.1

**Drop-Out Rate Trend**

For each of the last four years of the period cited in Table 11, the high school drop-out rate for Madison County public schools was higher than the comparable mean rate for the 17 school districts in WNC (one per county plus Asheville City Schools) and higher than the rate for all NC public schools as well for the first three school years shown in the table. Beginning in SY2009-2010 the Madison County drop-out rate fell dramatically to lower than the comparable rates in the other two jurisdictions.

The county has implemented various programs over the past several years that may be contributing to this decrease. A grant was obtained by the schools to focus on drop-out prevention. In addition, the first school based health center was opened in the county.

**Table 11. High School Drop-Out Numbers and Rates (SY2006-2007 through SY2010-2011)**

Geography	SY2006-2007		SY2007-2008		SY2008-2009		SY2009-2010		SY2010-2011	
	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate
Madison County	51	6.04	59	7.19	55	6.80	23	2.92	21	2.64
Regional Total	1,756	n/a	1,651	n/a	1,385	n/a	1,129	n/a	1,019	n/a
Regional Arithmetic Mean	n/a	5.66	n/a	5.58	n/a	4.51	n/a	3.61	n/a	3.36
State Total	23,550	5.27	22,434	4.97	19,184	4.27	16,804	3.75	15,342	3.43

### **Current High School Graduation Rate**

The four-year cohort graduation rates for subpopulations of 9<sup>th</sup> graders entering high school in SY2007-2008 and graduating in SY2010-2011 are presented in Table 12. In Madison County the graduation rates for all subpopulations exceeded the mean graduation rate for the 17 school districts in WNC, as well as the comparable rates for NC as a whole. The graduation rate for the population of economically disadvantaged students in Madison County is 4.0 points lower than the county's overall graduation rate. At the region- and state-level the graduation rate for economically disadvantaged students is approximately 6.7 points lower than the comparable overall graduation rates.

**Table 12. 4-Year Cohort High School Graduation Rate  
SY2007-2008 Entering 9th Graders Graduating in SY2010-2011 or Earlier**

Geography	Total Number of Students	% Students Graduating				
		All Students	Males	Females	Economically Disadvantaged	Limited English Proficiency
Madison County	187	81.8	75.8	88.6	77.8	n/a
Regional Total	7,545	78.8	75.2	82.5	72.0	57.2
State Total	110,377	77.9	73.8	82.2	71.2	48.1

### **Income**

There are several income measures that can be used to compare the economic well-being of communities, among them median household income, and median family income.

#### **Median Household and Family Income**

As calculated from the most recent estimate (2006-2010), the median *household* income in Madison County was \$38,580 compared to a mean WNC median household income of \$37,815, a difference of \$765 *more* in Madison County. The median household income in Madison County was over \$6,900 lower than the comparable state average for both the periods cited in Table 13, but the gap narrowed by \$579 from 2005-2009 to 2006-2010.

As calculated from the most recent estimate (2006-2010), the median *family* income in Madison County was \$49,838, compared to a mean WNC median family income of \$47,608, a difference of \$2,230 *more* in Madison County. The median family income in Madison County was more than \$6,300 *lower* than the comparable state average for both periods cited in Table 13, although the gap narrowed by \$475 between 2005-2009 and 2006-2010.

**Table 13. Median Household and Median Family Income****5-Year Estimates (2005-2009 and 200-2010)**

Geography	2005-2009				2006-2010			
	Median Household Income*		Median Family Income**		Median Household Income		Median Family Income	
	\$	\$ Difference from State	\$	\$ Difference from State	\$	\$ Difference from State	\$	\$ Difference from State
Madison County	37,500	-7,569	48,739	-6,790	38,580	-6,990	49,838	-6,315
Regional Arithmetic Mean	37,107	-7,962	46,578	-8,951	37,815	-7,756	47,608	-8,545
State Total	45,069	n/a	55,529	n/a	45,570	n/a	56,153	n/a

\* Median household income is the incomes of all the people 15 years of age or older living in the same household (i.e., occupying the same housing unit) regardless of relationship. For example, two roommates sharing an apartment would be a household, but not a family.

\*\* Median family income is the income of all the people 15 years of age or older living in the same household who are related through either marriage or bloodline. For example, in the case of a married couple who rent out a room in their house to a non-relative, the household would include all three people, but the family would be just the couple.

**Population in Poverty**

The *poverty rate* is the percent of the population (both individuals and families) whose money income (which includes job earnings, unemployment compensation, social security income, public assistance, pension/retirement, royalties, child support, etc.) is below a federally established threshold. (This is the "100%-level" figure.)

Table 14 shows the estimated annual poverty rate for two five year periods: 2005-2009 and 2006-2010. The table also presents an estimate for the number of persons living below 200% of the Federal poverty rate, since this figure is often used as a threshold for determining eligibility for government services. The data in this table describe an overall rate, representing the entire population in each geographic entity. As subsequent data will show, poverty may have a strong age component that is not detectable in these numbers.

The 100%-level poverty rate in Madison County was 16.9% in both 2005-2009 and 2006-2010 period. In both of these periods, the poverty rate in Madison County was higher than the comparable rates in both WNC and NC. As calculated from figures in Table 14, the 200%-level poverty rate in Madison County was 38.1% in the 2005-2009 period and fell to 37.1% in the 2006-2010 period, a decrease of 2.6%. In WNC the 200% poverty rate was 36.6% in the 2005-2009 period and rose to 37.3% in the 2006-2010 period, an increase of 1.9%. Statewide, the 100%-level poverty rate rose from 15.1% to 15.5% (an increase of 2.6%) and the 200%-level poverty rate rose from 35.0% to 35.6% (an increase of 1.7%) over the same time frame.

**Table 14. Population in Poverty, All Ages  
5-Year Estimates (2005-2009 and 2006-2010)**

Geography	2005-2009				2006-2010			
	Population Estimate	# Below Poverty Level	% Below Poverty Level	# Below 200% Federal Poverty Level	Population Estimate	# Below Poverty Level	% Below Poverty Level	# Below 200% Federal Poverty Level
Madison County	19,220	3,244	16.9	7,319	19,502	3,294	16.9	7,240
Regional Total	697,685	103,966	14.9	255,556	726,827	113,990	15.7	271,215
State Total	8,768,580	1,320,816	15.1	3,066,957	9,013,443	1,399,945	15.5	3,208,471

Table 15 presents similar data focusing this time exclusively on children under the age of 18. From these data it is apparent that children throughout WNC and NC as a whole suffer disproportionately from poverty. In Madison County the 2005-2009 poverty rate for young persons (17.4%) was 3.0% higher than the overall rate (16.9%), and the 2006-2010 poverty rate for young people (19.9%) was 17.8% higher than the overall rate (16.9%). Childhood poverty increased in both WNC and NC between the 2005-2009 and 2006-2010 periods, rising by 5.2% in WNC and 3.8% statewide. During this same interval, childhood poverty in Madison County increased 14.4%, from 17.4% to 19.9%.

**Table 15. Population in Poverty, Under Age 18  
5-Year Estimates (2005-2009 and 2006-2010)**

Geography	2005-2009			2006-2010		
	Population Estimate	# Below Poverty Level	% Below Poverty Level	Population Estimate	# Below Poverty Level	% Below Poverty Level
Madison County	3,975	693	17.4	4,087	814	19.9
Regional Total	146,592	31,196	21.3	149,649	33,486	22.4
State Total	2,173,508	452,280	20.8	2,205,704	476,790	21.6

### **Housing Costs**

Because the cost of housing is a major component of the overall cost of living for individuals and families it merits close examination. Table 16 presents housing costs as a percent of total household income, specifically the percent of housing units—both rented and mortgaged—for which the cost exceeds 30% of household income.

In Madison County, the percentage of *rental* housing units costing more than 30% of household income was 35.5% in the 2005-2009 period and 34.7% in the 2006-2010 period, a decrease of 2%. In WNC, the comparable percentage was 38.9% in the 2005-2009 period and 40.5% in the 2006-2010 period, an increase of 4%. These percentages correspond to state figures of 43.0% and 44.0%, respectively, with a state-level increase of only 2%. The percent of *mortgaged* housing units in Madison County costing more than 30% of household income was 25.8% in 2005-2009 and 26.4% in 2006-2010, an increase of 2%. Comparable figures for mortgaged housing units in WNC stood at 33.0% in 2005-2009 and 32.6% in 2006-2010, a decrease of 1%. These percentages compare to state figures of 31.4% and 31.7% in the same periods, and a state-level increase of not quite 1%. From these data it appears that in Madison County, WNC, and NC as a whole, a higher proportion of renters than mortgage holders spend 30% or more of household income on housing costs.

**Table 16. Estimated Housing Units Spending >30% Household Income on Housing  
5-Year Estimates (2005-2009 and 2006-2010)**

Geography	Renter Occupied Units				Mortgaged Housing Units			
	2005-2009		2006-2010		2005-2009		2006-2010	
	Total Units	% Units Spending >30%	Total Units	% Units Spending >30%	Total Units	% Units Spending >30%	Total Units	% Units Spending >30%
Madison County	2,029	35.5	1,856	34.7	2,899	25.8	2,829	26.4
Regional Total	82,441	38.9	86,022	40.5	122,383	33.0	132,668	32.6
State Total	1,131,480	43.0	1,157,690	44.0	1,634,410	31.4	1,688,790	31.7

Note: The percent of renter-occupied units spending greater than 30% of household income on rental housing was derived by dividing the number of renter-occupied units spending >30% on gross rent by the total renter-occupied units. Gross rent is defined as the amount of the contract rent plus the estimated average monthly cost of utilities (electricity, gas, and water and sewer) and fuels (oil, coal, kerosene, wood, etc.) if these are paid for by the renter (or paid for the renter by someone else). Gross rent is intended to eliminate differentials which result from varying practices with respect to the inclusion of utilities and fuels as part of the rental payment.

## Employment and Unemployment

The following definitions will be useful in understanding the data in this section.

- *Labor force* – includes all persons over the age of 16 who, during the week, are employed, unemployed or in the armed services.
- *Civilian labor force* – excludes the Armed Forces from the labor force equation.
- *Unemployed* – civilians not currently employed but are available for work and have actively looked for a job within the four weeks prior to the date of analysis; also, laid-off civilians waiting to be called back to their jobs, as well as those who will be starting new jobs in the next 30 days.
- *Unemployment rate* – calculated by dividing the number of unemployed persons by the number of people in the civilian labor force.

## **Employment**

Table 17 summarizes employment by sector. In Madison County the five sectors employing the greatest proportions of the workforce are, in descending order: (1) Educational Services (27.39%), (2) Health Care and Social Assistance (17.67%), (3) Public Administration (10.92%), (4) Retail Trade (9.65%), and (5) Manufacturing (8.91%). In WNC, the five leading employment sectors are: (1) Health Care and Social Assistance (18.52%), (2) Retail Trade (13.86%), (3) Accommodation and Food Services (11.43%), (4) Manufacturing (11.28%) and (5) Educational Services (9.19%). Statewide the comparably ordered list is composed of: (1) Health Care and Social Assistance (14.45%), (2) Retail Trade (11.66%), (3) Manufacturing (11.33%), (4) Educational Services (9.58%) and (5) Accommodation and Food Services (8.95%). The employment profile for WNC and NC lists are quite similar, with variations in WNC stemming from its relative lack of manufacturing jobs and the regionally greater significance of the tourism industry, represented by the Accommodations and Food Service sector. Madison County is quite different in that Accommodation and Food Service sector is not among the top five employers.

**Table 17. Insured Employment by Sector, Annual Summary (2011)**

Sector	Madison County		WNC	NC
	Avg. No. Employed	% Total Employment in Sector**	% Total Employment in Sector**	% Total Employment in Sector**
Agriculture, Forestry, Fishing & Hunting	*	n/a	0.58	0.74
Mining	*	n/a	0.24	0.08
Utilities	*	n/a	0.36	0.35
Construction	167	4.24	4.75	4.53
Manufacturing	351	8.91	11.28	11.33
Wholesale Trade	27	0.69	2.35	4.38
Retail Trade	380	9.65	13.86	11.66
Transportation & Warehousing	66	1.68	2.53	3.27
Information	11	0.28	1.35	1.82
Finance & Insurance	70	1.78	2.25	3.88
Real Estate & Rental & Leasing	18	0.46	0.93	1.23
Professional, Scientific & Technical Services	40	1.02	3.32	4.96
Management of Companies & Enterprises	*	n/a	0.49	2.01
Administrative & Waste Services	93	2.36	4.90	6.53
Educational Services	1,079	27.39	9.19	9.58
Health Care & Social Assistance	696	17.67	18.52	14.45
Arts, Entertainment & Recreation	135	3.43	1.73	1.58
Accommodation & Food Services	285	7.24	11.43	8.95
Public Administration	430	10.92	7.18	6.18
Other Services	91	2.31	2.76	2.49
Unclassified	n/a	n/a	0.00	n/a
TOTAL ALL SECTORS	3,939	100.00	100.00	100.00

Table 18 summarizes the annual average wage paid to employees in the various sectors. Data in Table 18 reveal that overall the annual wage per employee in Madison County (\$28,680) is \$3,464 lower than the comparable figure for employees region-wide (\$32,144) and \$18,092 lower than the average annual wage statewide (\$46,772). The annual wage in Madison County during 2011 was the second lowest in the 16-county WNC region.

**Table 18. Insured Wages by Sector, Annual Summary (2011)**

Sector	Average Annual Wage per Employee		
	Madison County	WNC	NC
Agriculture, Forestry, Fishing & Hunting	n/a	\$23,145	\$28,752
Mining	n/a	41,662	45,828
Utilities	n/a	72,196	76,552
Construction	23,842	31,190	41,316
Manufacturing	41,833	38,443	52,613
Wholesale Trade	23,976	36,182	61,194
Retail Trade	19,255	22,109	24,650
Transportation & Warehousing	37,688	39,117	43,400
Information	63,047	38,682	63,833
Finance & Insurance	41,657	42,881	75,088
Real Estate & Rental & Leasing	21,321	24,051	38,476
Professional, Scientific & Technical Services	32,137	36,584	66,951
Management of Companies & Enterprises	n/a	43,518	88,763
Administrative & Waste Services	20,722	25,753	30,258
Educational Services	24,391	32,604	39,787
Health Care & Social Assistance	24,178	32,843	42,811
Arts, Entertainment & Recreation	13,416	20,936	28,474
Accommodation & Food Services	14,858	14,424	14,877
Public Administration	30,301	33,818	43,641
Other Services	26,251	24,660	28,182
Unclassified	n/a	12,056	n/a
TOTAL ALL SECTORS	\$28,680	\$32,144	\$46,772

### ***Unemployment***

Table 19 summarizes the annual unemployment rate for 2007 through 2011. From these data it appears that the unemployment rate in Madison County was lower than comparable figures for both WNC and NC as a whole throughout the period from 2007-2011.



**Table 19. Unemployment Rate as Percent of Workforce,  
(2007 through 2011)**

Geography	Annual Average				
	2007	2008	2009	2010	2011
Madison County	3.9	5.7	9.6	9.9	9.8
Regional Arithmetic Mean	4.9	6.8	11.8	11.8	11.5
State Total	4.8	6.3	10.5	10.9	10.5

## Crime

Tables 20-22 present annual crime rates for Madison County, WNC and the state of NC for the 10 years from 2001 through 2010. Table 20 summarizes the "index crime rate", which is the sum of the violent crime rate (murder, forcible rape, robbery, and aggravated assault) *plus* the property crime rate (burglary, larceny, arson, and motor vehicle theft). Table 21 summarizes violent crime, and Table 22 summarizes property crime.

Data in Table 20 indicate that the index crime rate in Madison County was significantly lower than the mean WNC index crime rate and the NC index crime rate for every year cited in the table except 2002. The mean index crime rate in WNC was far lower than the comparable state rate for every year during the decade covered in the table. There is not enough information available from the data source to interpret annual variations in these rates.

**Table 20. Index Crime Rate (2001-2010)**

Geography	Index Crimes per 100,000 Population									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Madison County	715.9	4,451.6	819.3	854.2	1,257.5	1,350.7	1,531.9	1,359.8	1,395.8	1,340.0
Regional Arithmetic Mean	2,163.4	2,294.3	2,413.8	2,656.0	2,648.1	2,536.4	2,688.3	2,703.4	2,502.2	2,426.4
State Total	5,005.2	4,792.6	4,711.8	4,641.7	4,622.9	4,654.4	4,658.6	4,581.0	4,191.2	3,955.7

Table 21 separates the violent crime rate from the overall index crime rate for the same period cited above. As with overall index crime, violent crime rates in Madison County were lower than the comparable mean WNC rates and comparable state rates for every year cited except 2002. The mean violent crime rates in WNC are significantly lower than the rates for NC as a whole throughout the period cited in the table. According to data from the NC SCHS, there were a total of 148 homicides in the 16 WNC counties during the five-year period from 2006 through 2010, two of them in Madison County (*Data Workbook*).

**Table 21. Violent Crime Rate (2001-2010)**

Geography	Violent Crimes per 100,000 Population									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Madison County	77.1	623.5	56.5	67.4	149.2	116.5	104.3	21.1	57.1	56.9
Regional Arithmetic Mean	181.5	194.4	200.4	198.5	232.9	221.9	274.4	190.7	224.4	258.6
State Total	503.8	475.3	454.7	460.9	478.6	483.5	480.5	477.0	417.1	374.4

Table 22 separates the property crime rate from the overall index crime rate for the same period cited above. Comparing these figures to the index crime rate, it is clear that the majority of all index crime committed is property crime. In keeping with the pattern noted for index crime, the property crime rates for Madison County were well below the comparable WNC and NC rates for the entire period cited except 2002. The mean property crime rate for WNC was significantly lower than the comparable rate for NC as a whole from 2001-2010.

The source accessed for this data offers no explanation for unusual crime rates like the high rates registered for Madison County in 2002.

**Table 22. Property Crime Rate (2001-2010)**

Geography	Property Crimes per 100,000 Population									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Madison County	638.8	3,828.1	762.8	786.7	1,108.3	1,234.2	1,427.6	1,338.7	1,338.7	1,283.1
Regional Arithmetic Mean	1,981.9	2,093.9	2,215.2	2,423.1	2,410.3	2,298.7	2,468.3	2,494.0	2,262.1	2,228.4
State Total	4,501.4	4,317.3	4,257.1	4,180.7	4,144.3	4,170.9	4,178.1	4,103.9	3,774.1	3,581.4

## CHAPTER 3 – HEALTH STATUS AND HEALTH OUTCOME PARAMETERS

### Health Rankings

#### America's Health Rankings

Each year for 20 years, America's Health Rankings™, a project of United Health Foundation, has tracked the health of the nation and provided a comprehensive perspective on how the nation—and each state—measures up. America's Health Rankings is the longest running state-by-state analysis of health in the US (United Health Foundation, 2011).

America's Health Rankings are based on several kinds of measures, including *determinates* (socioeconomic and behavioral factors and standards of care that underlay health and well-being) and *outcomes* (measures of morbidity, mortality, and other health conditions). Together, the determinates and outcomes help calculate an overall rank. Table 23 shows where NC stood in the 2011 rankings relative to the "best" and "worst" states (where 1="best"). *When comparing county or regional health data with data for the state as a whole it is necessary to keep in mind that NC ranks 32<sup>nd</sup> overall, just outside the bottom third of the 50 US states.*

**Table 23. State Rank of North Carolina in America's Health Rankings (2011)**

Geography	National Rank (Out of 50)		
	Overall	Determinates	Outcomes
Vermont	1	1	5
North Carolina	32	31	38
Mississippi	50	48	50

Source: United Health Foundation, 2011. *America's Health Rankings*. Available at: <http://www.americahealthrankings.org/mediacenter/mediacenter2.aspx>

#### County Health Rankings

Building on the work of America's Health Rankings, the Robert Wood Johnson Foundation, collaborating with the University of Wisconsin Population Health Institute, supports a project to develop health rankings for the counties in all 50 states.

Each state's counties are ranked according to health outcomes and the multiple health factors that determine a county's health. Each county receives a summary rank for its health outcomes and health factors, and also for four different specific types of health factors: health behaviors, clinical care, social and economic factors, and the physical environment.

Below is a list of the parameters considered in each of the health outcome and health factor categories:

Health Outcomes – Mortality	Social and Economic Factors
Premature death	High school graduation
Morbidity	Some college
Poor or fair health	Unemployment
Poor physical health days	Children in poverty
Poor mental health days	Inadequate social support
Low birthweight	Children in single-parent households
Health Factors	Violent crime rate
Health Behaviors	Physical Environment
Adult smoking	Air pollution – particulate matter days
Adult obesity	Air pollution – ozone days
Physical inactivity	Access to recreational facilities
Excessive drinking	Limited access to healthy foods
Motor vehicle death rate	Fast food restaurants
Sexually transmitted infections	
Teen birth rate	
Clinical Care	
Uninsured	
Primary care physicians	
Preventable hospital stays	
Diabetic screening	
Mammography screening	

Table 24 presents the health outcome and health factor rankings for Madison County.

**Table 24. County Health Rankings via MATCH (2012)**

Geography	County Rank (Out of 100) <sup>1</sup>						Overall Rank
	Health Outcomes		Health Factors				
	Mortality	Morbidity	Health Behaviors	Clinical Care	Social & Economic Factors	Physical Environment	
Madison County	31	31	35	29	19	76	30

Source: *County Health Rankings and Roadmaps, 2012*. Available at <http://www.countyhealthrankings.org/app/north-carolina/2012/rankings/outcomes/overall>

## Pregnancy and Birth Data

### Pregnancy Rate

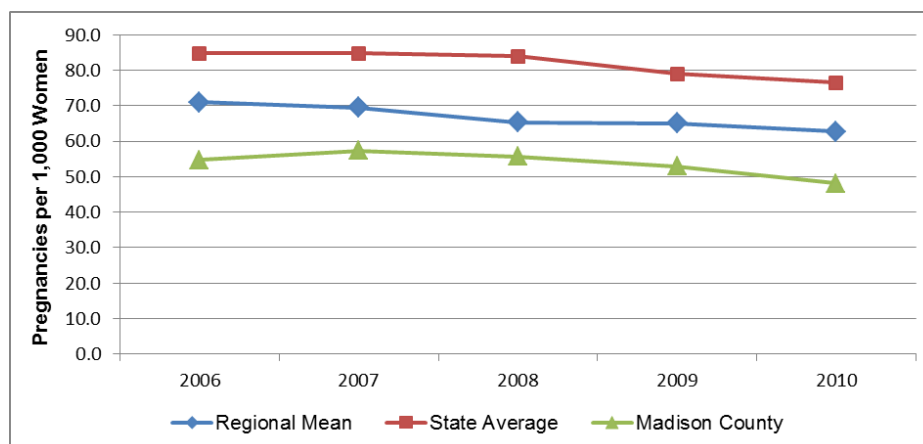
The following definitions and statistical conventions will be helpful in understanding the data on pregnancy:

- Reproductive age = 15-44
- Total pregnancies = live births + induced abortions + fetal death at >20 weeks gestation
- Pregnancy rate = number of pregnancies per 1,000 women of reproductive age
- Fertility rate = number of live births per 1,000 women of reproductive age
- Abortion rate = number of induced abortions per 1,000 women of reproductive age

The NC SCHS stratifies much of the pregnancy-related data it maintains into two age groups: ages 15-44 (all women of reproductive age) and ages 15-19 ("teens"). Figures below present pregnancy rate data for ages 15-44 and 15-19. Note that regional rates are presented as *arithmetic means* (sums of individual county rates divided by the number of county rates). These means are approximations of true regional rates, which NC SCHS does not compute.

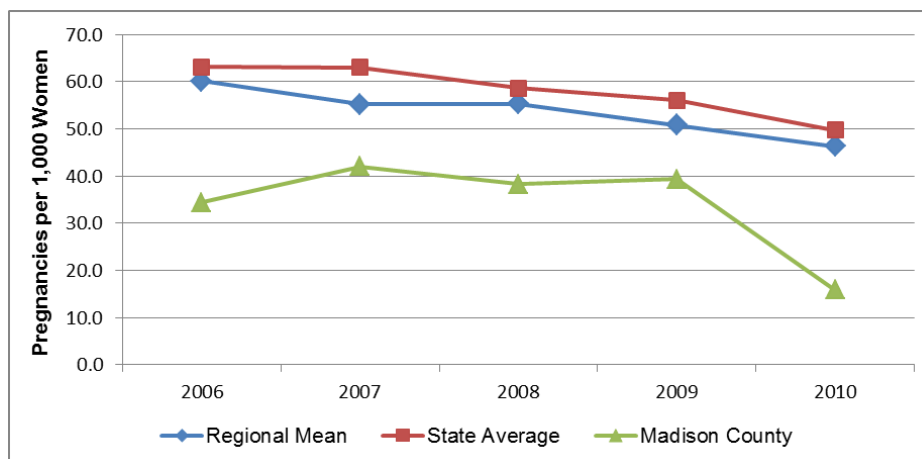
Data in Figure 1 illustrate that the pregnancy rate for women ages 15-44 in Madison County was lower than the comparable state rate and the mean WNC rate over the entire period cited. The pregnancy rates in all three jurisdictions decreased between 2006 and 2010, by 12.1% in Madison County, by 11.6% in WNC, and by 9.9% in NC. The 2010 pregnancy rate was 48.1 in Madison County, 62.7 in WNC, and 76.4 in NC.

**Figure 1 – Pregnancy Rate Ages 15-44, Pregnancies per 1,000 Women (Single Years, 2006-2010)**



Data in Figure 2 illustrate that the pregnancy rate for teens (ages 15-19) in Madison County was lower than the comparable WNC and NC rates throughout the period cited. The teen pregnancy rate in all three jurisdictions decreased between 2006 and 2010, by 53.8% in Madison County, by 22.9% in WNC, and by 21.2% in NC. The 2010 teen pregnancy rate was 15.9 in Madison County, 46.3 in WNC, and 49.7 in NC. Note that the most recent rate in Madison County is based on a total of only 11 pregnancies, half or less than the number in all other years represented in the figure.

**Figure 2 – Pregnancy Rate Ages 15-19, Pregnancies per 1,000 Women  
(Single Years, 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

## **Pregnancy Risk Factors**

### ***Smoking During Pregnancy***

Smoking during pregnancy is an unhealthy behavior that may have negative effects on both the mother and the fetus. Smoking can lead to fetal and newborn death, and contribute to low birth weight and pre-term delivery. In pregnant women, smoking can increase the rate of placental problems, and contribute to premature rupture of membranes and heavy bleeding during delivery (March of Dimes, 2012).

Table 25 presents data on the number and percent of births resulting from pregnancies in which the mother smoked during the prenatal period. The percentage frequency of smoking during pregnancy in Madison County was higher than the comparable mean percentages for WNC in every period except 2004-2008. The WNC means were significantly higher than (e.g., double) the comparable percentages statewide in *all* of the time periods cited in the table. The frequency of smoking during pregnancy in Madison County, WNC, and NC all improved over the period cited, by 11.6% in Madison County, by 8.0% in WNC, and by 14.7% in NC.

**Table 25. Births to Mothers Who Smoked During the Prenatal Period  
(Five-Year Aggregates, 2001-2005 through 2005-2009)**

Geography	2001-2005		2002-2006		2003-2007		2004-2008		2005-2009	
	#	%	#	%	#	%	#	%	#	%
Madison County	258	24.2	245	23.4	227	22.1	209	20.8	205	21.4
Regional Total	7,496	22.4	7,442	22.1	7,361	21.7	7,106	21.2	6,919	20.6
State Total	76,712	12.9	74,901	12.4	73,887	11.9	72,513	11.5	70,529	11.0

### ***Late or No Prenatal Care***

Good pre-conception health and early prenatal care can help assure women the healthiest pregnancies and best birth outcomes possible. Access to prenatal care is particularly important during the first three months of pregnancy (March of Dimes, 2012).

Table 26 shows data summarizing utilization of prenatal care during the first three months of pregnancy. The percent of births in Madison County that included early prenatal care was higher than both the WNC and NC percentages throughout the period cited. In fact, utilization of early prenatal care in Madison County was the highest among the 16 WNC counties in every period cited. Overall, the Madison County percentage rose from 93.4% in 2001-2005 to 95.1% in 2005-2009, an increase of 1.8%.

The frequency of early prenatal care utilization was higher in WNC than in the state as a whole for every period noted in the figure, but the percentages for both the region and the state decreased over the period cited, by 2.7% in WNC and by 1.7% in NC.

**Table 26. Births to Mothers Receiving Prenatal Care During the First Trimester  
(Five-Year Aggregates, 2001-2005 through 2005-2009)**

Geography	2001-2005		2002-2006		2003-2007		2004-2008		2005-2009	
	#	%	#	%	#	%	#	%	#	%
Madison County	997	93.4	989	94.3	975	94.8	954	95.1	913	95.1
Regional Total	35,375	89.3	35,799	89.0	36,433	88.9	36,806	88.0	37,049	86.9
State Total	497,895	83.5	503,331	83.0	510,954	82.5	519,098	82.1	524,902	82.1

### **Birth Outcomes**

#### ***Low Birth Weight***

Low birth weight can result in serious health problems in newborns (e.g., respiratory distress, bleeding in the brain, and heart, intestinal and eye problems), and cause lasting disabilities (mental retardation, cerebral palsy, and vision and hearing loss) or even death (March of Dimes, 2012).

Table 27 summarizes data on the number and percent of low birth weight ( $\leq$  2500 grams or 5.5 pounds) births. (Note that NC SCHS also maintains data on very low birth weight [ $\leq$ 1500 grams or 3.3 pounds] births. There are so few very low birth weight births in WNC that county rates are too unstable to calculate a stable regional mean.) In WNC, the percentage of low-birth weight births was lower than the comparable percentage for NC as a whole in each of the aggregate periods cited in the table. Further, the percentages were relatively static in both jurisdictions during the entire period.

In Madison County over the time span from 2002-2006 through 2006-2010, low birth weight percentages decreased gradually, from 10.0% to 8.5% (a 15% decrease) but nevertheless, county percentages were consistently higher than comparable figures for the region and occasionally higher than the state figures. This is a somewhat surprising outcome given the county's high utilization rate for early prenatal care.

**Table 27. Low-Weight Births (Five-Year Aggregates, 2002-2006 through 2006-2010)**

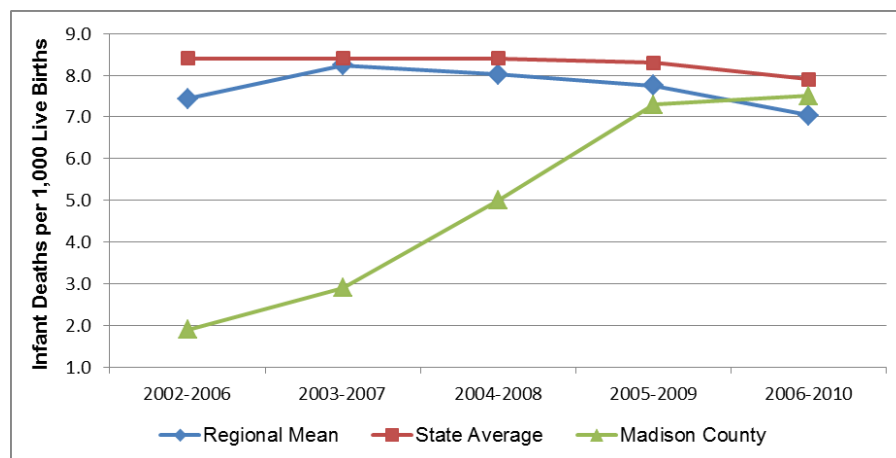
Geography	2002-2006		2003-2007		2004-2008		2005-2009		2006-2010	
	#	%	#	%	#	%	#	%	#	%
Madison County	105	10.0	97	9.4	91	9.1	87	9.1	79	8.5
Regional Total	3,447	8.2	3,473	8.4	3,467	8.3	3,434	8.2	3,373	8.2
State Total	54,991	9.1	56,541	9.1	57,823	9.1	58,461	9.1	58,260	9.1

### **Infant Mortality**

Infant mortality is the number of deaths of infants under one year of age per 1,000 live births. Figure 3 presents infant mortality data for WNC and the state. When interpreting this data it is important to remember that the infant mortality rate for NC as a whole is among the highest (i.e., worst) in the US, ranking 46th out of 50 according to the 2011 *America's Health Rankings*, cited previously.

The state's infant mortality rate recently has begun to decrease; after hovering near 8.5 for several years, it was 7.9 in the most recent aggregate period (2006-2010). The mean infant mortality rate for WNC has been lower than the state rate, and appears to be trending in the right direction. While the infant mortality rate for Madison County plotted in Figure 3 appears to be increasing dramatically, it should be noted that all five of the plotted rates are unstable due to small numbers of events (n=2-7 infant deaths per aggregate period). The large changes from one period to another may be attributable to those unstable rates.

**Figure 3. Infant Mortality Rate, Infant Deaths per 1,000 Live Births (Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rates.



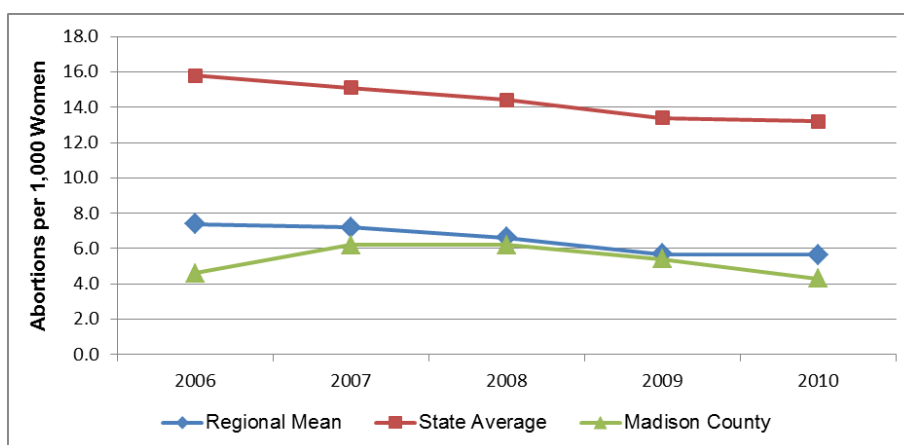
Due to small non-white populations and similarly small numbers of infant deaths among them in both Madison County and WNC it is not possible to calculate stable minority infant mortality rates for those jurisdictions. Statewide, the infant mortality rate among non-Hispanic African Americans is *more than twice* the comparable rate among whites (*Data Workbook*).

### **Abortion**

Figures 4 and 5 depict abortion rates for the region and state. Data in Figure 4 show that the mean abortion rate in WNC for women ages 15-44 is less than half the abortion rate for the state as a whole, and that the rate in both jurisdictions fell over the time period cited in the figure, by 24.3% in WNC and by 16.5% in NC. In 2010 the abortion rate was 5.6 in WNC and 13.2 in NC.

The abortion rate in Madison County was below both the WNC and NC rates throughout the period cited. In 2010 the abortion rate was 4.3 in Madison County, 5.6 in WNC and 13.2 in NC.

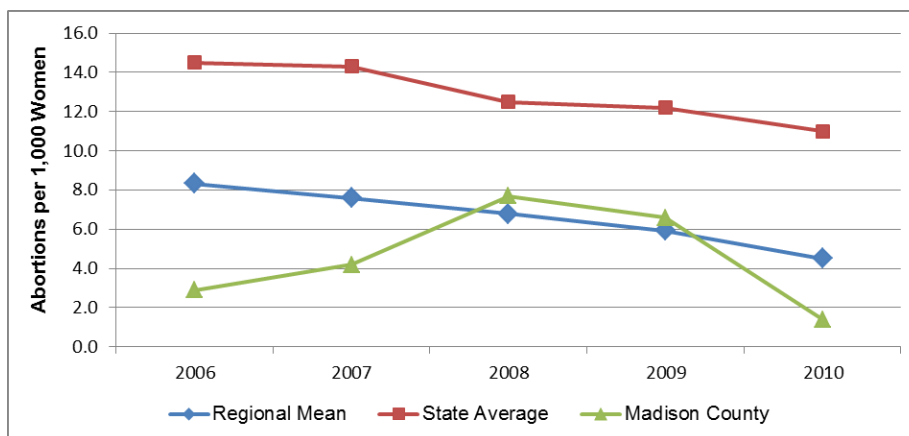
**Figure 4. Pregnancies Ending in Abortion, Ages 15-44, per 1,000 Population (Single Years, 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rates.

Data in Figure 5 show that the mean abortion rate in WNC for teens ages 15-19 was slightly more than half the teen abortion rate for the state as a whole for the first three years cited in the figure and less than half the state rate in the most recent two years. The rate in both jurisdictions fell over the time period cited in the figure, by 45.8% in WNC and by 24.1% in NC. The teen abortion rate in Madison County appears to have been rather variable but generally lower than the comparable WNC and state rates for most of the years cited. It should be noted that all teen abortion rates for Madison County for the period cited likely are unstable due to small numbers of abortions (n=1-6 per year).

**Figure 5. Pregnancies Ending in Abortion, Age 15-19, per 1,000 Population  
(Single Years, 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

## Mortality Data

This section describes mortality for the 15 leading causes of death, as well as mortality due to four major site-specific cancers. The list of topics and the accompanying data is derived from the NC SCHS *County Health Databook*. Unless otherwise noted, the numerical data are age-adjusted and represent overlapping five-year aggregate periods.

### Leading Causes of Death

Table 28 compares the mean rank order of the 15 leading causes of death in Madison County, WNC and NC for the five-year aggregate period 2006-2010. (The causes of death are listed in descending rank order for WNC.) From this data it appears that chronic lower respiratory disease, pneumonia and influenza, motor vehicle injury and suicide rank higher as causes of death in WNC than in the state as a whole. Conversely, cerebrovascular disease, kidney disease, and septicemia rank lower as causes of death regionally than statewide.

The leading causes of death in Madison County differ in rank order from the comparable lists for WNC or NC, most notably in a higher county placement for cancer, unintentional motor vehicle injuries, and septicemia. In Madison County the mortality rate for pneumonia and influenza (26.5) exceeds the mean WNC rate (19.1) by 38.7%, and the mortality rate resulting from motor vehicle injuries (20.5) exceeds both the WNC and NC rates (16.7) by 22.8%. Other differences in mortality statistics will be covered as each cause of death is discussed separately below. It should be noted from the onset, however, that for some causes of death (e.g., conditions ranked 12 through 15 below) there may not be stable county mortality rates, due to small numbers of deaths. Some unstable data will be presented in this document, but always accompanied by cautions regarding its use.

**Table 28. Rank of Cause-Specific Mortality Rates for the Fifteen Leading Causes of Death  
(Five-Year Aggregate, 2006-2010)**

Leading Cause of Death	Madison County		WNC Mean		NC	
	Rank	Rate	Rank	Rate	Rank	Rate
Heart Disease	2	180.0	1	194.4	1	184.9
Total Cancer	1	194.5	2	180.3	2	183.1
Chronic Lower Respiratory Disease	3	56.4	3	51.1	4	46.4
Cerebrovascular Disease	4	48.8	4	44.0	3	47.8
All Other Unintentional Injuries	5	34.3	5	42.9	5	28.6
Alzheimer's Disease	6	26.9	6	30.7	6	28.5
Diabetes Mellitus	11	15.1	7	19.6	7	22.5
Pneumonia and Influenza	7	26.5	8	19.1	9	18.6
Unintentional Motor Vehicle Injuries	8	20.5	9	16.7	10	16.7
Suicide	12	n/a	10	16.7	12	12.1
Nephritis, Nephrotic Syndrome & Nephrosis	10	17.2	11	16.2	8	18.9
Septicemia	9	19.1	12	13.4	11	13.7
Chronic Liver Disease & Cirrhosis	13	n/a	13	13.2	13	9.1
Homicide	14	n/a	14	n/a	14	6.6
Acquired Immune Deficiency Syndrome	15	n/a	15	n/a	15	5.4

It should be noted that the rank order of leading causes of death varies somewhat among the 16 counties in WNC. Further, in 2005-2009 and 2006-2010 the NC SCHS did not release mortality rates for some causes of death in several counties (including Madison) because the number of deaths fell below the Center's threshold of 20 per five-year aggregate period. The mean WNC ranking displayed in Table 28 includes only stable rates presented in the *Data Workbook*.

Each age group tends to have its own leading causes of death. Table 29 lists the three leading causes of death by age group for the five-year aggregate period from 2006-2010. (Note that for this purpose it is important to use *non*-age adjusted death rates.) The WNC rankings were developed by a qualitative examination of the individual ranking lists for each of the counties in the region.

In Madison County, deaths in the youngest age group are too highly varied by cause to yield stable rates for any cause of death; that instability is indicated by *italics*. Causes of death in the three older age groups are similar to those noted for WNC as a whole, although in the county chronic lower respiratory disease ranks third among the top three leading causes of death in the 40-64 age group when it is absent on the short list for WNC and NC.

Noteworthy findings among the age-grouped rankings of mortality in WNC compared to NC as a whole include the relatively greater regional prominence of non-motor vehicle injury in the two youngest age groups (00-19 and 20-39) and the third-place ranking of Alzheimer's disease among the leading causes of death in the oldest age group (85+).

**Table 29. Leading Causes of Death by Age Group  
Unadjusted Death Rates per 100,000 Population  
(Five-Year Aggregate, 2006-2010)**

Age Group	Rank	Leading Cause of Death		
		Madison County	WNC	NC
00-19	1	<i>SIDS</i>	Perinatal conditions	Perinatal conditions
	2	<i>Perinatal conditions</i>	Motor vehicle injuries	Congenital abnormalities
	3	<i>Suicide</i>	Congenital abnormalities	Motor vehicle injuries
		<i>Other unintentional injuries</i>	Other unintentional injuries	
20-39	1	Other unintentional injuries	Other unintentional injuries	Motor vehicle injuries
	2	Motor vehicle injuries	Motor vehicle injuries	Other unintentional injuries
	3	Suicide	Suicide	Suicide
40-64	1	Cancer – all sites	Cancer – all sites	Cancer – all sites
	2	Heart disease	Heart disease	Heart disease
	3	Chronic lower respiratory disease	Other unintentional injuries	Other unintentional injuries
65-84	1	Cancer – all sites	Cancer – all sites	Cancer – all sites
	2	Heart disease	Heart disease	Heart disease
	3	Chronic lower respiratory disease	Chronic lower respiratory disease	Chronic lower respiratory disease
85+	1	Diseases of the heart	Heart disease	Heart disease
	2	Cancer – all sites	Cancer – all sites	Cancer – all sites
	3	Cerebrovascular disease	Alzheimer's disease	Cerebrovascular disease

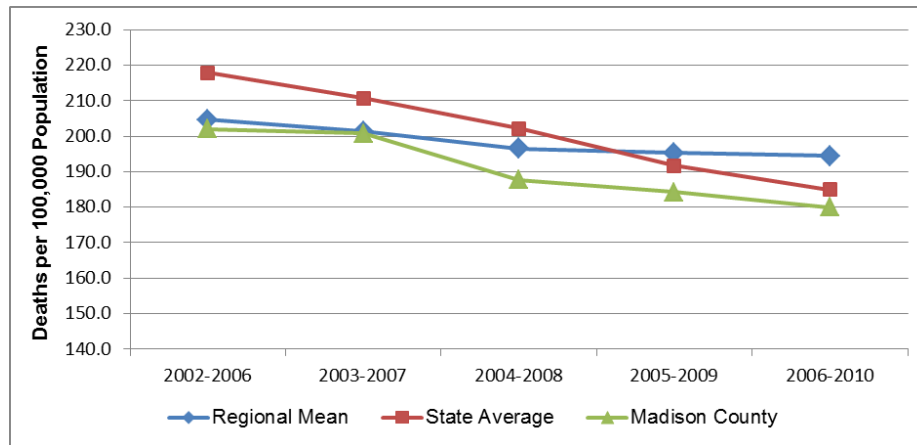
The following section examines in greater detail each of the causes of death listed in Table 28, in the order of highest mean WNC rank to lowest, beginning with heart disease.

### ***Heart Disease Mortality***

Heart disease is an abnormal organic condition of the heart or of the heart and circulation. Heart disease is the number one killer in the U.S. It is also a major cause of disability. The most common cause of heart disease, coronary artery disease, is a narrowing or blockage of the coronary arteries, the blood vessels that supply blood to the heart itself. This is the major reason people have heart attacks. Other kinds of heart problems may happen to the valves in the heart, or the heart may not pump well and cause heart failure (US National Library of Medicine).

Heart disease was the leading cause of death in WNC and NC, but the second leading cause of death in Madison County in the 2006-2010 aggregate period (Table 28, cited previously). Figure 6 presents heart disease mortality trend data. This graph illustrates that the heart disease mortality rate in Madison County was below the comparable rates for WNC and NC throughout the period cited. It also shows that the heart disease mortality rate fell in all three jurisdictions. The NC heart disease mortality rate fell from 217.9 for the 2002-2006 aggregate period to 184.9 for the 2006-2010 aggregate period, a decrease of 15.1%. The mean WNC rate, which for the first three periods cited was below the state rate, surpassed the state rate and leveled during the two most recent periods. For the 2002-2006 period the mean WNC heart disease mortality rate was 204.6; by the 2006-2010 period it had fallen to 194.4, a decrease of 4.9%. The heart disease mortality rate in Madison County fell from 202.0 in 2002-2006 to 180.0 in 2006-2010, a decrease of 10.9%.

**Figure 6. Heart Disease Mortality Rate, Deaths per 100,000 Population  
Five-Year Aggregates (2002-2006 through 2006-2010)**



Further subdivision of heart disease mortality data reveals a striking gender disparity. Figure 7 plots heart disease mortality rates for Madison County, stratified by gender. From these data it is clear that Madison County males have had a higher heart disease mortality rate than females for the past decade, with the difference as high as 44%. This trend data also shows an apparent 12.2% decrease in the heart disease mortality rate among county males (from 268.3 to 235.5) and a smaller (8.9%) decrease in the rate among county females (from 150.1 to 136.7) from the beginning of the entire period cited to the end.

**Figure 7. Gender Disparities in Heart Disease Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Only four of the 16 counties in WNC (Buncombe, Jackson, Rutherford and Swain) had large enough minority populations to yield stable heart disease mortality rates for minority populations, so it is not possible to calculate stable mean region-wide rate for minorities. At the state level, heart disease mortality demonstrates significant racial disparity, with the minority rate higher than the non-minority rate. For example, statewide in 2006-2010 the heart disease mortality rate among non-Hispanic African American males (285.8) was almost 23% higher than the comparable rate among non-Hispanic white males (233.0), and the rate among non-Hispanic African American females (175.7) was 25% higher than the rate among non-Hispanic white females (140.9). The comparable rates among Other non-Hispanics were 148.7 for males and 102.7 for females. Hispanics had the lowest heart disease mortality rates, 55.7 for males and 36.9 for females (*Data Workbook*).

### ***Total Cancer Mortality***

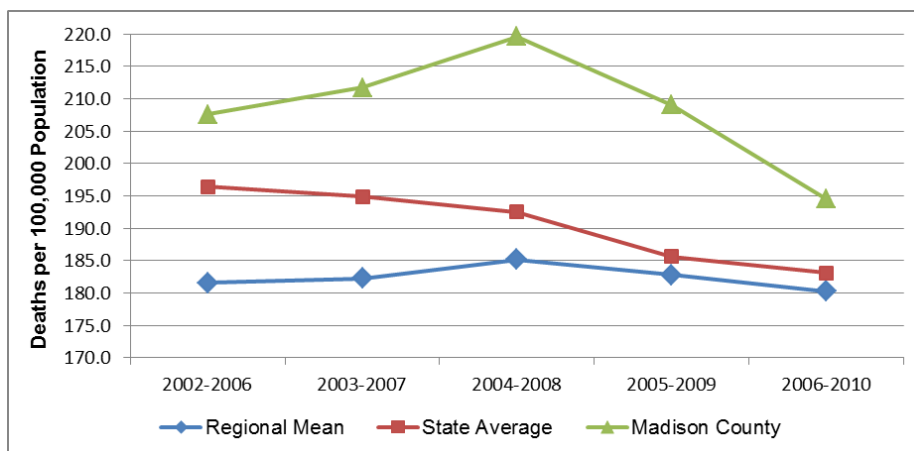
Cancer is a term for diseases in which abnormal cells divide without control and can invade nearby tissues. Cancer cells also can spread to other parts of the body through the blood and lymph systems. If the disease remains unchecked, it can result in death (National Cancer Institute).

Taken together, cancers of all types compose the second leading cause of death in WNC and NC, but the first leading cause of death in Madison County in 2006-2010 (Table 28, cited previously).

Figure 8 presents mortality trend data for total cancer. This graph illustrates how over the period cited the total cancer death rate in Madison County first rose during 2002-2006 through 2004-2008, then fell from 2005-2009 to 2006-2010, with an *overall* decrease of 6.3%, from 207.6 to 194.5 from the beginning of the period cited to the end. The total cancer mortality rate in the county was higher than the state and regional rates throughout the period cited.

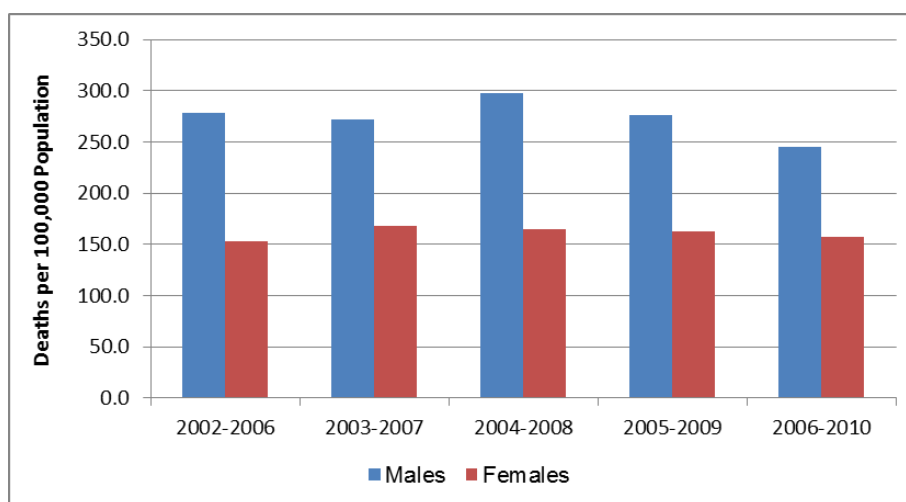
This graph also illustrates how over the period cited the total cancer death rate decreased at the state level, and the comparable mean regional rate fluctuated some but changed little in the net. Statewide, mortality attributable to all cancers decreased 6.8% over the period covered in the graph, from 196.4 in 2002-2006 to 183.1 in 2006-2010. In WNC the mean total cancer mortality rate decreased 0.6%, from 181.5 in 2002-2006 to 180.3 in 2006-2010. Nevertheless, the mean regional rate was lower than the comparable state rate in each of the periods cited in Figure 8, although the gap has narrowed.

**Figure 8. Total Cancer Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Like heart disease mortality, total cancer mortality demonstrates a gender disparity. Figure 9 plots mean total cancer mortality rates for Madison County, stratified by gender. From these data it is clear that males had and continue to have a higher total cancer mortality rate than females for the past decade. It appears that the overall mortality rate increase noted for the county in 2004-2008 in Figure 8 may be attributed mostly to deaths occurring among Madison County males, who experienced increased mortality at the same point in time. Note that the mortality rate for males decreased in subsequent aggregate periods. In the most recent aggregate period (2006-2010) the total cancer mortality rate for Madison County males (244.9) is 55.5% higher than the comparable rate for females (157.7).

**Figure 9. Gender Disparities in Total Cancer Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Regionally, only four of the 16 counties in WNC (Buncombe, Jackson, Rutherford and Swain) had large enough minority populations to yield stable total cancer mortality rates, so it is not possible to calculate stable mean region-wide rates for minority populations. At the state level, total cancer mortality demonstrates significant racial disparity, with the minority rates higher than non-minority rates. For example, statewide in 2006-2010 the total cancer mortality rate among non-Hispanic African American males (302.9) was 35% higher than the comparable rate among non-Hispanic white males (224.6), and the rate among non-Hispanic African American females (166.6) was 12% higher than the rate among non-Hispanic white females (149.3). The comparable total cancer mortality rates for Other non-Hispanics were 145.7 for males and 103.2 for females. Hispanics had the lowest total cancer mortality rates, 66.0 for males and 61.2 for females (*Data Workbook*).

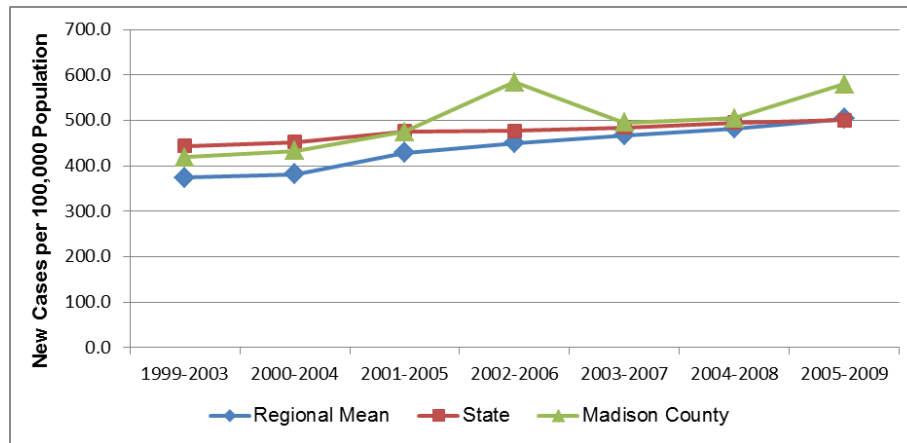
Since total cancer is a very significant cause of death, it is useful to examine patterns in the development of new cases of cancer in the county. The statistic important to understanding the growth of a health problem is *incidence*. Incidence is the population-based rate at which new cases of a disease occur and are diagnosed. It is calculated by dividing the number of newly diagnosed cases of a disease or condition during a given period by the population size during that period. Typically, the resulting value is multiplied by 100,000 and is expressed as cases per 100,000; sometimes the multiplier is a smaller number, such as 10,000 or 1,000. Cancer incidence rates were obtained from the NC Cancer Registry, which collects data on newly diagnosed cases from NC clinics and hospitals as well as on NC residents whose cancers were diagnosed at medical facilities in bordering states.

Figure 10 graphs the incidence rates for total cancer for seven five-year aggregate periods. From this data it appears that the incidence rate for total cancer increased in Madison County, WNC and NC between 1999-2003 and 2005-2009. In Madison County, the total cancer incidence rate rose from 418.7 at the beginning of the period cited to 579.2 at the end, an increase of 38.3%, and the highest rate of increase among the three jurisdictions, bringing it well above the comparable WNC and NC rates in 2006-2010.

While both state and mean WNC total cancer incidence rates increased over the period cited in the graph, the slope of increase for WNC is greater than that for the state as a whole. The NC rate rose from 444.0 in 1999-2003 to 500.1 in 2005-2009, a 12.6% increase. The mean total cancer incidence rate in WNC rose from 374.5 in 1999-2003 to 503.8 in 2005-2009, an increase of 35%. Further, the regional incidence rate for total cancer, which for years had been below the comparable NC rate, surpassed the state rate for the first time in the 2005-2009 period.



**Figure 10. Total Cancer Incidence Rate, New Cases per 100,000 Population (Five-Year Aggregates, 1999-2003 through 2005-2009)**



To this point the discussion of cancer mortality and incidence has focused on figures for total cancer. In Madison County, as throughout both WNC and the state of NC, there are four site-specific cancers that cause most cancer deaths: breast cancer, colon cancer, lung cancer, and prostate cancer. Table 30 summarizes the age-adjusted mortality rates for the four site-specific cancers for the 2006-2010 aggregate period. In Madison County the number of deaths attributable to breast cancer, prostate cancer, and colon cancer all are below the threshold for calculating a stable rate. The single stable county mortality rate for a site-specific cancer, lung cancer, was 66.9, well above the comparable WNC and NC rates. In WNC, lung cancer is the site-specific cancer with the highest mortality, followed by breast cancer, prostate cancer, and colon cancer.

**Table 30. Age-Adjusted Mortality Rates for Major Site-Specific Cancers (2006-2010)**

Geography	Deaths per 100,000 Population			
	Lung Cancer	Breast Cancer	Prostate Cancer	Colon Cancer
Madison County	66.9	n/a	n/a	n/a
Regional Mean	54.7	24.3	22.9	16.6
State	55.9	23.4	25.5	16.0

Multi-year mortality rate trends for these four site-specific cancers will be presented subsequently, as each cancer type is discussed separately.

Table 31 summarizes the age-adjusted incidence rates for these four site-specific cancers for the 2005-2009 aggregate period. From this data it appears that in Madison County, as in WNC, breast cancer is the site-specific cancer with the highest incidence, followed by prostate cancer, lung cancer, and colon cancer. Madison County incidence rates for breast, prostate and lung cancer are above the comparable incidence rates for WNC, and the county incidence rates for breast cancer and lung cancer are also higher than the comparable NC rates. Multi-year incidence rate trends for these four site-specific cancers will be presented subsequently, as each cancer type is discussed separately.

**Table 31. Age-Adjusted Incidence Rates for Major Site-Specific Cancers (2005-2009)**

Geography	New Cases per 100,000 Population			
	Breast Cancer	Prostate Cancer	Lung Cancer	Colon Cancer
Madison County	188.9	145.6	99.5	42.4
Regional Mean	154.0	139.2	75.4	46.0
State	154.5	158.3	75.9	45.5

### ***Lung Cancer Mortality***

Lung cancer was the leading cause of cancer mortality in Madison County in 2006-2010 (Table 30, cited above). Figure 11 plots lung cancer mortality rates for several aggregate periods. This data reveals that the lung cancer mortality rate in Madison County was higher than the comparable rates for WNC and NC throughout the period cited in the graph. The lung cancer mortality rate in Madison County rose until peaking in 2004-2008 before falling subsequently. The timing of the increase in lung cancer mortality corresponds to the increase in total cancer mortality noted during the same period in Figure 8, and may account for much of the total cancer increase. The net change in lung cancer mortality in Madison County from 2002-2006 to 2006-2010 was a decrease of only 2%. Statewide the lung cancer mortality rate fell from 59.8 for 2002-2006 to 55.9 for 2006-2010, a 6.5% decrease over the period. The comparable WNC rate fluctuated somewhat but was essentially the same at the end of the period (54.7) as at the beginning (54.2).

**Figure 11. Lung Cancer Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**

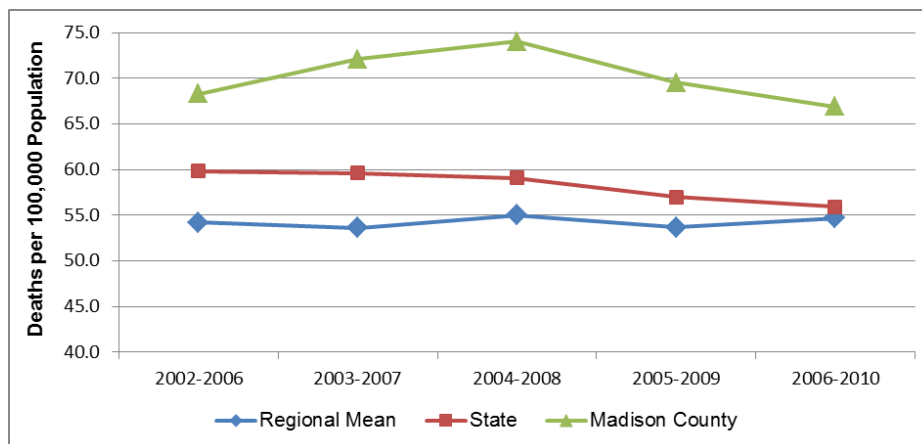
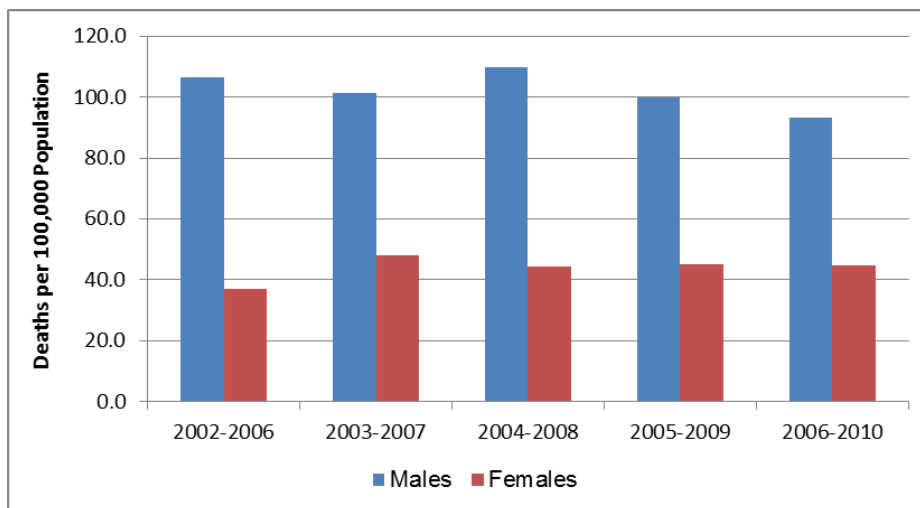


Figure 12 presents gender-stratified Madison County lung cancer mortality rates for several aggregate periods. From this data it is clear that males experience disproportionately higher lung cancer mortality than females, with the lung cancer mortality rate among men from *two to three times* the rate among women over the period cited. Of further note is the apparent recent decrease in lung cancer mortality rates among Madison County males, and simultaneous stability in lung cancer mortality rates among county females.

**Figure 12. Gender Disparities in Lung Cancer Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**

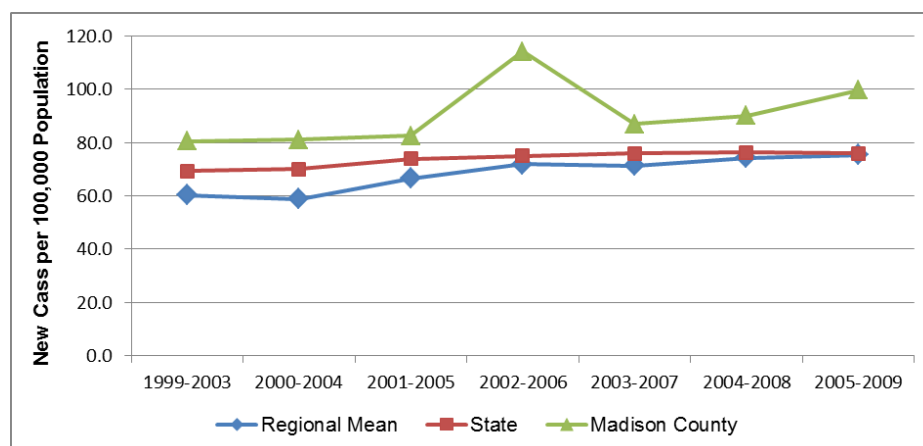


Regionally, only one of the 16 counties in WNC (Buncombe) had large enough minority populations to yield stable minority lung cancer mortality rates, so it is not possible to calculate stable mean region-wide rates for minorities. Statewide, lung cancer mortality rates demonstrate racial disparity. For example, statewide in 2006-2010 the lung cancer mortality rate among non-Hispanic African American males (90.9) was 19% higher than the comparable rate among non-Hispanic white males (76.1); however, the rate among non-Hispanic African American females (32.7) was 25% *lower* than the rate among non-Hispanic white females (43.7). The comparable rates among "Other" non-Hispanics were 47.2 for males and 24.6 for females. Hispanic males and females had the lowest lung cancer mortality rates, 12.7 and 8.6, respectively (*Data Workbook*).

Since lung cancer is a significant cause of mortality in Madison County, it is instructive to examine the trend of development of new lung cancer cases over time. Figure 13 depicts the seven-year trend of lung cancer incidence.

From this data it appears that lung cancer incidence in Madison County increased 23.8% overall (from 80.4 to 99.5) between 1999-2003 and 2005-2009. Lung cancer incidence in the county demonstrated a spike in the 2002-2006 aggregate period that corresponded in time to a similar spike in the incidence rate for total cancer; it is likely that the two sudden increases are related. Region-wide, the mean lung cancer incidence rate has been creeping upward over the past several years, from a point well below the comparable state rate to a point barely below it. The mean lung cancer incidence rate in WNC increased 25.0% from the 1999-2003 aggregate period (60.3) to the 2005-2009 aggregate period (75.4), while the statewide lung cancer incidence rate increased by 9.5% (from 69.3 to 75.9) over the same time frame. Since lung cancer mortality is already on the rise in the region, the increase in the incidence rate may portend additional lung cancer mortality in the future.

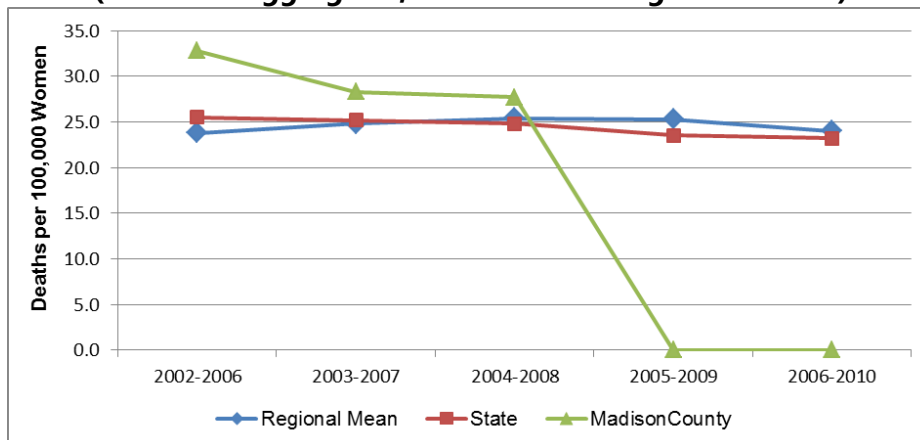
**Figure 13. Lung Cancer Incidence, New Cases per 100,000 Population (Five-Year Aggregates, 1999-2003 through 2005-2009)**



### ***Breast Cancer Mortality***

Breast cancer was the second leading cause of death in WNC in 2006-2010. No comparable breast cancer mortality rate is available for Madison County for that aggregate period. Figure 14 plots breast cancer mortality rates. In Madison County, breast cancer deaths in the last two five-year aggregate periods were too few ( $n=14-15$ ) to calculate and graph stable mortality rates. The "zero" rates plotted for the county in 2005-2009 and 2006-2010 signify that the NC SCHS did not release county rates in those aggregate periods due to below-threshold numbers of deaths. The three stable county rates all exceeded the comparable WNC and NC rates. At the state level, the breast cancer mortality rate fell throughout the period cited, from a high of 25.5 in 2002-2006 to a low of 23.2 in 2006-2010, a decrease of 9.0%. In WNC, the breast cancer mortality rate has been more volatile, actually increasing 6.7% from 23.8 in 2002-2006 to 25.4 in 2004-2008. Since then, the regional rate has reversed to a current breast cancer death rate of 24.0. The WNC mean breast cancer mortality rate exceeded the comparable state rate for the past three aggregate periods.

**Figure 14. Breast Cancer Mortality Rate, Deaths per 100,000 Women  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**

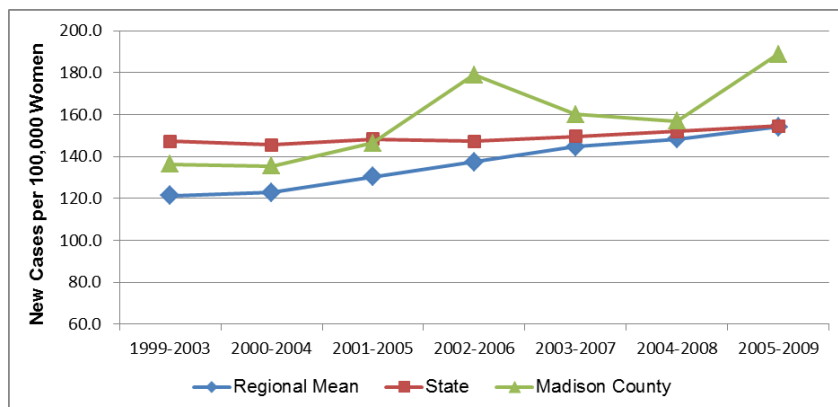


*Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.*

In WNC, none of the 16 counties had large enough minority populations to yield stable breast cancer mortality rates for any minority group. At the state level, minority breast cancer mortality rates are higher than the non-minority rates. For example, statewide in 2006-2010 the breast cancer mortality rate among non-Hispanic African American women (30.7) was 40% higher than the comparable rate among non-Hispanic white women (21.9), and the rate among “Other” non-Hispanic women (11.7) was less than half the rate among non-Hispanic white women. The rate among Hispanic women (6.7) was far lower than the rate in any other population (*Data Workbook*).

Figure 15 demonstrates that the breast cancer incidence rate has been increasing in all three jurisdictions over the past several years, but at the fastest pace in Madison County. In Madison County, the breast cancer incidence rate rose from 136.3 new cases per 100,000 women in the 1999-2003 aggregate period to 188.9 in the 2005-2009 aggregate period, an increase of 38.6%. Breast cancer incidence in the county demonstrated a spike in the 2002-2006 aggregate period that corresponded in time to a similar spike in the incidence rate for total cancer; it is likely that the two sudden increases are related. In WNC, the mean breast cancer incidence rate rose from 121.3 in the 1999-2003 aggregate period to 154.0 in the 2005-2009 aggregate period, an increase of 27.0%. At the state level, breast cancer incidence rate rose from 147.3 to 154.5 over the same period, an increase of approximately 5%.

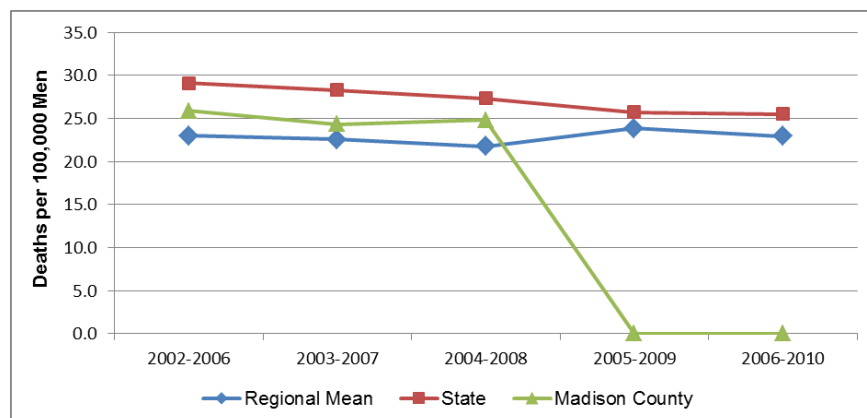
**Figure 15. Breast Cancer Incidence, New Cases per 100,000 Women  
(Five-Year Aggregates, 1999-2003 through 2005-2009)**



### ***Prostate Cancer Mortality***

Prostate cancer was the third leading cause of death in WNC in 2006-2010 (Table 30, cited previously). Deaths attributable to prostate cancer in Madison County (n=9-14 per five-year aggregate period) were too few to calculate stable mortality rates in that aggregate period or any other in the target period. Figure 16 plots the prostate cancer mortality trend for several aggregate periods. Statewide, prostate cancer mortality demonstrates a slight downward trend, with the 2006-2010 rate (25.5) approximately 12% lower than the comparable rate in 2002-2006 (29.1). In WNC, there has been fluctuation but little net decrease in the mean prostate cancer mortality rate over the period cited in the graph (23.0 the first aggregate period; 22.9 the last aggregate period). The limited data available for Madison County appears to show that the prostate cancer mortality rate in the county was essentially static, and mid-way between the comparable mean WNC and NC rates. The "zero" rates plotted for the county in 2005-2009 and 2006-2010 signify that the NC SCHS did not release county rates in those aggregate periods due to below-threshold numbers of deaths.

**Figure 16. Prostate Cancer Mortality Rate, Deaths per 100,000 Men  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**

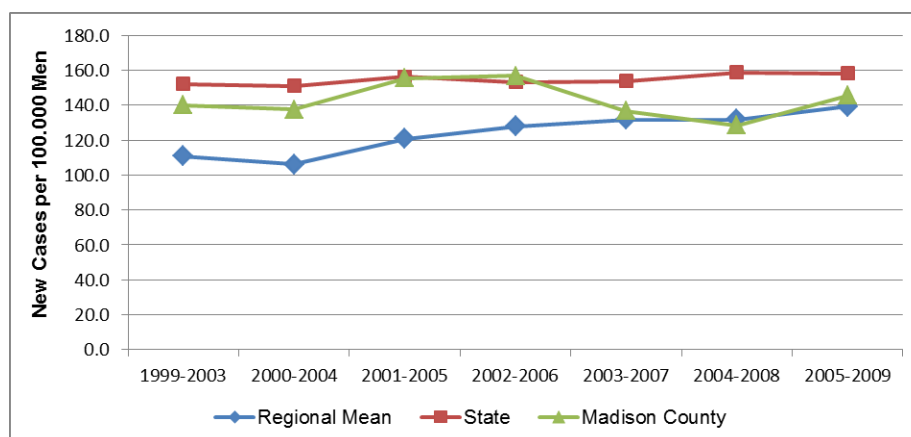


Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

In WNC, none of the 16 counties had large enough minority populations to yield stable prostate cancer mortality rates for any minority group. Statewide, there is a significant racial disparity in prostate cancer mortality. For 2006-2010 in NC as a whole the prostate cancer mortality rate among non-Hispanic African American males (59.4) was *three times* the rate for either non-Hispanic white males (20.4) or “Other” non-Hispanic males (18.2). The prostate cancer mortality rate for Hispanic males (9.5) was the lowest of any minority group in NC (*Data Workbook*).

Prostate cancer incidence statewide has remained relatively stable in recent years, increasing by 4.1%, from 152.0 to 158.3, in the period from 1999-2003 through 2005-2009 (Figure 17). Over the same span of time, the mean prostate cancer incidence rate in WNC rose from 110.7 new cases per 100,000 men in the 1999-2003 period to 139.2 in 2005-2009 period, a total increase of 25.7%, or over six times the percentage increase statewide. In Madison County, where the prostate cancer incidence rate was mostly above the WNC rate but below the NC rate, the rate rose from 139.9 to 145.6 over the same period, an overall increase of 4.1%.

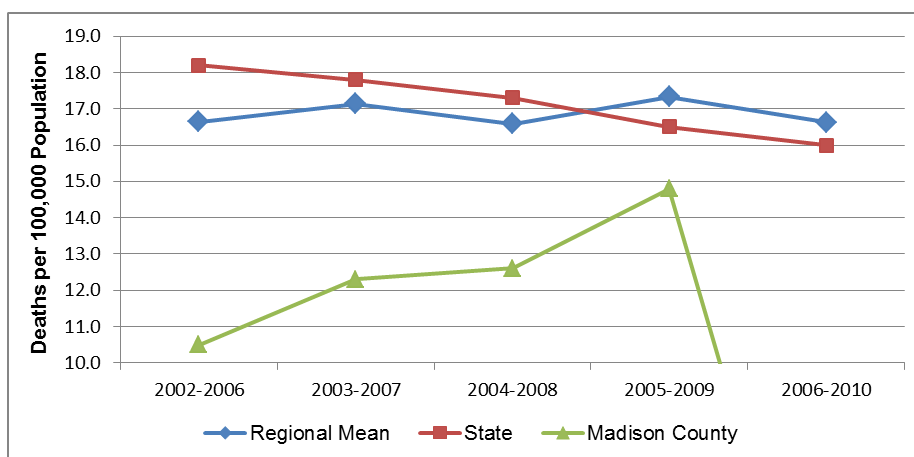
**Figure 17. Prostate Cancer Incidence, New Cases per 100,000 Men  
(Five-Year Aggregates, 1999-2003 through 2005-2009)**



### Colorectal Cancer Mortality

Cancer of the colon, rectum and anus (collectively “colorectal” cancer) caused the fourth largest mortality rate among the major site-specific cancers in WNC (Table 30, cited previously). Deaths attributable to colorectal cancer in Madison County (n=14-18 per five-year aggregate period) were too few to calculate a stable mortality rate in that period. Figure 18 plots the colorectal cancer mortality rate trend for several aggregate periods. As seen for a number of other cancers, the state colorectal cancer mortality rate has fallen steadily in recent years, from a high of 18.2 in the 2002-2006 period to a low of 16.0 in the 2006-2010 period, a rate decrease of 12.1%. In WNC, the mean colorectal cancer mortality rate fluctuated considerably, possibly due to a high proportion of unstable county rates, but was the same at the end of the period cited as at the beginning (16.6). In the most recent two aggregate periods, the mean regional colorectal cancer incidence rate surpassed the state rate, after being below the state rate for the prior three periods. From the limited data available for Madison County, it appears that colorectal cancer mortality rate in the county was lower than either the mean WNC or NC rate over the four aggregate periods for which there was data. It should be noted that the 2005-2009 data point for the county (14.8) is stable; the other county data is not. The NC SCHS did not release a colorectal cancer mortality rate for the county in the last aggregate period due to a below-threshold number of deaths.

**Figure 18. Colorectal Cancer Mortality Rate, Deaths per 100,000 Population (Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

In Madison County there were too few colorectal cancer deaths stratified by gender (n=2-13 per five-year aggregate period) to yield stable gender-based mortality rates, and the NC SCHS did not release gender-stratified rates in the last two aggregate periods due to below-threshold numbers of deaths. Nevertheless, the limited data shown in Figure 19 appears to demonstrate that the colorectal cancer mortality rate for Madison County males exceeds the comparable rate for county females. Further, it appears that the rate for females may have been rising while the rate for males remained static.



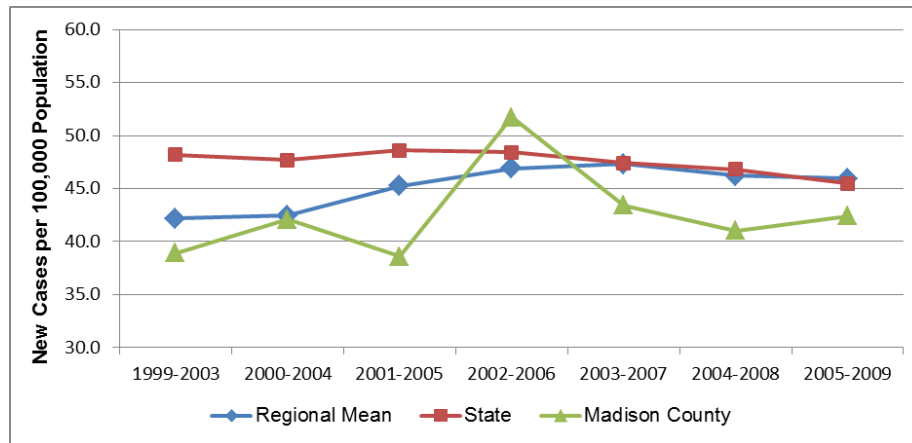
**Figure 19. Gender Disparities in Colorectal Cancer Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



In WNC, only one of the 16 counties (Buncombe) had large enough minority populations to yield stable colorectal cancer mortality rates for any minority group, so it is not possible to calculate stable mean region-wide colorectal cancer mortality rates for minorities. Statewide, colorectal cancer mortality rates demonstrate some racial disparities. In the 2006-2010 aggregate period, the colorectal cancer mortality rate among African American non-Hispanic males (29.0) was 58% higher than the comparable rate among white non-Hispanic males (18.4) and over three times the rate among Other non-Hispanic males (9.0). Statewide in the same period the colorectal cancer mortality rate was 18.5 for African American non-Hispanic females, 12.4 for white non-Hispanic females, and 9.9 for Other non-Hispanic females. Statewide, the colorectal cancer mortality rates were lowest for Hispanic males (7.4) and Hispanic females (5.4) (*Data Workbook*).

From data in Figure 20 it is apparent that the incidence rate for colorectal cancer in Madison County demonstrated considerable variability between 1999-2003 and 2005-2009, but rose overall across the full period cited, from 38.9 in 1999-2003 to 42.4 in 2005-2009, an increase of 9.0%. With the exception of a spike in the 2002-2006 aggregate period, the colorectal cancer incidence rate in Madison County was lower than both the comparable WNC and NC rates. The WNC colorectal cancer incidence rate has been, until recently, following a different trend than the comparable state rate. In the 1999-2003 aggregate period, the mean colorectal cancer incidence rate in WNC (42.2) was 12% lower than the comparable state rate (48.2). By the 2005-2009 aggregate period, the state colorectal cancer incidence rate had fallen to 45.5 (a decrease of over 5%), but the mean WNC rate had risen to 46.0 (an increase of 9%).

**Figure 20. Colorectal Cancer Incidence, New Cases per 100,000 Population  
(Five-Year Aggregates, 1999-2003 through 2005-2009)**



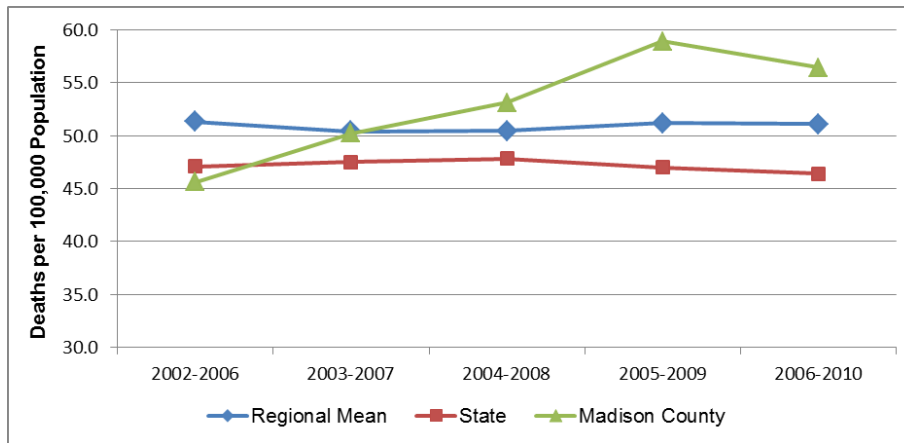
### ***Chronic Lower Respiratory Disease (CLRD) Mortality***

Chronic lower respiratory disease (CLRD) is composed of three major diseases, chronic bronchitis, emphysema, and asthma, all of which are characterized by shortness of breath caused by airway obstruction and sometimes lung tissue destruction. The obstruction is irreversible in chronic bronchitis and emphysema, reversible in asthma. Before 1999, CLRD was called chronic obstructive pulmonary disease (COPD). Some in the field still use the designation COPD, but limit it to mean chronic bronchitis and emphysema only. In the United States, tobacco use is a key factor in the development and progression of CLRD/COPD, but exposure to air pollutants in the home and workplace, genetic factors, and respiratory infections also play a role (West Virginia Health Statistics Center, 2006).

CLRD/COPD was the third leading cause of death in WNC and in Madison County for the 2006-2010 aggregate period (Table 28, cited previously).

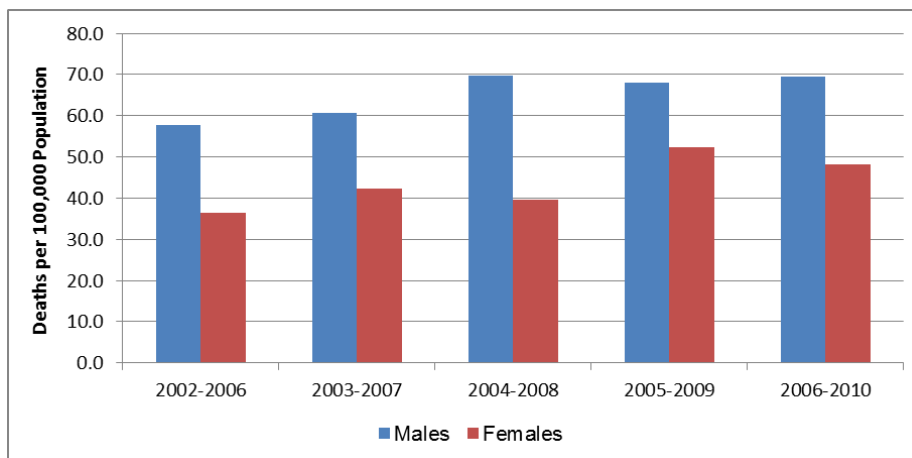
Figure 21 plots CLRD mortality rates for five aggregate periods. The CLRD mortality rate in Madison County rose 23.7% overall between 2002-2006 and 2006-2010, increasing from 45.6 to 56.4, and surpassed both the regional and state rates for CLRD mortality for the last three aggregate periods. The mean WNC CLRD mortality rate ranged from 5% to 10% higher than the NC rate throughout the period cited in the figure. Neither the NC nor the mean WNC CLRD mortality rates improved significantly over the period. CLRD mortality rates in 2006-2010 were 56.4 in Madison County, 46.4 in NC, and 51.1 in WNC.

**Figure 21. CLRD Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



In Madison County, the CLRD mortality rate among males exceeded the comparable rate among females by from 30% to 76% over the past decade (Figure 22). CLRD mortality rates increased over the period cited in both male and female subpopulations. The rate among males rose from 57.8 to 69.4, an increase of 20.0%, and the rate among females rose from 36.4 to 48.3, an increase of 32.7%.

**Figure 22. Gender Disparities in CLRD Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



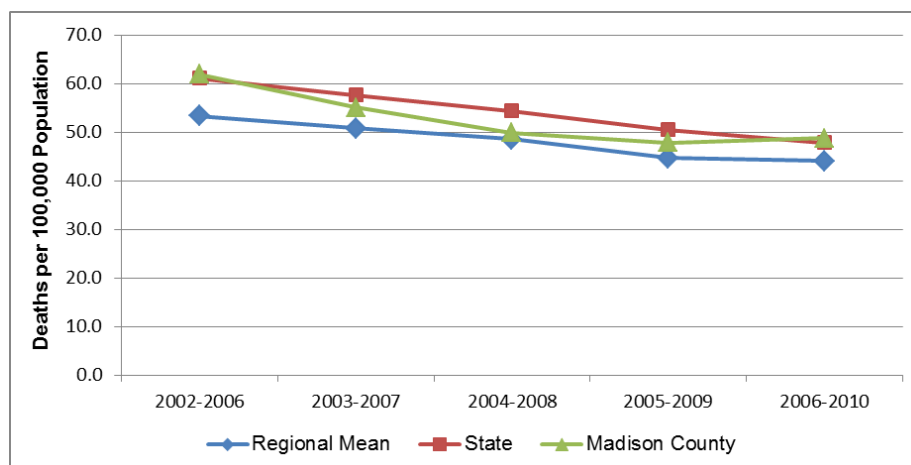
In WNC, only one of the 16 counties (Buncombe) had large enough minority populations to yield stable CLRD mortality rates for any minority group, so it is not possible to calculate a stable mean region-wide CLRD mortality rates for minorities. At the state level for the 2006-2010 aggregate period, the CLRD mortality rate was highest among non-Hispanic white males (58.7), followed by non-Hispanic white females (46.4), non-Hispanic African American males (45.1), Other non-Hispanic males (27.4), non-Hispanic females (21.1), and Other non-Hispanic females (15.6). CLRD mortality rates among Hispanic males and females are much lower (6.8 and 7.5, respectively) (*Data Workbook*).

### ***Cerebrovascular Disease (Stroke) Mortality***

Cerebrovascular disease describes the physiological conditions that lead to stroke. Strokes happen when blood flow to the brain stops and brain cells begin to die. There are two types of stroke. Ischemic stroke (the more common type) is caused by a blood clot that blocks or plugs a blood vessel in the brain. The other kind, called hemorrhagic stroke, is caused by a blood vessel that breaks and bleeds into the brain (US National Library of Medicine).

In the 2006-2010 aggregate period cerebrovascular disease (stroke) was the fourth leading cause of death in both WNC and Madison County (Table 28, cited previously). Figure 23 plots stroke mortality rates for several aggregate periods. The stroke mortality rates for Madison County, WNC and NC all decreased over the period cited in the graph. The rate fell 21.2% in Madison County (from 61.9 to 48.8), 17.4% in WNC (from 53.3 to 44.9) and 21.8% in NC (from 61.1 to 47.8). These data also illustrate how the stroke mortality rate for Madison County generally fell between the rates for the other two jurisdictions.

**Figure 23. Cerebrovascular Disease Mortality Rate, Deaths per 100,000 Population (Five-Year Aggregates, 2002-2006 through 2006-2010)**



Stroke is one cause of death for which there is little gender disparity in the WNC region (*Data Workbook*). The data in Figure 24, however, demonstrates that the cerebrovascular disease mortality rate in Madison County was from 2% to 20% higher for males than for females over most of the period cited.

**Figure 24. Gender Disparities in Cerebrovascular Disease Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



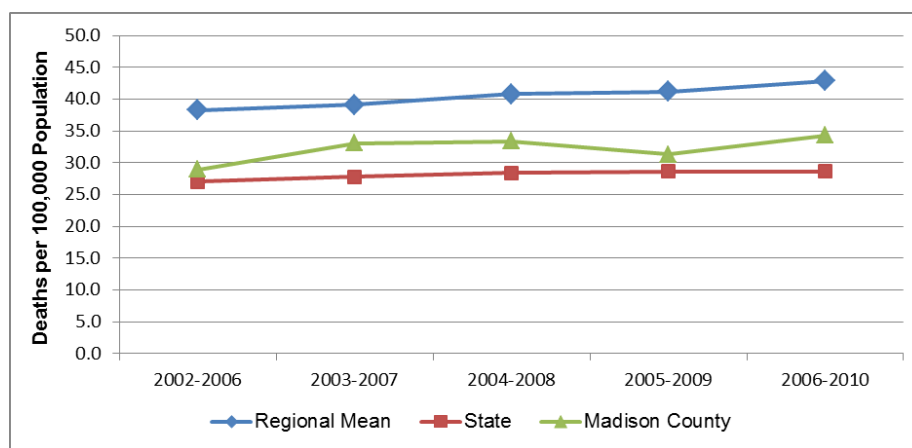
No county in WNC had large enough minority populations to yield stable cerebrovascular disease mortality rates for any minority group, so it is not possible to calculate stable mean region-wide cerebrovascular disease mortality rates for minorities. At the state level stroke mortality demonstrates a significant racial disparity. Statewide in the 2006-2010 aggregate period African American non-Hispanic males and females had the highest stroke mortality rates, 71.4 and 60.1, respectively. The comparable rate for non-Hispanic white males was 44.9, and the rate for non-Hispanic white females was 43.6, and the rate for Other non-Hispanic males was 39.6 and the rate for Other non-Hispanic females was 30.0. The Hispanic population had the lowest stroke mortality rates statewide over the same period, 13.1 among males and 15.2 among females (*Data Workbook*).

### ***Non-Motor Vehicle Injury Mortality (“All Other Injuries Mortality”)***

Mortality due to injuries *not* involving motor vehicles was the fifth leading cause of death in both WNC and Madison County in the 2006-2010 aggregate period (Table 28, cited previously). This “all other injuries” category includes death without purposeful intent due to poisoning, falls, burns, choking, animal bites, drowning, and occupational or recreational injuries. (Death due to injury involving motor vehicles is a separate cause of death and will be covered subsequently.)

Figure 25 plots the trend in mortality due to all other injuries for five aggregate periods. Throughout the period cited, the non-motor vehicle injury mortality rate in Madison County fell between the comparable mean WNC rate and the rate for NC. While the state rate increased 5.9% (from 27.0 to 28.6) over the entire span cited, the WNC rate rose 12.3% from the first period (38.2) to the last (42.9). Over the same span, the comparable rate in Madison County rose 18.7%, from 28.9 to 34.3.

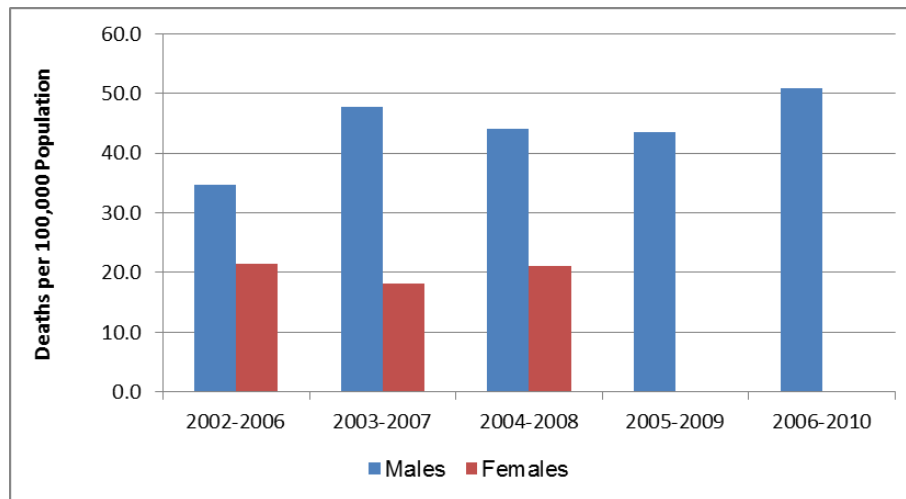
**Figure 25. All Other Unintentional Injury Mortality Rate, Deaths per 100,000 Population (Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

As in other leading causes of death, non-motor vehicle injury mortality in Madison County demonstrated a strong gender disparity (Figure 26). In each of the periods with rates for both males and females, the mortality rate among males was significantly higher than the comparable rate among females. Note, however, that all three rates for Madison County females were unstable due to small numbers of events; the NC SCHS did not release mortality rates for women in the final two aggregate periods for the same reason. The non-motor vehicle injury mortality rate among men in Madison County increased 46.7% overall between the 2002-2006 and 2006-2010 aggregate periods.

**Figure 26. Gender Disparities in All Other Unintentional Injury Mortality,  
Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



In WNC, none of the 16 counties had large enough minority populations to yield stable all other injury mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. At the state level for 2006-2010, mortality rates attributable to non-motor vehicle injury are higher among males of each race/ethnicity than females. All other injury mortality rates are highest among non-Hispanic white males (42.2), non-Hispanic African American males (31.7), Other non-Hispanic males (25.6) and Hispanic males (15.0). Comparable rates for females are 23.0 for non-Hispanic white females, 13.1 for non-Hispanic African American females, 12.5 for Other non-Hispanic females, and 6.2 for Hispanic females (*Data Workbook*).

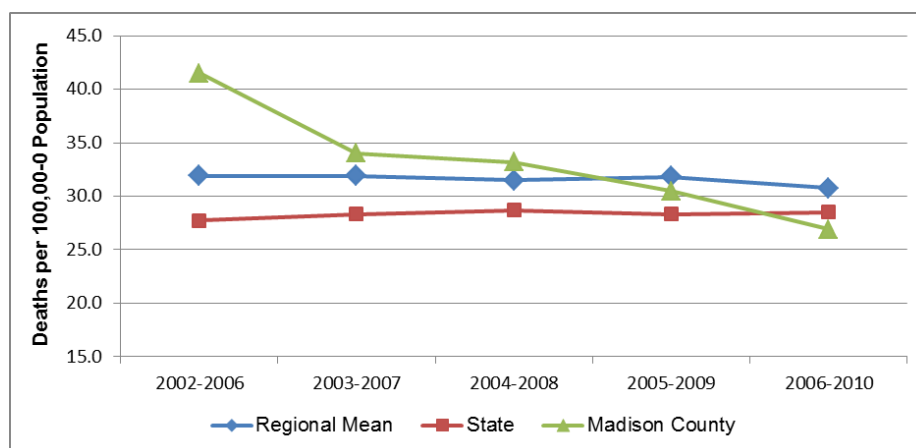
### ***Alzheimer's Disease Mortality***

Alzheimer's disease is a progressive neurodegenerative disease affecting mental abilities including memory, cognition and language. Alzheimer's disease is characterized by memory loss and dementia. The risk of developing Alzheimer's disease increases with age (e.g., almost half of those 85 years and older suffer from Alzheimer's disease). Early-onset Alzheimer's has been shown to be genetic in origin, but a relationship between genetics and the late-onset form of the disease has not been demonstrated. No other definitive causes have been identified (National Institute on Aging, 2012).

Alzheimer's disease was the sixth leading cause of death in Madison County and WNC for the aggregate period 2006-2010 (Table 28, cited previously).

Figure 27 plots Alzheimer's disease mortality rates over several aggregate periods. The Alzheimer's disease mortality rate in Madison County fell from 41.5 in 2002-2006 to 26.9 in 2006-2010, a decrease of 35.2%. The county rate, once higher than both the mean WNC and NC rates, was below both in the most recent aggregate period. The mean Alzheimer's disease mortality rate in WNC was higher than the comparable state rate throughout the span of time cited in Figure 27, despite the fact that the data used are all age-adjusted. Note, however, that NC SCHS made the age-adjustment calculations on the basis of the 2000 US Census, and as we have seen, the "elderly" population in WNC has grown considerably since 2000. It should be noted that the difference between the WNC and NC rates may look different once the 2010 Census becomes the basis of the age adjustment. In the 2006-2010 aggregate period the Alzheimer's disease mortality rate was 26.9 in Madison County, 30.7 in WNC, and 28.5 in NC.

**Figure 27. Alzheimer's Disease Mortality Rate, Deaths per 100,000 Population (Five-Year Aggregates, 2002-2006 through 2006-2010)**

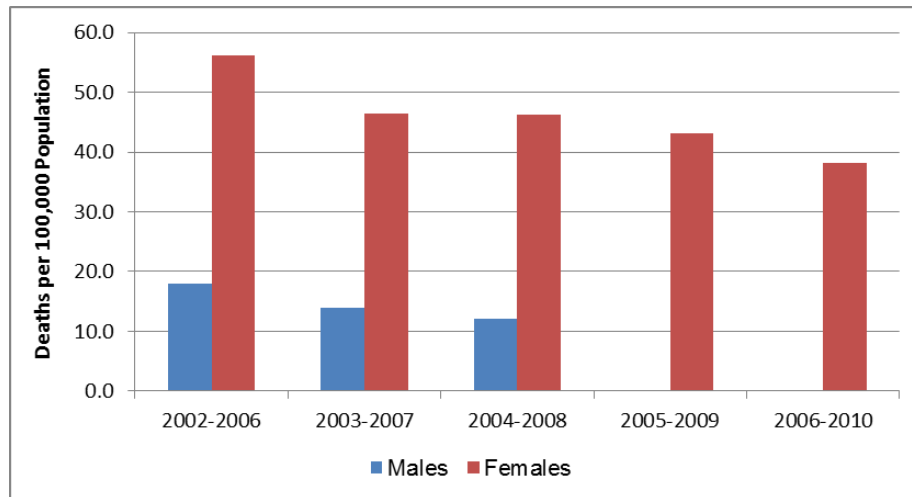


Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Alzheimer's disease mortality has a strong gender component, with mortality rates traditionally much higher among women than among men. In WNC, for example, the mean Alzheimer's disease mortality rate among women was from 51% to 62% higher than the rate among men over the past decade (*Data Workbook*). Figure 28 plots the limited available stratified data for Alzheimer's disease in Madison County. It should be noted that all the rates presented for males in Madison County are unstable, and that no rate was calculated for males the last two aggregate periods. The Alzheimer's disease mortality rate for Madison County females demonstrates a rather steady decline over the period covered in the figure, with an overall decrease of 32.2%. In the 2006-2010 aggregate period the Alzheimer's disease mortality rate for county females was 38.1.



**Figure 28. Gender Disparities in Alzheimer’s Disease Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



In WNC, none of the 16 counties had large enough minority populations to yield stable Alzheimer’s disease mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. Statewide, the disparity in Alzheimer’s disease mortality may be more gender-based than race-based. In NC as a whole in the 2006-2010 aggregate period, the Alzheimer’s disease mortality rate for white non-Hispanic females was 32.5, compared to 23.3 for white, non-Hispanic males; the rate for African American non-Hispanic females was 27.6 compared to 20.9 for African American non-Hispanic males; and the rate for Other non-Hispanic females was 21.1 compared to 17.3 for Other non-Hispanic males. The Alzheimer’s disease mortality rate for Hispanic females was 9.7; due to a small number of events, the NC SCHS did not release a comparable rate for Hispanic males (*Data Workbook*).

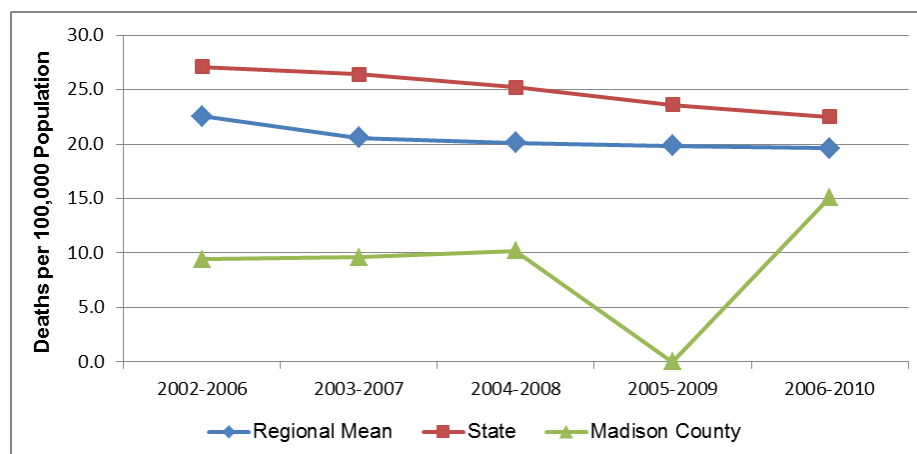
### ***Diabetes Mellitus Mortality***

Diabetes is a disease in which the body’s blood glucose levels are too high due to problems with insulin production and/or utilization. Insulin is a hormone that helps the glucose get to cells where it is used to produce energy. With type 1 diabetes, the body does not make insulin. With type 2 diabetes, the more common type, the body does not make or use insulin well. Without enough insulin, glucose stays in the blood. Over time, having too much glucose in the blood can damage the eyes, kidneys, and nerves. Diabetes can also lead to heart disease, stroke and even the need to remove a limb (US National Library of Medicine).

Diabetes was the seventh leading cause of death in WNC but the eleventh leading cause of death in Madison County in the 2006-2010 aggregate period (Table 28, cited previously).

Figure 29 plots trend data for diabetes mortality for several aggregate periods. In Madison County, deaths attributable to diabetes were too few to yield a complete series of stable mortality rates, so all points graphed for the county *except the last one* should be considered unstable. (The “zero” rate plotted for the 2005-2009 period signifies no rate was calculated for the period due to a below-threshold number of events.) For Madison County to have achieved a stable diabetes mortality rate in the 2006-2010 aggregate period points to a larger number of deaths than in other years. The terminal point, 15.1, represents a total of 20 deaths during that period, compared to a range of 12-16 deaths in earlier periods. The mean diabetes mortality rate in WNC is and has been lower than the state rate. Region-wide, the mean diabetes mortality rate fell from 22.6 to 19.6 (13.3%) over the period cited in the figure. Statewide, the diabetes mortality rate fell from 27.1 to 22.5 (17%) over the same time frame.

**Figure 29. Diabetes Mellitus Mortality Rate, Deaths per 100,000 Population (Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Diabetes mortality rates stratified by gender in Madison County are unstable or were not released by NC SCHS due to small numbers of deaths (n=5-11 per five-year aggregate period). The limited data plotted for the county in the figure below fails to demonstrate a clear pattern of difference in gender-based diabetes mortality rates.

**Figure 30. Gender Disparities in Diabetes Mellitus Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

In WNC, none of the 16 counties had large enough minority populations to yield stable diabetes mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. Statewide, diabetes mortality demonstrates significant racial disparities. At the state level in the 2006-2010 aggregate period, the highest diabetes mortality rates were observed among African American non-Hispanic males and females, with rates of 51.3 and 42.5, respectively. The next highest rates occurred among Other non-Hispanic persons, both male and female, with rates of 25.0 and 25.5, respectively. The diabetes mortality rate during this period for white non-Hispanics was 22.2 for males and 14.4 for females. The lowest diabetes mortality was observed in the Hispanic population, with a rate of 11.2 for men and 7.1 for women (*Data Workbook*).

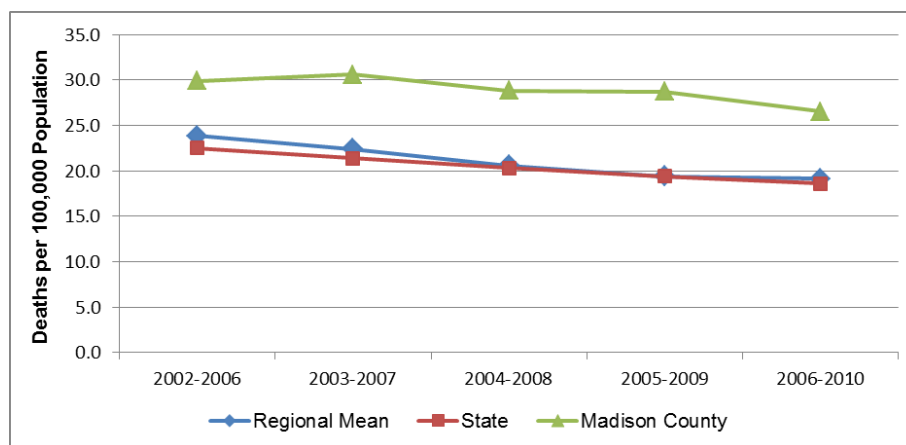
### ***Pneumonia and Influenza Mortality***

Pneumonia and influenza are diseases of the lungs. Pneumonia is an inflammation of the lungs caused by either bacteria or viruses. Bacterial pneumonia is the most common and serious form of pneumonia, and among individuals with suppressed immune systems, it may follow influenza or the common cold. Influenza (the “flu”) is a contagious infection of the throat, mouth and lungs caused by an airborne virus (US National Library of Medicine).

The joint mortality category pneumonia and influenza was the eighth leading cause of death in WNC and the seventh leading cause in Madison County for the period 2006-2010 (Table 28, cited previously).

Figure 31 plots the mortality trend for pneumonia and influenza for several aggregate periods. From this data it is apparent that the mean pneumonia/influenza mortality rate in WNC closely paralleled the comparable NC rate throughout the period cited in the figure. Both the regional and state mortality rates for this cause of death decreased in the net over the period. The mean WNC rate decreased from 23.8 to 19.1 (19.7%) and the comparable NC rate decreased from 22.5 to 18.6 (17.3%). The pneumonia/influenza mortality rate in Madison County was significantly higher than both the mean WNC and NC rates throughout the period cited in the figure. The county rate fell 12.8% from 29.9 in 2002-2006 to 26.5 in 2006-2010.

**Figure 31. Pneumonia and Influenza Mortality Rate, Deaths per 100,000 Population (Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Figure 32 plots gender-stratified pneumonia/influenza mortality rates for Madison County for several aggregate periods. Note that due to low numbers of pneumonia/influenza deaths among men (n=10-15 per five-year aggregate period) mortality rates for county males were unstable or not calculated. According to data displayed in the figure, the pneumonia/influenza mortality rate among Madison County females both rose and fell over the period cited. In the 2006-2010 aggregate period the pneumonia/influenza mortality rate among Madison County females stood at 26.9; a comparable rate among males was not calculated.

**Figure 32. Gender Disparities in Pneumonia/Influenza Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



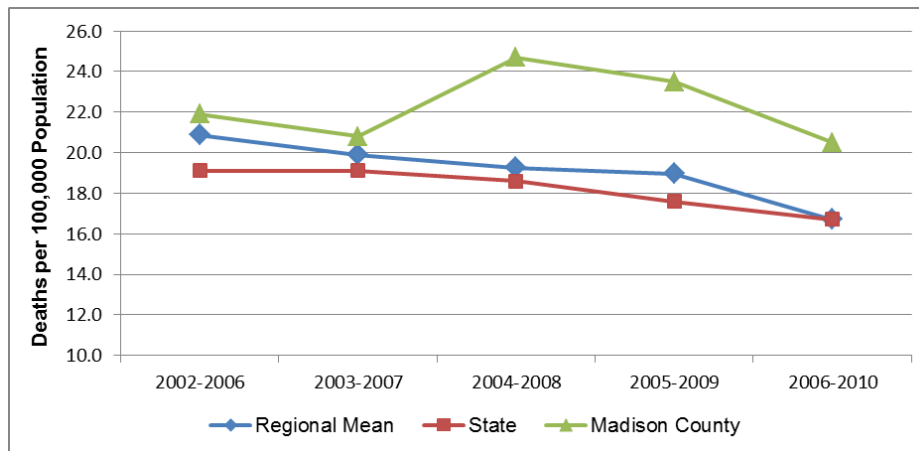
In WNC, none of the 16 counties had large enough minority populations to yield stable pneumonia/influenza mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. At the state level pneumonia and influenza mortality rates demonstrate moderate racial disparities. Statewide in the 2006-2010 aggregate period the highest pneumonia/influenza mortality rate (24.1) occurred among African American non-Hispanic males, followed in order by white non-Hispanic males (21.5), white non-Hispanic females (17.3), African American non-Hispanic females (15.8), other non-Hispanic males (11.1), and other non-Hispanic females (9.0). The Hispanic population, both male and female, experienced the lowest pneumonia and influenza mortality rates, 5.8 and 7.1, respectively (*Data Workbook*).

### ***Unintentional Motor Vehicle Injury (UMVI) Mortality***

Death due to injuries incurred in unintentional motor vehicle crashes was the ninth leading cause of death in WNC and the eighth leading cause of death in Madison County in the 2006-2010 aggregate period (Table 28, cited previously).

Figure 33 plots UMVI mortality rates over several aggregate periods. From this data it appears that the mortality rate attributable to UMVI in Madison County was substantially higher than the comparable rate for WNC, and that the mean WNC rate was slightly higher than the comparable state rate for most of the time span cited in the table. UMVI mortality rates fell in rather straight-line fashion in both WNC and NC. While the UMVI mortality rate in the county was 6.4% lower at the end of the period cited than at the beginning, it had risen 18.8% during an earlier period. In WNC, the mean UMVI mortality rate fell from 20.9 to 16.7 (20.1%) and in NC the rate fell from 19.1 to 16.7 (12.5%) over the entire period cited.

**Figure 33. Unintentional Motor Vehicle Injury Mortality Rate  
Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

In Madison County there were too few deaths among males and females attributable to UMVI to calculate stable gender-stratified mortality rates, and the NC SCHS did not release stratified rates in the last two aggregate periods due to below-threshold numbers of deaths. Nevertheless, from the limited county data presented in Figure 34, it appears that mortality attributable to UMVI in Madison County was as much as three times higher among males than among females over the period for which there are rates.

**Figure 34. Gender Disparities in Unintentional Motor Vehicle Injury Mortality  
Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



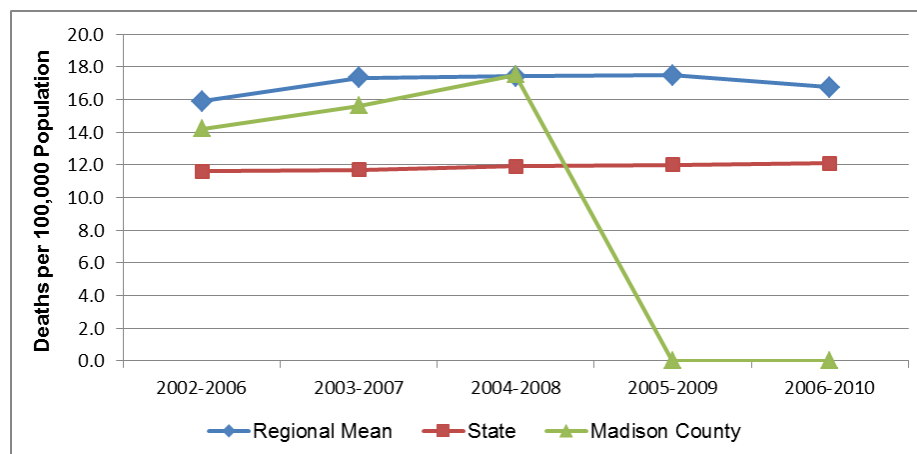
In WNC, none of the 16 counties had large enough minority populations to yield stable UMVI mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. Statewide, disparities in UMVI mortality appear more gender-based than racially-based. At the state level in 2006-2010, the highest UMVI mortality rates all occurred among males with the following rates, in decreasing order: 27.1 for African American non-Hispanic males, 24.2 for non-Hispanic males of other races, and 23.6 for both white non-Hispanic males and Hispanic males. Among women statewide the highest rates were noted among non-Hispanic females of other races (10.4), followed by white non-Hispanic females (9.9), African American non-Hispanic females (7.9) and Hispanic females (7.3) (*Data Workbook*).

### ***Suicide Mortality***

Suicide is the tenth leading cause of death in WNC but the twelfth leading cause of death in Madison County for the 2006-2010 aggregate period (Table 28, cited previously).

Although all the suicide mortality rates in Madison County for the target period technically are unstable, they are presented with mean WNC and NC rates in Figure 35. (Note that the “zero” rates plotted in the last two aggregate periods signify that no county rate was calculated for either period.) The mean suicide mortality rate in WNC ranged from 37% to 48% higher than the state rate over the period cited in Figure 35. The suicide mortality rates in WNC and NC changed little over the period cited. Early in the period cited, the suicide mortality rate for Madison County fell between the comparable rates for the region and the state.

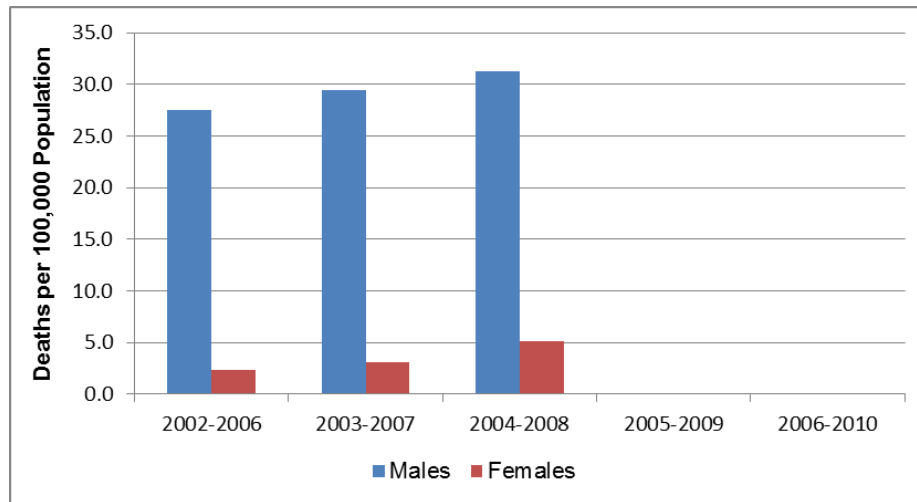
**Figure 35. Suicide Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Gender-stratified suicide mortality rates for Madison County for the period of interest were either unstable or not released, due to small numbers of events. Nevertheless, the limited county data plotted in Figure 36 appears to illustrate a significant gender difference in suicide mortality, with the rate for males several times higher than the rate for females.

**Figure 36. Gender Disparities in Suicide Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

In WNC, none of the 16 counties had large enough minority populations to yield stable suicide mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. At the state level, suicide mortality demonstrates a racial disparity as well as a gender disparity. Statewide in the 2006-2010 aggregate period the highest suicide mortality rates occurred among white non-Hispanic males (23.9) followed by other non-Hispanic males (10.8), African American non-Hispanic males (8.6) and Hispanic males (7.4). Among females, the highest suicide mortality rates occurred among white non-Hispanic females (6.7) followed by other non-Hispanic females (4.7), Hispanic females (1.7) and African American non-Hispanic females (1.5) (*Data Workbook*).

### ***Nephritis, Nephrotic Syndrome and Nephrosis (Kidney Disease) Mortality***

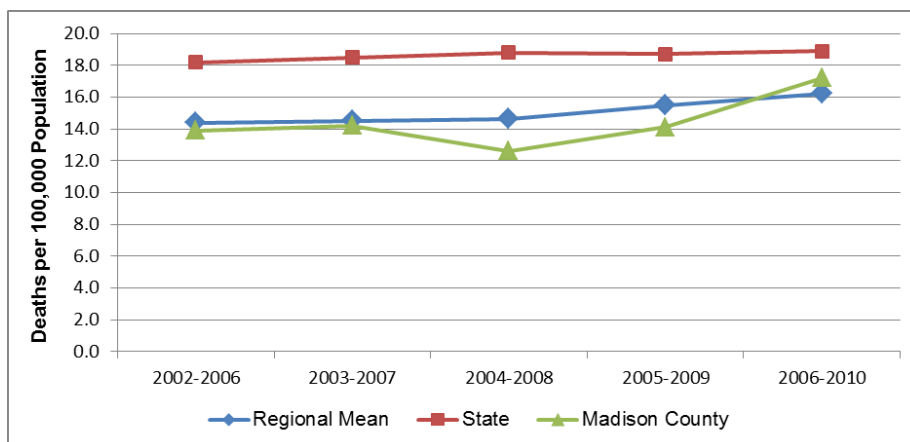
*Nephritis* refers to inflammation of the kidney, which causes impaired kidney function. Nephritis can be due to a variety of causes, including kidney disease, autoimmune disease, and infection. *Nephrotic syndrome* refers to a group of symptoms that include protein in the urine, low blood protein levels, high cholesterol levels, high triglyceride levels, and swelling. *Nephrosis* refers to any degenerative disease of the kidney tubules, the tiny canals that make up much of the substance of the kidney. Nephrosis can be caused by kidney disease, or it may be a complication of another disorder, particularly diabetes (MedineNet.com, March 2012; PubMed Health, 2011).

This set of kidney disorders was the eleventh leading cause of death in WNC and the tenth leading cause of death in Madison County for the 2006-2010 aggregate period (Table 28, cited previously).



Figure 37 plots kidney disease mortality over several aggregate periods. This data reveals that the mean kidney disease mortality rate in WNC was below the comparable figure for NC as a whole, and that the mortality rate in Madison County was below or equivalent to the WNC rate for most of the period cited in the figure. Between the 2002-2006 aggregate period and the 2006-2010 aggregate period the mean regional rate climbed from 14.4 to 16.2 (12.5%), and the Madison County rate rose from 13.9 to 17.2 (23.7%). Over the same time span the NC rate increased only slightly, from 18.2 to 18.9 (3.8%).

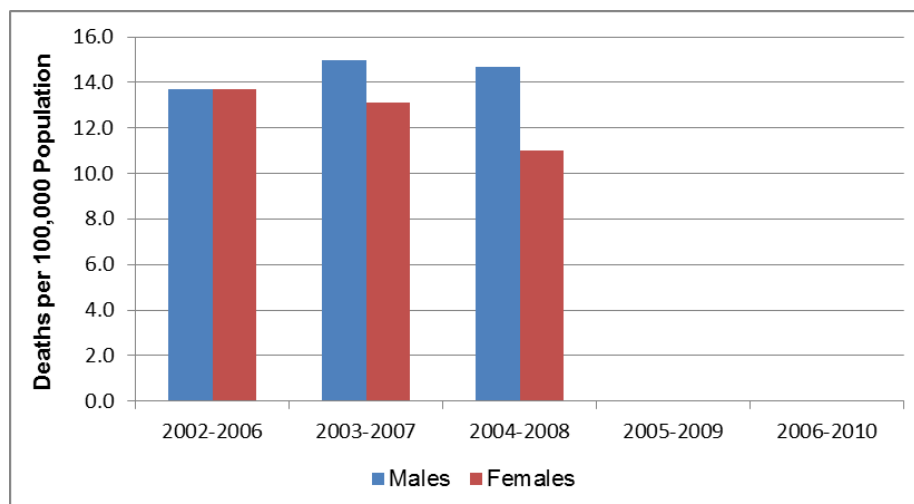
**Figure 37. Kidney Disease Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Gender-stratified kidney disease mortality rates for Madison County for the target time span either were unstable or were not released by NC SCHS. The limited county data plotted in Figure 38 fails to demonstrate any clear gender difference in kidney disease mortality in Madison County.

**Figure 38. Gender Disparities in Kidney Disease Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



In WNC, none of the 16 counties had large enough minority populations to yield stable kidney disease mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. Statewide for 2006-2010 kidney disease mortality rates demonstrate both racial and gender disparities. Men of all racial groups suffer kidney disease mortality at rates higher than their female counterparts in the same racial group, and non-Hispanic African Americans of either gender have the highest kidney disease mortality rates among their gender group. For instance, kidney disease mortality among non-Hispanic African American males in this period was 42.4, compared to 19.7 among non-Hispanic white males, 18.0 among other non-Hispanic males, and 7.1 among Hispanic males. Similarly, the kidney disease mortality rate among non-Hispanic African American females was 34.6, followed by 15.3 among other non-Hispanic females, 12.5 among non-Hispanic white females, and 5.4 among Hispanic females (*Data Workbook*).

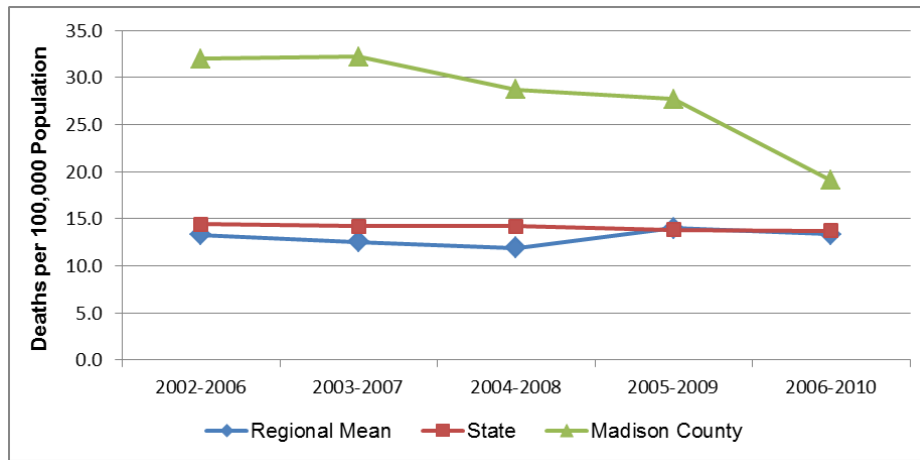
### ***Septicemia Mortality***

Septicemia is a rapidly progressing infection resulting from the presence of bacteria in the blood. The disease often arises from other infections throughout the body, such as meningitis, burns, and wound infections. Septicemia can lead to septic shock in which case low blood pressure and low blood flow cause organ failure (US National Library of Medicine). While septicemia can be community-acquired, some cases are acquired by patients hospitalized initially for other conditions; these are referred to as nosocomial infections. Sepsis is now a preferred term for septicemia, but NC SCHS continues to use the older term.

Septicemia was the twelfth leading cause of death in WNC but the ninth leading cause of death in Madison County for the aggregate period 2006-2010 (Table 28, cited previously).

Figure 39 plots septicemia mortality data for several aggregate periods. This data shows that the mean WNC septicemia mortality rate fluctuated over the period cited in approaching the state rate, while the state rate decreased 4.9%, from 14.1 to 13.7. Fluctuation at the WNC-level may be attributed partly to unstable regional mean rates. In Madison County, the septicemia mortality rate was roughly twice the comparable WNC mean rate for the first four aggregate periods cited, before falling to a point (19.1) 43% higher than the regional rate (13.4).

**Figure 39. Septicemia Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Gender-stratified septicemia mortality rates for Madison County males in the target period were all unstable or not released by NC SCHS; comparable rates for females were either stable or not released. From the limited data presented in Figure 40, it appears there may have been a slightly higher septicemia mortality rate among females than males over the period for which there are paired data points.

**Figure 40. Gender Disparities in Septicemia Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2005-2009)**



In WNC, none of the 16 counties had large enough minority populations to yield stable septicemia mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. At the state level, where the calculation of stable septicemia mortality rates is possible, mortality is highest among African American non-Hispanics, both male and female. Statewide the septicemia mortality rate for African American non-Hispanic males in the 2002-2010 aggregate period was 23.7; for females of the same population group the rate was 18.8. For white non-Hispanic males the comparable rate was 13.7; for white non-Hispanic females the rate was 11.5. Among other non-Hispanic males the septicemia mortality rate was 10.6; among other non-Hispanic females the rate was 7.6. The lowest septicemia mortality rates occurred among Hispanics; for males the rate was 5.3, and for females, 4.9 (*Data Workbook*).

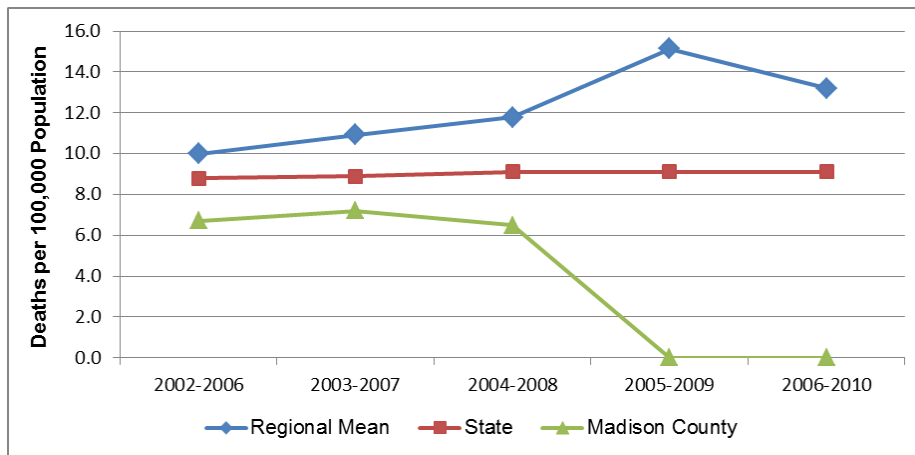
### ***Chronic Liver Disease and Cirrhosis Mortality***

Chronic liver disease describes an ongoing disturbance of liver function that causes illness. Liver disease, also referred to as hepatic disease, is a broad term that covers all the potential problems that cause the liver to fail to perform its designated functions. Usually, more than 75% or three quarters of liver tissue needs to be affected before decrease in function occurs. Cirrhosis is a term that describes permanent scarring of the liver. In cirrhosis, the normal liver cells are replaced by scar tissue that cannot perform any liver function (MedicineNet.com, June 2012).

Chronic liver disease and cirrhosis was the thirteenth leading cause of death in both WNC and Madison County in the 2006-2010 aggregate period (Table 28, cited previously).

Figure 41 plots mortality data for liver disease over several aggregate periods. Note that liver disease mortality rates in Madison County for the target period are all unstable; rates for the last two aggregate period were not calculated, and appear as "zero" rates on the graph. This data shows that the apparent liver disease mortality rate in Madison County was lower than the comparable mean WNC or NC rates during the first three aggregate periods cited. The mean chronic liver disease mortality rate in WNC exceeded the state rate throughout the period cited, and rose from 10.0 for 2002-2006 to 13.2 for 2006-2010, an increase of 32%. Throughout this period the state rate was static at or near 9.1.

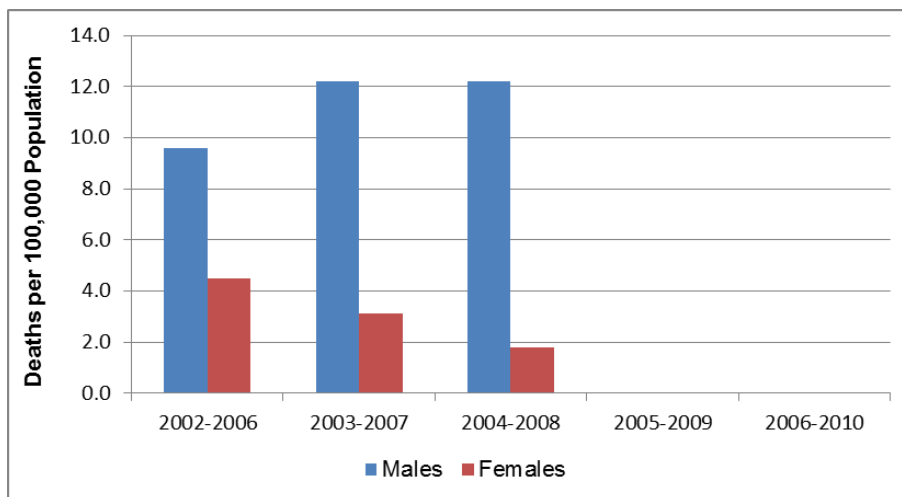
**Figure 41. Chronic Liver Disease and Cirrhosis Mortality Rate**  
**Deaths per 100,000 Population**  
**(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

Gender-stratified chronic liver disease and cirrhosis mortality rates for Madison County in the target period were either unstable or not released by NC SCHS. Nevertheless, the limited data presented in Figure 42 reveals a strong gender-based disparity with the mortality rate among Madison County men several times higher than comparable rate among county women.

**Figure 42. Gender Disparities in Chronic Liver Disease and Cirrhosis Mortality**  
**Madison County**  
**(Five-Year Aggregates, 2002-2006 through 2004-2008)**



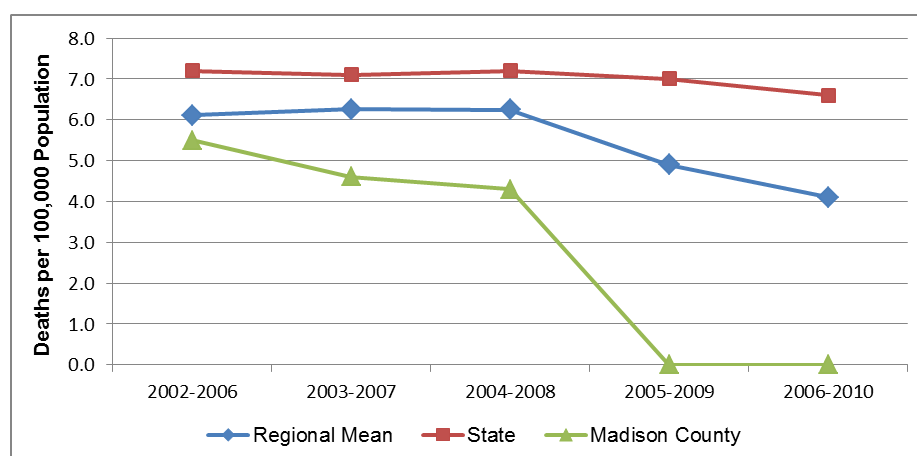
In WNC, none of the 16 counties had large enough minority populations to yield stable chronic liver disease/cirrhosis mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. At the state level, liver disease mortality rates demonstrate some differences among racial groups but a consistent trend of higher mortality rates among men than women. For example, the liver disease mortality rate is highest among white non-Hispanic men (13.8), followed by African American non-Hispanic men (11.2). The liver disease mortality rates among other non-Hispanic men was 7.5, and the rate among Hispanic men was 6.8. Liver disease mortality rates among females were highest for white non-Hispanic women (6.0), followed by other non-Hispanic women (5.2), and African American women non-Hispanic women (5.1). There were too few liver disease deaths among Hispanic women statewide to calculate a stable rate (*Data Workbook*).

### **Homicide Mortality**

Death by homicide was the fourteenth leading cause of death in WNC and Madison County for the 2006-2010 aggregate period (Table 28, cited previously).

Figure 43 plots homicide mortality rates over several aggregate periods. In Madison County there were too few deaths attributable to homicide to calculate stable rates, so the all the county rates presented in Figure 43 are unstable; the “zero” rates signify that no rate was calculated for that period. From this data it is apparent that mean homicide mortality rates in WNC are lower than comparable rates for NC as a whole. This observation would appear to be in concert with earlier data reporting lower rates of violent crime in WNC than in NC. The mean homicide mortality rate in WNC for the 2006-2010 aggregate period was 4.1; the comparable rate for NC was 6.6. The homicide mortality rates presented for Madison were lower than the rates for both WNC and NC.

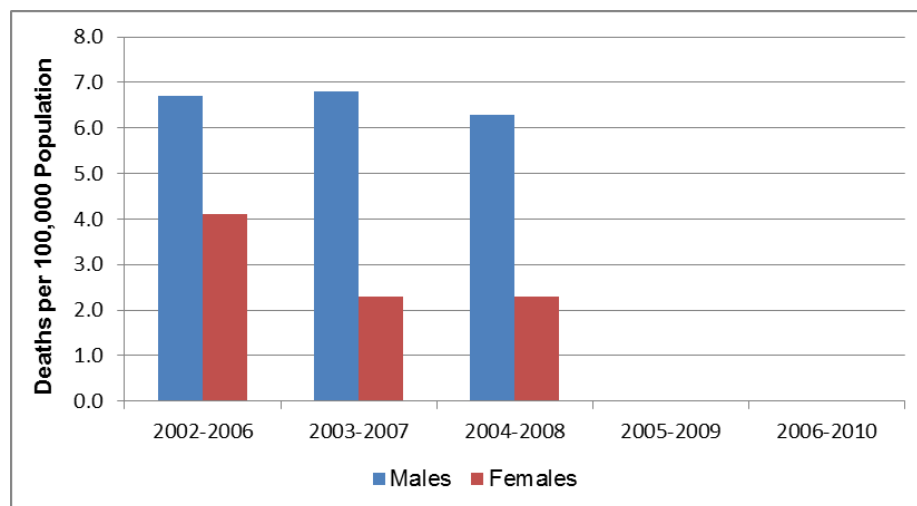
**Figure 43. Homicide Mortality Rate, Deaths per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

There were no stable gender-stratified homicide mortality rates for Madison County for the target period, and the NC SCHS did not release stratified rates in the last two aggregate periods. According to the limited county data presented in Figure 44, the homicide mortality rate among Madison County males appeared to be one-and-a-half to three times the rate among county females.

**Figure 44. Gender Disparities in Homicide Mortality, Madison County  
(Five-Year Aggregates, 2002-2006 through 2004-2008)**



In WNC, none of the 16 counties had large enough minority populations to yield stable homicide mortality rates for any minority group, so it is not possible to calculate stable mean region-wide rates for minorities. At the state level homicide mortality demonstrates strong racial and gender disparities. In NC for the 2006-2010 aggregate period the highest homicide mortality rates were among African American non-Hispanic males (25.6), and Hispanic males and other non-Hispanic males (13.0). The next highest homicide mortality rate occurred among African American non-Hispanic females (5.2), followed by white, non-Hispanic males (4.6), other non-Hispanic females (3.4), Hispanic females (2.6), and white non-Hispanic females (2.2) (*Data Workbook*).

### ***Acquired Immune Deficiency Syndrome (AIDS) Mortality***

The human immunodeficiency virus (HIV) is the virus that causes AIDS. HIV attacks the immune system by destroying CD4 positive (CD4+) T cells, a type of white blood cell that is vital to fighting off infection. The destruction of these cells leaves people infected with HIV vulnerable to other infections, diseases and other complications. The acquired immunodeficiency syndrome (AIDS) is the final stage of HIV infection. A person infected with HIV is diagnosed with AIDS when he or she has one or more opportunistic infections, such as pneumonia or tuberculosis, and has a dangerously low number of CD4+ T cells (less than 200 cells per cubic millimeter of blood) (National Institutes of Health, 2012).

AIDS was the fifteenth leading cause of death in WNC for the aggregate period 2006-2010 (Table 28, cited previously). In Madison County there were no deaths attributable to AIDS during the target period.

Because of small numbers of AIDS deaths across WNC, AIDS mortality rates are unstable or non-existent in 15 of the 16 counties in the region. A stable rate is available only for Buncombe County; hence it is not possible to plot meaningful regional AIDS mortality data.

Even at the state level it is not possible to calculate a stable AIDS mortality rate for several minority population groups. Using the stable NC rates available, it is apparent that non-Hispanic African Americans suffered mortality attributable to AIDS at rates much higher than did other groups. For example, in the 2006-2010 aggregate period, the AIDS mortality rate for African American non-Hispanic men (20.2) was almost 12 times the rate among white non-Hispanic men (1.7), and the rate among African American non-Hispanic women (9.8) was almost 25 times the rate among white non-Hispanic women (0.4). The AIDS mortality rate among Hispanic men statewide during this period was 4.1; rates were not released for any other minority group because of below-threshold numbers of AIDS deaths (*Data Workbook*).

## Life Expectancy

*Life expectancy* is the average number of additional years that someone at a given age would be expected to live if current mortality conditions remained constant throughout their lifetime. As the above data has demonstrated, there are many factors, from the prenatal period through the senior years, which can affect life expectancy. Table 32 presents a fairly recent summary of life expectancy for Madison County, WNC, and NC as a whole. From this data it appears that females born in Madison County in the period cited could expect to live 5.1 years longer than males born at the same time. Similarly, females born in WNC in the period cited in the table could expect to live 5.5 years longer on average than males born under the same parameters. There is no comparable data for minorities in Madison County, but African Americans born in WNC at the same time could expect to live a 3.3 year shorter lifespan than their white counterparts. Life expectancy overall in Madison County (77.1) is only 0.2 years shorter than life expectancy in WNC (77.0 years), where life expectancy is only 0.3 years shorter than for the state as a whole (77.3 years).

**Table 32. Life Expectancy at Birth (2006-2008)**

Geography	Overall	Gender		Race	
		Male	Female	White	African American
Madison County	77.1	74.6	79.7	77.0	n/a
Regional Arithmetic Mean	77.0	74.3	79.8	77.3	74.0
State Total	77.3	74.5	80.0	78.1	73.8



## Morbidity Data

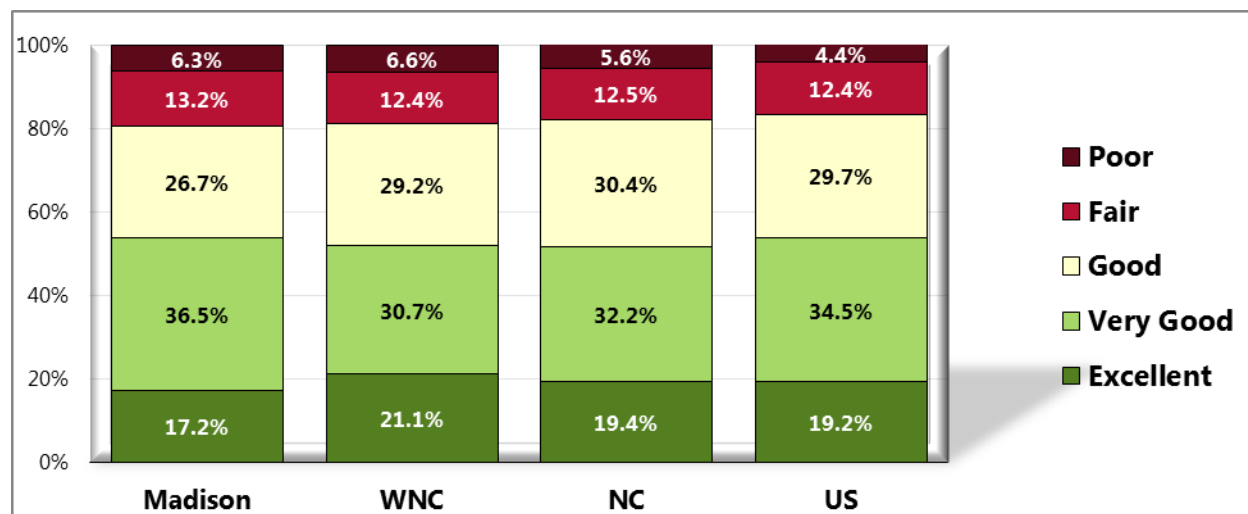
*Morbidity* as used in this report refers generally to the current presence of injury, sickness or disease (and sometimes the symptoms and/or disability resulting from those conditions) in the living population. In this report disability, diabetes, obesity, injury, communicable disease (including sexually-transmitted infections) and mental health conditions are the topics covered under morbidity.

The parameter most frequently used to describe the current extent of any condition of morbidity in a population is *prevalence*. Prevalence is the number of existing cases of a disease or health condition in a population at a defined point in time or during a period. Prevalence usually is expressed as a proportion, not a rate, and often represents an estimate rather than a direct count.

### **Self-Reported Health Status**

Survey respondents were asked, "Would you say that in general your health is excellent, very good, good, fair, or poor?"

**Figure 45. Self-Reported Health Status (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 12]  
• Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.  
• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes: • Asked of all respondents.

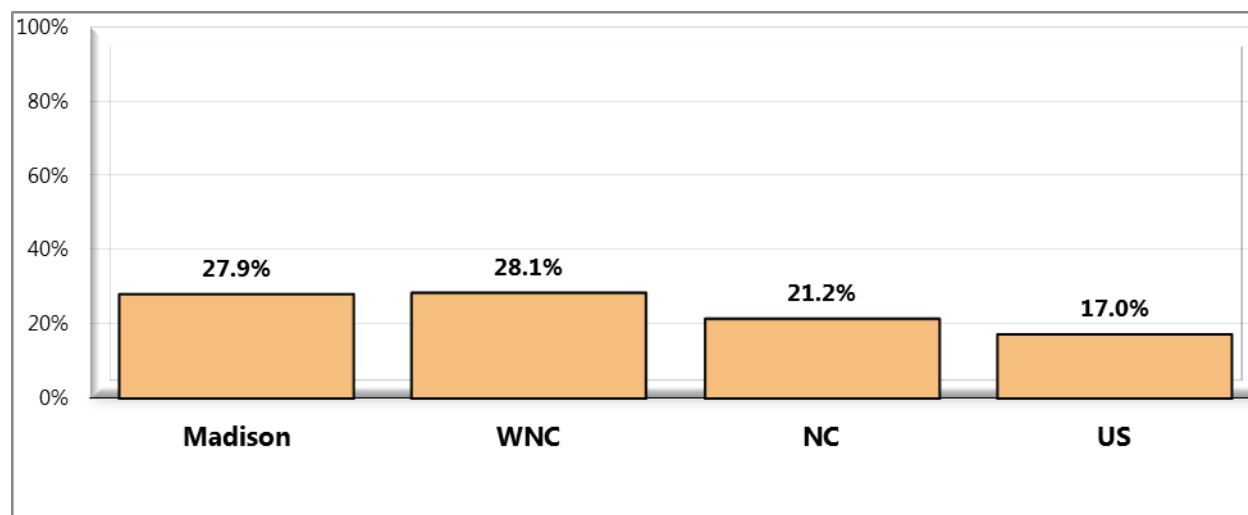
### **Disability and Limitations in Physical Activity**

An individual can get a disabling impairment or chronic condition at any point in life. Compared with people without disabilities, people with disabilities are more likely to (DHHS, 2010):

- Experience difficulties or delays in getting the health care they need.
- Not have had an annual dental visit.
- Not have had a mammogram in past 2 years.
- Not have had a Pap test within the past 3 years.
- Not engage in fitness activities.
- Use tobacco.
- Be overweight or obese.
- Have high blood pressure.
- Experience symptoms of psychological distress.
- Receive less social-emotional support.
- Have lower employment rates.

Survey respondents were asked, “Are you limited in any way in any activities because of physical, mental or emotional problems?” Those who responded, “yes,” were then asked to name the major impairment or health problem that limits them. Due to small county-level sample sizes, only regional data is shown for the latter question.

**Figure 46. Limited in Activities in Some Way  
Due to Physical, Mental or Emotional Problem (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 67]  
• Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.  
• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes: • Asked of all respondents

**Table 33. Type of Problem That Limits Activities (WNC Healthy Impact Survey)**  
(Among Those Reporting Activity Limitations)  
(Western North Carolina, 2012)

	Arthritis/ Rheumatism	Back/Neck Problem	Difficulty Walking	Fracture/Bone/ Joint Injury	Heart Problem	Lung/Breathing Problem	Mental/ Depression	Other (<3%)
Madison	8.3%	24.1%	10.1%	6.3%	3.8%	4.0%	4.7%	38.7%

Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 68]

Notes: • Asked of those respondents reporting activity limitations.

## **Diabetes**

Table 34 presents trend data from the US Centers for Disease Control and Prevention (CDC) on the estimated prevalence of diagnosed diabetes in Madison County and WNC. The prevalence of diagnosed diabetes and selected risk factors by county was estimated using data from CDC's Behavioral Risk Factor Surveillance System (BRFSS) and data from the U.S. Census Bureau's Population Estimates Program. Three years of data were used to improve the precision of the year-specific county-level estimates of diagnosed diabetes and selected risk factors.

From these data it appears that the estimated prevalence of diagnosed diabetes among adults in Madison County was variable over the period cited, not unusual for survey results from a small population. The percent prevalence in the county was lower than the comparable mean estimated percentage in WNC for every year except 2006. In WNC the mean estimated percent prevalence of diagnosed diabetes among adults in WNC rose from 8.5% in 2005 to 9.0% in 2009, an increase of 5.9%.

**Table 34. Estimate of Diagnosed Diabetes Among Adults Age 20 and Older (2005-2009)**

Geography	2005		2006		2007		2008		2009	
	#	%	#	%	#	%	#	%	#	%
Madison County	1,469	8.4	1,534	8.8	1,517	8.6	1,426	8.0	1,592	8.7
Regional Total	49,896	-	52,045	-	55,160	-	55,442	-	58,378	-
Regional Arithmetic Mean	3,119	8.5	3,253	8.7	3,448	8.9	3,465	8.8	3,649	9.0

In 2010, inpatient hospitalizations for diabetes among Madison County residents totaled 26 cases, or 1.3% of all inpatient hospitalizations listed for county residents. In the same year, there were 1,240 inpatient hospital cases associated with treatment of diabetes in WNC. This number of cases represented 1.6% of all hospitalizations in the region. Statewide, diabetes hospitalizations composed 1.9% of all hospitalizations in NC (*Data Workbook*).

## **Obesity**

Obesity is a problem throughout the population. However, among adults in the U.S., vast disparities in obesity exist. Within the U.S., the prevalence of obesity is highest for middle-aged people and for non-Hispanic black and Mexican American women. Among children and adolescents, the prevalence of obesity is highest among older and Mexican American children and non-Hispanic black girls. The association of income with obesity varies by age, gender, and race/ethnicity. Social and physical factors affecting diet and physical activity have an impact on weight. (DHHS, 2010).

Body Mass Index (BMI), which describes relative weight for height, is significantly correlated with total body fat content. The BMI should be used to assess overweight and obesity and to monitor changes in body weight. In addition, measurements of body weight alone can be used to determine efficacy of weight loss therapy. BMI is calculated as weight (kg)/height squared ( $m^2$ ). To estimate BMI using pounds and inches, use: [weight (pounds)/height squared (inches<sup>2</sup>)] x 703.

In this report, underweight is defined as a BMI of  $<18.5 \text{ kg}/m^2$ , normal is defined as a BMI of  $18.5$  to  $24.9 \text{ kg}/m^2$ , overweight is defined as a BMI of  $25.0$  to  $29.9 \text{ kg}/m^2$  and obesity as a BMI  $\geq 30 \text{ kg}/m^2$ . The rationale behind these definitions is based on epidemiological data that show increases in mortality with BMIs above  $25 \text{ kg}/m^2$ . The increase in mortality, however, tends to be modest until a BMI of  $30 \text{ kg}/m^2$  is reached. For persons with a BMI  $\geq 30 \text{ kg}/m^2$ , mortality rates from all causes, and especially from cardiovascular disease, are generally increased by 50 to 100 percent above that of persons with BMIs in the range of 20 to  $25 \text{ kg}/m^2$  (NIH, 1998)

### ***Adult Obesity***

Table 35 presents trend data from the CDC on the estimated prevalence of diagnosed adult obesity in Madison County and WNC. The prevalence of diagnosed obesity and selected risk factors by county was estimated using data from CDC's Behavioral Risk Factor Surveillance System (BRFSS) and data from the U.S. Census Bureau's Population Estimates Program. Three years of data were used to improve the precision of the year-specific county-level estimates of diagnosed diabetes and selected risk factors.

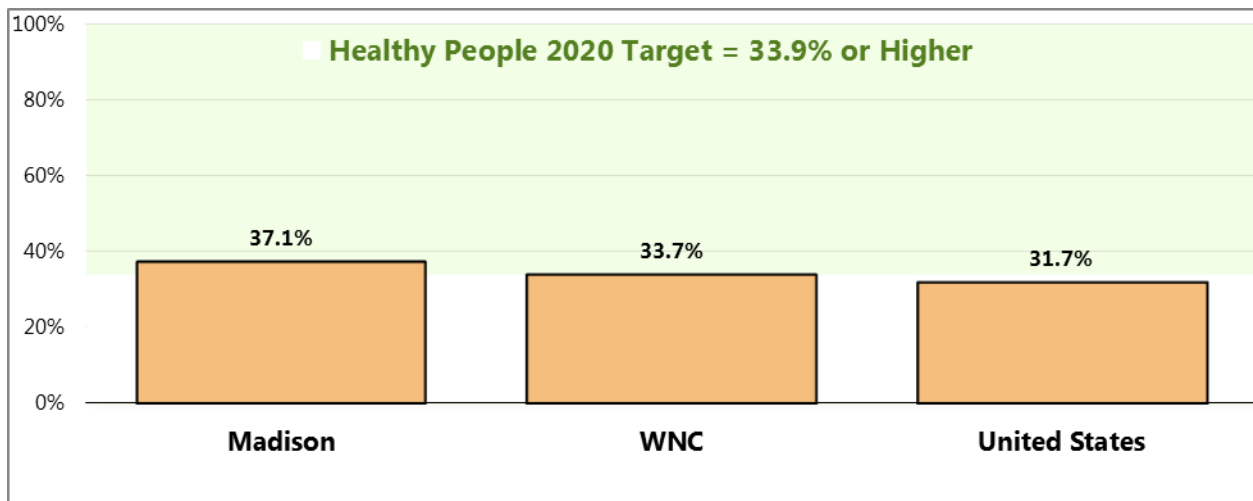
From these data it appears that estimated prevalence of diagnosed obesity among adults in Madison County rose every year but one between 2005 and 2009; the increase from 2005 to 2009 was 11.2%. The estimated mean prevalence of adult obesity in WNC increased annually throughout the period cited. Between 2005 and 2009 the estimated mean percent of the WNC population diagnosed as obese rose from 25.2% to 28.0%, a total increase of 11.1%.

**Table 35. Estimate of Diagnosed Obesity Among Adults Age 20 and Older (2005-2009)**

Geography	2005		2006		2007		2008		2009	
	#	%	#	%	#	%	#	%	#	%
Madison County	3,950	25.9	4,053	26.4	4,087	26.7	4,089	26.6	4,416	28.8
Regional Total	128,908	-	136,661	-	139,114	-	143,681	-	148,403	-
Regional Arithmetic Mean	8,057	25.2	8,541	26.4	8,695	26.7	8,980	27.4	9,275	28.0

Based on self-reported heights and weights, the survey data below shows 2012 county and regional estimates of the prevalence of healthy weight, overweight, and obesity.

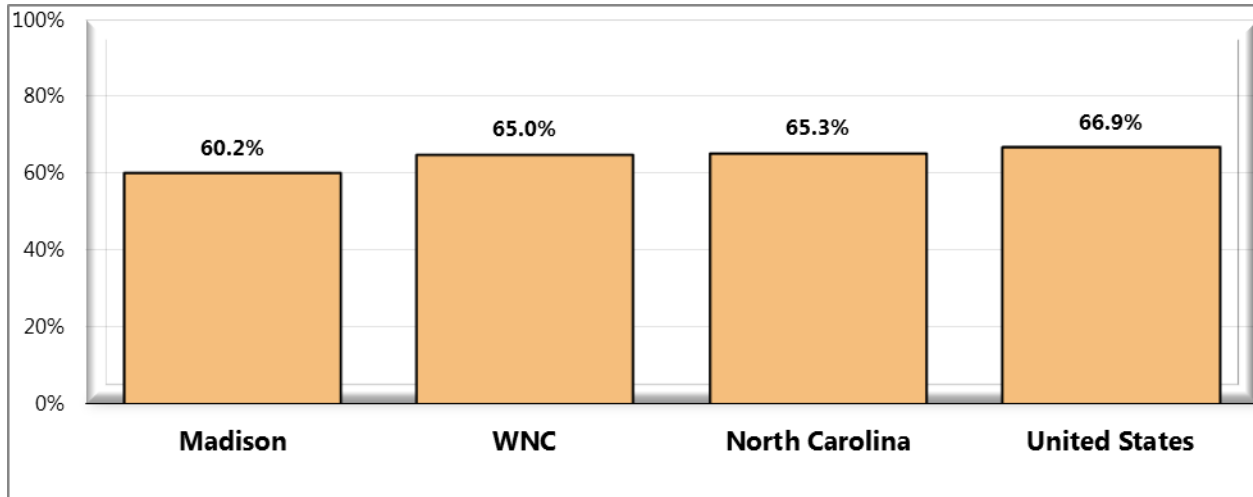
**Figure 47. Healthy Weight (WNC Healthy Impact Survey)**  
 (Percent of Adults With a Body Mass Index Between 18.5 and 24.9)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 85]  
 • 2011 PRC National Health Survey, Professional Research Consultants, Inc.

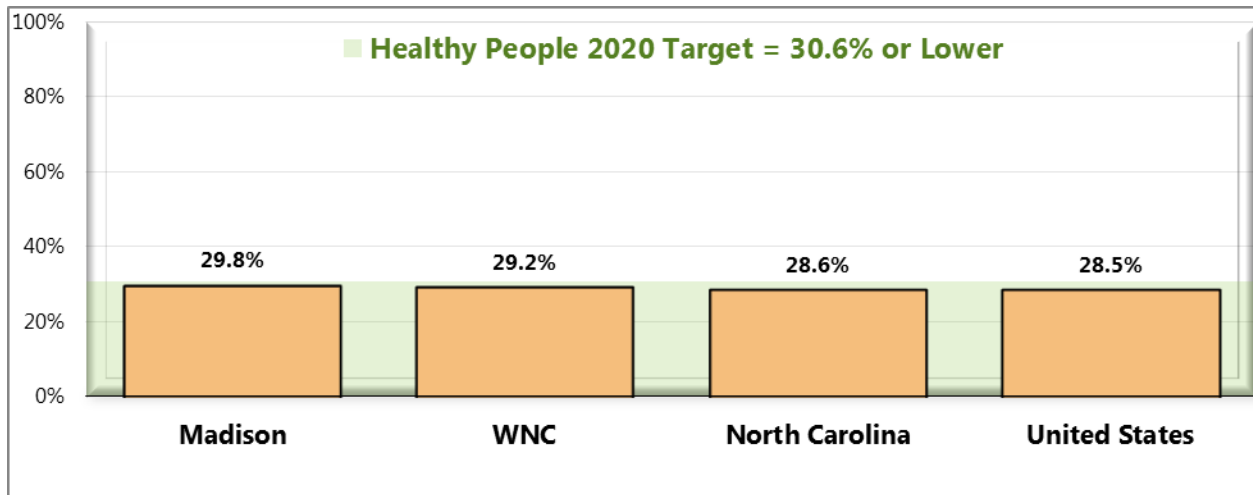
Notes: • Based on reported heights and weights, asked of all respondents.  
 • US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> Objective NWS-8]  
 • The definition of healthy weight is having a body mass index (BMI), a ratio of weight to height (kilograms divided by meters squared), between 18.5 and 24.9.

**Figure 48. Prevalence of Total Overweight (WNC Healthy Impact Survey)**  
(Percent of Overweight or/Obese Adults; Body Mass Index of 25.0 or Higher)



- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 85]
  - 2011 PRC National Health Survey, Professional Research Consultants, Inc.
  - Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- Notes:
- Based on reported heights and weights, asked of all respondents.
  - The definition of overweight is having a body mass index (BMI), a ratio of weight to height (kilograms divided by meters squared), greater than or equal to 25.0, regardless of gender. The definition for obesity is a BMI greater than or equal to 30.0.

**Figure 49. Prevalence of Obesity (WNC Healthy Impact Survey)**  
(Percent of Obese Adults; Body Mass Index of 30.0 or Higher)



- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 85]
  - 2011 PRC National Health Survey, Professional Research Consultants, Inc.
  - US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective NWS-9]
  - Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- Notes:
- Based on reported heights and weights, asked of all respondents.
  - The definition of obesity is having a body mass index (BMI), a ratio of weight to height (kilograms divided by meters squared), greater than or equal to 30.0, regardless of gender.

### Childhood Obesity

The NC Healthy Weight Initiative, using the NC Nutrition and Physical Activity Surveillance System (NC NPASS), collects height and weight measurements from children seen in NC DPH-sponsored WIC and Child Health Clinics, as well as some school-based Health Centers (NC DHHS – Nutrition Services Branch, 2012). (Note that this data is not necessarily representative of the county-wide or region-wide population of children.) This data is used to calculate Body Mass Indices (BMIs) in order to gain some insight into the prevalence of childhood obesity.

BMI is a calculation relating weight to height by the following formula:

$$\text{BMI} = (\text{weight in kilograms}) / (\text{height in meters})$$

For children, a BMI in the 95th percentile or above is considered “obese” (formerly defined as “overweight”), while BMIs that are between the 85th and 94th percentiles are considered “overweight” (formerly defined as “at risk for overweight”).

Tables 36, 37 and 38 present NC NPASS data for 2010 on children in three age groups: ages 2-4, ages 5-11, and ages 12-18.

From data presented in Table 36 it appears that the prevalence of healthy weight among 2-4 year-olds in Madison County (63.6%) was essentially the same as the comparable figure for NC (63.5%) but slightly lower than the figure for WNC (64.5%). The prevalence of *overweight* among children ages 2-4 appeared to be higher in Madison County (18.2%) than in WNC (17.2%) or in NC as a whole (16.1%). It must be noted, however, that the Madison County percentages for overweight and obesity were based on only a few children (n=8, n=2, respectively) and likely were unstable. Region-wide the mean prevalence of *overweight* in 2-4 year-olds (17.2%) was higher than the prevalence in NC (16.1%) and the prevalence of *obesity* (13.6%) was lower than the comparable percentage for the state as a whole (15.6%). It should be noted that the regional means denoted in *italics* contain one or more county percentages that were unstable due to small numbers of children participating in the program.

**Table 36. Prevalence of Obesity, Overweight, Healthy Weight and Underweight  
Children 2 through 4 years  
(2010)**

Geography	Total	Underweight		Healthy Weight		Overweight		Obese	
		<5th Percentile		≥5th to <85th Percentile		≥85th to <95th Percentile		≥95th Percentile	
	#	#	%	#	%	#	%	#	%
Madison County	44	6	13.6	28	63.6	8	18.2	2	4.5
Regional Total	6,814	316	-	4,410	-	1,139	-	949	-
Regional Arithmetic Mean	426	20	4.8	276	64.5	71	17.2	59	13.6
State Total	105,410	4,935	4.7	66,975	63.5	17,022	16.1	16,478	15.6

The Madison County Health Department does not routinely collect NC NPASS data for the 5-11 year-old age group, so none is presented here. From regional and state-wide data presented in Table 37 it appears that the prevalence children ages 5-11 with healthy weight in WNC (63.4%) was higher than the figure for NC (54.3%). The prevalence of overweight children in this age group in WNC (14.3%) was lower than the comparable prevalence statewide (17.1%), and the prevalence of *obese* children ages 5-11 in WNC (19.4%) was lower than the comparable figure for NC as a whole (25.8%). It must be noted that the regional means denoted in *italics* contain one or more county percentages that were unstable due to small numbers of children participating in the program.

**Table 37. Prevalence of Obesity, Overweight, Healthy Weight and Underweight Children 5 through 11 years (2010)**

Geography	Total	Underweight		Healthy Weight		Overweight		Obese	
		<5th Percentile		≥5th to <85th Percentile		≥85th to <95th Percentile		≥95th Percentile	
	#	#	%	#	%	#	%	#	%
Madison County	32	1	3.1	23	71.9	2	6.3	6	18.8
Regional Total	1,243	26	-	721	-	208	-	288	-
Regional Arithmetic Mean	78	2	2.9	45	63.4	13	14.3	18	19.4
State Total	12,633	353	2.8	6,859	54.3	2,157	17.1	3,264	25.8

The Madison County Health Department does not routinely collect NC NPASS data for the 12-18 year-old age group, so none is presented here. Examining instead regional and state data in Table 38 it appears that the prevalence of healthy-weight children ages 12-18 was higher in WNC (56.3%) than statewide (51.9%), that the prevalence of *overweight* children ages 12-18 was higher in WNC (19.0%) than in NC as a whole (18.1%), but that the prevalence of *obesity* in this age group was smaller in WNC (23.8%) than statewide (28.0%). It must be noted that the regional means denoted in *italics* contain one or more county percentages that were unstable due to small numbers of children participating in the program.

**Table 38. Prevalence of Obesity, Overweight, Healthy Weight and Underweight Children 12 through 18 years (2010)**

Geography	Total	Underweight		Healthy Weight		Overweight		Obese	
		<5th Percentile		≥5th to <85th Percentile		≥85th to <95th Percentile		≥95th Percentile	
	#	#	%	#	%	#	%	#	%
Madison County	3	0	n/a	2	n/a	1	n/a	0	n/a
Regional Total	1,348	13	-	729	-	245	-	361	-
Regional Arithmetic Mean	84	1	1.0	46	56.3	15	19.0	23	23.8
State Total	6,854	133	1.9	3,560	51.9	1,241	18.1	1,920	28.0



For further details regarding this NC NPASS data, consult the *Data Workbook*.

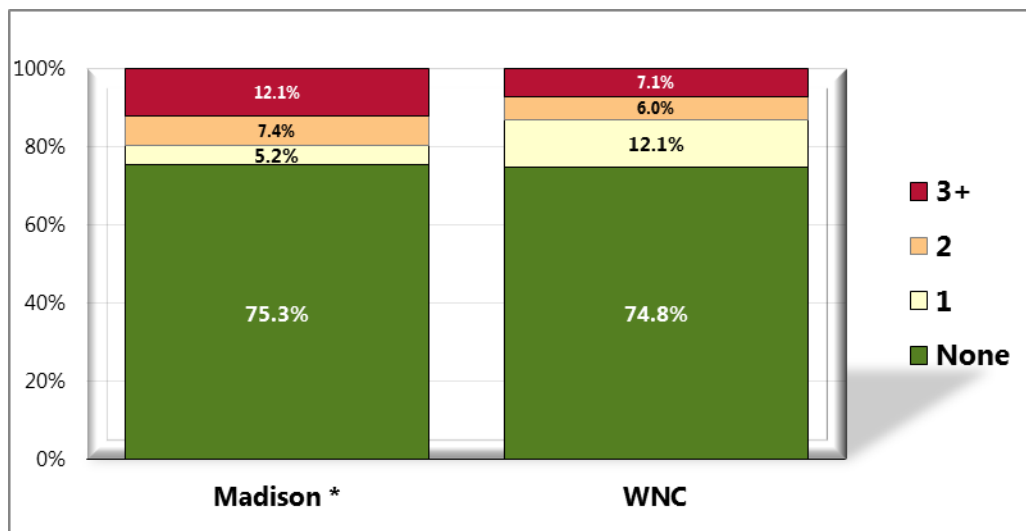
## **Injuries**

### ***Falls***

There were 10 deaths due to falls in Madison County in the period 2006-2010. In 2009 alone there were three, all of them in the over-65 age group (two in the 75-84 age group, and one in the 85-and-over age group) (*Data Workbook*).

Survey respondents were also asked how many times they have fallen in the past 12 months, and how many of these falls caused an injury. Data is shown below for adults age 65 and older. Due to small county-level sample sizes, fall-related injury data is provided at the regional level.

**Figure 50. Number of Falls in the Past Year (WNC Healthy Impact Survey)**  
(Among Adults Age 65 and Older)

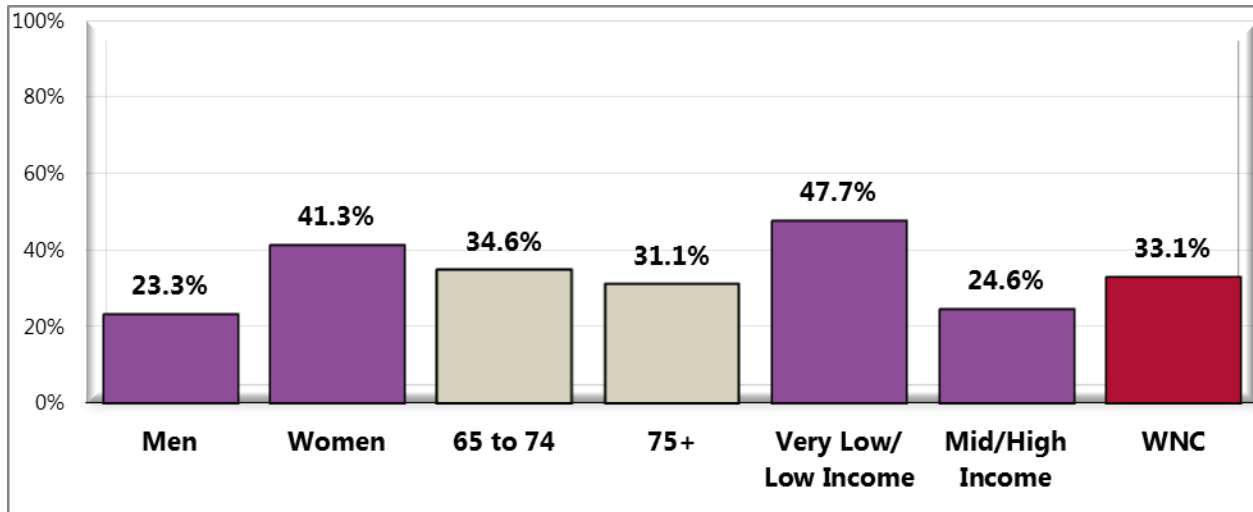


Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 40]

Notes: • Asked of respondents age 65 and older.

\* These counties have sample sizes deemed unreliable (n<50).

**Figure 51. Sustained a Fall-Related Injury in the Past Year (WNC Healthy Impact Survey)**  
 (Among Adults 65+ Who Have Fallen in the Past Year)  
 (Western North Carolina, 2012)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 41]

- Notes:
- Asked of respondents age 65 and older who have fallen in the past year.
  - Includes falls that caused respondent to limit his/her regular activities for at least a day or caused him/her to go see a doctor.
  - Hispanics can be of any race. Other race categories are non-Hispanic categorizations (e.g., "White" reflects non-Hispanic White respondents).
  - Income categories reflect respondent's household income as a ratio to the federal poverty level (FPL) for their household size. "Low Income" includes households with incomes up to 200% of the federal poverty level; "Mid/High Income" includes households with incomes at 200% or more of the federal poverty level.

### **Vehicle Crashes**

The Highway Safety Research Center at the University of North Carolina at Chapel Hill tracks information about vehicle crashes across the state on an annual basis, including detail on the fraction of crashes that are alcohol-related. Table 39 presents trend data on vehicle crashes for the period from 2006 through 2010. The data presented for Madison County demonstrate high variability, but the percentage of alcohol-related crashes in the county was usually below the percentage for WNC. However the percentage of alcohol-related traffic crashes in the county was above the comparable state rate in every year cited in the table except 2008. The data in the table also shows that the percentage of alcohol-related vehicle crashes in WNC was higher than the comparable percentage for the state as a whole throughout the period cited, with the difference varying from 16% to 27% depending on the year.

**Table 39. Alcohol-Related Traffic Crashes (2006-2010)**

Geography	2006		2007		2008		2009		2010	
	# Crashes	% Alcohol-Related	# Crashes	% Alcohol-Related	# Crashes	% Alcohol-Related	# Crashes	% Alcohol-Related	# Crashes	% Alcohol-Related
Madison County	342	5.6	331	6.3	326	5.5	319	7.8	336	5.1
Regional Total	15,004	6.2	15,216	6.5	13,997	7.1	14,075	6.6	14,763	5.8
State Total	220,307	5.1	224,307	5.3	214,358	5.6	209,695	5.4	213,573	5.0

Table 40 presents additional detail on the nature of vehicular crashes for a single year, 2010. In Madison County 5.1% of *all* crashes were alcohol-related; although the following number may be unstable since it is based on only two events, 100.0% of the *fatal* crashes (2 of 2) in the county were alcohol-related. In both WNC and NC as a whole, the proportion of *all* crashes that were alcohol-related was less than 6%, but the proportion of *fatal* crashes that were alcohol-related was over 30%. It is noteworthy that the percentages of crashes that were alcohol-related were higher in WNC than in NC for every outcome category displayed in Table 40.

**Table 40. Outcomes of Traffic Crashes (2010)**

Geography	Total Crashes		Property Damage Only Crashes		Non-Fatal Crashes		Fatal Crashes	
	# Reportable Crashes	% Alcohol-Related Crashes	# Reportable Crashes	% Alcohol-Related Crashes	# Reportable Crashes	% Alcohol-Related Crashes	# Reportable Crashes	% Alcohol-Related Crashes
Madison County	336	5.1	259	4.2	75	5.3	2	100.0
Regional Total	14,763	5.8	9,469	4.0	5,192	8.3	102	36.3
State Total	213,573	5.0	143,211	3.4	69,138	7.8	1,224	32.4

### ***Distracted Drivers***

There is no comparable data for Madison County, WNC or NC, but in the US as a whole in 2010, 3,092 people died and 416,000 were injured as a result of distracted driving (*Data Workbook*).

### ***Workplace Injury***

There is no comparable data for Madison County, WNC or the US, but in NC as a whole, the mortality rate associated with work-related injury was 3.9 deaths per 100,000 full-time equivalent workers in 2008, and 3.3 in 2009 (*Data Workbook*).

### ***Poisonings***

For the five-year aggregate period 2006-2010 there were eight unintentional poisoning deaths in Madison County, a figure too small to calculate a corresponding age-adjusted mortality rate. The comparable mean unintentional poisoning mortality rate for WNC was 23.1 over the same period.

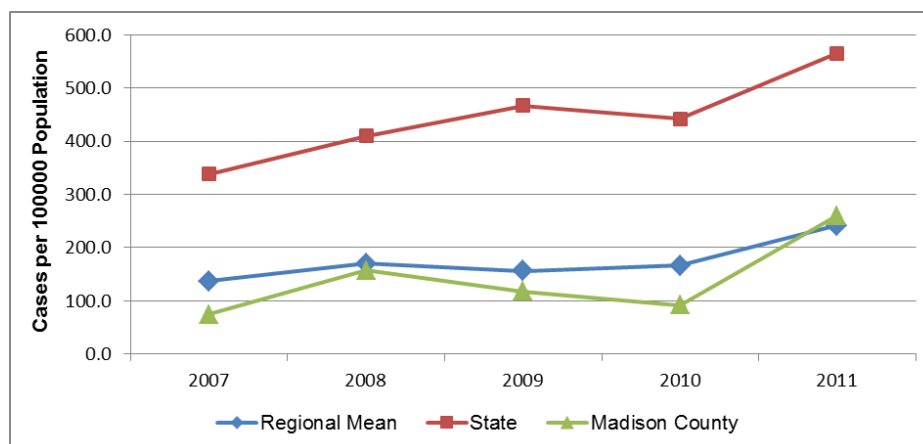
## **Communicable Disease**

A communicable disease is a disease transmitted through direct contact with an infected individual or indirectly through a vector (Merriam-Webster.com). The topic of communicable diseases includes sexually transmitted infections (STIs). The STIs of greatest regional interest are chlamydia and gonorrhea. HIV/AIDS is sometimes grouped with STIs, since sexual contact is one mode of HIV transmission. While AIDS, as the final stage of HIV infection, was discussed previously among the leading causes of death, HIV is discussed here as a communicable disease.

**Chlamydia** is the most frequently reported bacterial STI in the US. It is estimated that there are approximately 2.8 million new cases of chlamydia in the US each year. Chlamydia cases frequently go undiagnosed and can cause serious problems in men and women, such as penile discharge and infertility respectively, as well as infections in newborn babies of infected mothers (CDC, 2012).

Figure 52 plots chlamydia rates for several years. From this data it appears that chlamydia infection was less prevalent in Madison County than in either WNC or NC over the period cited. In WNC the mean chlamydia infection rate was 57% to 66% lower than the comparable rate for NC as a whole for the time span cited. Chlamydia rates in both NC and WNC increased overall between 2007 and 2010, as the NC rate rose 67.2% (from 337.7 to 564.8) and the WNC rate rose 76.4% (from 136.9 to 241.5). In Madison County over the same period the chlamydia infection rate appears to have more than tripled, from 74.1 to 260.1.

**Figure 52. Chlamydia Rate, All Ages, Cases per 100,000 Population  
(Five Single Years, 2007-2011)**

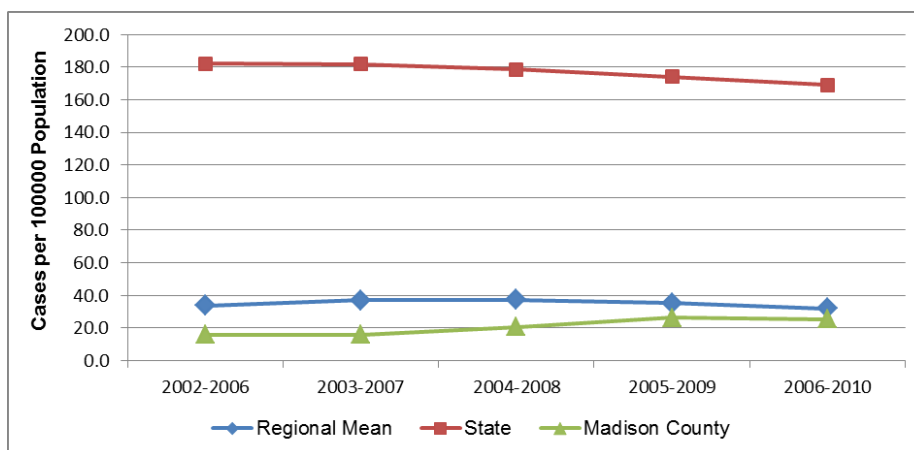


Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

**Gonorrhea** is the second most commonly reported bacterial STI in the US. The highest rates of gonorrhea have been found in African Americans, people 20 to 24 years of age, and women, respectively. In women, gonorrhea can spread into the uterus and fallopian tubes, resulting in pelvic inflammatory disease (PID). PID affects more than 1 million women in the US every year and can cause tubal pregnancy and infertility in as many as 10 percent of infected women. In addition, some health researchers think gonorrhea adds to the risk of getting HIV infection (CDC, 2012).

Figure 53 plots gonorrhea rates for several aggregate periods. From this data it appears that for the entire period cited gonorrhea was far less prevalent in Madison County than in either WNC or NC. The mean gonorrhea rate in WNC was approximately 80% lower than the state rate for the span of aggregate periods shown in Figure 53. As the state gonorrhea rate decreased 7.2% (from 182.0 to 168.9) over the period cited, the mean WNC gonorrhea rate decreased 5.3% (from 33.7 to 31.9) in the same time span. Over the same period, the gonorrhea infection rate in Madison County increased 60.4%, from 15.9 to 25.5.

**Figure 53. Gonorrhea Rate, Cases per 100,000 Population  
(Five-Year Aggregates, 2002-2006 through 2006-2010)**



Note: There is some instability in the regional mean rates because each includes one or more unstable county rate.

**HIV infection**, an important communicable disease in some regions of NC, is a rare occurrence throughout most of WNC. Only one county in the region (Buncombe) has reported enough cases in some years to calculate a stable incidence rate. The total number of HIV cases in WNC in 2008 was 58; in 2009 the total was 46, and in 2010 the total was 40 (*Data Workbook*).

## CHAPTER 4 – HEALTH BEHAVIORS

### Physical Activity

Regular physical activity can improve the health and quality of life of Americans of all ages, regardless of the presence of a chronic disease or disability. Among adults and older adults, physical activity can lower the risk of: early death; coronary heart disease; stroke; high blood pressure; type 2 diabetes; breast and colon cancer; falls; and depression. Among children and adolescents, physical activity can: improve bone health; improve cardiorespiratory and muscular fitness; decrease levels of body fat; and reduce symptoms of depression. For people who are inactive, even small increases in physical activity are associated with health benefits.

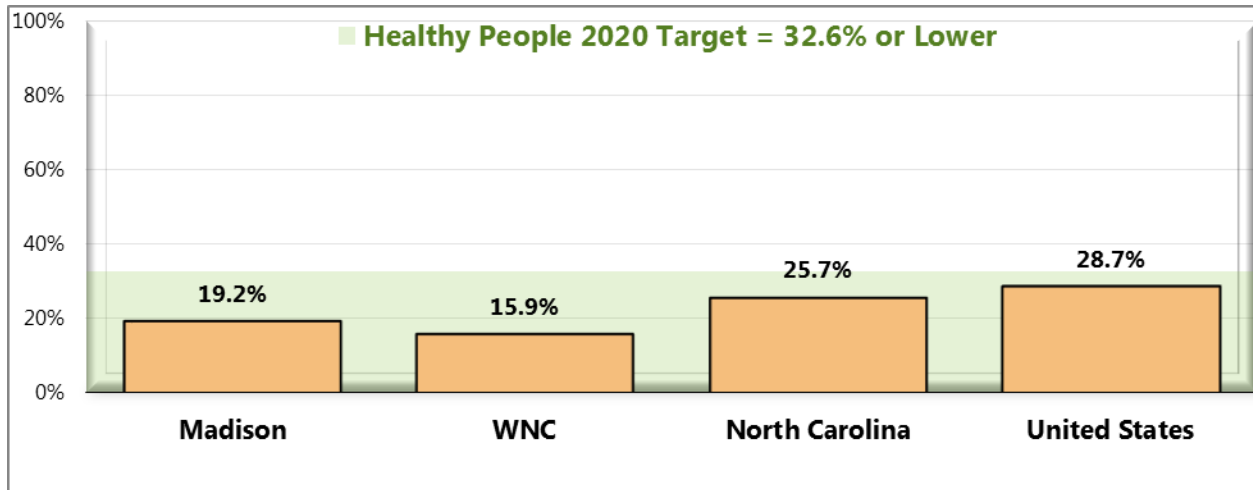
Personal, social, economic, and environmental factors all play a role in physical activity levels among youth, adults, and older adults. Factors **positively** associated with adult physical activity include: postsecondary education; higher income; enjoyment of exercise; expectation of benefits; belief in ability to exercise (self-efficacy); history of activity in adulthood; social support from peers, family, or spouse; access to and satisfaction with facilities; enjoyable scenery; and safe neighborhoods. Factors **negatively** associated with adult physical activity include: advancing age; low income; lack of time; low motivation; rural residency; perception of great effort needed for exercise; overweight or obesity; perception of poor health; and being disabled. Older adults may have additional factors that keep them from being physically active, including lack of social support, lack of transportation to facilities, fear of injury, and cost of programs (DHHS, 2010).

Adults (age 18–64) should do 2 hours and 30 minutes a week of moderate-intensity, or 1 hour and 15 minutes (75 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic physical activity. Aerobic activity should be performed in episodes of at least 10 minutes, preferably spread throughout the week. Additional health benefits are provided by increasing to 5 hours (300 minutes) a week of moderate-intensity aerobic physical activity, or 2 hours and 30 minutes a week of vigorous-intensity physical activity, or an equivalent combination of both.

Older adults (age 65 and older) should follow the adult guidelines. If this is not possible due to limiting chronic conditions, older adults should be as physically active as their abilities allow. They should avoid inactivity. Older adults should do exercises that maintain or improve balance if they are at risk of falling.

For all individuals, some activity is better than none. Physical activity is safe for almost everyone, and the health benefits of physical activity far outweigh the risks (DHHS, 2008).

**Figure 54. No Leisure-Time Physical Activity in the Past Month  
(WNC Healthy Impact Survey)**

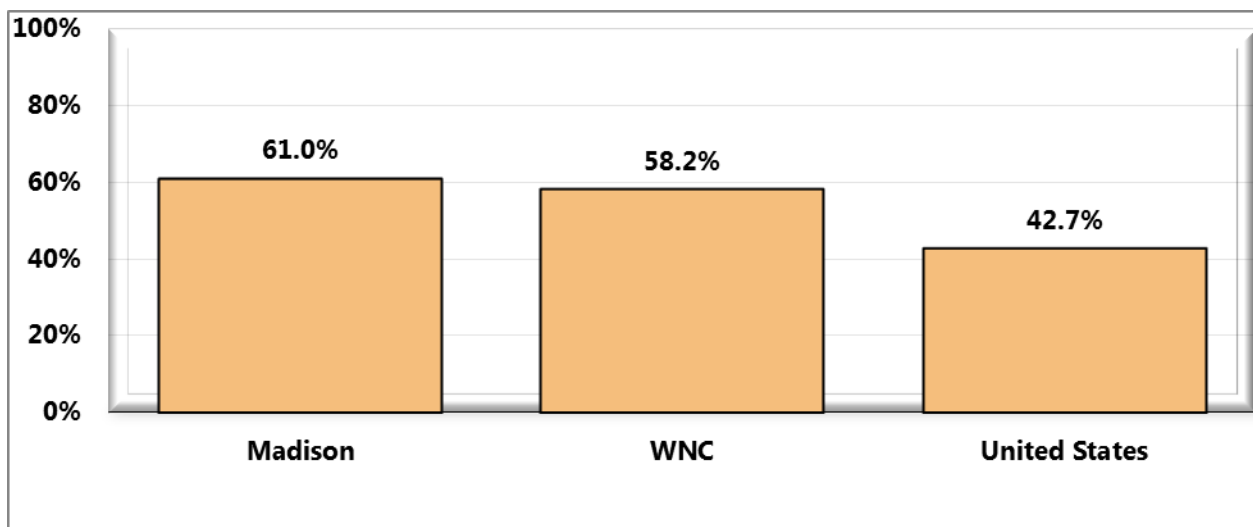


- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 56]
  - Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
  - 2011 PRC National Health Survey, Professional Research Consultants, Inc.
  - US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective PA-1]

Notes:

- Asked of all respondents.

**Figure 55. Meets Physical Activity Recommendations (WNC Healthy Impact Survey)**



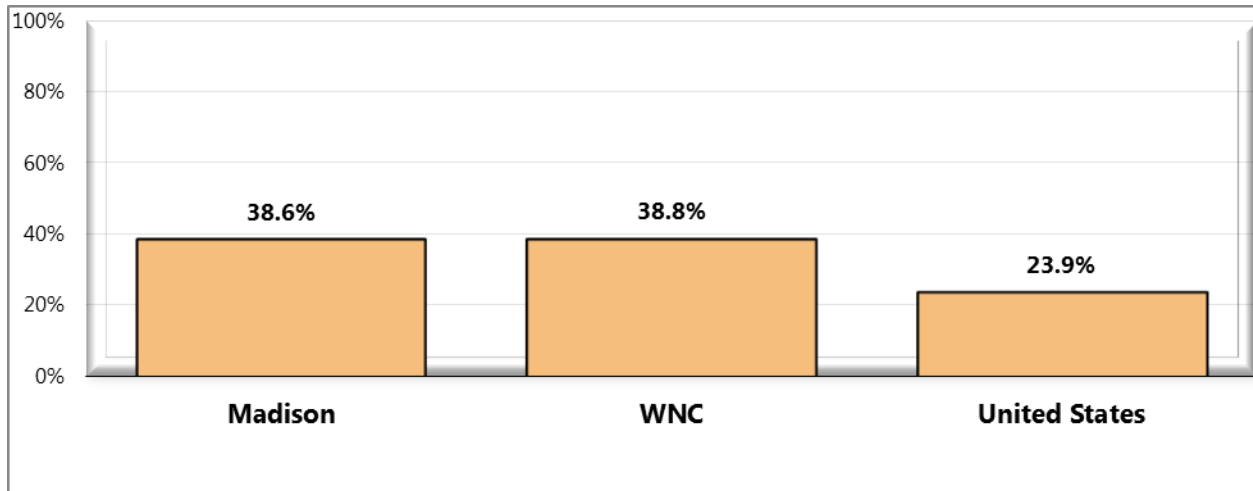
- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 80]
  - 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes:

- Asked of all respondents.
- In this case the term “meets physical activity recommendations” refers to participation in moderate physical activity (exercise that produces only light sweating or a slight to moderate increase in breathing or heart rate ) at least 5

times a week for 30 minutes at a time, and/or vigorous physical activity (activities that cause heavy sweating or large increases in breathing or heart rate) at least 3 times a week for 20 minutes at a time.

**Figure 56. Moderate Physical Activity (WNC Healthy Impact Survey)**



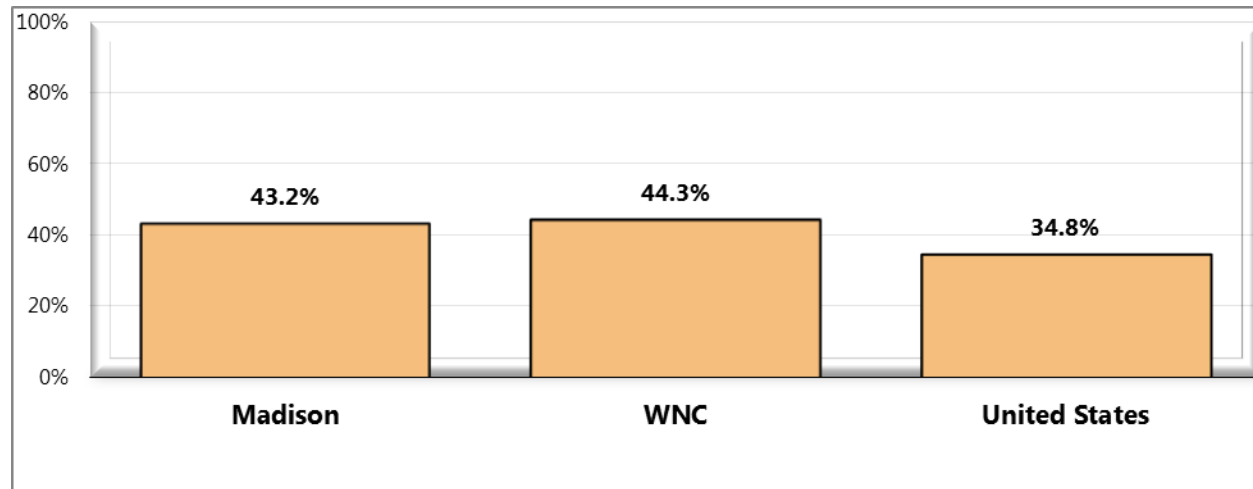
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 81]

• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes: • Asked of all respondents.

• Moderate Physical Activity: Takes part in exercise that produces only light sweating or a slight to moderate increase in breathing or heart rate at least 5 times per week for at least 30 minutes per time.

**Figure 57. Vigorous Physical Activity (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 82]

• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

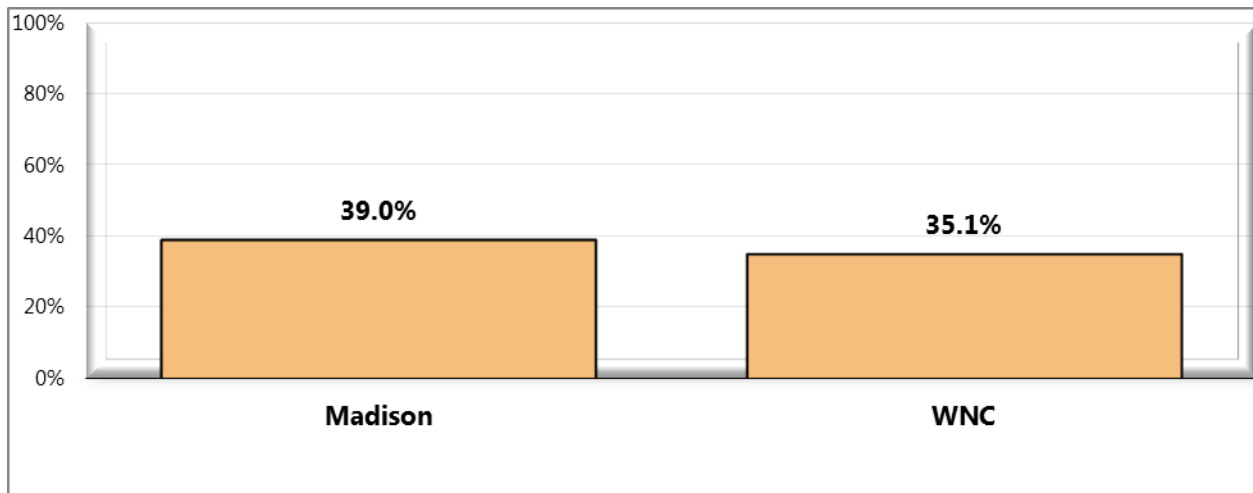
• Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.

Notes: • Asked of all respondents.

• Vigorous Physical Activity: Takes part in activities that cause heavy sweating or large increases in breathing or heart rate at least 3 times per week for at least 20 minutes per time.



**Figure 58. Strengthening Physical Activity (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 83]

Notes: • Asked of all respondents.

• Strengthening Physical Activity: Takes part in physical activities or exercises that strengthen muscles at least 2 times per week.

## Diet and Nutrition

Strong science exists supporting the health benefits of eating a healthful diet and maintaining a healthy body weight. Diet and body weight are related to health status. Good nutrition is important to the growth and development of children. A healthful diet also helps Americans reduce their risks for many health conditions, including: overweight and obesity; malnutrition; iron-deficiency anemia; heart disease; high blood pressure; dyslipidemia (poor lipid profiles); type 2 diabetes; osteoporosis; oral disease; constipation; diverticular disease; and some cancers. Efforts to change diet and weight should address individual behaviors, as well as the policies and environments that support these behaviors in settings such as schools, worksites, healthcare organizations, and communities.

**Social Determinants of Diet.** Social factors thought to influence diet include:

- Knowledge and attitudes
- Skills
- Social support
- Societal and cultural norms
- Food and agricultural policies
- Food assistance programs
- Economic price systems

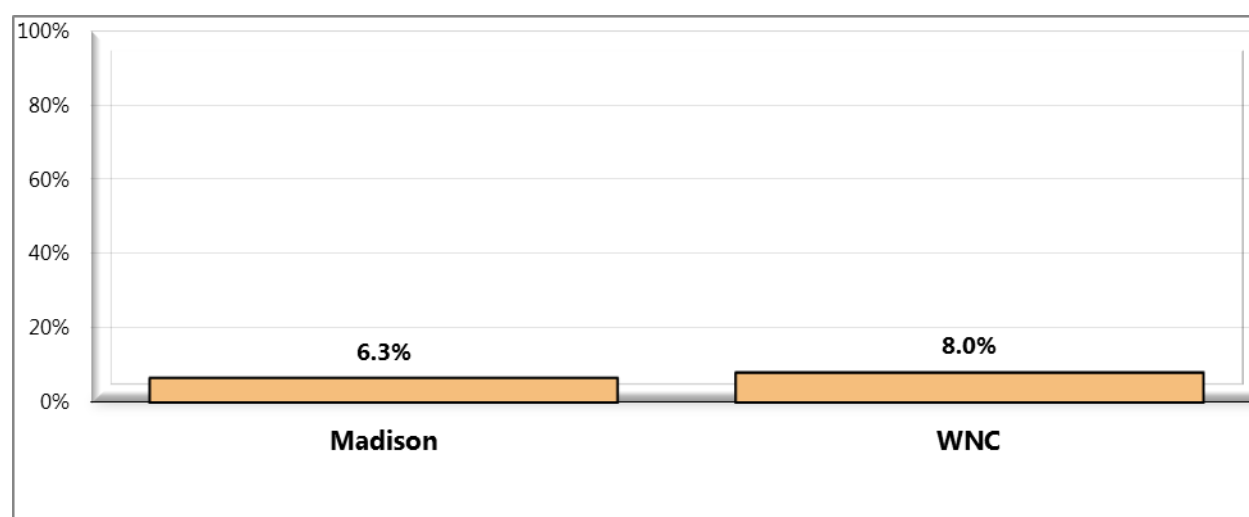
### Physical Determinants of Diet.

The places where people eat appear to influence their diet. For example, foods eaten away from home often have more calories and are of lower nutritional quality than foods prepared at home. Marketing also influences people's—particularly children's—food choices (DHHS, 2010).

More information is available elsewhere in this report about some of these determinants.

To measure fruit and vegetable consumption, survey respondents were asked how many one-cup servings of fruit and one-cup servings of vegetables (not counting lettuce salad or potatoes) they ate over the past week.

**Figure 59. Had an Average of Five or More Servings of Fruits/Vegetables per Day in the Past Week (WNC Healthy Impact Survey)**

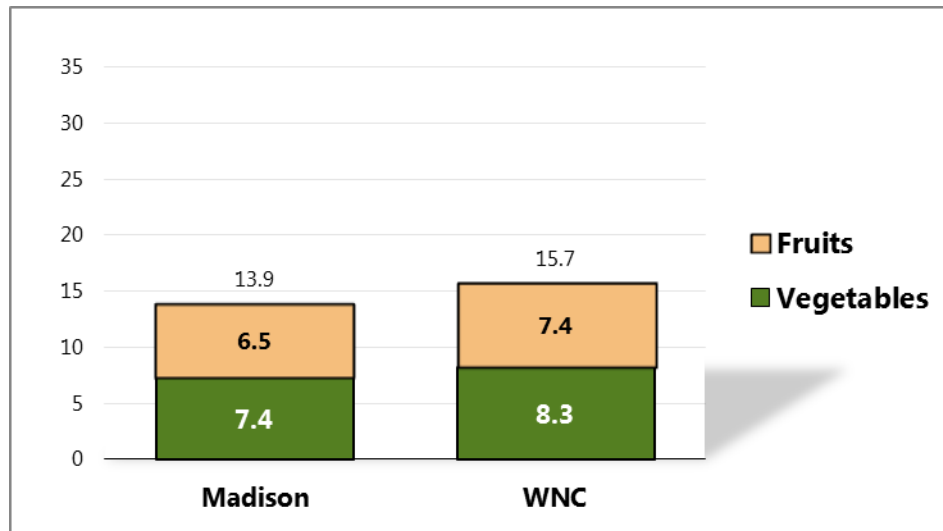


Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 79]

Notes: • Asked of all respondents.

- For this issue, respondents were asked to recall their food intake during the previous week. Reflects 35 or more 1-cup servings of fruits and/or vegetables in the past week, excluding lettuce salad and potatoes.

**Figure 60. Average Servings of Fruits/Vegetables in the Past Week  
(WNC Healthy Impact Survey)**



- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Items 53-54]
- Notes:
- Asked of all respondents.
  - For this issue, respondents were asked to recall their food intake during the previous week. Reflects 35 or more 1-cup servings of fruits and/or vegetables in the past week, excluding lettuce salad and potatoes.

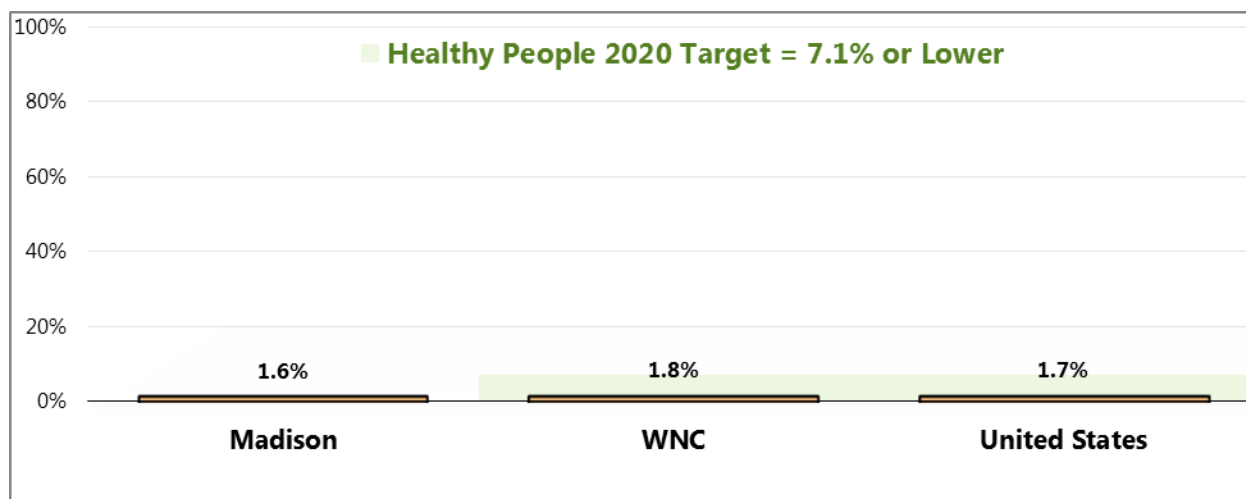
## Substance Use/Abuse

Substance abuse refers to a set of related conditions associated with the consumption of mind- and behavior-altering substances that have negative behavioral and health outcomes. Social attitudes and political and legal responses to the consumption of alcohol and illicit drugs make substance abuse one of the most complex public health issues. In 2005, an estimated 22 million Americans struggled with a drug or alcohol problem. Almost 95% of people with substance use problems are considered unaware of their problem. Of those who recognize their problem, 273,000 have made an unsuccessful effort to obtain treatment. These estimates highlight the importance of increasing prevention efforts and improving access to treatment for substance abuse and co-occurring disorders. Substance abuse has a major impact on individuals, families, and communities. The effects of substance abuse are cumulative, significantly contributing to costly social, physical, mental, and public health problems (DHHS, 2010).

### **Illicit Drugs**

For the purposes of the survey, “illicit drug use” includes use of illegal substances or of prescription drugs taken without a physician’s order. It is important to note that as a self-reported measure – and because this indicator reflects potentially illegal behavior – it is reasonable to expect that it might be underreported, and that actual illicit drug use in the community is likely higher.

**Figure 61. Illicit Drug Use in the Past Month (WNC Healthy Impact Survey)**



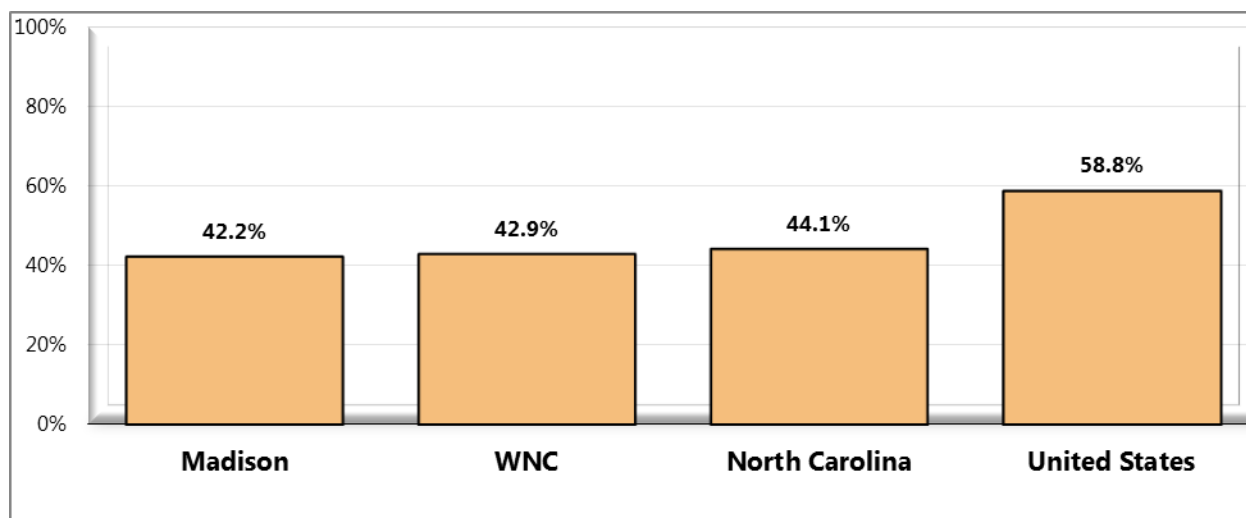
- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 52]
  - 2011 PRC National Health Survey, Professional Research Consultants, Inc.
  - US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective SA-13.3]
- Notes:
- Asked of all respondents.
  - Includes reported use of an illegal drug or of a prescription drug not prescribed to the respondent.

## **Alcohol**

**“Current drinkers”** include survey respondents who had at least one drink of alcohol in the month preceding the interview. For the purposes of this study, a “drink” is considered one can or bottle of beer, one glass of wine, one can or bottle of wine cooler, one cocktail, or one shot of liquor. **“Chronic drinkers”** include survey respondents reporting 60 or more drinks of alcohol in the month preceding the interview.

In this assessment, **“binge drinkers”** include adults who report drinking 5 or more alcoholic drinks on any single occasion during the past month. Note that state and national data reflect different thresholds for men (5+ drinks) and women (4+ drinks), so county and regional data is not directly comparable to state and national figures.

**Figure 62. Current Drinkers (WNC Healthy Impact Survey)**



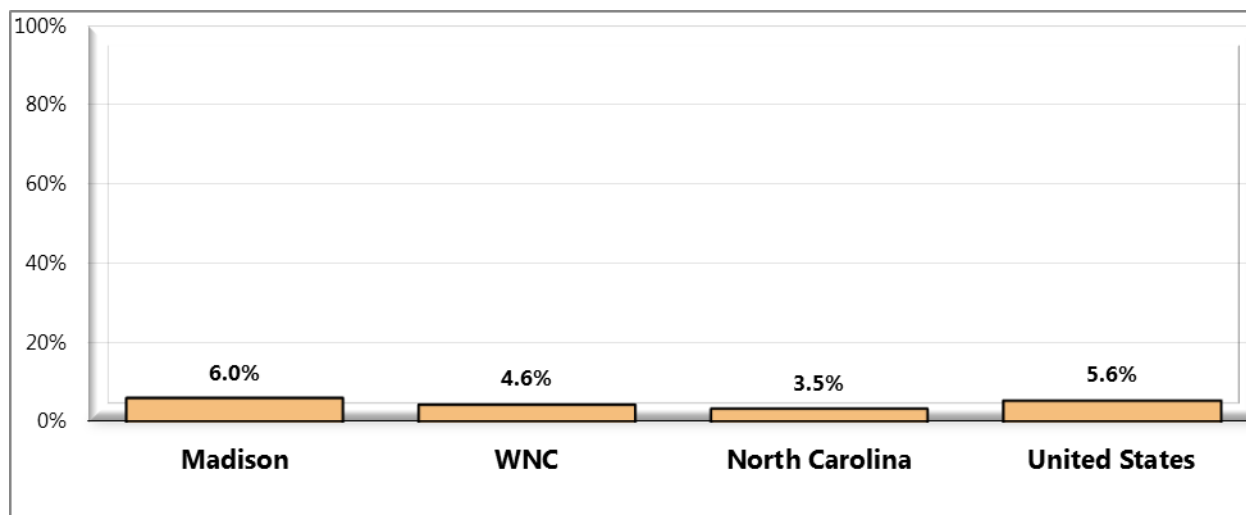
Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 88]
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes:

- Asked of all respondents.
- Current drinkers had at least one alcoholic drink in the past month.

**Figure 63. Chronic Drinkers (WNC Healthy Impact Survey)**



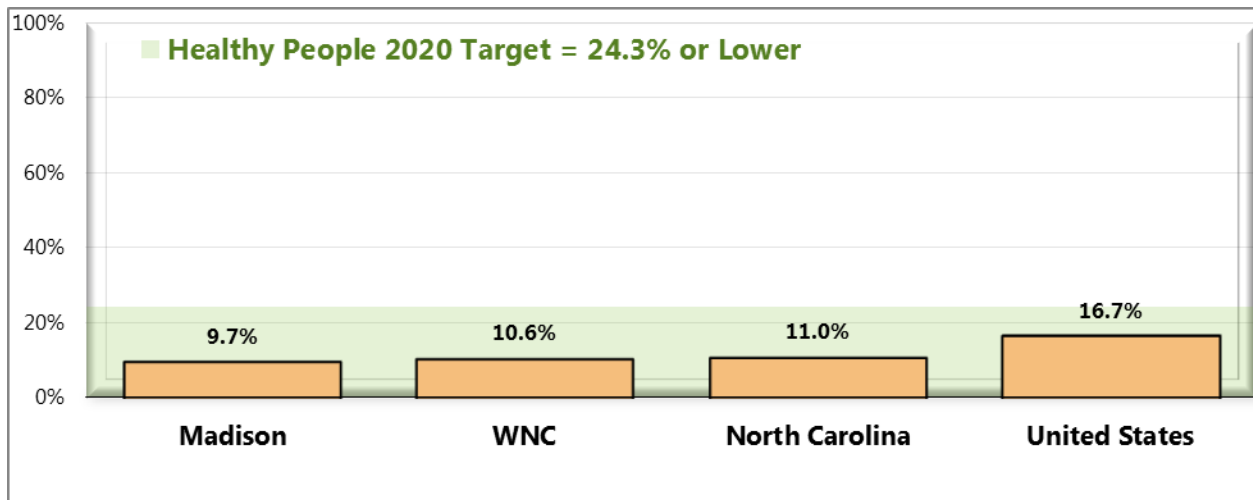
Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 89]
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes:

- Asked of all respondents.
- Chronic drinkers are defined as having 60+ alcoholic drinks in the past month.
- \*The state definition for chronic drinkers is males consuming 2+ drinks per day and females consuming 1+ drink per day in the past 30 days.

**Figure 64. Binge Drinkers (WNC Healthy Impact Survey)**



Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 90]
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective SA-14.3]

Notes:

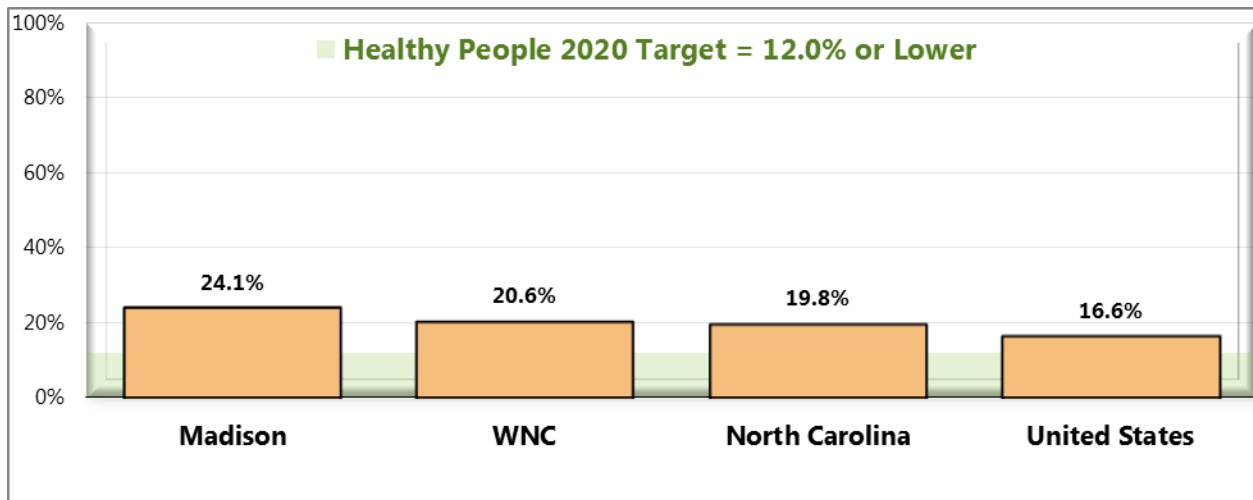
- Asked of all respondents.
- Binge drinkers are defined as those consuming 5+ alcoholic drinks on any one occasion in the past 30 days; \* note that state and national data reflect different thresholds for men (5+ drinks) and women (4+ drinks).

## **Tobacco**

Tobacco use is the single most preventable cause of death and disease in the United States. Each year, approximately 443,000 Americans die from tobacco-related illnesses. For every person who dies from tobacco use, 20 more people suffer with at least one serious tobacco-related illness. In addition, tobacco use costs the US \$193 billion annually in direct medical expenses and lost productivity. Preventing tobacco use and helping tobacco users quit can improve the health and quality of life for Americans of all ages. People who stop smoking greatly reduce their risk of disease and premature death. Benefits are greater for people who stop at earlier ages, but quitting tobacco use is beneficial at any age.

Many factors influence tobacco use, disease, and mortality. Risk factors include race/ethnicity, age, education, and socioeconomic status. Significant disparities in tobacco use exist geographically; such disparities typically result from differences among states in smoke-free protections, tobacco prices, and program funding for tobacco prevention (DHHS, 2010).

**Figure 65. Current Smokers (WNC Healthy Impact Survey)**



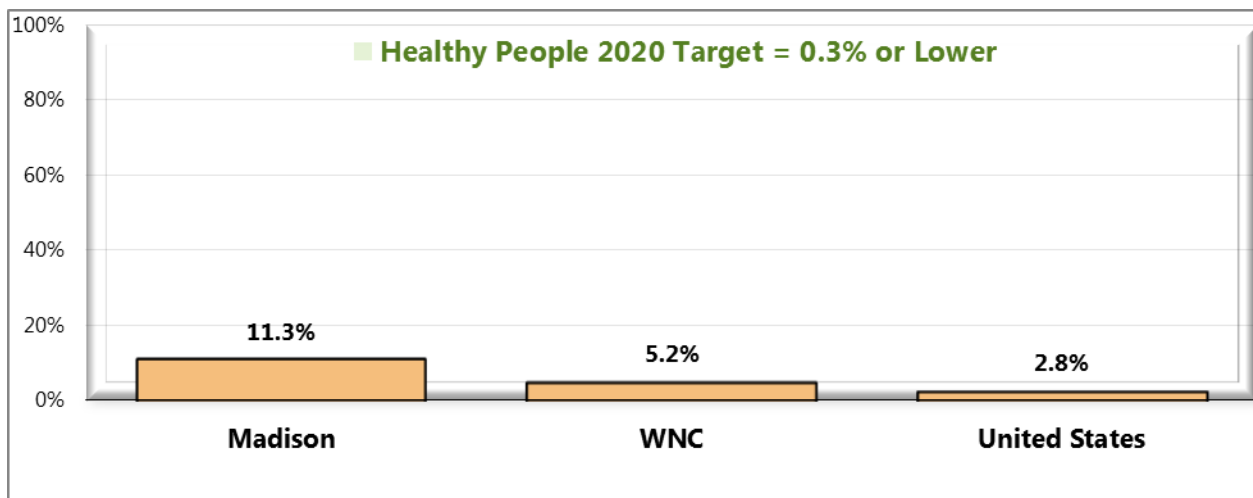
Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 86]
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective TU-1.1]

Notes:

- Asked of all respondents.
- Includes regular and occasional smokers (every day and some days).

**Figure 66. Currently Use Smokeless Tobacco Products (WNC Healthy Impact Survey)**



Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 43]
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective TU-1.2]

Notes:

- Asked of all respondents.
- Includes regular and occasional users (every day and some days).

**Table 41. Top Three Resources Respondents Would Go to for Help Quitting Tobacco (WNC Healthy Impact Survey)**

	Doctor	On My Own/Cold Turkey	Don't Know
Madison	✓	✓	✓
WNC	✓	✓	✓

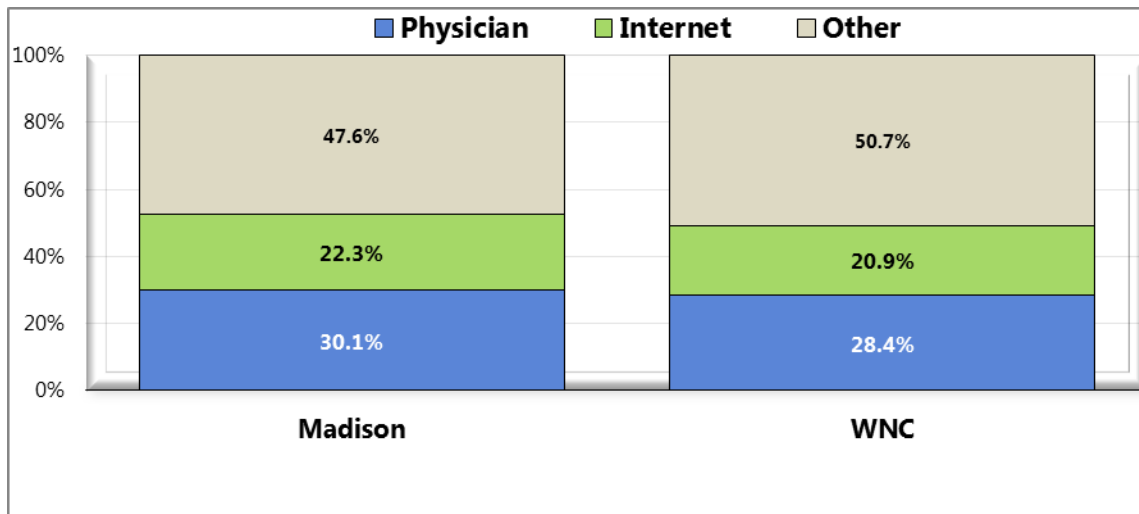
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 48]

Notes: • Asked of all respondents.

## Health Information

Survey respondents were asked about where they get their healthcare information.

**Figure 67. Primary Source of Healthcare Information (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 11]

Notes: • Asked of all respondents.



## CHAPTER 5 – CLINICAL CARE PARAMETERS

### Medical Care Access

Access to comprehensive, quality health care services is important for the achievement of health equity and for increasing the quality of a healthy life for everyone. It impacts: overall physical, social, and mental health status; prevention of disease and disability; detection and treatment of health conditions; quality of life; preventable death; and life expectancy.

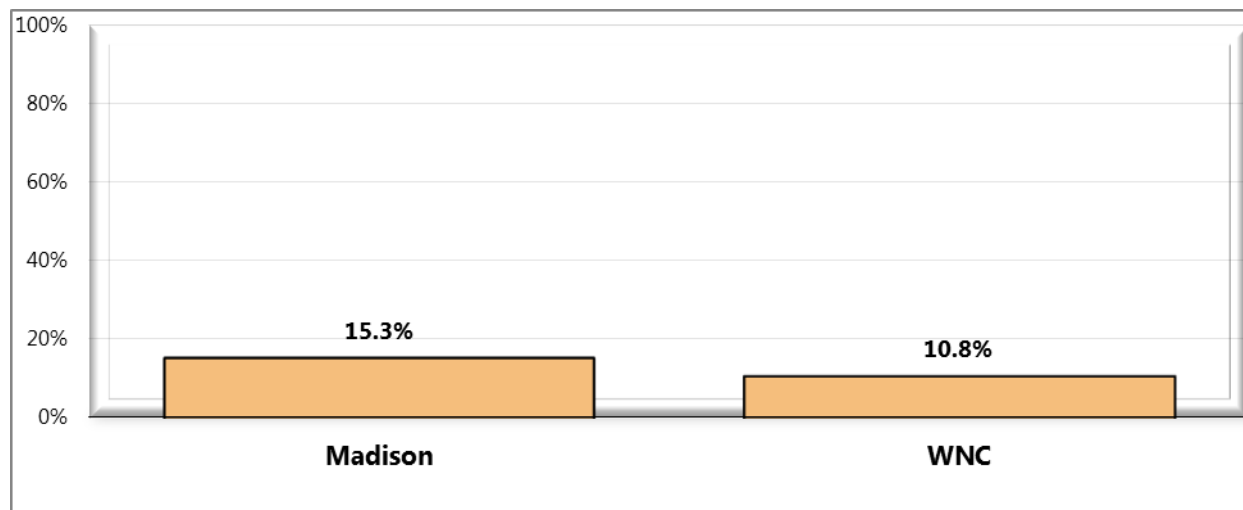
Access to health services means the timely use of personal health services to achieve the best health outcomes. It requires three distinct steps: 1) gaining entry into the health care system; 2) accessing a health care location where needed services are provided; and 3) finding a health care provider with whom the patient can communicate and trust (DHHS, 2010).

#### **Self-Reported Access**

Survey respondents were asked if there was a time in the past 12 months when they needed medical care, but could not get it. If they responded, "yes," they were asked to name the main reason they could not get needed medical care. Due to small county-level sample sizes, the responses to the latter question are displayed at the regional-level, below.

Survey respondents were also asked to indicate their agreement with the following statement: *"Considering cost, quality, number of options and availability, there is good healthcare in my county."* Survey respondents for Madison County were also asked about prescription medicine access.

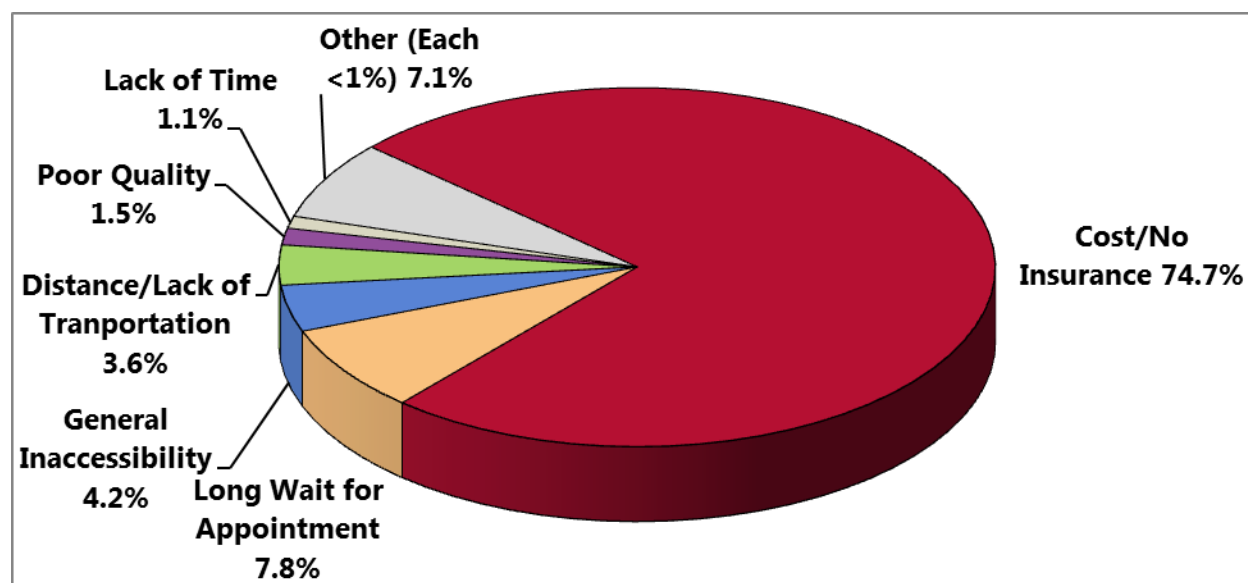
**Figure 68. Was Unable to Get Needed Medical Care at Some Point in the Past Year (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 13]

Notes: • Asked of all respondents.

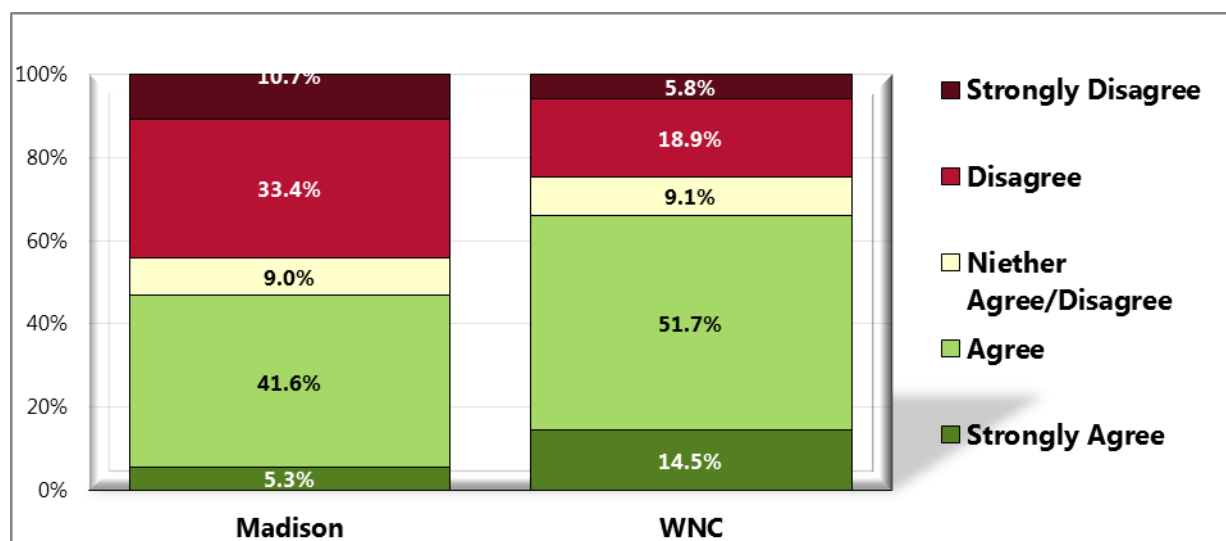
**Figure 69. Primary Reason for Inability to Get Needed Medical Care (WNC Healthy Impact)**  
(Western North Carolina Adults Unable to Get Needed Medical Care at Some Point in the Past Year)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 14]

Notes: • Asked of all respondents.

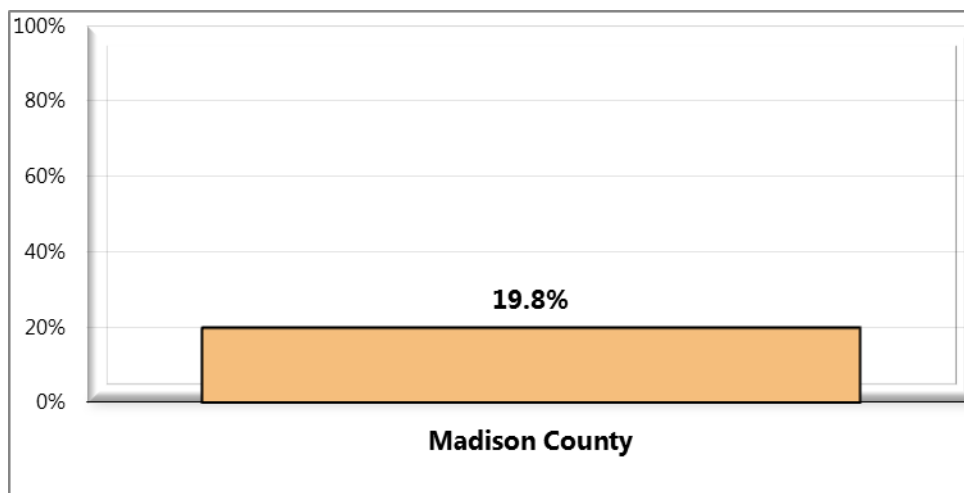
**Figure 70. "Considering cost, quality, number of options And availability, there is good health care in my county (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 7]

Notes: • Asked of all respondents

**Figure 71. Had a Time in the Past Year When Could Not Get a Desired Prescription (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 99]  
 Notes: • Asked of all respondents.

## **Health Care Providers**

### ***Provider/Population Ratios***

One way to judge the supply of health care providers in a jurisdiction is to calculate the ratio of the number of health professionals to the number of persons in the population of that jurisdiction. In NC, there is data on the ratio of active health professionals per 10,000 population calculated at the county level. Table 42 presents those data (which for simplicity's sake will be referred to simply as the "ratio") for Madison County, WNC, the state as a whole, and the US for five key categories of health care professionals: physicians, primary care physicians, dentists, registered nurses, and pharmacists. The years covered are 2008 and 2010.

According to this data, the ratio of professionals to population is lower in all categories for Madison County than in WNC, NC, or the US. It should be noted that the average ratios for WNC also are lower than the comparable state averages in every professional category listed in the table, and lower than the comparable national average in every professional category except primary care.

**Table 42. Active Health Professionals per 10,000 Population (2006, 2008 and 2009)**

Geography	2008					2010				
	Phys	Primary Care Phys	Dents	RNs	Pharms	Phys	Primary Care Phys	Dents	RNs	Pharms
Madison County	6.1	5.8	1.9	29.3	3.4	5.3	5.3	1.9	30.3	5.3
Regional Average	15.0	8.9	3.4	75.3	7.0	14.8	8.9	3.4	74.9	6.9
State Average	21.2	9.0	4.3	95.1	9.3	21.7	9.4	4.4	97.4	9.2
National Average	23.2*	8.5*	4.9	91.4	8.0	22.7**	8.2**	5.7	92.0	8.3

\* Data are for 2006

\*\* Data are for 2008

### ***Providers by Specialty***

Table 43 lists the number of active health care professionals in Madison County and WNC, by specialty, for 2010. From these data it is apparent that there are several categories of professionals absent from Madison County, among them general practitioners, obstetricians/gynecologists, certified nurse midwives, podiatrists, psychological assistants and respiratory technicians.

**Table 43. Active Health Professionals in Madison County and WNC, by Specialty (2010)**

<b>Category of Professionals</b>	<b>Madison County</b>	<b>WNC Total</b>
<b>Physicians</b>		
Primary Care Physicians	11	813
<i>Family Practice</i>	8	368
<i>General Practice</i>	0	10
<i>Internal Medicine</i>	2	240
<i>Obstetrics/Gynecology</i>	0	85
<i>Pediatrics</i>	1	110
Other Specialties	0	853
<b>Dentists and Dental Hygienists</b>		
Dentists	4	342
Dental Hygienists	4	479
<b>Nurses</b>		
Registered Nurses	63	7,981
<i>Nurse Practitioners</i>	4	316
<i>Certified Nurse Midwives</i>	0	28
Licensed Practical Nurses	32	1,854
<b>Other Health Professionals</b>		
Chiropractors	3	192
Occupational Therapists	2	242
Occupational Therapy Assistants	3	99
Optometrists	2	84
Pharmacists	11	669
Physical Therapists	7	511
Physical Therapy Assistants	3	309
Physician Assistants	5	290
Podiatrists	0	24
Practicing Psychologists	3	201
Psychological Assistants	0	87
Respiratory Therapists	0	370

## Uninsured Population

Table 44 presents periodic biennial data on the proportion of the non-elderly population (ages 19-64) without health insurance of any kind. While there was a 21% increase in the percent of uninsured at the state level from 2006-2007 to 2009-2010, the percent of uninsured adults in Madison County varied, and the mean percent in WNC actually decreased from one biennial period to the next throughout the span of years shown in the table.

**Table 44. Estimated Percent Uninsured Adults, Ages 19-64  
Biennial Periods (2006-2007, 2008-2009, and 2009-2010)**

Geography	Percent Uninsured		
	2006-2007	2008-2009	2009-2010
Madison County	22.5	21.2	23.8
Regional Arithmetic Mean	23.4	22.3	22.0
State Total	19.5	23.2	23.6

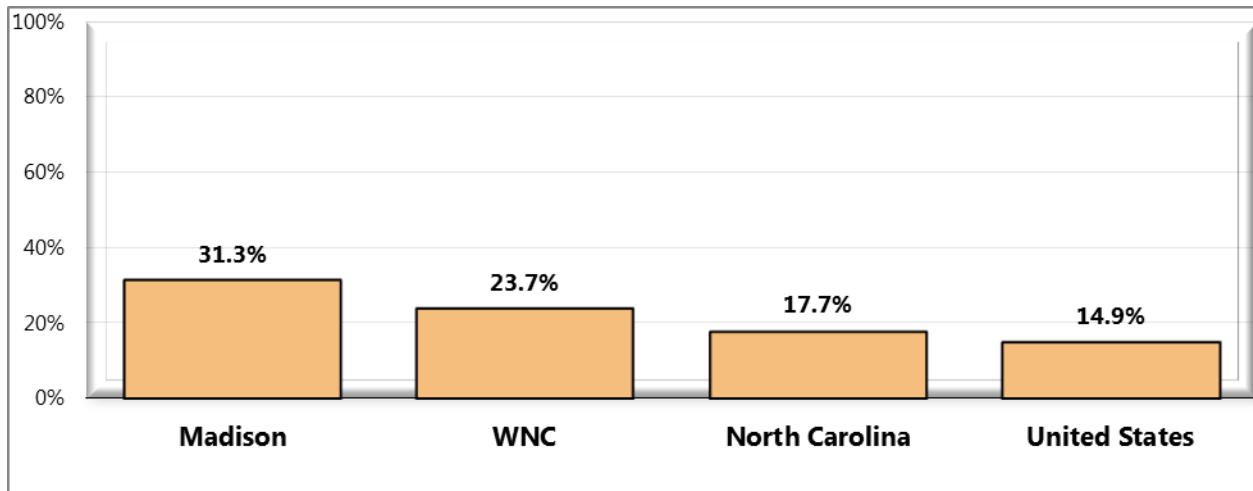
Table 45 shows the percent uninsured for one biennium (2009-2010) stratified by age. This data makes it clear that in Madison County as well as in WNC and NC as a whole, insurance coverage is better for children, among whom the percentage uninsured is less than half the percentage uninsured among the 19-64 age group. For all age categories cited, the percent uninsured is lower in WNC than in NC. The figures for Madison are closer to those for NC as a whole than those in WNC.

**Table 45. Estimated Percent Uninsured, All Ages  
(2009-2010)**

Geography	2009-2010		
	Children (0-18)	Adults (19-64)	Total (0-64)
Madison County	10.2	23.8	19.9
Regional Arithmetic Mean	9.6	22.0	18.6
State Total	10.3	23.6	19.6

Survey data also provides county and regional estimates of health insurance coverage. Lack of health insurance coverage reflects respondents age 18 to 64 (thus, excluding the Medicare population) who have no type of insurance coverage for healthcare services – neither private insurance nor government-sponsored plans (e.g., Medicaid).

**Figure 72. Lack of Healthcare Insurance Coverage (WNC Healthy Impact Survey)**  
(Among Adults 18-64)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 125]  
 • Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.  
 • 2011 PRC National Health Survey, Professional Research Consultants, Inc.  
 • US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective AHS-1]

Notes: • Reflects adults under the age of 65.  
 • Includes any type of insurance, such as traditional health insurance, prepaid plans such as HMOs, or government-sponsored coverage (e.g., Medicare, Medicaid, Indian Health Services, etc.).

### **Medicaid Eligibility**

Table 46 presents trend data on the number and percent of persons eligible for Medicaid for several state fiscal years. This data demonstrates that in Madison County the number and percent of Medicaid-eligible persons increased every year since SFY2005. The percent of Medicaid-eligible Madison County residents was higher than the comparable figures for WNC and NC for each year shown in the figure. With the exception of SFY2007, the mean percent of the WNC population eligible for Medicaid rose from one year to the next throughout the period cited in the table. Note that between SFY2006 and SFY2007 the number in WNC that were Medicaid-eligible rose even if the percentage did not. Further, the mean percent Medicaid-eligible in WNC exceeded the comparable percent eligible statewide for every period cited.

**Table 46. Number and Percent of Population Medicaid-Eligible**  
(SFY2004 through SFY2008)

Geography	SFY 2004		SFY 2005		SFY 2006		SFY 2007		SFY 2008	
	#	%	#	%	#	%	#	%	#	%
Madison County	4,360	21.83	4,401	21.78	4,483	22.09	4,600	22.49	4,611	22.50
Regional Total	128,727	-	132,895	-	138,616	-	139,891	-	142,606	-
Regional Arithmetic Mean	16,091	19.90	16,612	20.21	17,327	20.75	17,486	20.52	17,826	20.82
State Total	1,512,360	17.97	1,563,751	18.31	1,602,645	18.46	1,682,028	18.98	1,726,412	19.04

## Screening and Prevention

### **Diabetes**

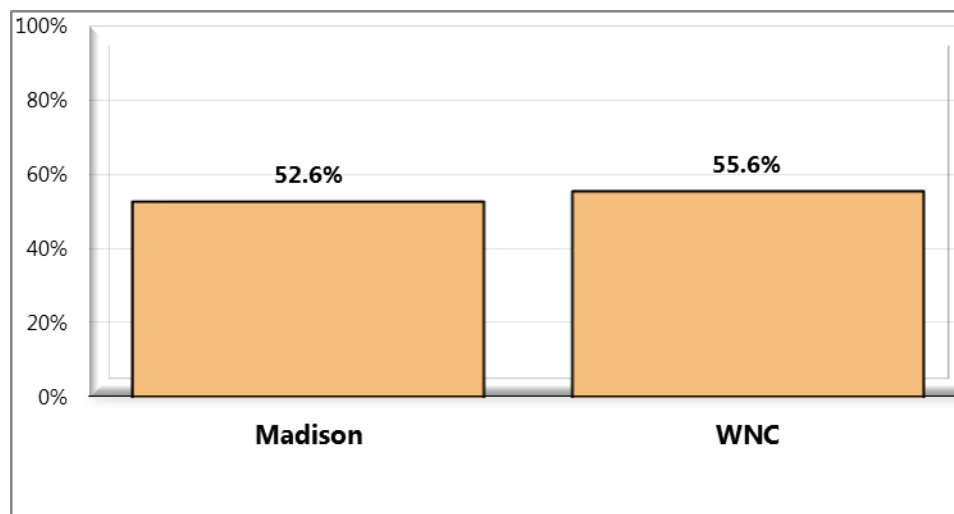
Diabetes mellitus occurs when the body cannot produce or respond appropriately to insulin. Insulin is a hormone that the body needs to absorb and use glucose (sugar) as fuel for the body's cells. Without a properly functioning insulin signaling system, blood glucose levels become elevated and other metabolic abnormalities occur, leading to the development of serious, disabling complications. Many forms of diabetes exist; the three common types are Type 1, Type 2, and gestational diabetes.

Diabetes mellitus affects an estimated 23.6 million people in the United States and is the 7th leading cause of death. Diabetes mellitus:

- Lowers life expectancy by up to 15 years.
- Increases the risk of heart disease by 2 to 4 times.
- Is the leading cause of kidney failure, lower limb amputations, and adult-onset blindness.

People from minority populations are more frequently affected by type 2 diabetes. Minority groups constitute 25% of all adult patients with diabetes in the US and represent the majority of children and adolescents with type 2 diabetes. Lifestyle change has been proven effective in preventing or delaying the onset of type 2 diabetes in high-risk individuals (DHHS, 2010).

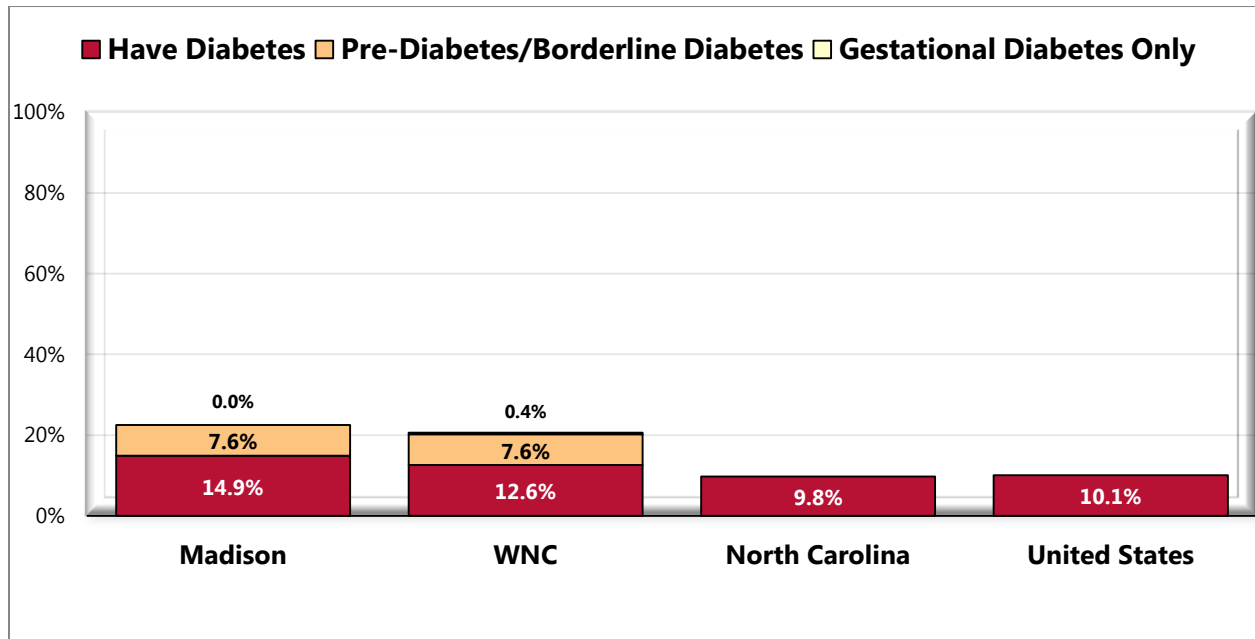
**Figure 73. Tested for Diabetes in the Past Three Years (WNC Healthy Impact Survey)**  
(Among Adults Who Have Not Been Diagnosed With Diabetes)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 19]

Notes: • Asked of respondents who have never been diagnosed with diabetes; also includes women who have only been diagnosed when pregnant.

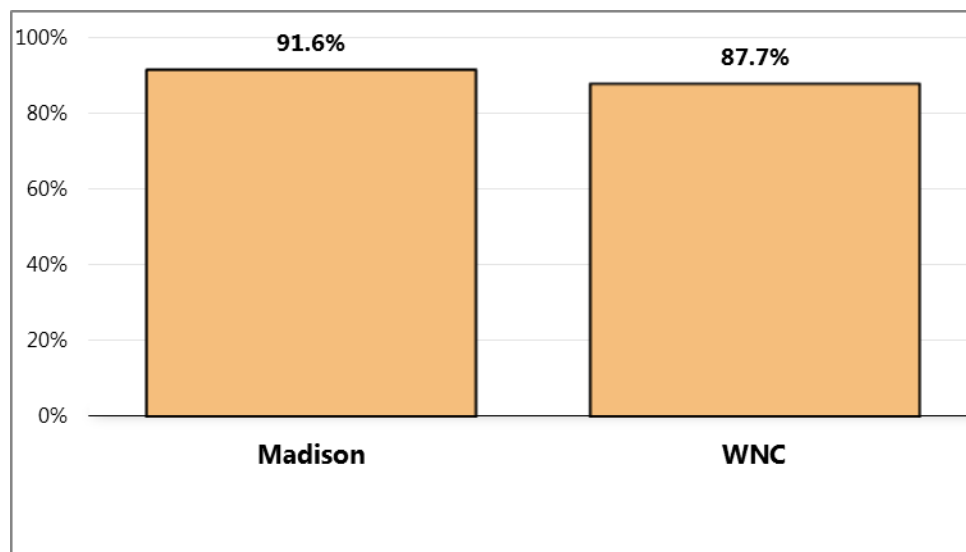
**Figure 74. Prevalence of Diabetes (Ever Diagnosed)  
(WNC Healthy Impact Survey)**



- Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 78]
  - 2011 PRC National Health Survey, Professional Research Consultants, Inc.
  - Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC); 2010 North Carolina data.
- Notes:
- Asked of all respondents.
  - Local and national data exclude gestation diabetes (occurring only during pregnancy).



**Figure 75. Taking Action to Control Diabetes or Prediabetes (WNC Healthy Impact Survey)**  
(Among Adults Diagnosed with Diabetes or Prediabetes/Borderline Diabetes)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 21]

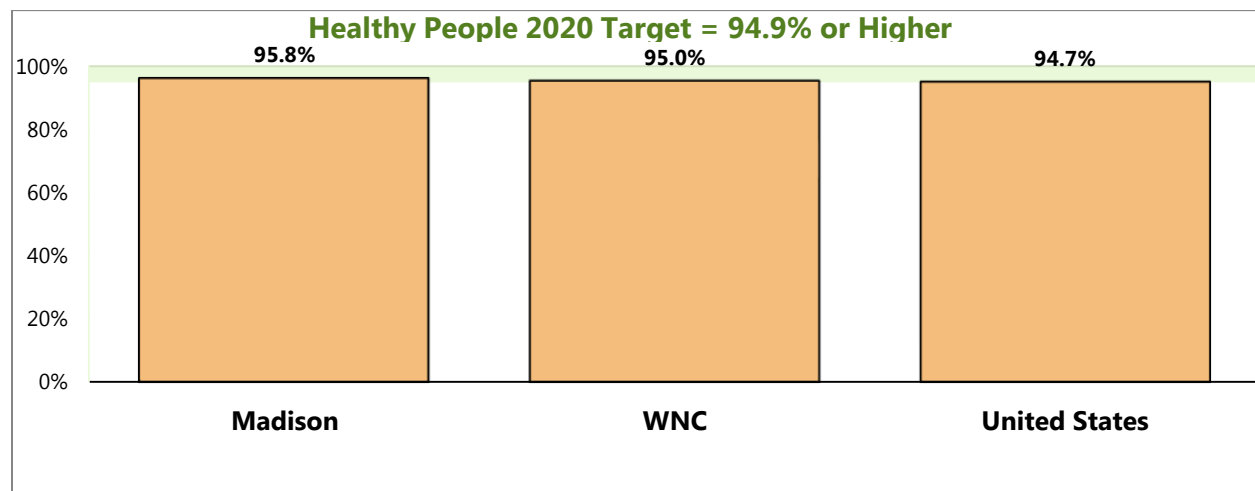
Notes: • Asked of respondents who have been diagnosed with diabetes or prediabetes/borderline diabetes.

• In this case, the term "action" refers to taking natural or conventional medicines or supplements, diet modification, or exercising.

## Hypertension

Controlling risk factors for heart disease and stroke remains a challenge. High blood pressure is still a major contributor to the national epidemic of cardiovascular disease. High blood pressure affects approximately 1 in 3 adults in the United States, and more than half of Americans with high blood pressure do not have it under control (DHHS, 2010).

**Figure 76. Have Had Blood Pressure Checked in the Past Two Years  
(WNC Healthy Impact Survey)**



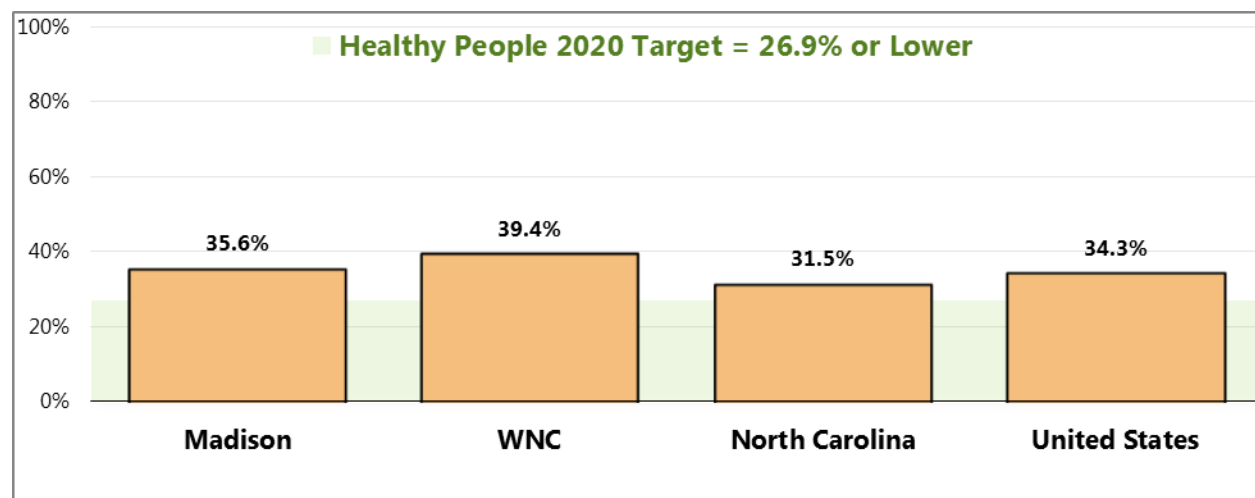
Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 24]
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective HDS-4]

Notes:

- Asked of all respondents.

**Figure 77. Prevalence of High Blood Pressure (WNC Healthy Impact Survey)**



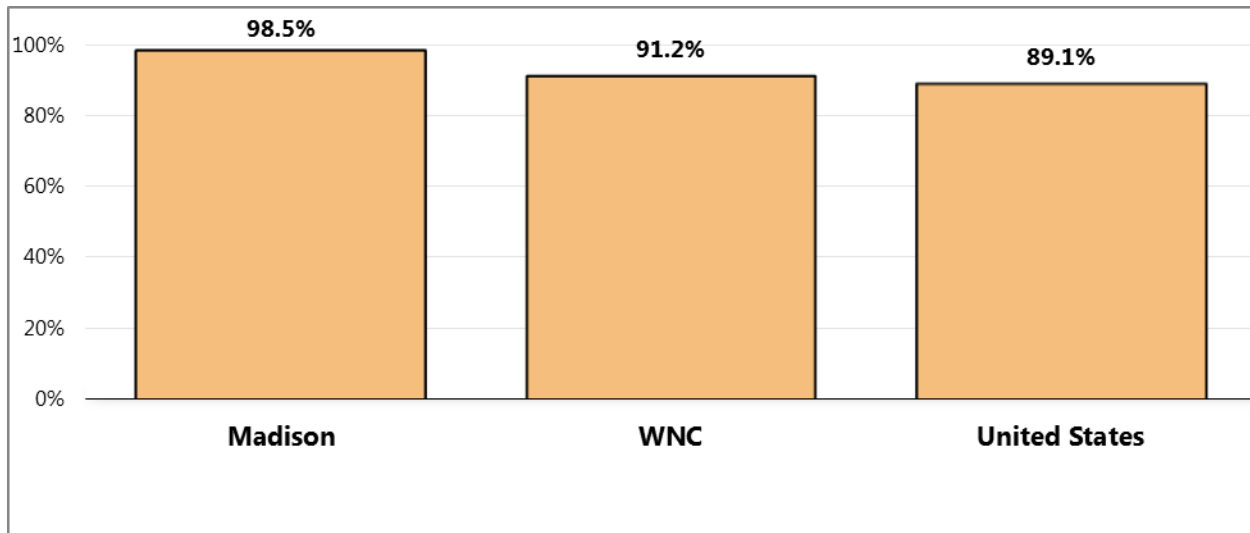
Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 76]
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2009 North Carolina data.
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective HDS-5.1]

Notes:

- Asked of all respondents

**Figure 78. Taking Action to Control Hypertension (WNC Healthy Impact Survey)**  
(Among Adults with High Blood Pressure)



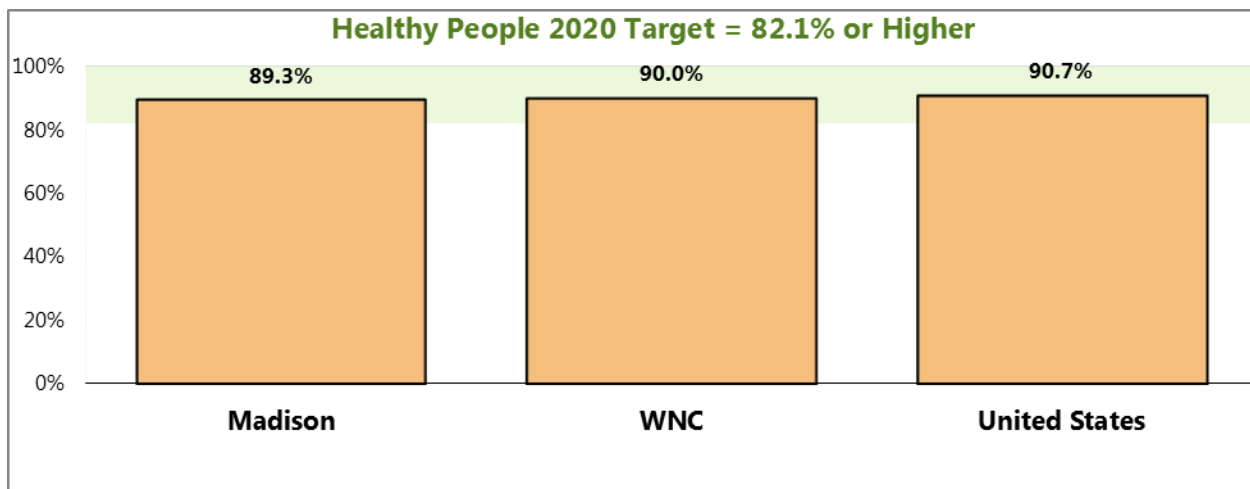
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 23]  
• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes: • Asked of respondents who have been diagnosed with high blood pressure.  
• In this case, the term "action" refers to medication, change in diet, and/or exercise.

### **Cholesterol**

Cholesterol is also a major contributor to the national epidemic of cardiovascular disease. Survey respondents were asked a series of questions about their blood cholesterol levels.

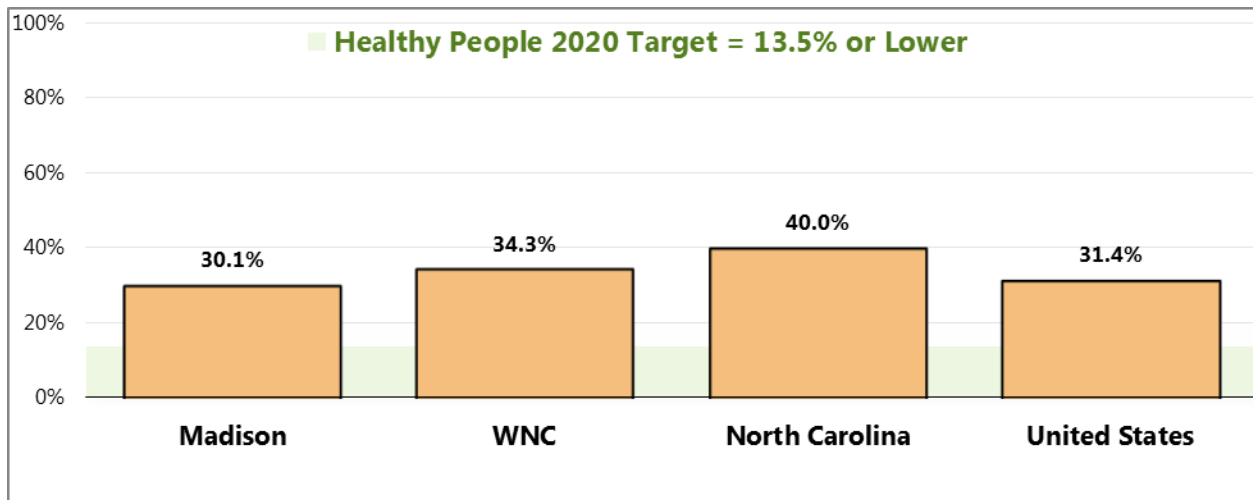
**Figure 79. Have Had Blood Cholesterol Levels Checked in the Past Five Years (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 27]  
• 2011 PRC National Health Survey, Professional Research Consultants, Inc.  
• US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective HDS-6]

Notes: • Asked of all respondents.

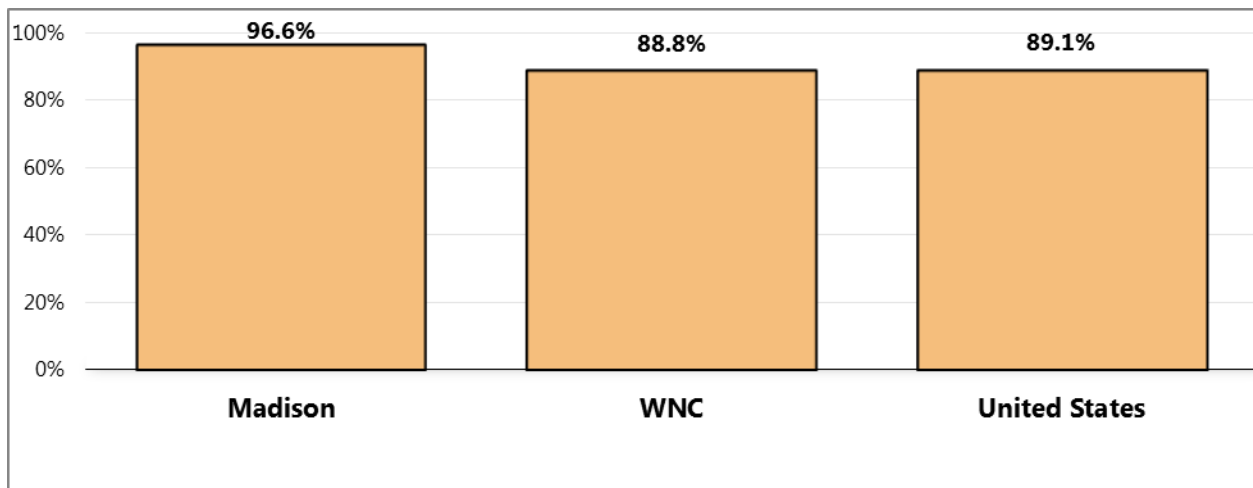
**Figure 80. Prevalence of High Blood Cholesterol (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 77]  
• Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2009 North Carolina data.  
• 2011 PRC National Health Survey, Professional Research Consultants, Inc.  
• US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective HDS-7]

Notes: • Asked of all respondents.

**Figure 81. Taking Action to Control High Blood Cholesterol (WNC Healthy Impact Survey)**  
(Among Adults With High Blood Pressure)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 26]  
• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes: • Asked of respondents who have been diagnosed with high blood cholesterol.  
• In this case, the term "action" refers to medication, change in diet, and/or exercise.

## Healthcare Utilization

### **Routine Medical Care**

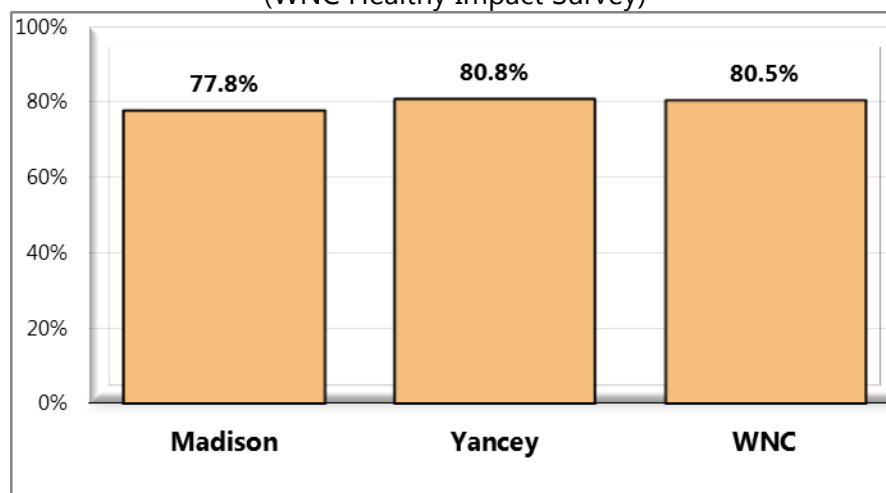
Improving health care services depends in part on ensuring that people have a usual and ongoing source of care. People with a usual source of care have better health outcomes and fewer disparities and costs. Having a primary care provider (PCP) as the usual source of care is especially important. PCPs can develop meaningful and sustained relationships with patients and provide integrated services while practicing in the context of family and community. Having a usual PCP is associated with:

- Greater patient trust in the provider
- Good patient-provider communication
- Increased likelihood that patients will receive appropriate care

Improving health care services includes increasing access to and use of evidence-based preventive services. Clinical preventive services are services that: **prevent** illness by detecting early warning signs or symptoms before they develop into a disease (primary prevention); or **detect** a disease at an earlier, and often more treatable, stage (secondary prevention) (DHHS, 2010).

**Figure 82. Have One Person Thought of as  
Respondent's Personal Doctor or Health Care Provider**

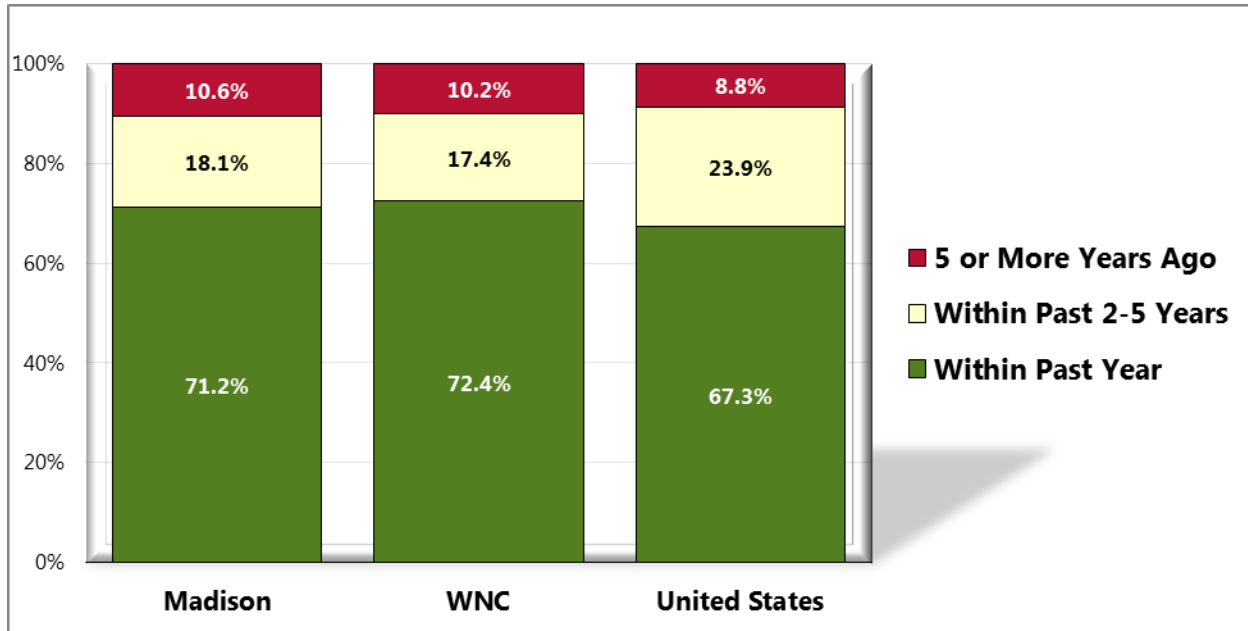
(WNC Healthy Impact Survey)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 16]

Notes: • Asked of all respondents.

**Figure 83. Length of Time Since Last Routine Check-Up  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 15]

• 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Notes: • Asked of all respondents.

### **Emergency Department Utilization**

According to data in Table 47, the diagnoses associated with the highest frequency of emergency department visits in Madison County in 2010 were psychiatric disorders (21.52% of all ED visits), followed by chest pain/ischemic heart disease (17.05%) and lower respiratory disorders (12.66%). On the regional level, the diagnoses associated with the highest frequency of ED visits were chest pain/ischemic heart disease (11.83% of all ED visits), followed by psychiatric disorders (10.98%) and lower respiratory disorders (9.48%)

**Table 47. North Carolina Emergency Department Visits, NC DETECT Data (2010)**

Diagnosis	Madison County		WNC Mean
	#	%	%
Chest pain/ischemic heart disease	1,400	17.05	11.83
Heart failure	339	4.13	2.58
Cardiac arrest	11	0.13	0.14
Lower respiratory disorders	1,040	12.66	9.48
Diabetes	876	10.67	8.80
Neoplasms	169	2.06	1.57
Dental problems	59	0.72	1.85
Stroke/TIA	69	0.84	0.62
Traumatic brain injury	21	0.26	0.30
Psychiatric disorders	1,767	21.52	10.98
Substance abuse	317	3.86	2.99
Total ED Visits	8,212	n/a	n/a

\* % represents percent of total ED visits

\*\* "S" indicates the data was suppressed due to a case count under 10

Note: for the full description of the disease group diagnosis codes included in each diagnosis line, see the *Data Workbook*.

Table 48 presents a summary of the major first-listed emergency department diagnoses for the WNC region according to DRG code. According to this data, the most common first-listed diagnosis codes in emergency departments across the region are abdominal pain (2.37% of all ED visits) and back pain, sprains of the lumbar spine, and sciatica (also 2.37%). It would appear that some of these cases could qualify for diversion to other health care providers *if* they were present in the community.

**Table 48. Most Common First-Listed Diagnosis Codes in Emergency Departments, WNC  
NC DETECT Data  
2010**

Diagnosis	Diagnosis Codes	# ED Visits	% of Total ED Visits
Abdominal pain	789.0, 789.00, 789.03, 789.09	7,597	2.37
Back pain, sprains of lumbar spine, sciatica	724.2, 724.3, 724.5, 847.2	7,590	2.37
Essential hypertension	401.9	7,490	2.34
Nausea with vomiting or vomiting alone	787.01, 787.03	5,873	1.83
Headache, Migraine, unspecified	784.0, 346.9	5,584	1.74
Acute URI/Pharyngitis, Streptococcal sore throat	034.0, 465.9, 462	5,458	1.70
Cough, Bronchitis	786.2, 466.0, 490	4,703	1.47
Dental caries, periapical abscess, tooth structure, disorders	521.00, 522.5, 525.9	4,210	1.31
UTI	599	4,027	1.26
Fever, Unknown origin	780.6, 780.60	3,285	1.03
Asthma, unspecified	493.90, 439.92	2,823	0.88
Neck sprains/stains	723.1, 847.0	2,728	0.85
Pain in joint	719.41, 719.45, 719.46	2,609	0.81
Pain in limb	729.5	2,486	0.78
Chest pain	786.5, 786.50, 786.59	2,186	0.68
Otitis media	382.9	2,083	0.65
Pneumonia	486	1,934	0.60
Open wound of hand or finger without complication	882.0, 883.0	1,644	0.51
Contusion of face, scalp, and neck except eyes	920	1,622	0.51
Syncope and collapse	780.2	1,552	0.48
<b>TOTAL ED VISITS</b>		<b>320,429</b>	

### **Inpatient Hospitalizations**

Table 49 lists the diagnostic categories accounting for the most cases of inpatient hospitalization for 2010. The source data is based on a patient's county of residence, so the WNC totals presented in the table represent the sum of hospitalizations from each of the 16 WNC counties.

According to data in Table 49, the diagnosis resulting in the highest number of cases of hospitalization in 2010 among Madison County residents was cardiovascular and circulatory diseases (including heart disease and cerebrovascular disease), which accounted for 346 hospitalizations. The next highest number of hospitalizations was for respiratory diseases, including pneumonia/influenza and chronic obstructive pulmonary disease (207 cases), followed by digestive system diseases, including chronic liver disease and cirrhosis (206 cases).



**Table 49. Inpatient Hospital Utilization by Madison County Residents,  
by Principal Diagnoses  
Excluding Newborns and Discharges from Out-of-State Hospitals  
(2011)**

Diagnostic Category	Total # Cases		
	Madison County	Region	North Carolina
INFECTIOUS & PARASITIC DISEASES	69	2,741	41,705
-- Septicemia	37	1,604	27,412
-- AIDS	n/a	41	1,456
MALIGNANT NEOPLASMS	77	2,599	31,225
-- Colon, Rectum, Anus	13	324	3,770
-- Trachea, Bronchus, Lung	11	346	4,541
-- Female Breast	5	157	1,498
-- Prostate	4	192	2,505
BENIGN, UNCERTAIN & OTHER NEOPLASMS	14	650	8,948
ENDOCRINE, METABOLIC & NUTRITIONAL DISEASES	63	2,905	40,208
-- Diabetes	26	1,240	18,101
BLOOD & HEMOPOETIC TISSUE DISEASES	10	770	14,011
NERVOUS SYSTEM & SENSE ORGAN DISEASES	59	1,597	19,315
CARDIOVASCULAR & CIRCULATORY DISEASES	346	12,961	162,327
-- Heart Disease	234	9,006	108,060
-- Cerebrovascular Disease	76	2,259	29,429
RESPIRATORY DISEASES	207	8,683	93,891
-- Pneumonia/Influenza	66	3,089	29,852
-- Chronic Obstructive Pulmonary Disease	73	2,557	30,832
DIGESTIVE SYSTEM DISEASES	206	8,527	95,068
-- Chronic Liver Disease/Cirrhosis	2	178	2,361
GENITOURINARY DISEASES	106	4,123	45,978
-- Nephritis, Nephrosis, Nephrotic Synd.	32	1,036	14,368
PREGNANCY & CHILDBIRTH	177	7,921	125,271
SKIN & SUBCUTANEOUS TISSUE DISEASES	28	1,287	17,734
MUSCULOSKELETAL SYSTEM DISEASES	171	5,950	58,753
-- Arthropathies and Related Disorders	97	3,155	30,683
CONGENITAL MALFORMATIONS	9	294	3,318
PERINATAL COMPLICATIONS	2	198	4,035
SYMPTOMS, SIGNS & ILL-DEFINED CONDITIONS	124	3,916	48,299
INJURIES & POISONING	182	7,474	78,637
OTHER DIAGNOSES (INCL. MENTAL DISORDERS)	191	7,329	84,657
ALL CONDITIONS	2,041	79,925	973,380

Source: *Inpatient Hospital Utilization and Charges by Principal Diagnosis, and County of Residence, North Carolina, 2010 (Excluding Newborns & Discharges from Out of State Hospitals)* Retrieved June 20, 2012, from North Carolina State Center for Health Statistics (NC SCHS), 2012 County Health Data Book website: <http://www.schs.state.nc.us/schs/data/databook/>

## Dental Services

The significant improvement in the oral health of Americans over the past 50 years is a public health success story. Most of the gains are a result of effective prevention and treatment efforts. One major success is community water fluoridation, which now benefits about 7 out of 10 Americans who get water through public water systems. However, some Americans do not have access to preventive programs. People who have the least access to preventive services and dental treatment have greater rates of oral diseases. A person's ability to access oral healthcare is associated with factors such as education level, income, race, and ethnicity.

Oral health is essential to overall health. Good oral health improves a person's ability to speak, smile, smell, taste, touch, chew, swallow, and make facial expressions to show feelings and emotions. However, oral diseases, from cavities to oral cancer, cause pain and disability for many Americans. Good self-care, such as brushing with fluoride toothpaste, daily flossing, and professional treatment, is key to good oral health. Health behaviors that can lead to poor oral health include:

- Tobacco use
- Excessive alcohol use
- Poor dietary choices

There are also social determinants that affect oral health. In general, people with lower levels of education and income, and people from specific racial/ethnic groups, have higher rates of disease. People with disabilities and other health conditions, like diabetes, are more likely to have poor oral health (DHHS, 2010).

### **Utilization of Dental Services by the Medicaid Population**

Table 50 presents data on the percent of the Medicaid population eligible for dental care that utilizes it. This data represents the Medicaid population of all ages, but split into under-age-21 and age-21-and over-categories. In all three jurisdictions the Medicaid population under age 21 appears to be more likely to utilize dental services than the population age 21 and older.

**Table 50. Medicaid Recipients Receiving Dental Services, All Ages (2010)**

Geography	Medicaid Recipients Utilizing Dental Services (by Ages Group)					
	<21 Years Old			21+ Years Old		
	# Eligible for Services	# Receiving Services	% Eligibles Receiving Services	# Eligible for Services	# Receiving Services	% Eligibles Receiving Services
Madison County	2,387	1,108	46.4	2,215	680	30.7
Regional Total	85,652	42,135	49.2	62,817	18,536	29.5
State Total	1,113,692	541,210	48.6	679,139	214,786	31.6

Table 51, focusing only on children ages 1-5, helps in understanding why utilization in the under-21 age group is so high. In this youngest age group, half or more of the eligible population received dental services in WNC and NC; in Madison County the comparable figure was 42.4%.

**Table 51. Medicaid-Recipients Receiving Dental Services, Ages 1-5 (2010)**

Geography	Children (aged 1-5) Enrolled in Medicaid Who Received Any Dental Service In the Previous 12 Months)		
	# Eligible for Services*	# Receiving Services**	% Eligibles Receiving Services
Madison County	679	288	42.4
Regional Total	26,820	14,407	53.7
State Total	n/a	n/a	51.7

### **Dental Screening Results among Children**

Table 52 presents 2009 dental screening results for kindergarteners. While the screening process captures other data, this data covers only the average number of decayed, missing or filled teeth. The average number of decayed, missing or filled teeth discovered among kindergarteners screened in Madison County (2.35 per child) was 8% higher than the mean percentage for WNC (2.18) and 57% higher than the state average (1.50).

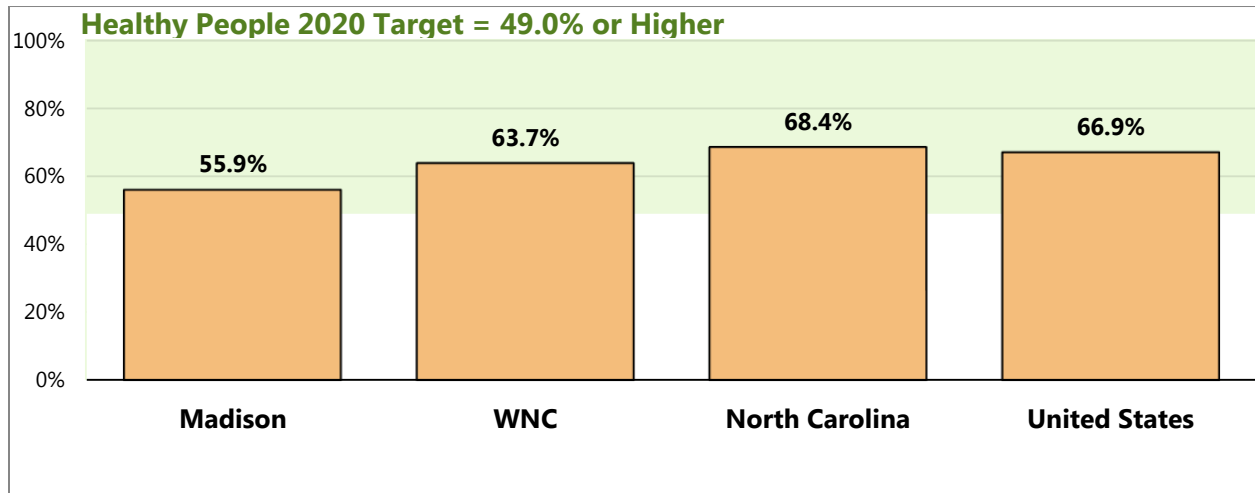
**Table 52. Dental Screening Results, Kindergarteners (2009)**

Geography	Average # Decayed, Missing or Filled Teeth
Madison County	2.35
Regional Arithmetic Mean	2.18
State Total	1.50

### **Utilization of Preventive Dental Care**

Survey respondents were asked, "About how long has it been since you last visited a dentist or a dental clinic for any reason? This includes visits to dental specialists, such as orthodontists."

**Figure 84. Have Visited a Dentist or Dental Clinic Within the Past Year  
(WNC Healthy Impact Survey)**



Sources:

- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 17]
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- US Department of Health and Human Services. Healthy People 2020. December 2010. <http://www.healthypeople.gov> [Objective OH-7]
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.

Notes:

- Asked of all respondents.

## Mental Health

Mental health is a state of successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with challenges. Mental health is essential to personal well-being, family and interpersonal relationships, and the ability to contribute to community or society. Mental disorders are health conditions that are characterized by alterations in thinking, mood, and/or behavior that are associated with distress and/or impaired functioning. Mental disorders contribute to a host of problems that may include disability, pain, or death. Mental illness is the term that refers collectively to all diagnosable mental disorders.

Mental disorders are among the most common causes of disability. The resulting disease burden of mental illness is among the highest of all diseases. According to the national Institute of Mental Health (NIMH), in any given year, an estimated 13 million American adults (approximately 1 in 17) have a seriously debilitating mental illness. Mental health disorders are the leading cause of disability in the United States and Canada, accounting for 25% of all years of life lost to disability and premature mortality. Moreover, suicide is the 11<sup>th</sup> leading cause of death in the United States, accounting for the deaths of approximately 30,000 Americans each year.

Mental health and physical health are closely connected. Mental health plays a major role in people's ability to maintain good physical health. Mental illnesses, such as depression and anxiety, affect people's ability to participate in health-promoting behaviors. In turn, problems with physical health, such as chronic diseases, can have a serious impact on mental health and decrease a person's ability to participate in treatment and recovery.

In addition to advancements in the prevention of mental disorders, there continues to be steady progress in treating mental disorders as new drugs and stronger evidence-based outcomes become available (DHHS, 2010).

The unit of NC government responsible for overseeing mental health services is the Division of Mental Health, Developmental Disabilities and Substance Abuse Services (DMH/DD/SAS). The NC mental health system is built on a system of Local Management Entities (LMEs)—area authorities or county programs—responsible for managing, coordinating, facilitating and monitoring the provision of MH/DD/SAS services in the catchment area served. There are two LMEs serving the population in WNC: Smoky Mountain Center and Western Highlands Network (NC Division of Mental Health, August 2012).

### **Mental Health Service Utilization Trends**

Table 53 presents figures on the numbers of persons receiving services in Area Mental Health Programs in 2006 through 2010. No clear pattern of service utilization is apparent from this data in any of the three jurisdictions, although utilization in each jurisdiction increased between 2009 and 2010; in Madison County the increase was 70%. It should be noted that the mental health system in NC is in some disarray, as reform of the recent past is being reconsidered.

**Table 53. Persons Served in Area Mental Health Programs (2006-2010)**

Geography	# Persons Served in Area Mental Health Programs				
	2006	2007	2008	2009	2010
Madison County	840	844	590	665	1,133
Regional Total	30,952	31,271	28,380	24,527	28,453
State Total	322,397	315,338	306,907	309,155	332,796

Table 54 presents figures on the numbers of persons receiving services in NC state alcohol and drug treatment centers. Although the pattern of increase was not straight-line, it appears that increasing numbers of persons in WNC received services from NC state alcohol and drug treatment centers since 2007. Noteworthy at the regional level was a 23% increase in persons being served between 2009 and 2010. There is no clear pattern discernible in the data for Madison County other than a high number of cases in 2010 relative to other years.

**Table 54. Persons Served in NC State Alcohol and Drug Treatment Centers (2006-2010)**

Geography	# Persons Served in NC Alcohol and Drug Treatment Centers				
	2006	2007	2008	2009	2010
Madison County	19	13	13	9	22
Regional Total	664	604	774	751	921
State Total	4,003	3,733	4284	4,812	4,483

Table 55 presents figures on the numbers of persons receiving services in NC state psychiatric hospitals. The number of persons in Madison County utilizing these services fell every year from 2006 to 2010, decreasing by 72% over the period. The number of persons in WNC receiving these services also fell. The number of persons in WNC utilizing state psychiatric hospital services in 2010 (564) was 63% lower than the number utilizing services in 2006 (1,509). The decrease in persons receiving services likely is a reflection of a decreasing availability of state services, rather than a decreasing need for services.

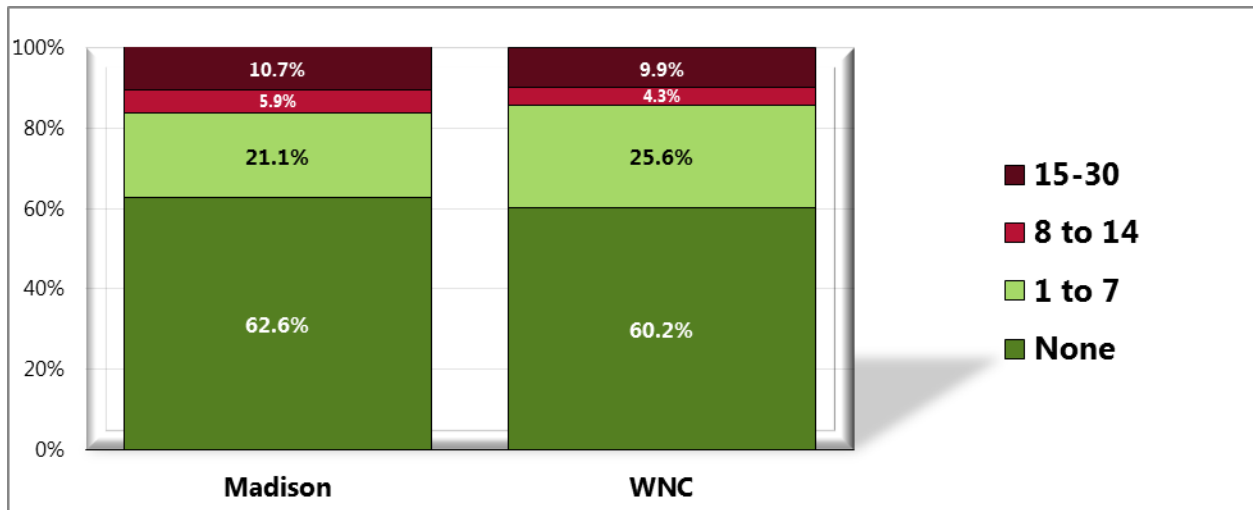
**Table 55. Persons Served in NC State Psychiatric Hospitals (2006-2010)**

Geography	# Persons Served in NC State Psychiatric Hospitals				
	2006	2007	2008	2009	2010
Madison County	46	47	43	35	13
Regional Total	1,509	1,529	1190	818	564
State Total	18,292	18,498	14643	9,643	7,188

### Poor Mental Health Days

Survey respondents were asked, "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many of the past 30 days was your mental health not good?"

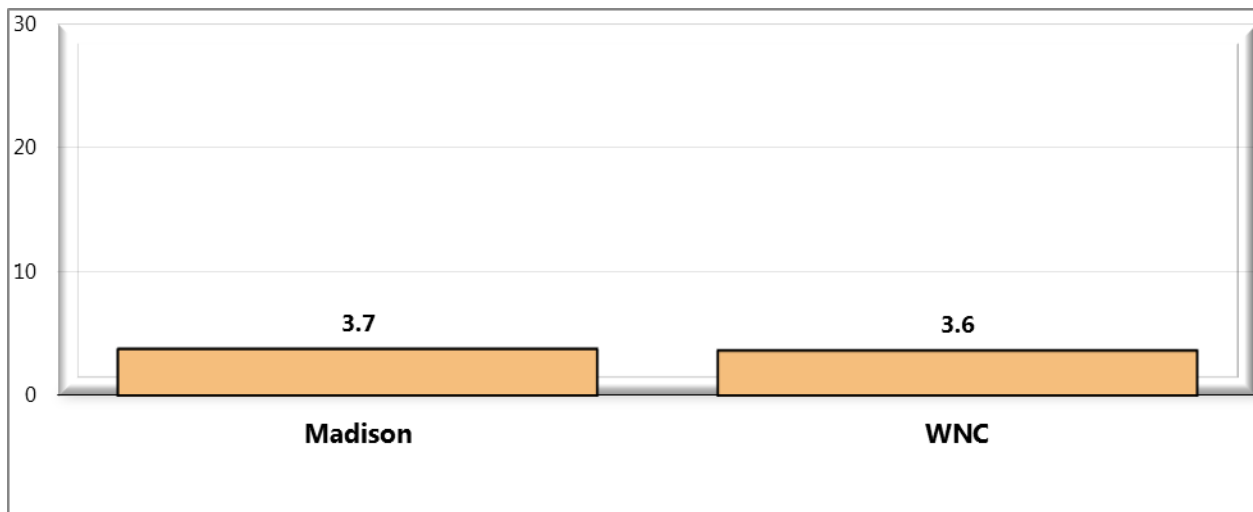
**Figure 85. Number of Days in the Past 30 Days on Which Mental Health Was Not Good (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 64]

Notes: • Asked of all respondents.

**Figure 86. Average Number of the Past 30 Days on Which Mental Health Was Not Good (WNC Healthy Impact Survey)**



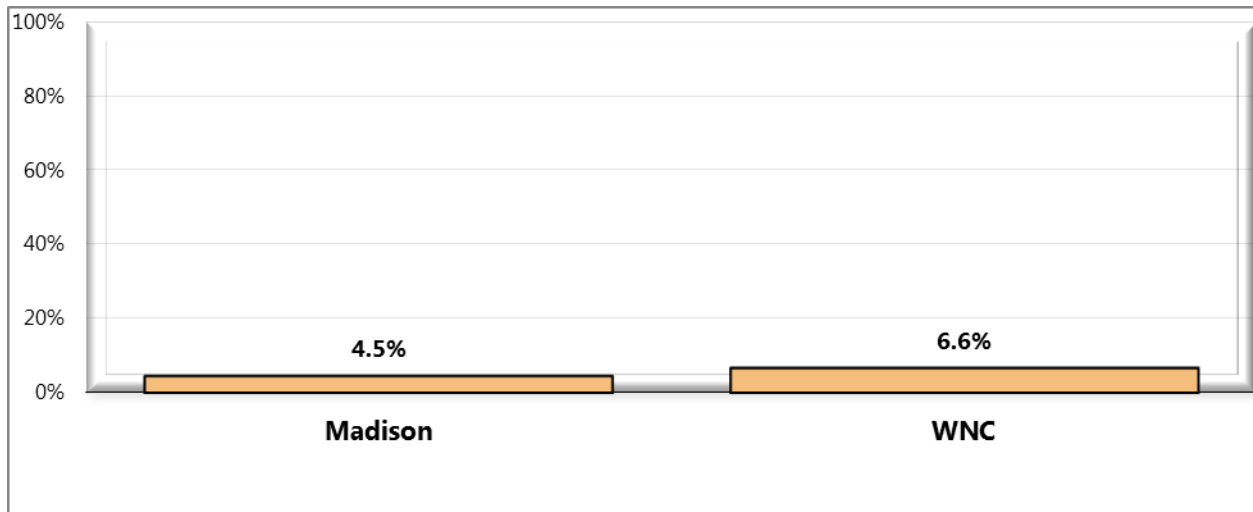
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 64]

Notes: • Asked of all respondents.

### **Access to Mental Health Services**

Survey respondents were asked if they had a time in the past year when they needed mental health care or counseling, but did not get it at that time. Those who responded, "yes," were asked to name the main reason they did not get mental health care or counseling. Due to small county-level sample sizes, responses to the latter question are displayed below for the region.

**Figure 87. Had a Time in the Past Year When Mental Health Care or Counseling Was Needed, But Was Unable to Get It (WNC Healthy Impact Survey)**



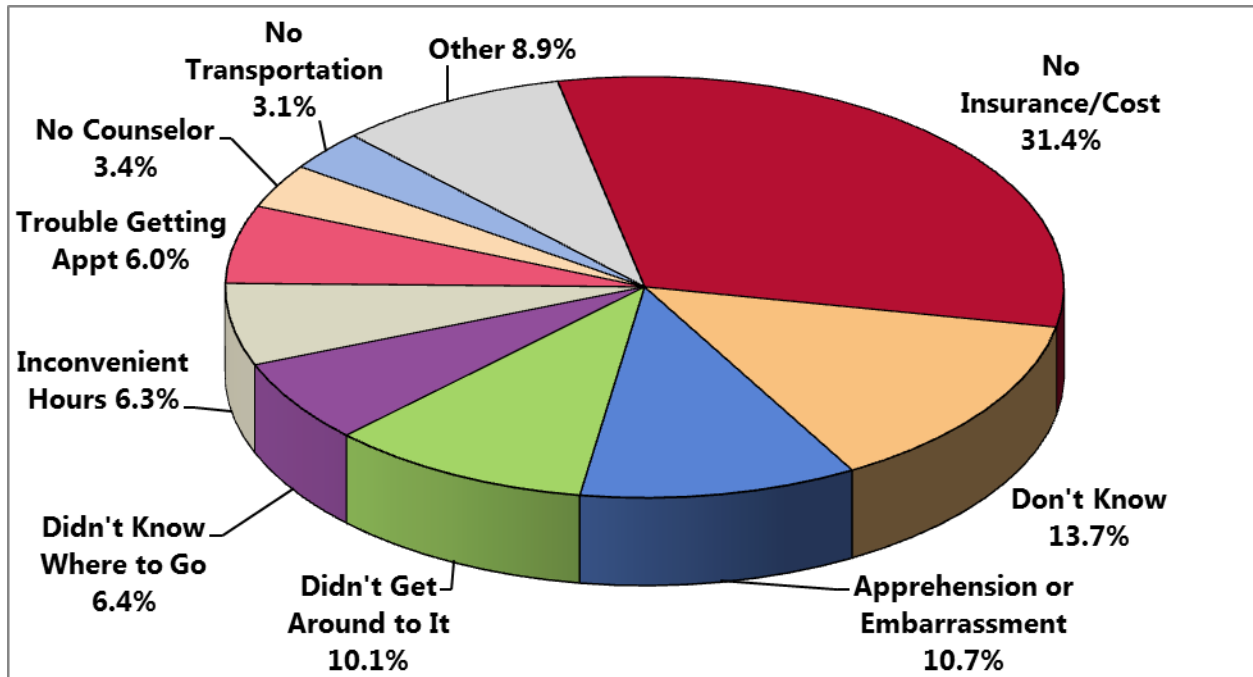
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 65]

Notes: • Asked of all respondents.



**Figure 88. Primary Reason for Inability to Access Mental Health Services (WNC Healthy Impact Survey)**

(Western North Carolina Adults Unable to Get Needed Mental Health Care in the Past Year)



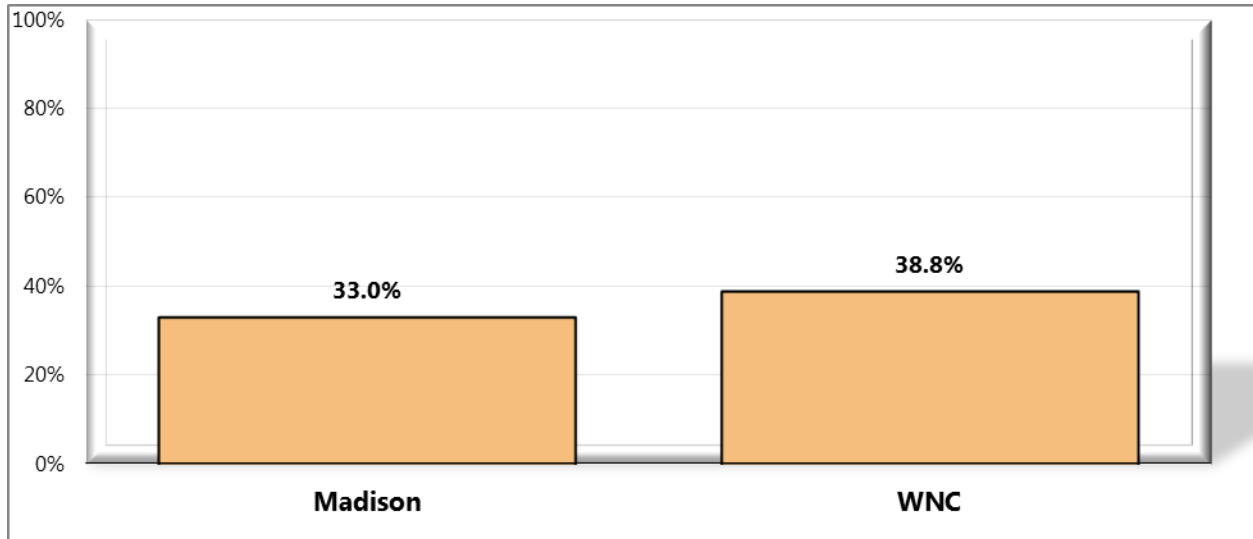
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 66]

Notes: • Asked of those respondents who were unable to get needed mental health care in the past year.

## Advance Directives

An Advance Directive is a set of directions given about the medical care a person wants if he/she ever loses the ability to make decisions for him/herself. Formal Advance Directives include Living Wills and Healthcare Powers of Attorney. Survey respondents were asked whether they have any completed Advance Directive documents, and if so, if they have communicated these health care decisions to their family or doctor.

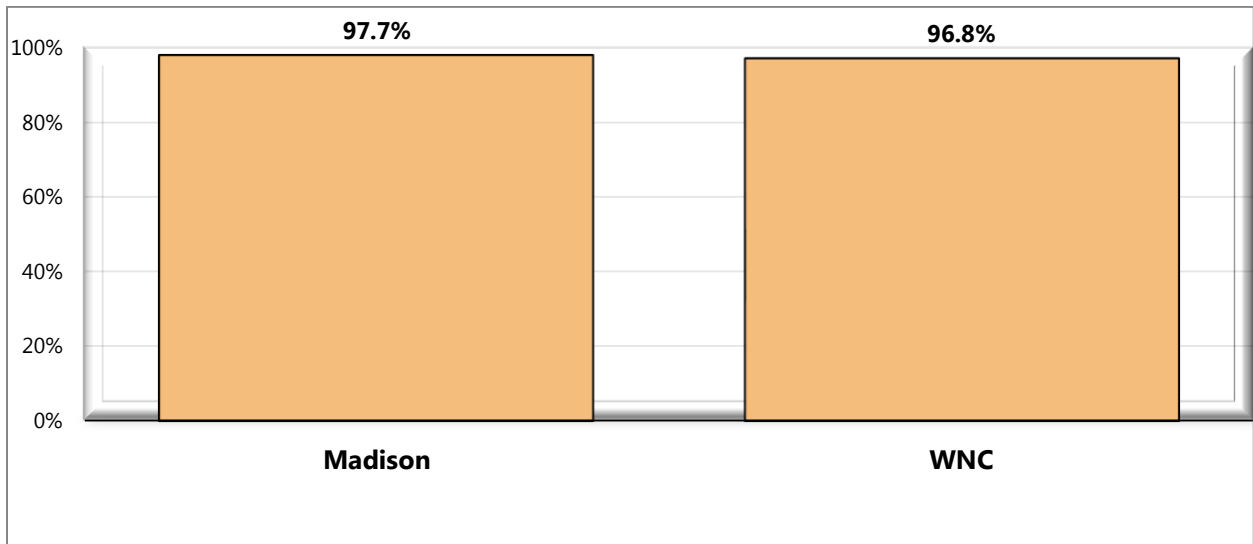
**Figure 89. Have Completed Advance Directive Documents  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 34]

Notes: • Asked of all respondents.

**Figure 90. Have Communicated Health Care Decisions to Family or Doctor  
(WNC Healthy Impact Survey)**  
(Among Respondents with Advance Directive Documents)



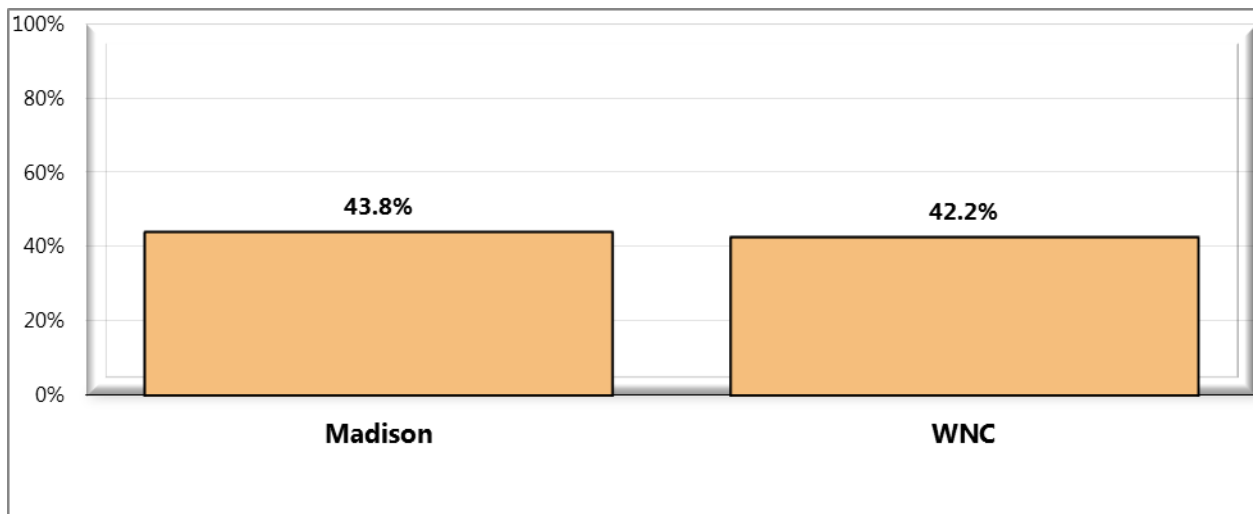
Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 35]

Notes: • Asked of respondents with completed advance directive documents.

## Care-giving

People may provide regular care or assistance to a friend or family member who has a health problem, long-term illness, or disability. Respondents were asked, "During the past month, did you provide any such care or assistance to a friend or family member?" Those who answered, "yes," were asked for the age, primary health issue, and the primary type of assistance needed by the person for whom the respondent provides care.

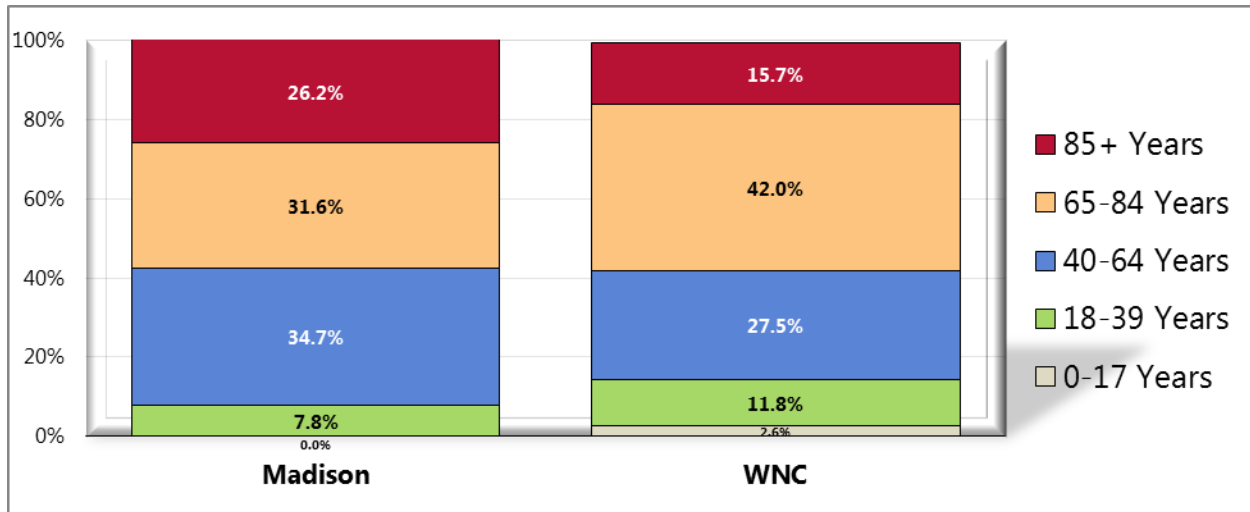
**Figure 91. Provide Regular Care or Assistance to a Friend/Family Member Who Has a Health Problem or Disability (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 69]

Notes: • Asked of all respondents.

**Figure 92. Age of Person for Whom Respondent Provides Care  
(WNC Healthy Impact Survey)**  
(Among Respondents Acting as a Caregiver for a Friend/Family Member)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 70]

Notes: • Asked of respondents acting as a caregiver for a friend or family member.

**Table 56. Primary Health Issue of Person for Whom  
Respondent Provides Care (WNC Healthy Impact Survey)**  
(Among Respondents Acting as a Caregiver for a Friend/Family Member)

	Aging	Alzheimers /Dementia	Cancer	Diabetes	Emotional/ Mental	Heart Disease	Stroke	Other (Each <4%)	Don't Know/Not Sure
Madison	4.3%	11.9%	8.1%	3.8%	0.0%	9.4%	2.9%	47.5%	12.1%
WNC	7.9%	8.4%	8.6%	4.3%	4.8%	7.4%	4.9%	46.3%	7.4%

Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 71]

Notes: • Asked of respondents acting as a caregiver for a friend or family member.

**Table 57. Primary Type of Assistance Needed by  
Person for Whom Respondent Provides Care (WNC Healthy Impact Survey)**  
(Among Respondents Acting as a Caregiver for a Friend/Family Member)

	Other (Each <2%)	Learning/ Remembering	Communi- cating	Moving Around the Home	Taking Care of Living Space	Taking Care of Self	Help with Anxiety/ Depression	Transportation Outside Home
Madison	2.8%	8.3%	2.3%	6.2%	25.1%	17.8%	18.7%	18.7%
WNC	2.0%	3.8%	3.9%	6.3%	18.5%	20.1%	20.9%	24.5%

Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 72]

Notes: • Asked of respondents acting as a caregiver for a friend or family member.

## CHAPTER 6 – PHYSICAL ENVIRONMENT

### Air Quality

#### **Outdoor Air Quality**

Nationally, outdoor air quality monitoring is the responsibility of the Environmental Protection Agency (EPA); most of the following information and data originate with that agency. In NC, the agency responsible for monitoring air quality is the Division of Air Quality (DAQ) in the NC Department of Environment and Natural Resources (NC DENR).

The EPA categorizes outdoor air pollutants as “criteria air pollutants” (CAPs) and “hazardous air pollutants” (HAPs). Criteria air pollutants (CAPS), which are covered in this report, are six chemicals that can injure human health, harm the environment, or cause property damage: carbon monoxide, lead, nitrogen oxides, particulate matter, ozone, and sulfur dioxide. The EPA has established National Ambient Air Quality Standards (NAAQS) that define the maximum legally allowable concentration for each CAP, above which human health may suffer adverse effects (US Environmental Protection Agency, 2012).

The impact of CAPs in the environment is described on the basis of emissions, exposure, and health risks. A useful measure that combines these three parameters is the *Air Quality Index* (AQI).

The AQI is an information tool to advise the public. The AQI describes the general health effects associated with different pollution levels, and public AQI alerts (often heard as part of local weather reports) include precautionary steps that may be necessary for certain segments of the population when air pollution levels rise into the unhealthy range. The AQI measures concentrations of five of the six criteria air pollutants and converts the measures to a number on a scale of 0-500, with 100 representing the NAAQS standard. An AQI level in excess of 100 on a given day means that a pollutant is in the unhealthy range that day; an AQI level at or below 100 means a pollutant is in the “satisfactory” range (AIRNow, 2011). Table 58 defines the AQI levels.

**Table 58. General Health Effects and Cautionary Statements, Air Quality Index**

Index Value	Descriptor	Color Code	Meaning
Up to 50	Good	Green	Air quality is satisfactory, and air pollution poses little or no risk.
51 to 100	Moderate	Yellow	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
101 to 150	Unhealthy for sensitive groups	Orange	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
151 to 200	Unhealthy	Red	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
201-300	Very unhealthy	Purple	Health alert: everyone may experience more serious health effects.
301-500	Hazardous	Maroon	Health warnings of emergency conditions. The entire population is more likely to be affected.

Source: AIRNow, Air Quality Index (AQI) – A Guide to Air Quality and Your Health;  
<http://airnow.gov/index.cfm?action=aqibasics.aqi>

The EPA reports AQI measures for nine of the 16 counties in the WNC region: Buncombe, Haywood, Graham, Jackson, Macon, McDowell, Mitchell, Swain and Yancey. Note that Madison County is not among the monitored counties. The WNC figures presented in Tables 59 and 60 below represent the arithmetic means of the values for those nine counties. Data in Table 59 shows that there were no days rated “very unhealthy” or “unhealthy” in 2011, and only one day was rated “unhealthy for sensitive groups”. Of the 2011 mean of 275 days in WNC with an assigned AQI, 227 had “good” air quality and 47 had “moderate” air quality.

**Table 59. Air Quality Index Summary, WNC (2011)**

Geography	No. Days with AQI	Number of Days When Air Quality Was:				
		Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
Regional Arithmetic Mean	275	227	47	1	0	0

Table 60 lists the pollutants causing the air quality deficiencies. This data shows that in WNC in 2011 the primary air pollutants were ozone (O<sub>3</sub>) and small particulate matter (PM<sub>2.5</sub>).

Ozone, the major component of smog, is not usually emitted directly but rather formed through chemical reactions in the atmosphere. Peak O<sub>3</sub> levels typically occur during the warmer and sunnier times of the day and year. The potential health effects of ozone include damage to lung tissues, reduction of lung function and sensitization of lungs to other irritants (Scorecard, 2011).

Particulate matter is usually categorized on the basis of size, and includes dust, dirt, soot, smoke, and liquid droplets emitted directly into the air by factories, power plants, construction activity, fires and vehicles (Scorecard, 2011). Particulates in air can affect breathing, aggravate existing respiratory and cardiovascular disease, and damage lung tissue (reference).

**Table 60. CAPs Causing Air Quality Problems, WNC (2011)**

Geography	No. Days with AQI	Number of Days When Air Pollutant Was:					
		CO	NO <sub>2</sub>	O <sub>3</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
Regional Arithmetic Mean	275	0	0	156	0	118	0

### **Toxic Chemical Releases**

Over 4 billion pounds of toxic chemicals are released into the nation's environment each year. The US Toxic Releases Inventory (TRI) program, created in 1986 as part of the Emergency Planning and Community Right to Know Act, is the tool the EPA uses to track these releases. Approximately 20,000 industrial facilities are required to report *estimates* of their environmental releases and waste generation annually to the TRI program office. These reports do not cover all toxic chemicals, and they omit pollution from motor vehicles and small businesses (US Environmental Protection Agency, 2012).

According to EPA data, twelve of the 16 WNC counties had measurable TRI releases in 2010. (Only Clay, Madison, Polk and Transylvania Counties did not.) In 2010, Haywood County in WNC was the eighth leading emitter of TRIs in NC in terms of tonnage of TRI chemicals released. Although not among the "top ten", Rutherford County, also in WNC, ranks just off the list, at number eleven. (No other WNC county ranks higher than 21<sup>st</sup>.) The *Data Workbook* presents detail on toxic chemical releases in all 16 WNC counties. Madison County ranks 83<sup>rd</sup> among the state's 86 ranked counties. As noted above, there were no measurable TRI releases in Madison County in 2010.

### **Indoor Air Quality**

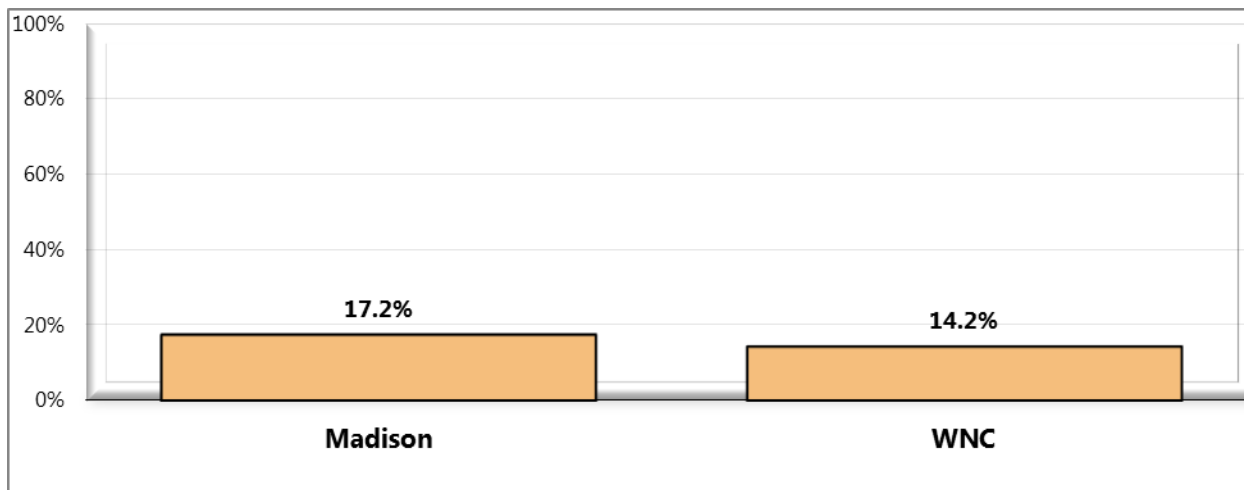
#### ***Environmental tobacco smoke***

Tobacco smoking has long been recognized as a major cause of death and disease, responsible for hundreds of thousands of deaths each year in the U.S. Smoking is known to cause lung cancer in humans, and is a major risk factor for heart disease. However, it is not only active smokers who suffer the effects of tobacco smoke. In 1993, the EPA published a risk assessment on passive smoking and concluded that the widespread exposure to environmental tobacco smoke (ETS) in the US had a serious and substantial public health impact (US Environmental Protection Agency, 2011).

ETS is a mixture of two forms of smoke that come from burning tobacco: sidestream smoke (smoke that comes from the end of a lighted cigarette, pipe, or cigar) and mainstream smoke (smoke that is exhaled by a smoker). When non-smokers are exposed to secondhand smoke it is called involuntary smoking or passive smoking. Non-smokers who breathe in secondhand smoke take in nicotine and other toxic chemicals just like smokers do. The more secondhand smoke that is inhaled, the higher the level of these harmful chemicals will be in the body (American Cancer Society, 2011).

Survey respondents were asked about their second-hand smoke exposure in their workplace. Specifically, they were asked, "During how many of the past 7 days, at your workplace, did you breathe the smoke from someone who was using tobacco?" In order to evaluate community members' perceptions about environmental tobacco smoke, survey respondents were given a series of three statements regarding smoking in public places and asked whether they "strongly agree," "agree," "neither agree nor disagree," "disagree" or "strongly disagree" with each statement. The statements were: "I believe it is important for universities and colleges to be 100% tobacco-free," "I believe it is important for government buildings and grounds to be 100% tobacco-free," and, "I believe it is important for parks and public walking/biking trails to be 100% tobacco free."

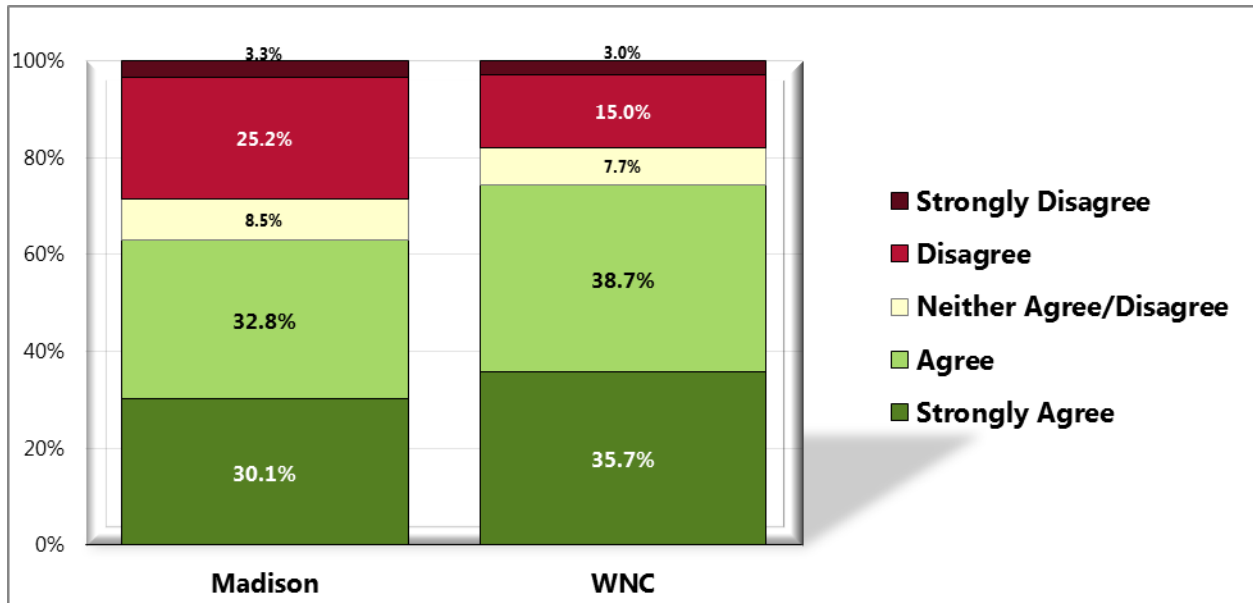
**Figure 93. Have Breathed Someone Else's Cigarette Smoke at Work in the Past Week (WNC Healthy Impact Survey)**  
(Among Employed Respondents)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 44]  
Notes: • Asked of employed respondents.



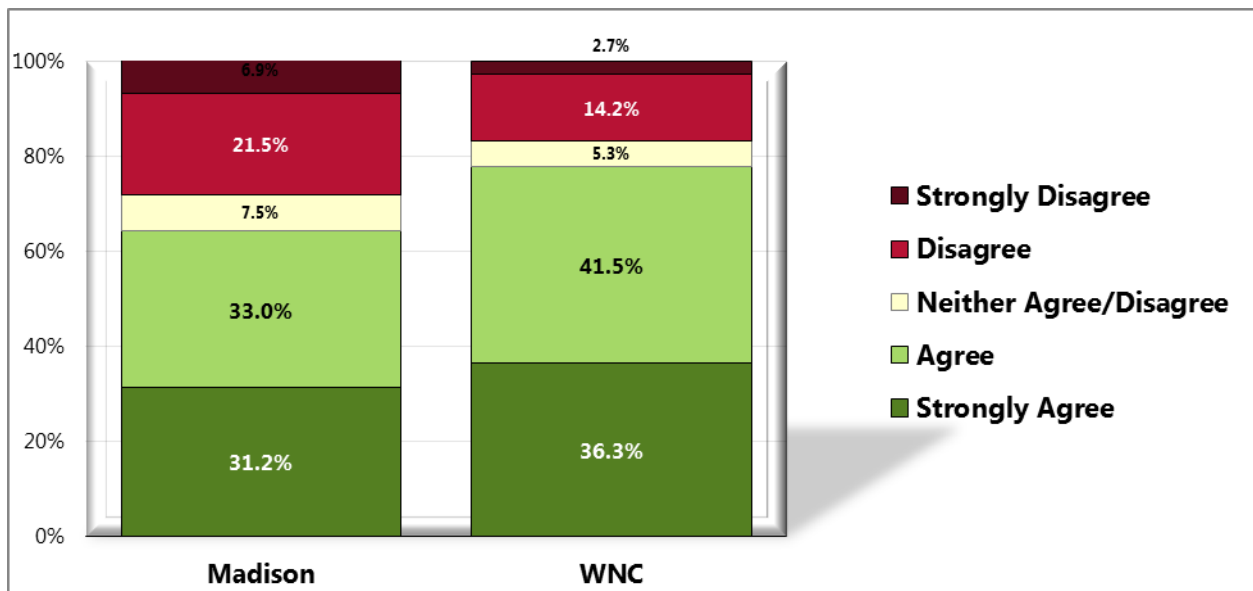
**Figure 94. "I believe it is important for  
universities and colleges to be 100% tobacco-free"  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 45]

Notes: • Asked of all respondents.

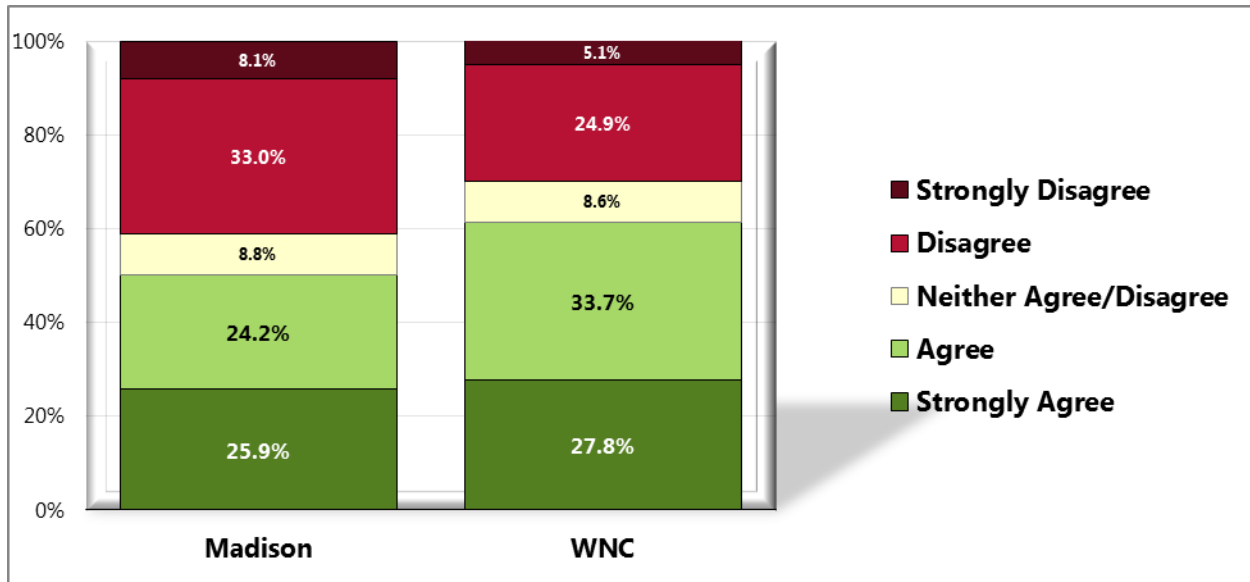
**Figure 95. "I believe it is important for  
government buildings and grounds to be 100% tobacco-free"  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 46]

Notes: • Asked of all respondents.

**Figure 96. "I believe it is important for parks and public walking/biking trails to be 100% tobacco-free (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 47]

Notes: • Asked of all respondents.

## Drinking Water

The source from which the public gets its drinking water is a health issue of considerable importance. Water from all municipal and most community water systems is treated to remove harmful microbes and many polluting chemicals, and is generally considered to be "safe" from the standpoint of public health because it is subject to required water quality standards. Municipal drinking water systems are those operated and maintained by local governmental units, usually at the city/town or county level. Community water systems are systems that serve at least 15 service connections used by year-round residents or regularly serves 25 year-round residents. This category includes municipalities, but also subdivisions and mobile home parks. In February 2012, a regional mean of 55% of the WNC population was being served by community water systems (*Data Workbook*). The 45% remaining presumably were being served by wells or by some other source, such as springs, creeks, rivers, lakes, ponds or cisterns.

Individual counties in WNC, however, have highly varied percentages of their populations served by community water systems; in some counties the figure is as low as 18% and in others it is as high as 65%. In Madison County, 6,832 of 20,764 county residents, or 32.9%, were being served by community water systems in February of 2012. Presumably the remaining 67.1% were served by wells or other sources.

## Radon

Radon is a naturally occurring, invisible, odorless gas that comes from soil, rock and water. It is a radioactive decay product of radium, which is in turn a decay product of uranium; both radium and uranium are common elements in soil. Radon usually is harmlessly dispersed in outdoor air, but when trapped in buildings it can be harmful. Most indoor radon enters a home from the soil or rock beneath it, in the same way air and other soil gases enter: through cracks in the foundation, floors, hollow-block walls, and openings around floor drains, heating and cooling ductwork, pipes, and sump pumps. The average outdoor level of radon in the air is normally so low that it is not a problem (NC Department of Environment and Natural Resources).

Radon may also be dissolved in water as it flows over radium-rich rock formations. Dissolved radon can be a health hazard, although to a lesser extent than radon in indoor air. Homes supplied with drinking water from private wells or from community water systems that use wells as water sources generally have a greater risk of exposure to radon in water than homes receiving drinking water from municipal water treatment systems. This is because well water comes from ground water, which has much higher levels of radon than surface waters. Municipal water tends to come from surface water sources which are naturally lower in radon, and the municipal water treatment process itself tends to reduce radon levels even further (NC Department of Environment and Natural Resources).

There are no immediate symptoms to indicate exposure to radon. The primary risk of exposure to radon gas is an increased risk of lung cancer (after an estimated 5-25 years of exposure). Smokers are at higher risk of developing radon-induced lung cancer than non-smokers. There is no evidence that other respiratory diseases, such as asthma, are caused by radon exposure, nor is there evidence that children are at any greater risk of radon-induced lung cancer than are adults (NC Department of Environment and Natural Resources).

Elevated levels of radon have been found in many counties in NC, but the highest levels have been detected primarily in the upper Piedmont and mountain areas of the state where the soils contain the types of rock (gneiss, schist and granite) that have naturally higher concentrations of uranium and radium (NC Department of Environment and Natural Resources). Eight counties in NC historically have had the highest levels of radon, exceeding, on average, 4 pCi/L (pico curies per liter). These counties are Alleghany, Buncombe, Cherokee, Henderson, Mitchell, Rockingham, Transylvania and Watauga, five of which are in the WNC region. There are an additional 31 counties in the central and western Piedmont area of the state with radon levels in the 2-4 pCi/L range; the remaining 61 NC counties, mostly in the piedmont and eastern regions of the state have predicted indoor radon levels of less than 2 pCi/L (NC Department of Environment and Natural Resources).

According to one recent assessment, the regional mean indoor radon level for the 16 counties of WNC was 4.3 pCi/L, over three times the national indoor radon level of 1.3 pCi/L. According to this same source, the level for Madison County was 2.8 pCi/L, over twice the national indoor radon level (*Data Workbook*).

## Built Environment

The term “built environment” refers to the human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighborhoods and cities that can often include their supporting infrastructure, such as water supply, or energy networks. In recent years, public health research has expanded the definition of built environment to include healthy food access, community gardens, “walkability”, and “bikability” (Wikipedia, 2012).

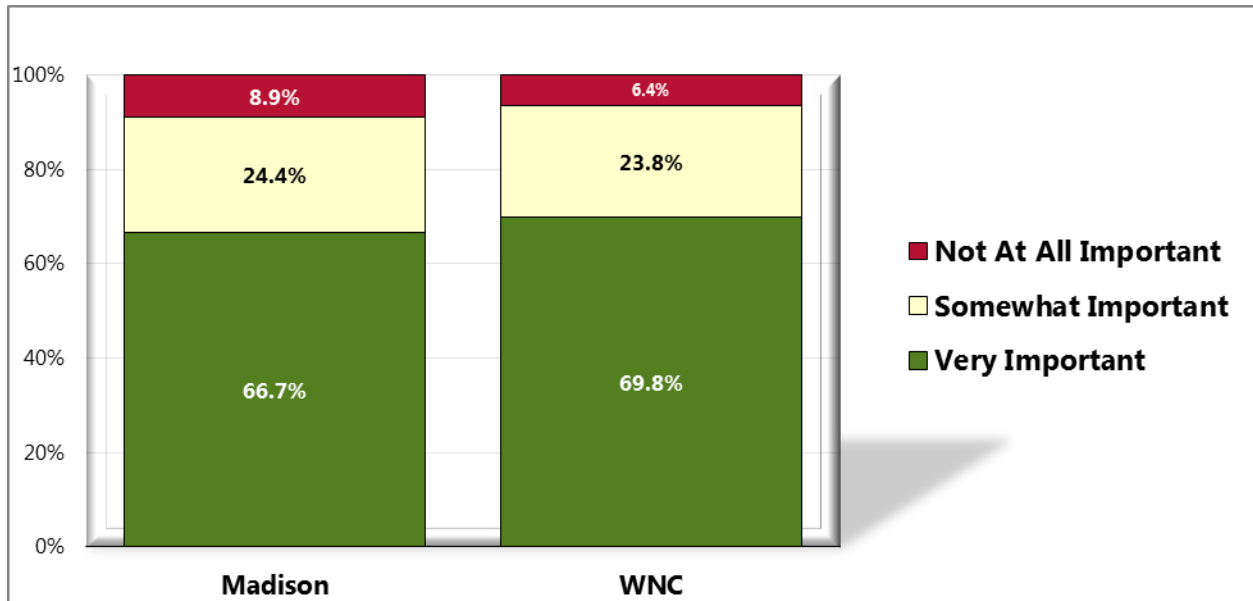
### **Access to Farmers’ Markets and Grocery Stores**

According to the US Department of Agriculture (USDA) Economic Research Service’s *Your Food Environment Atlas*, there were a total of 49 farmers’ markets in the 16 WNC counties in 2009. This number was reported to have grown by 5, to a total of 54, in 2011, an increase of 10%. According to this source, in Madison County there were three farmers’ markets in both 2009 and 2011 (*Data Workbook*).

According to the same source, there were a total of 158 grocery stores in the 16 WNC counties in 2007. This number was reported to have shrunk by 4, to a total of 154, in 2009, a decrease of 2%. In Madison County the number of grocery stores grew from 2 to 3 over the same period (*Data Workbook*).

Survey respondents were asked, “How important do you feel it is for your community to make it easier for people to access farmer’s markets, including mobile farmer’s markets and tailgate markets?” Survey respondents in Madison County were also asked about their access to affordable food, including fresh produce.

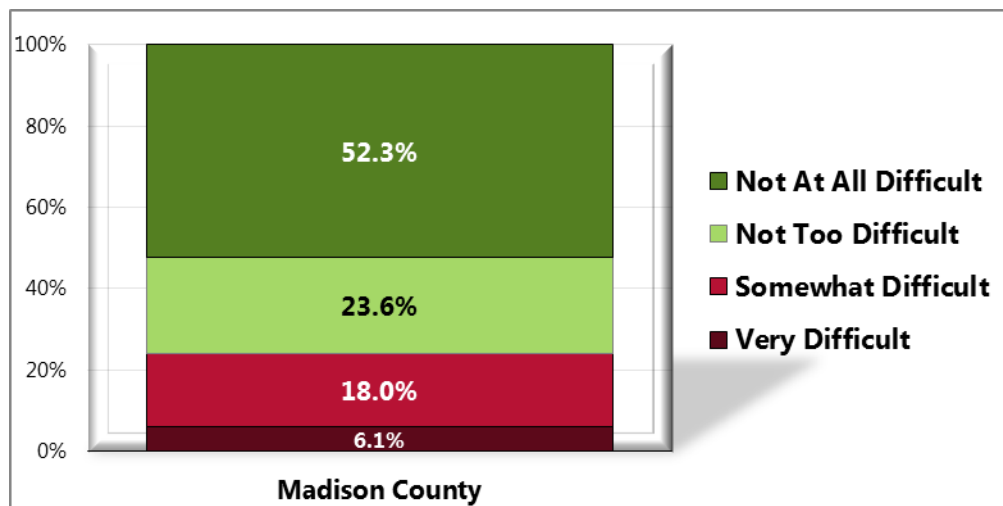
**Figure 97. Importance of Communities Making It Easier to Access Farmer's Markets, Including Mobile/Tailgate Markets (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 55]

Notes: • Asked of all respondents.

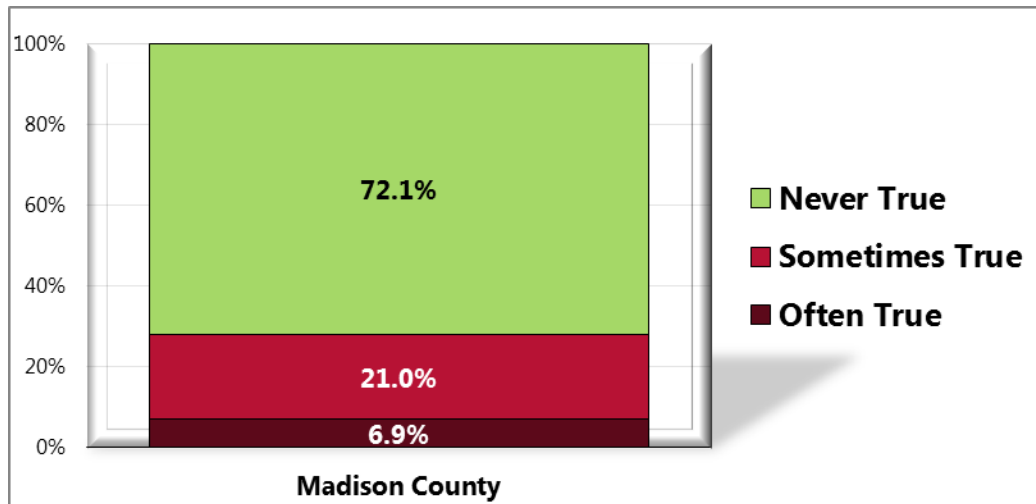
**Figure 98. Level of Difficulty Accessing Fresh Produce at an Affordable Price (WNC Healthy Impact Survey) (Madison County, 2012)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 108]

Notes: • Asked of all respondents

**Figure 99. Have worried in the Past Year About Food Running Out Before Having Money to Buy More (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 113]

Notes: • Asked of all respondents.

### **Access to Fast Food Restaurants**

According to the same source cited above, there were a total of 526 fast food restaurants in the 16 WNC counties in 2007. This number was reported to have dropped by 21, to a total of 505, in 2009, a decrease of 4%. In Madison County the number of fast food restaurants fell from 10 to 8 over the same period (*Data Workbook*).

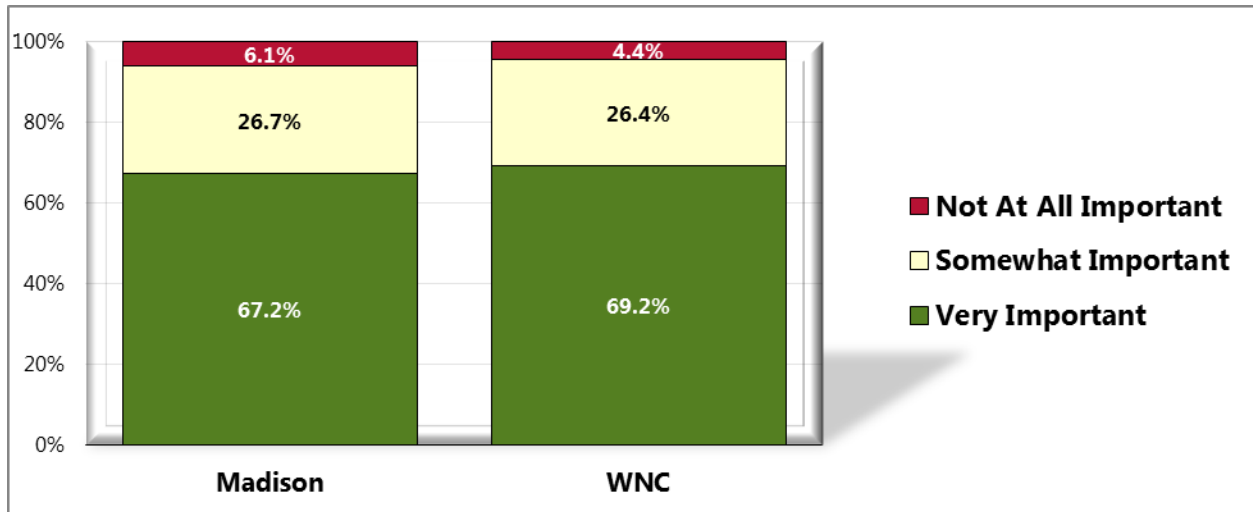
Also according to the USDA, mean per capita fast food expenditures in WNC rose 45% (from \$514 to \$746) between 2002 and 2007, and mean per capita restaurant expenditures in WNC also rose 45% (from \$449 to \$665) over the same period (*Data Workbook*).

### **Access to Recreational Facilities**

According to the same source cited above, there were a total of 81 recreation and fitness facilities in the 16 WNC counties in 2007. This number was reported to have dropped by 26, to a total of 55a total of 55, in 2009, a decrease of 32%. In Madison County the number of recreational and fitness facilities fell from 5 to 2 over the same period (*Data Workbook*).

Survey respondents were asked whether they feel it is important for community organizations to explore ways to increase the public's access to physical activity spaces during off-times, as well as whether it is important for communities to improve access to trails, parks, and greenways.

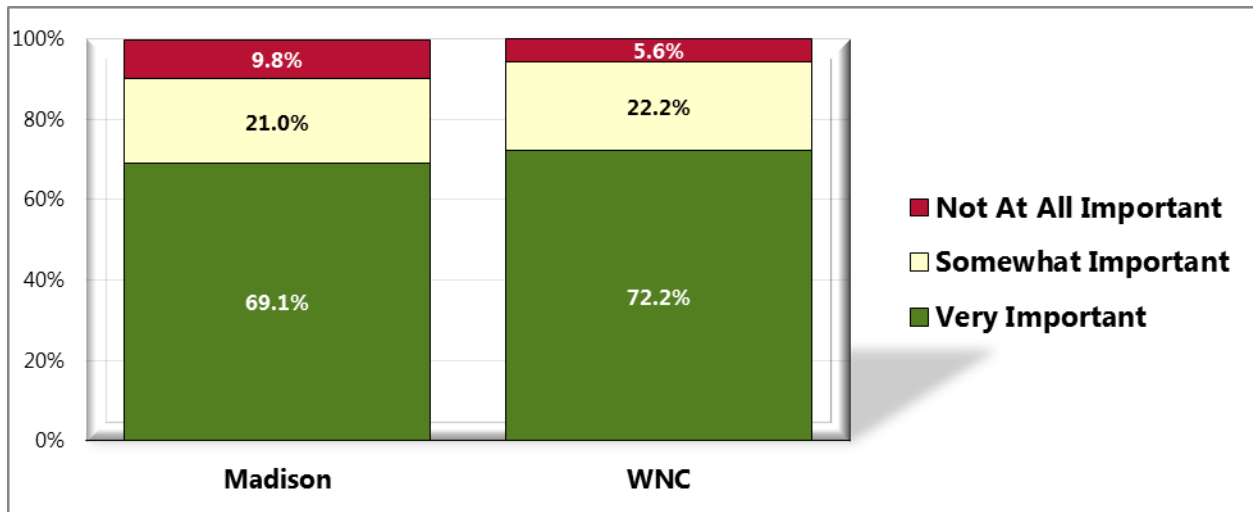
**Figure 100. Importance That Community Organizations Make Physical Activity Spaces Available for Public Use After Hours (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 60]

Notes: • Asked of all respondents.

**Figure 101. Importance That Communities Improve Access to Trails, Parks, and Greenways (WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 61]

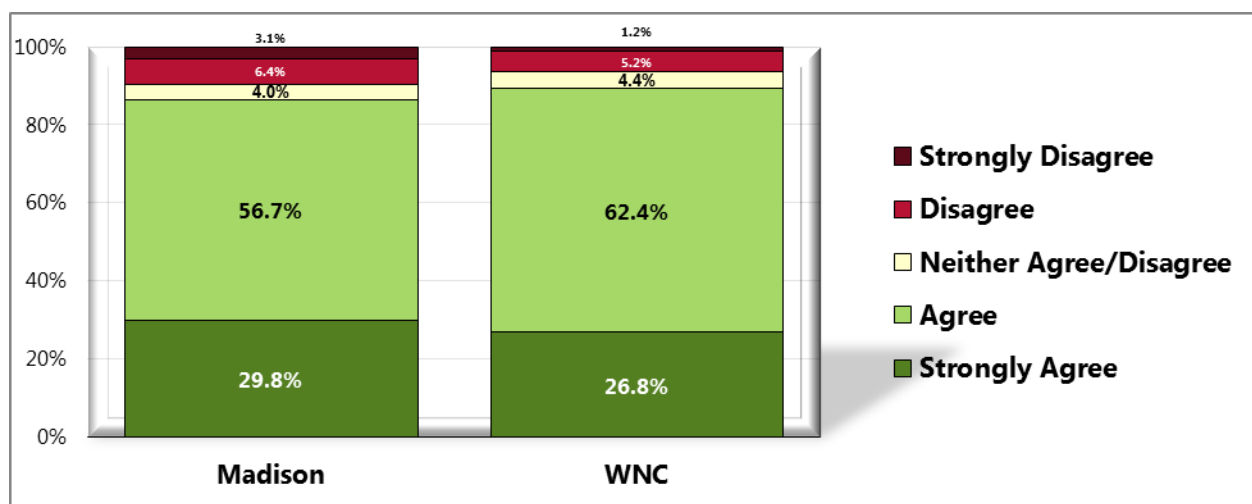
Notes: • Asked of all respondents.

## CHAPTER 7 – QUALITY OF LIFE

### Perception of County

In order to evaluate community members' perceptions about the quality of life in western North Carolina (WNC), survey respondents were given a series of three statements regarding life in their county (my county is a good place to raise children, my county is a good place to grow old, and there is plenty of help for people during times of need in my county) and asked whether they *"strongly agree," "agree," "neither agree nor disagree," "disagree" or "strongly disagree"* with each statement. Survey respondents were also asked about their frequency of getting needed social and emotional support, their satisfaction with life, the one thing that needs the most improvement in their neighborhood or community, and the one issue which has the most negative impact on the quality of life in their county.

**Figure 102. "My county is a good place to raise children"**  
(WNC Healthy Impact Survey)

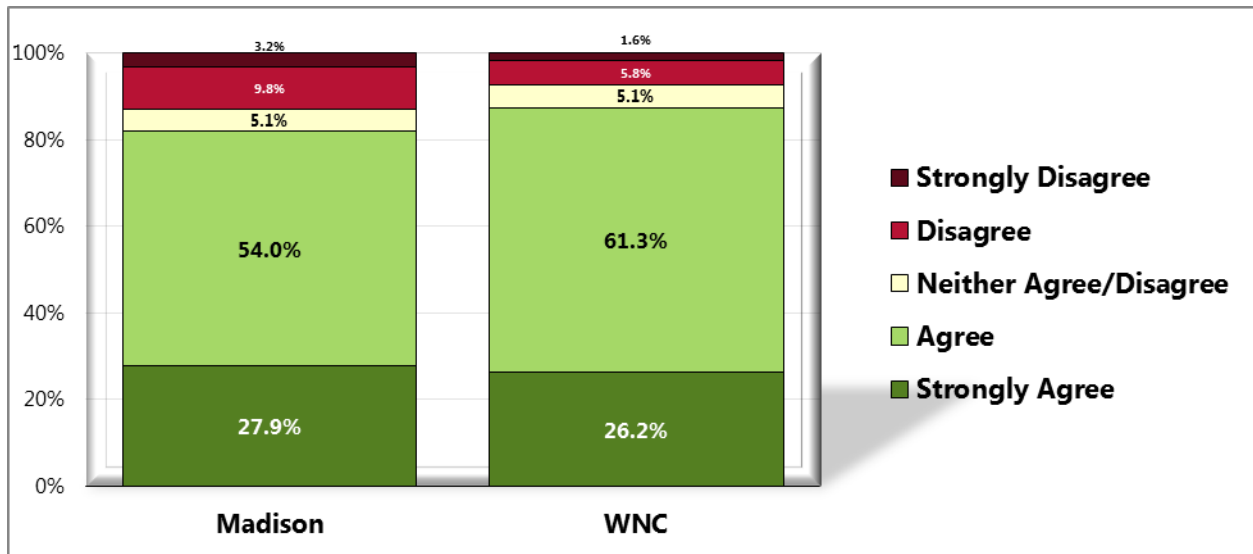


Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 5]

Notes: • Asked of all respondents.



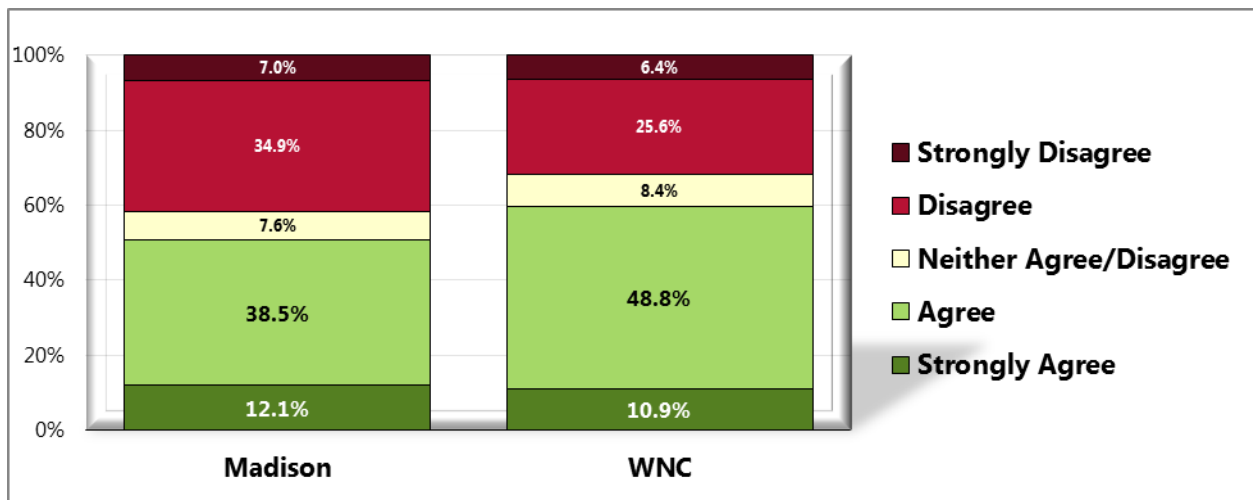
**Figure 103. "My county is a good place to grow old."  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 6]

Notes: • Asked of all respondents.

**Figure 104. "There is plenty of help for  
people during times of need in my county."  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 8]

Notes: • Asked of all respondents.

**Table 61. Top Three County Issues Perceived as Having the Most Negative Impact on Quality of Life (WNC Healthy Impact Survey)**

	Economy/ Unemployment	Nothing	Don't Know	Substance Abuse	Government/ Politics	Health Care
Madison	✓	✓			✓	
WNC	✓	✓	✓			

Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 10]

Notes: • Asked of all respondents.

**Table 62. Top Three Neighborhood/Community Issues Perceived as in Most Need of Improvement (WNC Healthy Impact Survey)**

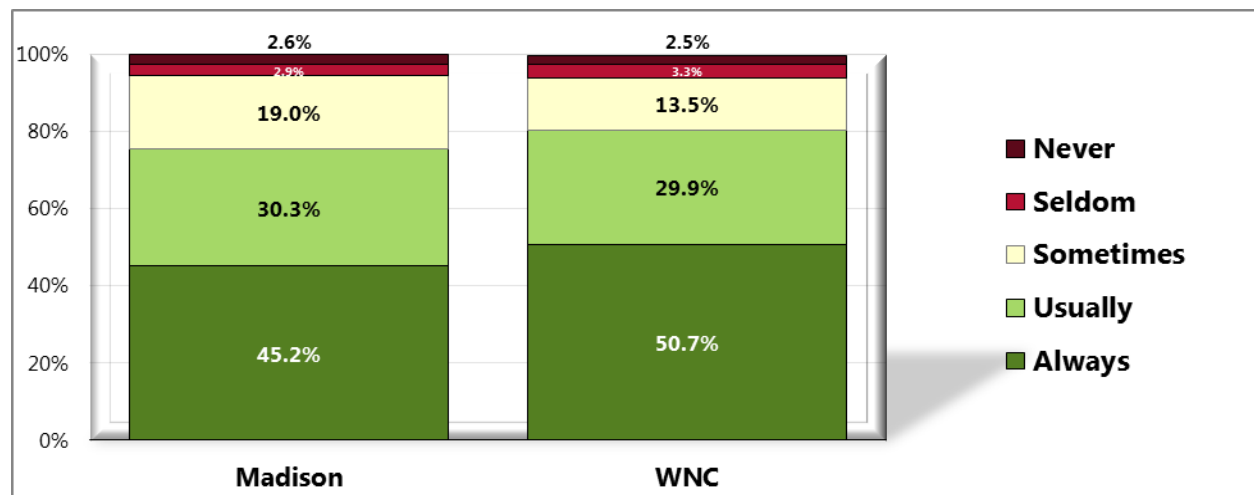
	Economy/ Unemployment	Healthcare Services	Activity/Recreation Options	Nothing
Madison	✓	✓		✓
WNC	✓	✓		✓

Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 9]

Notes: • Asked of all respondents.

## Social and Emotional Support

**Figure 105. Frequency of Getting Needed Social/Emotional Support (WNC Healthy Impact Survey)**

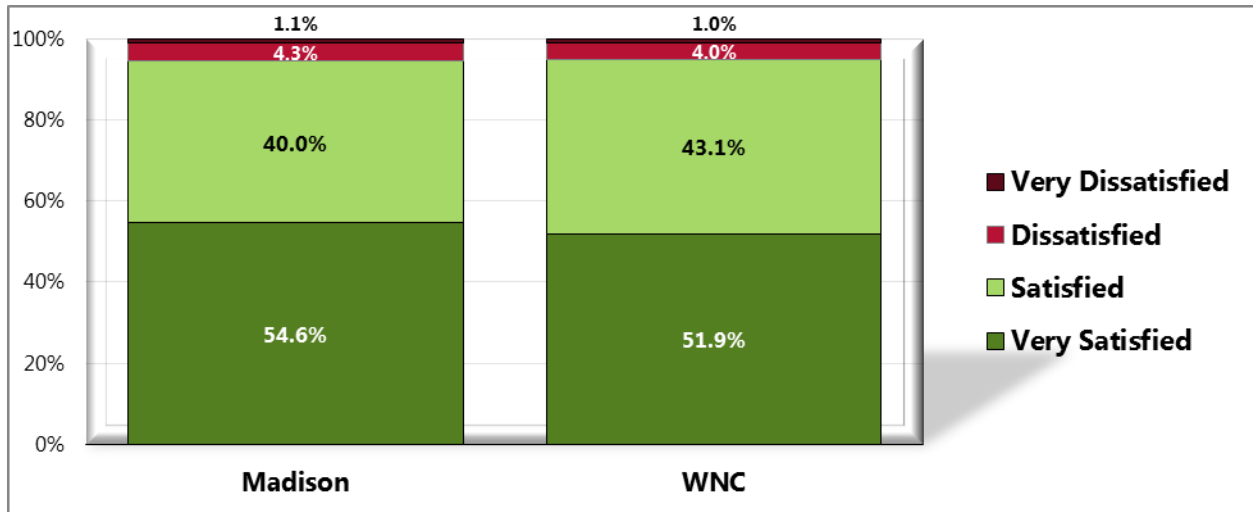


Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 63]

Notes: • Asked of all respondents.

## Satisfaction with Life

**Figure 106. Satisfaction with Life  
(WNC Healthy Impact Survey)**



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 62]

Notes: • Asked of all respondents.

## CHAPTER 8 - HEALTHCARE & HEALTH PROMOTION RESOURCES

### Health Resources

See [Appendix A](#) for a description of the data collection methods use to gather this information.

See [Appendix C](#) for a summary list of the healthcare and health promotion resources and facilities available in Madison County to respond to the health needs of the community.

### Resource Gaps

The following resource gaps are based on local review and collaborative discussions around availability of services specifically related to Madison County's prioritized needs of improving access to preventive care and treatment for chronic disease, improving child health outcomes, and improving access to mental health services.

Resources for clinical breast exams and mammograms (Including funding and diagnostic services)

Resources for cancer treatment within the county (i.e. chemotherapy)

Tobacco cessation resources other than the Quitline

Dental care providers (especially those who treat children)

## CHAPTER 9 - HEALTH PRIORITIES & NEXT STEPS

### Prioritization Process & Criteria

During the 2011 Community Health Assessment, county health data information was collected from community health resources as recommended by the Community Health Assessment Standards and Instructions. Committee members compiled the information and reviewed a wide variety of quantitative data, highlighting areas of significance. This data was placed into the following categories:

Changing Demographics	Poverty
Chronic Diseases	Education
Child Health	Mental Health
Access to Care	

Next, the survey response data was assigned to one or more of the above categories. Findings were placed in separate charts and committee members were asked to rank each category in order of importance.

From this process the above list was narrowed to the following priority areas: Child Health, Chronic Disease, and Mental Health/Substance Abuse.

During the 2012 Assessment process. WNC Healthy Impact assisted with gathering both primary and secondary data via various sources including a phone survey. This data was then reviewed locally. It was determined that the priority areas would not change. However, the areas were modified slightly in order to narrow their focus. The priority areas for 2012 are:

- Improve access to preventive care and treatment for chronic disease
  - Improve child health outcomes
  - Improve access to mental health services.
- Poverty continues to play a major role in these areas.

### Priority Health Issues

The last CHA for Madison County was conducted in 2011. This means that the 2012 CHA is taking place only one year after the last CHA was submitted. This involved requesting an extension on action planning until 2013. For this reason, the 2012 CHA has involved the examination of the 2011 priority areas and the engagement of a smaller number of community leaders rather than re-creating the extensive process that took place in 2011.

## Next Steps

The 2012 Madison County Community Health Assessment will be shared with the Madison County Board of Health and Madison County Board of Commissioners.

The Madison Community Health Consortium, a Healthy Carolinians Task Force, and Mission Hospital will be instrumental in reviewing the report and assisting with development of action plans to address the identified health priorities over the next four years.

In addition, Madison County, along with our partners in WNC Healthy Impact, will move forward with information in this Community Health Assessment to collaborative action planning and determining how we can most effectively impact health in western North Carolina. Including the possibility of creating a Community Health Improvement Plan to coordinate action and target resources in order to inform our action planning process.

Dissemination of this CHA report will include making all reports publicly available on the Madison County Health Department website, the WNC Healthy Impact website, and local libraries.

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# APPENDICES

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Appendix A – Data Collection Methods & Limitations  
Appendix B – WNC Healthy Impact Survey Instrument  
Appendix C – Health Resource Inventory

## APPENDIX A - DATA COLLECTION METHODS & LIMITATIONS

### Secondary Data

Supplementary to this Community Health Assessment is the WNC Healthy Impact [Secondary Data Workbook \(Data Workbook\)](#) that contains complete county-level data from a wide range of sources, as well as the state and regional averages and totals described here. Readers can consult the Data Workbook if looking for the direct source information and links to this secondary data for all counties in the region.

This data workbook was created by WNC Healthy Impact to manage and report the large amount of secondary data collected from a variety of sources during our regional process. This process and product were part of our regional effort to improve efficiency and standardization of data collection and reporting across a sixteen county region.

Unless specifically noted otherwise, all tables, graphs and figures presented in this report were derived directly from spreadsheets in the Data Workbook or survey data reported by the survey vendor (PRC).

#### **Secondary Data Methodology**

In order to learn about the specific factors affecting the health and quality of life of residents of WNC, the WNC Healthy Impact data workgroup and consulting team identified and tapped numerous secondary data sources accessible in the public domain. For data on the demographic, economic and social characteristics of the region sources included: the US Census Bureau; Log Into North Carolina (LINC); NC Office of State Budget and Management; NC Department of Commerce; Employment Security Commission of NC; NC Department of Public Instruction; NC Department of Justice; NC Division of Medical Assistance; and the Cecil B. Sheps Center for Health Services Research. The WNC Healthy Impact consultant team made every effort to obtain the most current data available *at the time the report was prepared*. It was not possible to continually update the narrative past a certain date; in most cases that end-point was June 30, 2012.

The principal source of secondary health data for this report was the NC State Center for Health Statistics (NC SCHS), including its County Health Data Books, Behavioral Risk Factor Surveillance System, Vital Statistics unit, and Cancer Registry. Other health data sources included: NC Division of Public Health (DPH) Epidemiology Section; NC Division of Mental Health, Developmental Disabilities and Substance Abuse Services; National Center for Health Statistics; NC DPH Nutrition Services Branch; UNC Highway Safety Research Center; NC Department of Transportation; NC DETECT and the NC DPH Oral Health Section.

Because in any CHA it is instructive to relate local data to similar data in other jurisdictions, throughout this report representative county data is compared to like data describing the 16-county region and the state of NC as a whole. WNC Healthy Impact received approval from the

NC Division of Public Health to use this regional comparison as “peer” for the purposes of our assessments (and related requirements). County data may not be available for some of the data parameters included in this report; in those cases state-level data is compared to US-level data or other standardized measures. Where appropriate and available, trend data has been used to show changes in indicators over time.

Environmental data was gathered from sources including: US Environmental Protection Agency; US Department of Agriculture, and NC Radon Program.

It is important to note that this report contains data retrieved **directly** from sources in the public domain. In some cases the data is very current; in other cases, while it may be the most current available, it may be several years old. Note also that the names of organizations, facilities, geographic places, etc. presented in the tables and graphs in this report are quoted exactly as they appear in the source data. In some cases these names may **not** be those in current or local usage; nevertheless they are used so readers may track a particular piece of information directly back to the source.

### **Data Definitions**

Reports of this type customarily employ a range of technical terms, some of which may be unfamiliar to many readers. This report defines technical terms within the section where each term is first encountered.

Health data, which composes a large proportion of the information included in this report, employs a series of very specific terms which are important to interpreting the significance of the data. While these technical health data terms are defined in the report at the appropriate time, there are some data caveats that should be applied from the onset.

### ***Error***

First, readers should note that there is some error associated with every health data source. Surveillance systems for communicable diseases and cancer diagnoses, for instance, rely on reports submitted by health care facilities across the state and are likely to miss a small number of cases, and mortality statistics are dependent on the primary cause of death listed on death certificates without consideration of co-occurring conditions.

### ***Age-adjusting***

Secondly, since much of the information included in this report relies on *mortality* data, it is important to recognize that many factors can affect the risk of death, including race, gender, occupation, education and income. The most significant factor is age, because an individual's risk of death inevitably increases with age. As a population ages, its collective risk of death increases; therefore, an older population will automatically have a higher overall death rate just because of its age distribution. At any one time some communities have higher proportions of “young” people, and other communities have a higher proportion of “old” people. In order to compare mortality data from one community with the same kind of data from another, it is necessary first to control for differences in the age composition of the communities being

compared. This is accomplished by *age-adjusting* the data. Age-adjustment is a statistical manipulation usually performed by the professionals responsible for collecting and cataloging health data, such as the staff of the NC State Center for Health Statistics (NC SCHS). It is not necessary to understand the nuances of age-adjustment to use this report. Suffice it to know that age-adjusted data are preferred for comparing most health data from one population or community to another and have been used in this report whenever available.

### **Rates**

Thirdly, it is most useful to use *rates* of occurrence to compare data. A rate converts a raw count of events (deaths, births, disease or accident occurrences, etc.) in a target population to a ratio representing the number of same events in a standard population, which removes the variability associated with the size of the sample. Each rate has its own standard denominator that must be specified (e.g., 1,000 women, 100,000 persons, 10,000 people in a particular age group, etc.) for that rate.

While rates help make data comparable, it should be noted that small numbers of events tend to yield rates that are highly unstable, since a small change in the raw count may translate to a large change in rate. To overcome rate instability, another convention typically used in the presentation of health statistics is *data aggregation*, which involves combining like data gathered over a multi-year period, usually three or five years. The practice of presenting data that are aggregated avoids the instability typically associated with using highly variable year-by-year data, especially for measures consisting of relatively few cases or events. The calculation is performed by dividing the sum number of cases or deaths in a population due to a particular cause over a period of years by the sum of the population size for each of the years in the same period. Health data for multiple years or multiple aggregate periods is included in this report wherever possible. Sometimes, however, even aggregating data is not sufficient, so the NC SCHS recommends that any rate based on fewer than 20 events—whether covering an aggregate period or not—be considered *unstable*. In fact, in some of its data sets the NC SCHS no longer calculates rates based on fewer than 20 events. To be sure that unstable data do not become the basis for local decision-making, this report will highlight and discuss primarily rates based on 20 or more events in a five-year aggregate period, or 10 or more events in a single year. Where exceptions occur, the text will highlight the potential instability of the rate being discussed.

### **Regional arithmetic mean**

Fourthly, sometimes in order to develop a representative regional composite figure from 16 separate county measures the consultants calculated a *regional arithmetic mean* by summing the available individual county measures and dividing by the number of counties providing those measures. It must be noted that when regional arithmetic means are calculated from *rates* the mean is not the same as a true average rate but rather an approximation of it. This is because most rates used in this report are age-adjusted, and the regional mean cannot be properly age-adjusted.

### ***Describing difference and change***

Fifthly, in describing differences in data of the same type from two populations or locations, or changes over time in the same kind of data from one population or location—both of which appear frequently in this report—it is useful to apply the concept of *percent* difference or change. While it is always possible to describe difference or change by the simple subtraction of a smaller number from a larger number, the result often is inadequate for describing and understanding the *scope* or *significance* of the difference or change. Converting the amount of difference or change to a percent takes into account the relative size of the numbers that are changing in a way that simple subtraction does not, and makes it easier to grasp the meaning of the change. For example, there may be a rate of for a type of event (e.g., death) that is one number one year and another number five years later. Suppose the earlier figure is 12.0 and the latter figure is 18.0. The simple mathematical difference between these rates is 6.0. Suppose also there is another set of rates that are 212.0 in one year and 218.0 five years later. The simple mathematical difference between these rates also is 6.0. But are these same simple numerical differences really of the same significance in both instances? In the first example, converting the 6 point difference to a percent yields a relative change factor of 50%; that is, the smaller number increased by half, a large fraction. In the second example, converting the 6 point difference to a percent yields a relative change factor of 2.8%; that is, the smaller number increased by a relatively small fraction. In these examples the application of percent makes it very clear that the difference in the first example is of far greater degree than the difference in the second example. This document uses percentage almost exclusively to describe and highlight degrees of difference and change, both positive (e.g., increase, larger than, etc.) and negative (e.g., decrease, smaller than, etc.)

### **Data limitations**

Some data that is used in this report may have inherent limitations, due to the sample size, its geographic focus, or its being out-of-date, for example, but it is used nevertheless because there is no better alternative. Whenever this kind of data is used, it will be accompanied by a warning about its limitations.

## **WNC Healthy Impact Survey (Primary Data)**

### **Survey Methodology**

#### ***Survey Instrument***

To supplement the secondary core dataset, meet additional stakeholder data needs, and hear from community members about their concerns and priorities, a community survey, *2012 WNC Healthy Impact Survey* (a.k.a. 2012 PRC Community Health Survey), was developed and implemented in 16 counties across western North Carolina. The survey instrument was developed by WNC Healthy Impact's data workgroup, consulting team, and local partners, with assistance from Professional Research Consultants, Inc. (PRC). Many of the questions are derived from the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS), as well as other public health surveys; other questions were developed specifically for WNC Healthy Impact to address particular issues of interest to

communities in western North Carolina. Each county was given the opportunity to include three additional questions of particular interest to their county, which were asked of their county's residents.

**Professional Research Consultants, Inc.**



The geographic area for the regional survey effort included 16 counties: Buncombe, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania and Yancey counties.

***Sample Approach & Design***

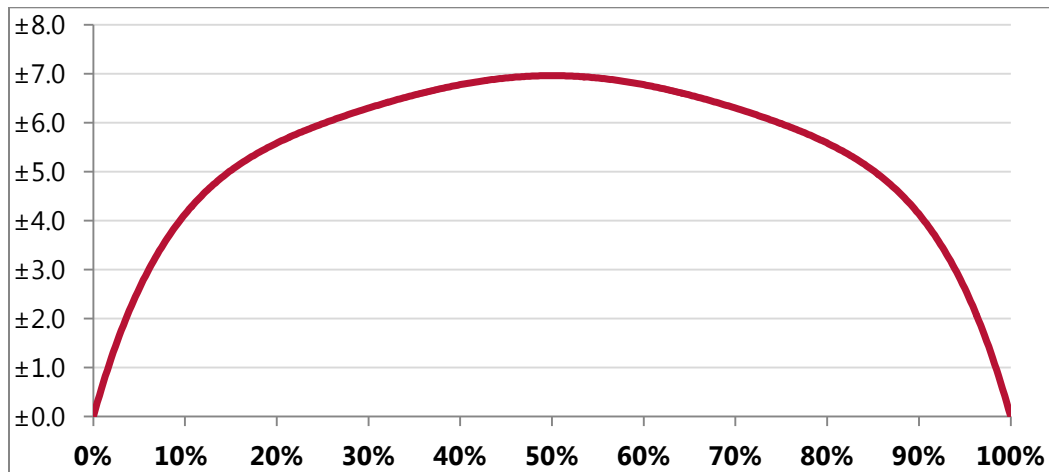
To ensure the best representation of the population surveyed, a telephone interview methodology (one that incorporates both landline and cell phone interviews) was employed. The primary advantages of telephone interviewing are timeliness, efficiency and random-selection capabilities.

The sample design used for this regional effort consisted of a stratified random sample of 3,300 individuals age 18 and older in Western North Carolina. Our county's sample size was 200. All administration of the surveys, data collection and data analysis was conducted by Professional Research Consultants, Inc. (PRC). The interviews were conducted in either English or Spanish, as preferred by respondents.

***Sampling Error***

For our county-level findings, the maximum error rate is  $\pm 6.9\%$ .

### Expected Error Ranges for a Sample of 200 Respondents at the 95 Percent Level of Confidence



Note: • The "response rate" (the percentage of a population giving a particular response) determines the error rate associated with that response. A "95 percent level of confidence" indicates that responses would fall within the expected error range on 95 out of 100 trials.

Examples:

- If 10% of the sample of 200 respondents answered a certain question with a "yes," it can be asserted that between 5.8% and 14.2% ( $10\% \pm 4.2\%$ ) of the total population would offer this response.
- If 50% of respondents said "yes," one could be certain with a 95 percent level of confidence that between 43.1% and 56.9% ( $50\% \pm 6.9\%$ ) of the total population would respond "yes" if asked this question.

### **Sample Characteristics**

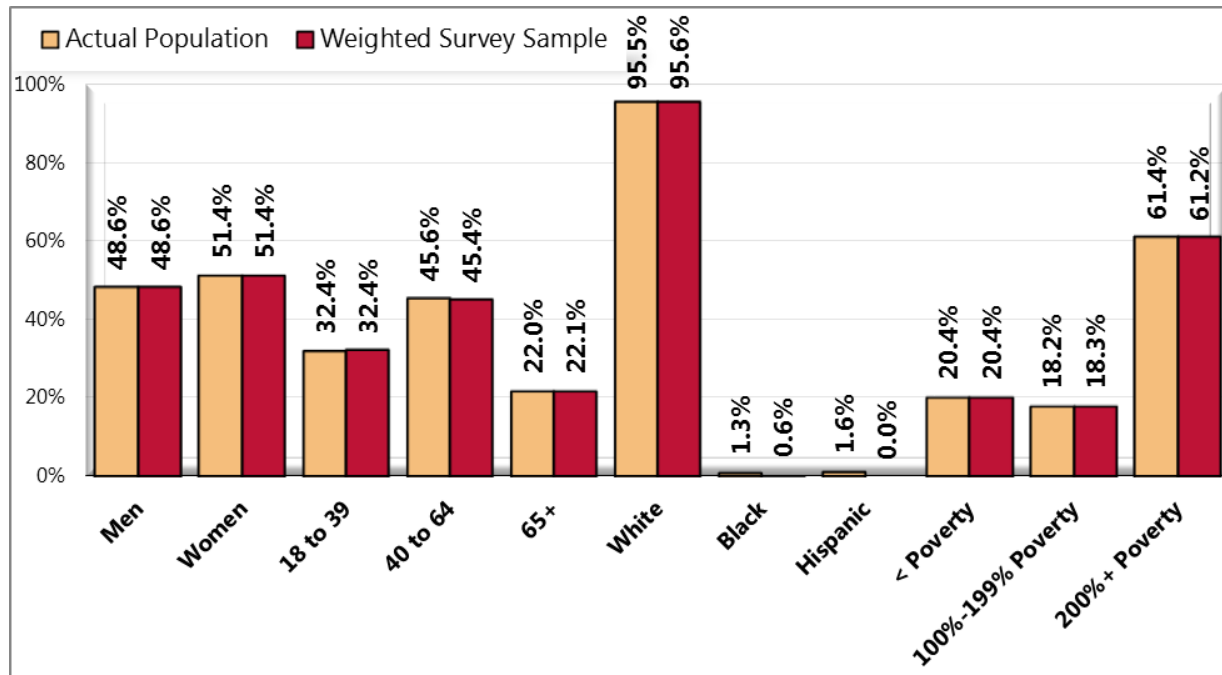
To accurately represent the population studied, PRC worked to minimize bias through application of a proven telephone methodology and random-selection techniques. And, while this random sampling of the population produces a highly representative sample, it is a common and preferred practice to "weight" the raw data to improve this representativeness even further. This is accomplished by adjusting the results of a random sample to match the geographic distribution and demographic characteristics of the population surveyed (poststratification), so as to eliminate any naturally occurring bias. Specifically, once the raw data are gathered, respondents are examined by key demographic characteristics (namely gender, age, race, ethnicity, and poverty status) and a statistical application package applies weighting variables that produce a sample which more closely matches the population for these characteristics. Thus, while the integrity of each individual's responses is maintained, one respondent's responses may contribute to the whole the same weight as, for example, 1.1 respondents. Another respondent, whose demographic characteristics may have been slightly oversampled, may contribute the same weight as 0.9 respondents. In order to determine WNC regional estimates, county responses were weighted in proportion to the actual population distribution so as to appropriately represent Western North Carolina as a whole.

The following chart outlines the characteristics of the survey sample for our county by key demographic variables, compared to actual population characteristics revealed in census data. Note that the sample consisted solely of area residents age 18 and older.



## Population & Sample Characteristics

(Madison County, 2012)



Sources: • Census 2010, Summary File 3 (SF 3). U.S. Census Bureau.

• 2012 PRC Community Health Survey, Professional Research Consultants, Inc.

Notes: • Hispanics can be of any race. Other race categories are non-Hispanic categorizations (e.g., "White" reflects non-Hispanic White respondents).

Poverty descriptions and segmentation used in this report are based on administrative poverty thresholds determined by the US Department of Health & Human Services. These guidelines define poverty status by household income level and number of persons in the household (e.g., *the 2012 guidelines place the poverty threshold for a family of four at \$23,050 annual household income or lower*). In sample segmentation: "very low income" refers to community members living in a household with defined poverty status; "low income" refers to households with incomes just above the poverty level, earning up to twice the poverty threshold; and "mid/high income" refers to those households living on incomes which are twice or more the federal poverty level.

The sample design and the quality control procedures used in the data collection ensure that the sample is representative. Thus, the findings may be generalized to the total population of community members in the defined area with a high degree of confidence.

### **Benchmark Data**

#### ***North Carolina Risk Factor Data***

Statewide risk factor data are provided where available as an additional benchmark against which to compare local survey findings; these data are reported in the most recent *BRFSS (Behavioral Risk Factor Surveillance System) Prevalence and Trend Data* published by the Centers for Disease Control and Prevention and the US Department of Health & Human Services.

### ***Nationwide Risk Factor Data***

Nationwide risk factor data, which are also provided in comparison charts where available, are taken from the *2011 PRC National Health Survey*; the methodological approach for the national study is identical to that employed in this assessment, and these data may be generalized to the US population with a high degree of confidence.

### ***Healthy People 2020***

Healthy People provides science-based, 10-year national objectives for improving the health of all Americans. The Healthy People initiative is grounded in the principle that setting national objectives and monitoring progress can motivate action. For three decades, Healthy People has established benchmarks and monitored progress over time in order to:

- Encourage collaborations across sectors.
- Guide individuals toward making informed health decisions.
- Measure the impact of prevention activities.



Healthy People 2020 is the product of an extensive stakeholder feedback process that is unparalleled in government and health. It integrates input from public health and prevention experts, a wide range of federal, state and local government officials, a consortium of more than 2,000 organizations, and perhaps most importantly, the public. More than 8,000 comments were considered in drafting a comprehensive set of Healthy People 2020 objectives.

### **Survey Administration**

#### ***Pilot Testing & Quality Assurance***

Before going into the field in the latter half of May, PRC piloted 30 interviews across the region with the finalized survey instrument. After this phase, PRC corrected any process errors that were found, and discussed with the consulting team any substantive issues that needed to be resolved before full implementation.

PRC's methods and survey administration comply with current research methods and industry standards. To maximize the reliability of research results and to minimize bias, PRC follows a number of clearly defined quality control protocols. PRC uses a telephone methodology for its community interviews, in which the respondent completes the questionnaire with a trained interviewer, not through an automated touch-tone process.

With more than 700 full- and part-time interviewers who work exclusively with healthcare and health assessment projects, PRC uses a state-of-the-art, automated CATI interviewing system that assures consistency in the research process. Furthermore, PRC maintains the resources to conduct all aspects of this project in-house from its headquarters in Omaha, Nebraska, assuring the highest level of quality control.

### ***Random-Digit Dialing***

PRC employs the latest CATI (computer-aided telephone interviewing) system technology in its interviewing facilities. The system PRC uses is a hybrid variation of a commercial application enhanced with internally developed software applications designed to specifically meet the needs of its health care client base. Since 1998 PRC has maintained, refined and developed proficiency in using this CATI system.

The CATI system automatically generates the daily sample for data collection using a random-digit dialing technique, retaining each telephone number until the Rules of Replacement (see description, below) are met. Up to five call attempts are made on different days and at different times to reach telephone numbers for which there is no answer. Systematic, unobtrusive electronic monitoring is conducted regularly by supervisors throughout the data collection phase of the project.

### ***Rules of Replacement***

Replacement means that no further attempts are made to connect to a particular number, and that a replacement number is drawn from the sample. To retain the randomness of the sample, telephone numbers drawn for the sample are not discarded and replaced except under very specific conditions.

### ***Minimizing Potential Error***

In any survey, there exists some degree of potential error. This may be characterized as sampling error (because the survey results are not based on a complete census of all potential respondents within the population) or non-sampling error (e.g., question wording, question sequencing, or through errors in data processing). Throughout the research effort, Professional Research Consultants makes every effort to minimize both sampling and non-sampling errors in order to assure the accuracy and generalizability of the results reported.

**Noncoverage Error.** One way to minimize any effects of underrepresentation of persons without telephones is through poststratification. In poststratification, the survey findings are weighted to key demographic characteristics, including gender, age, race/ethnicity and income.

**Sampling Error.** Sampling error occurs because estimates are based on only a sample of the population rather than on the entire population. Generating a random sample that is representative and of adequate size can help minimize sampling error. Sampling error, in this instance, is further minimized through the strict application of administration protocols. Poststratification, as mentioned above, is another means of minimizing sampling error.

**Measurement Error.** Measurement error occurs when responses to questions are unduly influenced by one or more factors. These may include question wording or order, or the interviewer's tone of voice or objectivity. Using a tested survey instrument minimizes errors associated with the questionnaire. Thorough and specific interviews also reduce possible errors.

The automated CATI system is designed to lessen the risk of human error in the coding and data entry of responses.

### **Information Gaps**

While this assessment is quite comprehensive, it cannot measure all possible aspects of health in the community, nor can it adequately represent all possible populations of interest. It must be recognized that these information gaps might in some ways limit the ability to assess all of the community's health needs.

For example, certain population groups (such as the homeless, institutionalized persons, or those who only speak a language other than English or Spanish) are not represented in the survey data. Other population groups (for example, pregnant women, lesbian/gay/bisexual/transgender residents, undocumented residents, and members of certain racial/ethnic or immigrant groups) might not be identifiable or might not be represented in numbers sufficient for independent analyses.

In terms of content, this assessment was designed to provide a comprehensive and broad picture of the health of the overall community. However, there are certainly a great number of medical conditions that are not specifically addressed.

### **Health Resource Inventory**

The health resource list was compiled using information from the Chamber of Commerce Guide as well as from 211.

## APPENDIX B - COMMUNITY HEALTH SURVEY INSTRUMENT

\*Double-click on the survey coversheet below to access the complete survey instrument. If you cannot access this, please contact your local health department for a copy.\*



Interviewed by \_\_\_\_\_ Date \_\_\_\_\_ ID# \_\_\_\_\_

2012-0615-02

### WESTERN NORTH CAROLINA 2012 Community Health Needs Assessment MASTER Asheville, North Carolina

Hello, this is \_\_\_\_\_ with Professional Research Consultants. We are conducting a survey to study ways to improve the health of your community.

(IF NECESSARY, READ:) Your number has been chosen randomly to be included in the study, and we'd like to ask some questions about things people do which may affect their health. Your answers will be kept completely confidential.

(IF Respondent seems suspicious, READ:) Some people we call want to know more before they answer the survey. If you would like more information regarding this research study, you can call '+chaname+' at '+chanumb+' during regular business hours.

*\*\*Note that this survey is for processing & reports only. It is not to be used for interviewing in its current form. The notes in this survey do not have supporting logic, and this survey did not receive the review that the individual child surveys received from quality assurance.\*\**

## **APPENDIX C - HEALTH RESOURCE INVENTORY**

### **Health Care Providers**

#### **Hot Springs Health Program, Inc.**

PO Box 69  
590 Medical Park Drive  
Marshall, NC 28753-0069

Robert Ford, Director  
(828) 649-3500

[info@hotspringshealth-nc.org](mailto:info@hotspringshealth-nc.org)

HSHP provides primary care to residents of Madison County via four Medical Centers/Pharmacies, Home Care and Hospice Services.

### **Nursing Facilities**

#### **Elderberry HealthCare**

415 Elderberry Lane  
[Marshall, North Carolina 28753](#)

(828) 649-9345

Skilled Nursing Facility

#### **Madison Health and Rehabilitation**

345 Manor Road  
Mars Hill, NC 28754

(828) 689-5200

[www.madisonmanorrehab.com](http://www.madisonmanorrehab.com)

Skilled Nursing Facility

**Mars Hill Retirement Center**

170 South Main Street  
Mars Hill, NC 28754

(828) 689-7970

[www.marshillretire.com](http://www.marshillretire.com)

Assisted Living Facility

**Dental Care Providers****Madison County Health Department Dental Center**

493B Medical Park Drive  
Marshall, NC 28753

Shelia McAbee, Office Manager  
(828) 649-1271

[www.madisoncountypublichealthnow.com](http://www.madisoncountypublichealthnow.com)

General Dentistry

**Steen & Snyder, Dentists**

831 South Main Street  
Mars Hill, NC 28754

(828) 689-4311

General Dentistry

**Robert M. Adams, DDS**

81 North Main Street  
PO Box 129  
Marshall, NC 28753

(828) 649-2621

General Dentistry

## **Public Transportation Systems**

### **Madison County Transportation**

MCTA (Madison County Transportation Authority)  
462 Long Branch Road  
Marshall, NC 28753

Rita Murray, Supervisor/Coordinator  
(828) 649-2219

## **Mental Health Care Providers**

### **RHA Behavioral Health Services**

140 Healthcare Lane  
Marshall, NC 28753

(828) 649-9174

[www.rhahealthservices.org](http://www.rhahealthservices.org)

RHA provides outpatient therapy, substance abuse services, prevention programming.

### **Madison Healing Center**

20 South Main Street  
Marshall, NC 28753

Meg Kelly, LCSW  
(828) 649-9361

### **Mars Hill Counseling Services**

PO Box 146  
15-A Mountain View Road  
Mars Hill, NC 28754

John Williams, M.Ed., LCAS, Director  
(828) 689-4600



**Families Together, Inc.**

Kyla Boyles

1-888-573-1006

Mobile Crisis Management Program

**Recreation Facilities****Mars Hill College**

100 Athletic Street  
Mars Hill, NC 28754

(866) 642-4968

[www.mhc.edu](http://www.mhc.edu)

**Madison County Wellness Center**

5738 US Highway 25/70  
Marshall, NC 28753

(828) 649-9276

**Social Services**

5707 U.S. Hwy 25/70, Unit D  
PO Box 219  
Marshall, NC 28753

Connie Harris, Director  
(828) 649-2711

**Senior Centers****Mars Hill**

67 North Main Street  
Mars Hill, NC 28754

Elaine Ball, Manager  
(828) 689-2911

**Spring Creek**

13077 NC HWY 209  
Hot Springs, NC 28743

Kathy Johnson, Manager  
(828) 622-7427

**Center Community Center**

1300 Grapevine Road  
Marshall, NC 28753

Kathy Roberts, Manager  
(828) 689-9021

**Hot Springs**

356 NW HWY 25/70  
Hot Springs, NC 28743

Mary Chandler, Manager  
(828) 622-7427

**Shelton Laurel**

4100 HWY 212  
Marshall, NC 28753

Norma Cutshall, Manager  
(828) 656-2759

**Marshall**

462 Long Branch Road  
Marshall, NC 28753

(828) 649-3587

**Beech Glen**

2936 Beech Glen Road  
Mars Hill, NC 28754

Hazel Roberts, Manager  
(828) 680-9525

**Upper Laurel**

281 Laurel Valley Road  
Mars Hill, NC 28754

Angela Fox, Manager  
(828) 680-9343

**Pharmacies****Ingles Market**

5580 Hwy. 25/70  
Marshall, NC 28753  
(828) 649-1636

**Ingles Market**

225 Carl Eller Rd  
Mars Hill, NC 28754  
828-689-5980

**CVS**

191 Carl Eller Road  
Mars Hill, NC 28754  
(828) 689-5757

[www.cvs.com](http://www.cvs.com)

**Madison Pharmacy**

4401 Us Highway 25/70  
Marshall, NC 28753  
(828) 649-1632

**Marshall Family Pharmacy**

115 US Highway 25/70  
Marshall, NC 28753-6448  
(828) 649-0682

[www.marshallfamilypharmacy.com](http://www.marshallfamilypharmacy.com)

**Mars Hill Pharmacy**

144 Mountain View Road  
Mars Hill, NC, 28754  
(828) 689 2667

[www.marshallpharmacy.net](http://www.marshallpharmacy.net)

**Hot Springs Medical Center Pharmacy**

66 N.W. Highway 25-70  
Hot Springs, NC 28743  
(828) 622-3245

**Laurel Medical Center Pharmacy**

80 Guntertown Road  
Marshall, NC 28753  
(828) 656-2611

**Mars Hill Medical Center Pharmacy**

119 Mountain View Road  
Mars Hill, NC 28754  
(828) 689-3507

**Mashburn Medical Center Pharmacy**

590 Medical Park Drive  
Marshall, NC 28753  
(828) 649-3500

**Other****CRC, Madison County****In Home Services/Respite Care****Department of Community Services**

462 Long Branch Road  
Marshall, NC 28753  
(828) 649-2722

**Emergency Assistance****Beacon of Hope Services**

120 Calvary Drive  
Marshall, NC 28753  
(828) 649-3470

**Neighbors In Need**  
165 South Main Street  
Marshall, NC 28753  
(828) 689-8372