

# Madison County 2015 Community Health Assessment

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1/11/2016



# MADISON COUNTY COMMUNITY HEALTH ASSESSMENT

## ACKNOWLEDGEMENTS

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# MADISON COUNTY 2015 CHA EXECUTIVE SUMMARY

## 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 health and determine the availability of resources 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.

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 the 2015 local level assessment process.

As part of WNC Healthy Impact, the consulting team compiled a core set of secondary data for Madison County. This data was then compared to the data collected in the 2012 assessment to look for similarities and differences.

Primary data was also collected in a community survey via telephone. 200 community members completed the random-sample survey. In addition, to solicit input from key informants who have a broad interest in the health of the community, a key informant online survey was also implemented. A total of 32 community stakeholders took part in the survey.

The Madison County Health Department, Madison Community Health Consortium, and the Madison County community was engaged in the health assessment process via local data interpretation and priority setting.

## Data Summary

### **Community**

The natural beauty of Madison County is one of its greatest assets. 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.

In addition to the natural beauty, Madison County is defined by its rural nature. 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. There are three municipalities located in the county; Mars Hill, Marshall, and Hot Springs.

Poverty issues are a concern for this rural, mountainous county. The percentage of people with incomes below the poverty level in Madison County was 17.3% (US Census). More than 64% of children attending school receive free or reduced meals.

Madison County has long been a county of many family farms where burley tobacco has been the major crop. The number of tobacco farms has dropped significantly from 3,255 farms in 1993 to 12 farms in 2012 generating a little under 1 million dollars in revenue. Madison County was the number one producer of burley tobacco in the state of North Carolina for about 100 years. However, reliance on tobacco production has decreased as local farmers explore new alternatives to farming in Madison County.

As of 2010, there were 20,764 people living in Madison County. There were more than 8000 households in the county. The county is predominantly Caucasian (96.5%) while small percentages of the population are Black, American Indian, Hispanic and Asian. Males comprise 49% of the population while females total 51%. Nearly 18% of the population in Madison County in 2010 was 65 years of age and older. By 2030 projections estimate there will be more than 6,200 persons age 65+ in Madison County, roughly 29% of total population in the county. (US Census)

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.

Assets include a wide range of civic groups, such as the Rotary Club and the Lion's Club that are active in the county. Local community centers provide opportunities for neighbors to convene for meals and activities. The local fire departments receive much volunteer support from auxiliary groups in the community. There are at least 100 churches in the county with the majority being Baptist affiliations.

### **Health Outcomes**

Some areas have shown improvement since our 2012 assessment.

- Substantiated reports of child abuse have decreased on average since 2006.
- Between 2006 and 2013, the number of residents served annually by the Area Mental Health Program increased overall.
- Over an 8-year period the number of residents served annually in State Psychiatric Hospitals decreased.
- Between the 2012 and 2015 assessment periods there was improvement in mortality rates for four of the nine leading causes of death, with the largest improvement being cancer.

Other areas have emerged as issues to watch.

- From 2009-2013, over half of grandparents living with their minor-aged grandchildren also were financially responsible for them.
- Mortality attributable to heart disease, chronic lower respiratory disease, stroke, Alzheimer's disease and kidney disease increased in the past three years.

## **Populations at risk**

While Americans as a group are healthier and living longer, segments of the population continue to suffer poor health status. Within Madison County, health disparate groups include the unemployed, the uninsured/underinsured, the aging population and those without a high school education.

## **Health Priorities**

During the 2015 Community Health Assessment process WNC Healthy Impact assisted with gathering both primary and secondary data via various sources including a phone and key informant survey. This data was then reviewed locally by the CHA team to identify areas of significance. The following criteria was used for reviewing data; indicator not trending in the desired direction, indicator notably different from WNC or NC, health disparities, and significant/emerging community concern. The CHA team was able to identify nine areas of concern. These nine areas were then prioritized to 6 and then to 3 by using a ranking tool in which each member of the Madison Community Health Consortium ranked the areas based on relevance, impact fullness, and feasibility. The three priority areas for 2015 are:

### **Health Priority 1**

Substance Use

### **Health Priority 2**

Mental Health

### **Health Priority 3**

Healthy Weight

## **Next Steps**

The 2015 Madison Community Health Assessment will be shared with the Madison County Board of Health and Board of Commissioners. The report will also be available on the health department website, the WNC Healthy Impact website, and in the public libraries. The Madison Community Health Consortium 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 three years.

# CHAPTER 1 – COMMUNITY HEALTH ASSESSMENT PROCESS

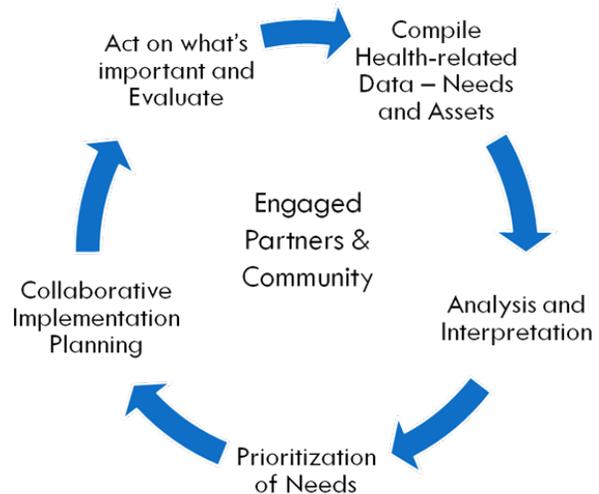
## Purpose

Community health assessment (CHA) is an important part of improving and promoting the health of county residents. **Community-health assessment is a key step in the ongoing community health improvement process.**

A community health assessment (CHA), which is both a process and a product, investigates and describes the current health indicators and status of the community, what has changed, and what still needs to change to reach a community's desired health-related results.

## Definition of Community

Community is defined as "county" for the purposes of the North Carolina Community Health Assessment Process. Madison county is included in Mission Hospitals community for the purposes of community health improvement, and as such they were key partner in this local level assessment.



## WNC Healthy Impact

WNC Healthy Impact is a partnership between hospitals and health departments in western 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 [www.WNCHealthyImpact.com](http://www.WNCHealthyImpact.com). Our county and partner hospitals are involved in this regional/local vision and collaboration. Participating counties include: Buncombe, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania and Yancey.

## Data Collection

The set of data reviewed for our community health assessment process is comprehensive, though not all of it is presented in this document. Within this community health assessment product we share a general overview of health and influencing factors then focus more on priority health issues identified through this collaborative process. Our assessment also highlights some of our community strengths and resources available to help address our most pressing issues.

## **Core Dataset Collection**

The data reviewed as part of our community's health assessment came from the WNC Healthy Impact regional core set of data and additional local data compiled and reviewed by our local CHA team. WNC Healthy Impact's core regional dataset includes secondary (existing) and primary (newly collected) data compiled to reflect a comprehensive look at health. The following data set elements and collection are supported by WNC Healthy Impact data consulting team, a survey vendor, and partner data needs and input:

- A comprehensive set of publically available secondary data metrics with our county compared to the sixteen county WNC region as "peer"
- Set of maps accessed from Community Commons and NC Center for Health Statistics
- Telephone survey of a random sample of adults in the county
- Email key-informant survey

See [Appendix A](#) for details on the regional data collection methodology.

## **Health Resources Inventory**

An inventory of available resources of our community was conducted through reviewing a subset of existing resources currently listed in the 2-1-1 database for our county as well as working with partners to fill in additional information. Where gaps were identified, we partnered with 2-1-1 to fill in or update this information when applicable. See [Chapter 7](#) for more details related to this process.

## **Community Input & Engagement**

Including input from the community is an important element of the community health assessment process. Our county included community input and engagement in a number a ways:

- Partnership on conducting the health assessment process
- Through primary data collection efforts (survey and key informant interviews)
- In the identification and prioritization of health issues

In addition, community engagement is an ongoing focus for our community and partners as we move forward to the collaborative action planning phase of the community health improvement process. Partners and stakeholders with current efforts or interest related to priority health issues will continue to be engaged. We also plan to work together with our partners to help assure programs and strategies in our community are developed and implemented with community members and partners.

## **At-Risk & Vulnerable Populations**

Throughout our community health assessment process and product, our team was focused on understanding general health status and related factors for the entire population of our county as well as the groups particularly at risk for health disparities or adverse health outcomes. In particular, for the purposes of the overall community health assessment, we aimed to understand variability in health outcomes and access of medically underserved, low-income, minority, and others experiencing health disparities.

## CHAPTER 2 – MADISON COUNTY

### Location and Geography

Madison County offers 288,800 scenic acres (452 square miles) of beautiful mountains and fertile valleys. With whitewater rafting, snow skiing, snow tubing, 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. 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.

There are three municipalities located in the county: Mars Hill, Marshall, the county seat, and Hot Springs.

Mars Hill is home to Mars Hill University which is one of the few universities 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.

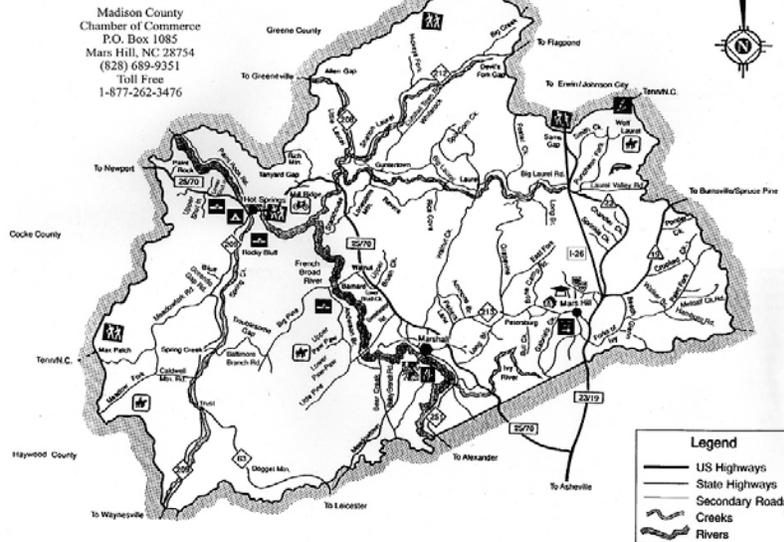
The county seat of Marshall is experiencing a revitalization effort that has led to extensive renovations of old buildings and a greater appreciation for the uniqueness of its architecture. The Madison County Arts Council sponsors many programs and events throughout the year. Buildings that housed Marshall 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 three elementary schools, one middle school, high school, and early college. There are approximately 2600 students in the school system. Mars Hill University, a private Liberal Arts University, was founded in 1856. The university has reorganized into three schools: Education and Leadership; Business and Community Service; and Arts and Science. In 2015 the RN to BSN program was added with the traditional BSN program beginning in Fall 2016. The Madison Campus of Asheville-Buncombe Technical Community College, located in Marshall, offers training in tailored trade and technical classes, and industrial training.

## MADISON COUNTY

### North Carolina



## 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 University was founded in 1856 and sits on its original site. The university'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.

### General Population Characteristics 2010 US Census

County	Total Population (2010)	% Males	% Females	Median Age*	% Under 5 Years Old	% 5-19 Years Old	% 20 - 64 Years Old	% 65 Years and Older
Madison	20,764	49.5	50.5	43.3	4.5	18.7	59.1	17.7
WNC (Regional) Total	759,727	48.5	51.5	44.7	n/a	n/a	n/a	n/a
State Total	9,535,483	48.7	51.3	37.4	6.6	20.2	60.2	12.9

The Madison County population has a slightly higher proportion of females than males. The median age of (43.3 years) is 1.4 years “younger” than WNC regional average but 5.9 years “older” than the NC average. Madison County has lower proportions of “younger persons” and higher proportions of the “older persons” than NC as a whole.

### POPULATION DISTRIBUTION BY RACE/ETHNICITY 2010 US CENSUS

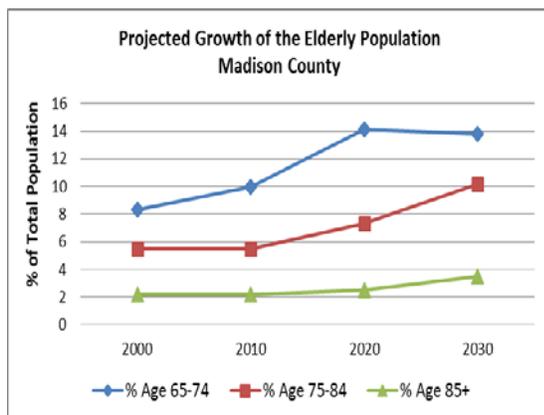
County	Total Population (2010)	White	Black or African American	American Indian, Alaskan Native	Asian	Native Hawaiian, Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any race)
		%	%	%	%	%	%	%	%
Madison	20,764	96.5	1.2	0.2	0.3	0.0	0.5	1.3	2.0
WNC (Regional) Total	759,727	89.3	4.2	1.5	0.7	0.1	2.5	1.8	5.4
State Total	9,535,483	68.5	21.5	1.3	2.2	0.1	4.3	2.2	8.4

Madison County has significantly lower proportions of all minority racial and ethnic groups than the WNC region and NC as a whole.

PERCENT POPULATION GROWTH			
DECADE	MADISON COUNTY	WNC REGION	STATE OF NC
2000-2010	5.4	13.0	15.6
2010-2020	5.3	6.7	10.7
2020-2030	3.2	6.1	9.5

Sources: US Census Bureau and NC Office of State Budget and Management

The modest rate of growth in Madison County is expected to slow over the next two decades, to a rate lowest among comparators by 2030.



Sources: US Census Bureau and NC Office of State Budget and Management

The population in each major age group age 65 and older in Madison County will increase between 2010 and 2030. The proportion of the population age 75-84 will increase by 85%, and the population age 85 and older will increase by 59%, in the period 2010-2030.

By 2030 projections estimate that there will be more than 6,200 persons age 65+ in Madison County.

## CHAPTER 3 – A HEALTHY MADISON

### Elements of a Healthy Community

When key informants were asked to describe what elements they felt contributed to a health community in our county, they reported:

- Quality Health Care
- Access to Health Care
- Affordable Health Care
- Good Education
- Access to Preventative Health Care

During our collaborative action planning efforts and next steps, we will further explore these concepts and the results our community has in mind.

### Community Assets

We also asked key informants to share some of the assets or “gems” they thought were important in our community. They shared the following information and ideas:

- Natural Environment
- Sense of Community
- People
- Low Key Living
- Safe Place to Live

Strong sense of community and  
collaboration across sectors...  
Community/Business Leader

## CHAPTER 4 – SOCIAL & ECONOMIC FACTORS

### Income

Income allows families and individuals to purchase health insurance and medical care, but also provides options for healthy lifestyle choices. Poor families and individuals are most likely to live in unsafe homes and neighborhoods, often with limited access to healthy foods, employment options, and quality schools.

Adults in the highest income brackets are healthier than those in the middle class and will live, on average, more than six years longer than those with the lowest incomes.

The ongoing stress and challenges associated with poverty can lead to health damage, both physical and mental. Chronic illness is more likely to affect those with the lowest incomes, and children in low income families are sicker than their high income counterparts. Low income mothers are more likely than higher income mothers to have pre-term or low birth weight babies, who are at higher risk for chronic diseases and behavioral problems.

Income inequality is a measure of the divide between the poor and the affluent. Income inequality in our communities affects how long and how well we live and is particularly harmful to the health of poorer individuals. Income inequality within US communities can have broad health impacts, including increased risk of mortality, poor health, and increased cardiovascular disease risks.

Source: County Health Rankings, <http://www.countyhealthrankings.org/our-approach/health-factors/income>

In Madison County:

2009-2013 Median Household Income = \$38,598

up \$18 since 2006-2010

\$289 below WNC average

\$7,736 below NC average

Source: US Census Bureau

Economy/unemployment was one of the top three county issues in most need of improvement.

Source: 2015 PRC Community Health Survey

## Employment

Work provides not only income, but also benefits such as health insurance, paid sick leave, and workplace wellness programs that, together, support opportunities for healthy choices.

These opportunities, however, are greater for higher wage earners - usually those with more education. The estimated 10 million workers who are part of the "working poor" face many challenges: they are less likely to have health insurance and access to preventive care than those with higher incomes, and are more likely to work in hazardous jobs. Working poor parents may not be able to afford quality child care, and often, lack paid leave to care for their families and themselves.

Those who are unemployed face even greater challenges to health and well-being, including lost income and, often, health insurance. Racial and ethnic minorities and those with less education, often already at-risk for poor health outcomes, are most likely to be unemployed.

Source: County Health Rankings, <http://www.countyhealthrankings.org/our-approach/health-factors/employment>

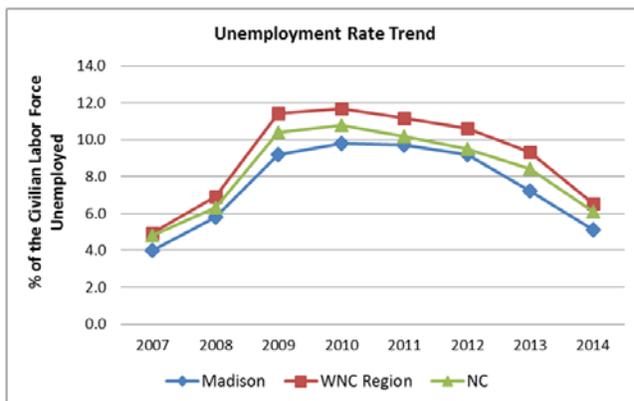
As of 2013, the three employment sectors in Madison County with the largest proportions of workers (and average weekly wages) were:

Educational Services: 22.93% of workforce (\$599)

Health Care and Social Assistance: 15.40% of workforce (\$520)

Public Administration: 12.53% of workforce (\$611).

Source: NC Employment Security Commission



Source: NC Department of Commerce

## Education

More schooling is linked to higher incomes, better employment options, and increased social supports that, together, support opportunities for healthier choices.

Higher levels of education can lead to a greater sense of control over one's life, which is linked to better health, healthier lifestyle decisions, and fewer chronic conditions. Education is also connected to lifespan: on average, college graduates live nine more years than high school dropouts.

Parental education is linked to children's health and educational attainment. Stress and poor health early in life, common among those whose parents have lower levels of education, is linked to decreased cognitive development, increased tobacco and drug use, and a higher risk of cardiovascular disease, diabetes, depression, and other conditions.

Source: County Health Rankings, <http://www.countyhealthrankings.org/our-approach/health-factors/education>

Compared to the WNC Region average, Madison County has:

7% *higher* percentage of persons in the population over age 25 having only a high school diploma or equivalent (2009-2013 Estimate)

12% *lower* percentage of persons in the population over age 25 having a Bachelor's degree or higher (2009-2013 Estimate)

4% *lower* overall HS graduation rate (for 4-year cohort of 9<sup>th</sup> graders entering school in SY 2010-2011 and graduating in SY2013-2014 or earlier)

Sources: US Census Bureau and Public Schools of North Carolina

Education was one of the top three county issues in most need of improvement. Source: 2015 PRC Community Health Survey

## Community Safety

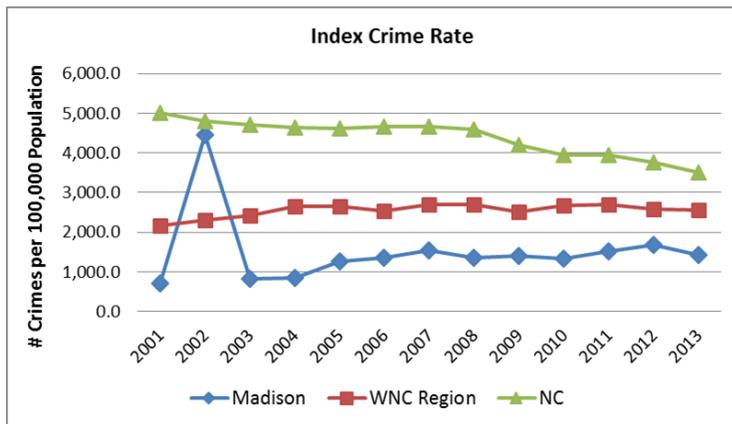
Community safety reflects not only violent acts in neighborhoods and homes, but also injuries caused unintentionally through accidents.

In 2013, more than 6.1 million violent crimes such as assault, robbery, and rape, were committed. Each year, 18,000 children and adults are victims of homicide and more than 1,700 children die from abuse or neglect. Children in unsafe circumstances can suffer post-traumatic stress disorder and the

chronic stress associated with living in unsafe neighborhoods can accelerate aging and harm health. Unsafe neighborhoods can cause anxiety, depression, and stress, and are linked to higher rates of pre-term births and low birth weight babies, even when income is accounted for. Fear of violence can keep people indoors, away from neighbors, exercise, and healthy foods. Companies may be less willing to invest in unsafe neighborhoods, making jobs harder to find.

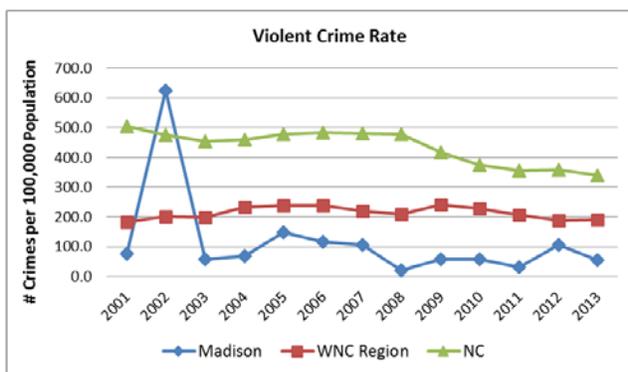
Source: County Health Rankings, <http://www.countyhealthrankings.org/our-approach/health-factors/community-safety>

Index crime is the sum of all violent and property crime. The index crime rate in Madison County was lowest among comparators throughout the period cited except for 2002.



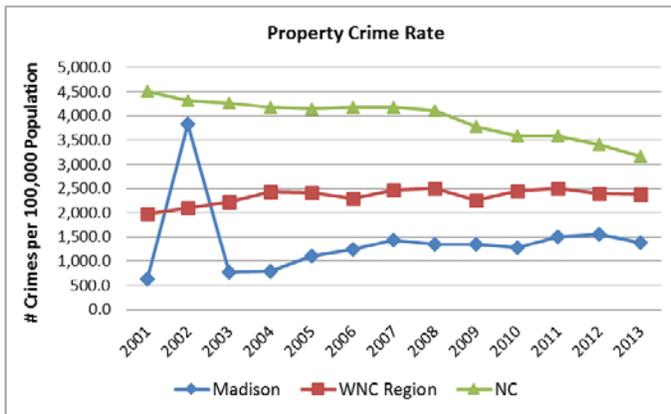
Source: NC Department of Justice

Violent crime includes murder, forcible rape, robbery, and aggravated assault. The violent crime rate in Madison County was lowest among comparators throughout the period cited except for 2002, when the local rate was the highest.



Source: NC Department of Justice

Property crime includes burglary, arson, and motor vehicle theft. The property crime rate in Madison County was lowest among comparators throughout the period cited except for 2002.



Source: NC Department of Justice

In FY2013-2014, 155 persons in Madison County were identified as victims of sexual assault.

The single most frequently reported specific type of sexual assault in Madison County during the period was adult survivor of child sexual assault (28%). Regionally, the most frequently reported type was adult survivor of child sexual assault (23%); statewide the most frequently reported type was child sexual offense (26%).

State-wide and region-wide the most commonly reported offender was a relative. In Madison County as well the most common offender was a relative. Source: NC Department of Administration, Council for Women

## Housing

Housing structures can protect us from extreme weather and provide safe environments for families and individuals to live, learn, grow, and form social bonds. However, houses and apartments can also be unhealthy or unsafe environments.

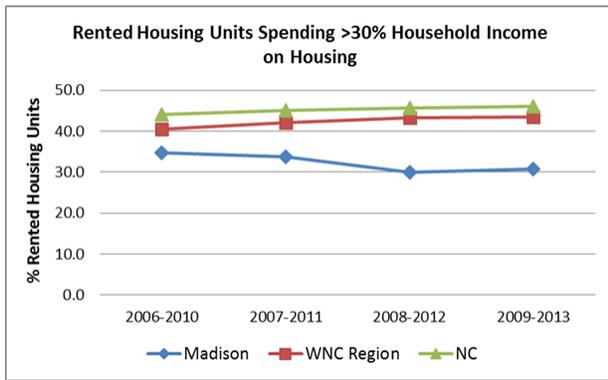
Housing is also a substantial expense, reflecting the largest single monthly expenditure for many individuals and families. Quality housing is not affordable for everyone, and those with lower incomes are most likely to live in unhealthy, overcrowded, or unsafe housing conditions.

Source: County Health Rankings, <http://www.countyhealthrankings.org/our-approach/health-factors/housing-transit>

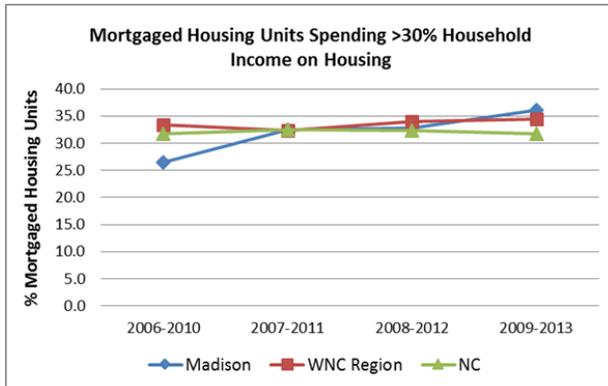
One measure of economic burden in a community is the percent of housing units spending more than 30% of household income on housing.

In Madison County in 2009-2013, a smaller proportion of renters but a higher proportion of mortgage holders spent >30% of household income on housing than the WNC or NC average.

The proportion of Madison County mortgagees spending above the 30% threshold increased 37% between 2006-2009 and 2009-2013.



Source: US Census Bureau



Source: US Census Bureau

## Family & Social Support

Social support stems from relationships with family members, friends, colleagues, and acquaintances. Social capital refers to the features of society that facilitate cooperation for mutual benefit, such as interpersonal trust and civic associations. Individual social support and cohesive, capital-rich communities help to protect physical and mental health and facilitate healthy behaviors and choices.

Socially isolated individuals have an increased risk for poor health outcomes. Individuals who lack adequate social support are particularly vulnerable to the effects of stress, which has been linked to cardiovascular disease and unhealthy behaviors such as overeating and smoking in adults, and obesity in children and adolescents.

Residents of neighborhoods with low social capital are more likely to rate their health status as fair or poor than residents of neighborhoods with more social capital, and may be more likely to suffer anxiety and depression. Neighborhoods with lower social capital may be more prone to violence than those with more social capital and often have limited community resources and role models. Socially isolated individuals are more likely to be concentrated in communities with limited social capital.

Individuals with higher educational attainment and higher status jobs are more likely to have greater social support than those with less education and lower incomes. Adults and children in single-parent households, often at-risk for social isolation, have an increased risk for illness, mental health problems and mortality, and are more likely to engage in unhealthy behaviors than their counterparts.

Source: County Health Rankings, <http://www.countyhealthrankings.org/our-approach/health-factors/family-and-social-support>

“Always” or “Usually” Get Needed Social/Emotional Support  
 (“Always” and “Usually” Responses; Madison County)

2012 Madison 75.5% WNC 80.6%  
 2015 Madison 83.1% WNC 79.3%

Source: PRC Community Survey

In the 5-year period from 2009-2013, an estimated 253 Madison County grandparents living with their minor-aged grandchildren also were financially responsible for them.

Over the same period there were an estimated 8,207 households in Madison County, 1,951 of them with children under 18 years of age.

Among the households with minor-age children, 68% were headed by a married couple. An additional 22% were headed by a female single parent, and 10% were headed by a male single parent.

#### Minor-Age Children Living with Grandparents and in Single-Parent Households, 2009-2013

County	# Grandparents Living with Own Grandchildren (<18 Years)	Grandparent Responsible for Grandchildren (under 18 years)*		# 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. #	%**	Est. #	%**
Madison	494	253	51.2	8,207	1,330	16.2	201	2.4	420	5.1
WNC (Regional) Total	15,007	8,142	54.3	316,799	49,395	15.6	6,133	1.9	17,711	5.6
State Total	206,632	100,422	48.6	3,715,565	706,106	19.0	84,199	2.3	293,665	7.9

Source: US Census Bureau

## CHAPTER 5 – HEALTH DATA FINDINGS SUMMARY

### Mortality

People in Madison County have lower mortality than the population statewide only for cancer among the nine leading causes of death for which there are stable county rates.

- **Color**
  - **Red** indicates a “worse than” or negative difference
  - **Green** indicates a “better than” or positive difference

#### ***Leading Causes of Death: Overall***

<b>Age-Adjusted Rates (2009-2013)</b>	<b>Madison No. of Deaths</b>	<b>Madison Mortality Rate</b>	<b>Rate Difference from NC</b>
1. Diseases of the Heart	268	189.9	<b>+11.7%</b>
2. Cancer	210	143.8	<b>-17.0%</b>
3. Chronic Lower Respiratory Disease	84	59.5	<b>+29.1%</b>
4. Cerebrovascular Disease	73	50.8	<b>+16.2%</b>
5. Alzheimer’s Disease	47	32.6	<b>+12.8%</b>
6. All Other Unintentional Injuries	39	31.7	<b>+8.2%</b>
7. Pneumonia and Influenza	31	22.3	<b>+24.6%</b>
8. Nephritis, Nephrotic Syndrome, Nephrosis	27	20.2	<b>+14.8%</b>
9. Suicide	18	16.0	<b>+31.1%</b>
10. Septicemia	20	14.3	<b>+3.6%</b>
11. Diabetes Mellitus	18	12.5	<b>-42.4%</b>
12. Unintentional Motor Vehicle Injuries	11	12.1	<b>-11.7%</b>
13. Chronic Liver Disease and Cirrhosis	18	10.9	<b>+14.7%</b>
14. Homicide	5	5.1	<b>-12.1%</b>
15. AIDS	1	0.9	<b>-79.3%</b>

Source: NC State Center for Health Statistics

*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. For persons born in 2011-2013, life expectancy among comparator jurisdictions is longest overall and among men, women, and white persons in Madison County. Life expectancy for African Americans is longest in NC as a whole.

### Life Expectancy at Birth for Persons Born in 2011-2013

County	Overall	Sex		Race	
		Male	Female	White	African-American
Madison	79.1	76.5	81.6	78.9	n/a
WNC (Regional) Arithmetic Mean	77.7	75.3	80.2	77.9	75.2
State Total	78.2	75.7	80.6	78.8	75.9

Source: NC State Center for Health Statistics

Between the 2012 and 2015 assessment periods there was improvement in mortality rates for four of the nine leading causes of death in Madison County for which there were stable county rates. Mortality attributable to heart disease, CLRD, stroke, Alzheimer's disease and kidney disease increased in the past three years.

- **Color**
  - **Red** indicates a "worse than" or negative difference
  - **Green** indicates a "better than" or positive difference

#### ***Leading Causes of Death: Time Comparison***

Madison County Rank by Descending Overall Age-Adjusted Rate (2009-2013)-	Rank 2006-2010	Rank Change 2006-2010 to 2009-2013	% Rate Change 2006-2010 to 2009-2013
1. Diseases of the Heart	2	+1	<b>+5.5%</b>
2. Cancer	1	-1	<b>-26.1%</b>
3. Chronic Lower Respiratory Disease	3	nc	<b>+5.5%</b>
4. Cerebrovascular Disease	4	nc	<b>+4.1%</b>
5. Alzheimer's Disease	6	+1	<b>+21.2%</b>
6. All Other Unintentional Injuries	5	-1	<b>-7.6%</b>
7. Pneumonia and Influenza	7	nc	<b>-15.8%</b>
8. Nephritis, Nephrotic Syndrome, Nephrosis	10	+2	<b>+17.4%</b>
9. Suicide	12	+3	<b>n/a</b>
10. Septicemia	9	-1	<b>-25.1%</b>
11. Diabetes Mellitus	11	nc	<b>-17.2%</b>
12. Unintentional Motor Vehicle Injuries	8	-4	<b>-41.0%</b>
13. Chronic Liver Disease and Cirrhosis	13	nc	<b>n/a</b>
14. Homicide	14	nc	<b>n/a</b>
15. AIDS	12	nc	<b>n/a</b>

Source: Sheila Pfaender, Public Health Consultant; based on data from NC State Center for Health Statistics

Madison County mortality rates have decreased over time for three of the four major site-specific cancers, but increased for colorectal cancer.

Incidence rates have increased for breast cancer and colorectal cancer. Both of these site-specific cancers are subjects for periodic community screening efforts and therefore increased surveillance may be contributing to increases in incidence.

**Site-Specific Cancer Trends**  
**Madison County**  
**Incidence: 1999-2003 to 2008-2012**  
**Mortality: 2002-2006 to 2009-2013**

<b>Cancer Site</b>	<b>Parameter</b>	<b>Overall Trend Direction</b>
Lung Cancer	Incidence	▼
	Mortality	▼
Prostate Cancer	Incidence	▼
	Mortality	▼
Breast Cancer	Incidence	▲
	Mortality	▼
Colorectal Cancer	Incidence	▲
	Mortality	▲

Source: Sheila Pfaender, Public Health Consultant; based on data from NC State Center for Health Statistics

**Health Status & Behaviors**

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:

<b>Health Outcomes – Mortality</b>	<b>Social and Economic Factors</b>
<b>Premature death</b>	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 birth weight	Children in single-parent households
<b>Health Factors</b>	Violent crime rate
Health Behaviors	<b>Physical Environment</b>
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	
<b>Clinical Care</b>	
Uninsured	
Primary care physicians	
Preventable hospital stays	
Diabetic screening	
Mammography screening	

According to *County Health Rankings* (2014) for NC, Madison County was ranked 38<sup>th</sup> overall among the 100 NC counties.

Madison County health outcomes rankings out of 100 (where 1 is best):

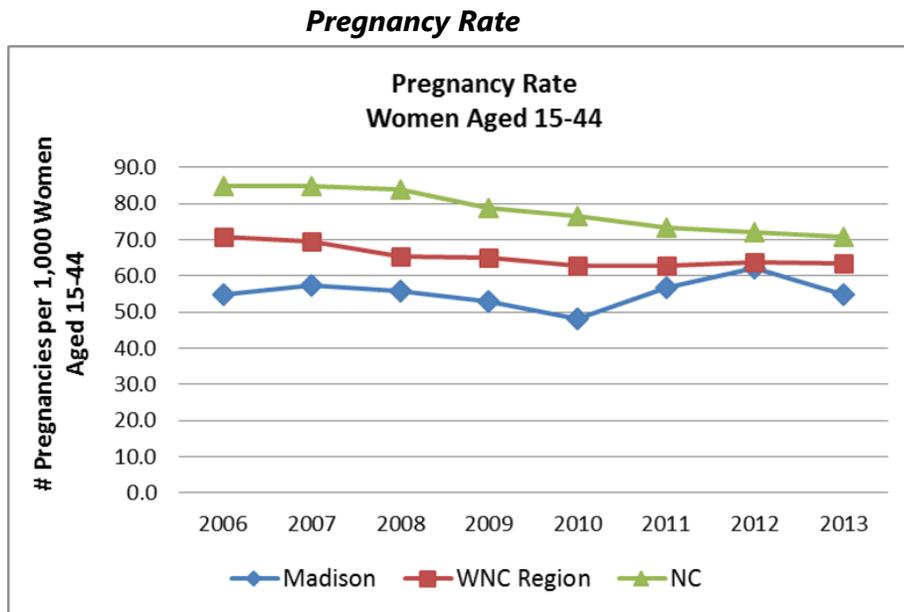
- 33<sup>rd</sup> in length of life
- 54<sup>th</sup> for quality of life

Madison County **health factors** rankings out of 100 (where 1 is best):

- 31<sup>st</sup> for health behaviors
- 34<sup>th</sup> for clinical care
- 24<sup>th</sup> for social and economic factors
- 86<sup>th</sup> for physical environment

The total pregnancy rates in WNC and NC have fallen overall since 2007, but appear to have stabilized recently.

The total pregnancy rate in Madison County was more variable, first falling then rising briefly before falling again. This may be attributed to the growing older population and the decreasing younger population in the county.



Source: NC State Center for Health Statistics

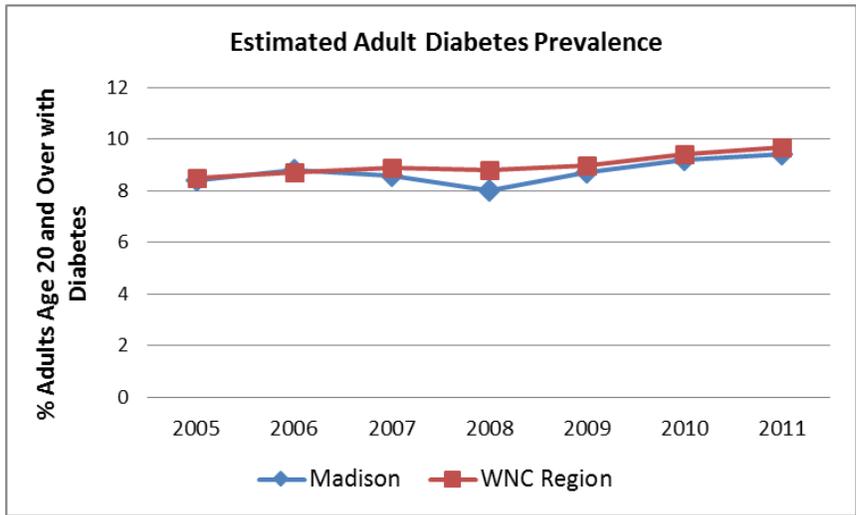
Madison County can boast higher percentages of early prenatal care than its comparators in every period cited (2005-2013) except 2011 and falling low birth rates.

Source: NC State Center for Health Statistics, Baby Book

However, the infant mortality rate in Madison County appears to be increasing. It should be noted, however, that all infant mortality rates in Madison County are unstable, based on small and varying numbers of events.

Source: NC State Center for Health Statistics

The average self-reported prevalence of Madison County adults with diabetes was 8.7% in the period from 2005 - 2011. Over the same period the WNC average was 9.0%. Prevalence of self-reported adult diabetes has been rising over time in both WNC and Madison County.

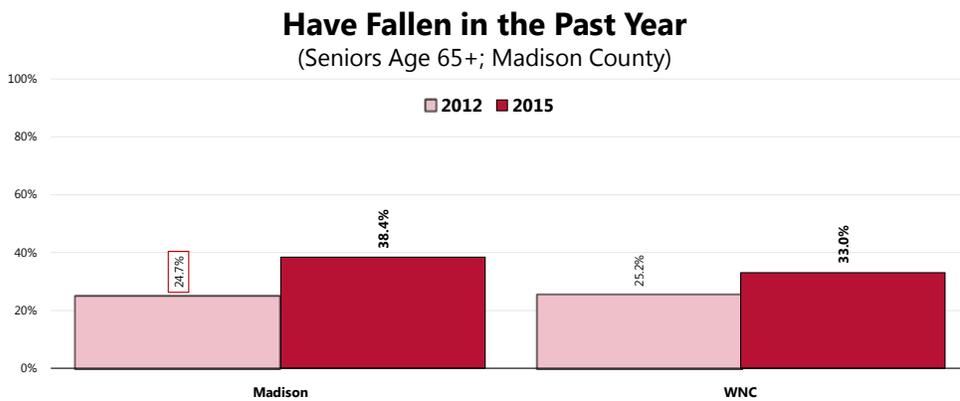


Source: Centers for Disease Control and Prevention, via BRFSS

From 2011 through 2013, 12 Madison County residents died as a result of an unintentional fall. Of the 12 fall-related deaths, 11 (92%) occurred in the population age 65 and older and 5 (42%) occurred in the population age 85 and older.

Source: NC State Center for Health Statistics

In addition, 38.4% of Madison County Seniors age 65 and older stated they had fallen in the past 12 months.



Sources: PRC Community Health Surveys, Professional Research Consultants, Inc. [Item 88]  
 Notes: Asked of those respondents age 65+.  
 Percentages outlined in red reflect sample sizes deemed unreliable (n<50).

Substantiated reports of child abuse in Madison County have decreased since 2006.

County	Reports Substantiated**					Child Abuse Homicides***						
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2011	2012
Madison	154	118	85	80	93	0	0	0	0	0	0	0
WNC (Regional) Total	2,273	1,958	1,754	1,449	1,512	4	1	2	1	0	4	2
State Total	20,340	14,966	12,429	11,252	11,300	34	25	33	17	19	24	28

Source: Annie E. Casey Foundation KIDS COUNT Data Center

The average number of decayed, missing, or filled teeth discovered among kindergartners screened in Madison County decreased from 2.35 per child in 2009 to 2.03 per child in 2013. This continues to be higher than the state average of 1.54

Source: North Carolina Oral Health Section, County Level Summary (2012-2013)

Between 2006 and 2013, the number of Madison County residents served annually by the Area Mental Health Program increased overall from 840 to 1,921 (▲ 129%)

Over the same 8-year period the number of Madison County residents served annually in State Psychiatric Hospitals decreased from 46 to 1 (▼ 98%).

During the same 8-year period a total of 115 Madison County residents were served in NC State Alcohol and Drug Abuse Treatment Centers (ADATCs), with the number varying considerably but averaging 14 persons annually.

Source: NC Office of State Budget and Management, State Data Center, Log Into North Carolina (LINC)

Mental Health was reported as a "major problem" by key informants. Top concerns were lack of resources, access barriers, and lack of providers

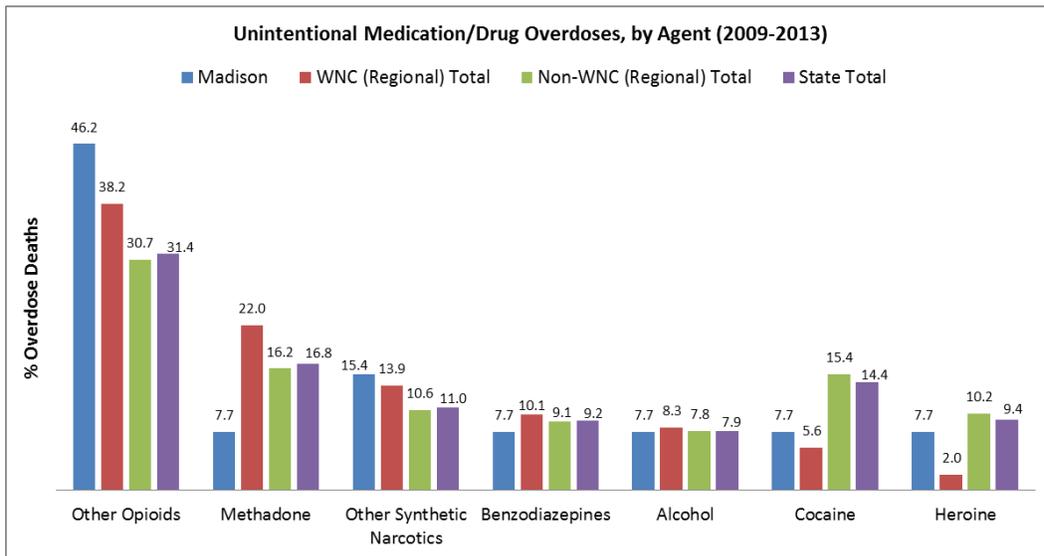
Source: PRC Key Informant Survey, Madison County 2015

Of the 11 unintentional poisoning deaths in Madison county (2009-2013), 11 (100%) were due to medication or drug overdoses.

Sources: NC State Center for Health Statistics and NC DPH, Chronic Disease and Injury Section, Injury and Violence Prevention Branch

"Other Opioids" caused the highest proportion of drug overdose deaths (46.2%) in Madison County in the period 2009-2013. "Other opioids" could include: hydrocodone (e.g., Vicodin), oxycodone (e.g., OxyContin, Percocet), morphine (e.g., Kadian, Avinza), codeine, and related drugs.

Benzodiazepines could include anti-anxiety medications, sleeping pills, anti-seizure drugs, muscle relaxers (e.g., Xanax, Klonopin, Valium, Rohypnol, Ativan, among many others). Other synthetic narcotics could include: bath salts, synthetic marijuana, incense, air fresheners, things known as "designer drugs".



Source: NC DPH, Chronic Disease and Injury Section, Injury and Violence Prevention Branch

The percentage of Binge Drinkers (single occasion- 5+ drinks men, 4+ women) increased from 2012.  
Source: PRC Community Survey, Madison County 2015

The percentage of individuals that reported ever sharing a prescription medication with someone else is slightly higher than the WNC rate.  
Source: PRC Community Survey, Madison County 2015

Substance Abuse was reported as a “major problem” by key informants. Top concerns were prevalence/incidence, self-medicating, current laws, poverty, crime, lack of education  
Source: PRC Key Informant Survey, Madison County 2015

Key informants most often identified methamphetamines or other amphetamines, alcohol, and opioid analgesics as the most problematic substances abused in Madison County.  
Source: PRC Key Informant Survey, Madison County 2015

### **Clinical Care & Access**

The percent uninsured adults age 18-64 in Madison County, WNC and NC increased between 2009 and 2010 but have decreased since.

The WNC Region had the highest percent uninsured among comparators in both age groups in every year cited.

In all comparator jurisdictions the age group 0-18 has a significantly lower percentage of uninsured than the adult age group, due at least partly to their inclusion in NC Health Choice.

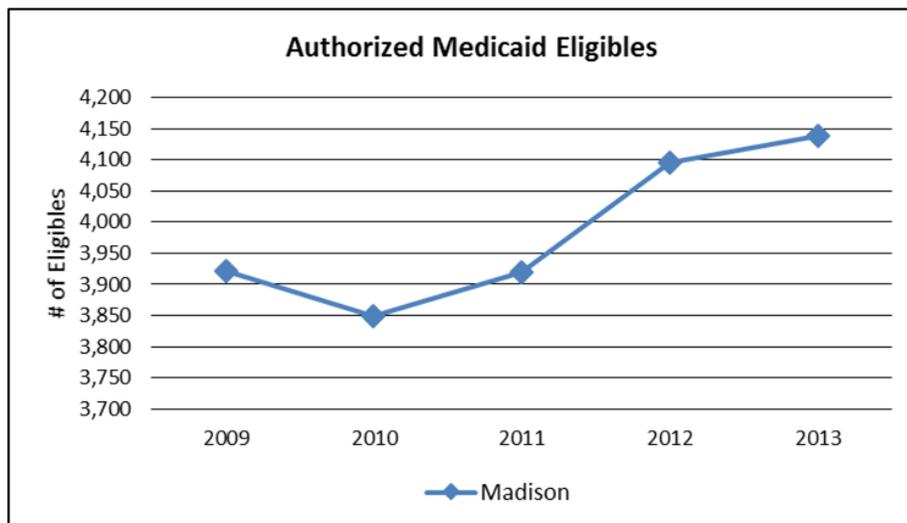
Percent of Population Without Health Insurance, by Age Group

County	2009		2010		2011		2012		2013	
	0-18	18-64	0-18	18-64	0-18	18-64	0-18	18-64	0-18	18-64
<b>Madison County</b>	9.4	22.8	8.2	23.3	6.9	22.5	8.1	22.9	6.9	21.4
<b>WNC Region</b>	<b>9.9</b>	<b>24.2</b>	<b>9.7</b>	<b>26.0</b>	<b>9.1</b>	<b>25.2</b>	<b>9.3</b>	<b>25.4</b>	<b>8.6</b>	<b>25.0</b>
<b>State of NC</b>	8.7	21.9	8.3	23.5	7.9	23.0	7.9	23.4	6.9	22.5

Source: US Census Bureau

The total number of people in Madison County eligible for Medicaid decreased between 2009 and 2010 before increasing every year between 2010 and 2013.

Madison County Medicaid-Eligibles, 2009-2013



Source: NC Division of Medical Assistance

In 2012 Madison County had the lowest ratio among comparators in every category of active health professional cited.

The national ratios were highest among comparators for physicians, primary care physicians, and dentists. The state ratios were highest among comparators for registered nurses and pharmacists.

## Number of Active Health Professionals per 10,000 Population

County	2012				
	Physicians	Primary Care Physicians	Dentists	Registered Nurses	Pharmacists
Madison County	5.19	5.19	1.89	31.14	5.0
WNC (Regional) Arithmetic Mean	14.29	6.84	3.61	76.94	7.97
State Ratio	22.31	7.58	4.51	<b>99.56</b>	<b>10.06</b>
National Ratio (date)	<b>23.0</b> (2011)	<b>8.1</b> (2011)	<b>5.3</b> (2012)	91.6 (2012)	9.1 (2012)

Sources: Cecil G. Sheps Center for Health Services Research, US Census Bureau, and US Bureau of Labor Statistics

Data in the county-level Data Workbook indicate that as of 2012 there were 7 certified nurse practitioners and 4 physician assistants among the county's active health professionals. Indicating that these professions help to fill the gap in primary health care services.

### **At Risk Populations**

While Americans as a group are healthier and living longer, segments of the population continue to suffer poor health status. Within Madison County, at risk populations include the unemployed, the uninsured/underinsured, the aging, and those without a high school education.

The geographic layout of the county and a lack of transportation services are disadvantages that add to the health inequities experienced by such groups. Lower income and fixed income families are less likely to have access to transportation and other health resources. Adults with less than a high school education are more likely to be unemployed and experience low health literacy. Not only are individuals less likely to visit a doctor, they are less likely to understand the information given to them. Interventions must consider the county's societal conditions, health behaviors of disparate groups, and their access to health care in order to positively affect health outcomes.

## CHAPTER 6 – PHYSICAL ENVIRONMENT

Clean air and water support healthy brain and body function, growth, and development. Air pollutants can harm our health and the environment.

Air pollution is associated with increased asthma rates and can aggravate asthma, emphysema, chronic bronchitis, and other lung diseases, damage airways and lungs, and increase the risk of premature death from heart or lung disease.

Improper medicine disposal, chemical, pesticide, and microbiological contaminants in water can lead to poisoning, gastro-intestinal illnesses, eye infections, increased cancer risk, and many other health problems.

By adopting and implementing various strategies to improve and protect the quality of their air and water, communities like Madison County can support healthy people and environments. (County Health Rankings, <http://www.countyhealthrankings.org/our-approach/healthfactors>)

### Air Quality

#### **Outdoor Air Quality**

The Air Quality Index (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 five air pollutants and converts the measures to a number on a scale of 0-500, with 100 representing the National Air Quality 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.

The Environmental Protection Agency reports AQI for nine of the 16 counties in the WNC region, however Madison County is not among those. The data below shows that there were no days rated very unhealthy or unhealthy in 2014. Only 1 day was rated unhealthy for sensitive groups. of the 2014 mean of 181 days in WNC with an assigned AQI, 157 had good air quality and 24 had moderate air quality.

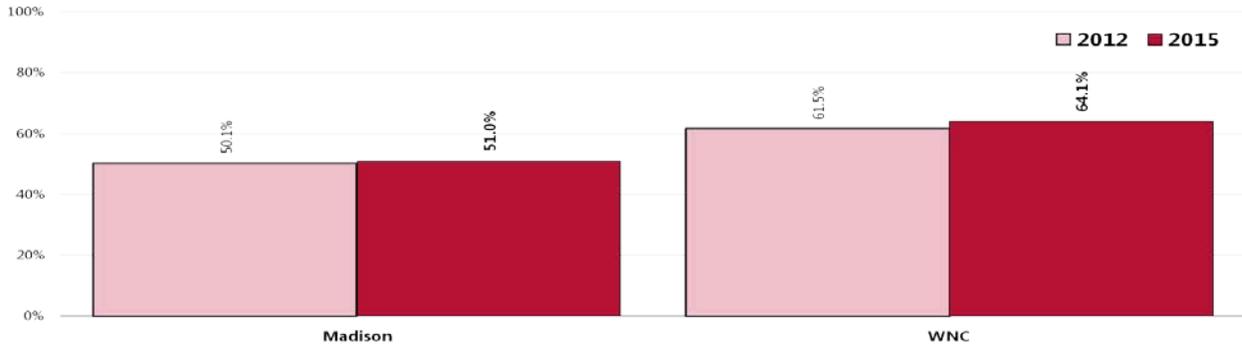
### Air Quality Index Summary (2014)

County	No. Days with AQI	Number of Days When Air Quality Was:					Number of Days When Air Pollutant Was:						
		Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	CO	NO2	O3	SO2	PM2.5	PM10	
Madison	No report												
WNC (Regional) Total	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WNC (Regional) Arithmetic Mean	181	157	24	1	n/a	n/a	n/a	n/a	139	n/a	122	n/a	n/a
State Total	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note: Annual statistics for 2014 are not final until May 1, 2015.

1 - *Air Quality Index Reports, 2014*. United States Environmental Protection Agency Air Data: [http://www.epa.gov/airdata/ad\\_rep\\_aqi.html](http://www.epa.gov/airdata/ad_rep_aqi.html)

### Believe It Is Important That Public Walking/Biking Trails Are 100% Tobacco-Free ("Strongly Agree" and "Agree" Responses)



Sources: 2015 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 50]

Notes: Asked of all respondents.

Includes "very important" and "somewhat important" responses.

### **Toxic Chemical Releases**

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.

Madison County ranks 83<sup>rd</sup> among the state's 86 ranked counties.

Toxic Release Inventory (TRI) Summary (2012)

County	Total On- and Off-Site Disposal or Other Releases, In Pounds	County Rank (of 86 reporting) for Total Releases	Compounds Released in Greatest Quantity	Quantity Released, In Pounds	Releasing Facility	Facility Location
Madison	0	83	Diisocyanates Phenol	0 0	Dynamic Systems Inc. Honeywell Sensing & Control	Leicester Mars Hill
WNC (Regional) Total	6,416,482					
WNC (Regional) Arithmetic Mean	493,576					
State Total						
NC County Average	0					

1 - TRI Release Reports: Chemical Reports, 2013 (Released October, 2014). US EPA TRI Explorer, Release Reports, Chemical Reports: [http://iaspub.epa.gov/triexplorer/tri\\_release.chemical](http://iaspub.epa.gov/triexplorer/tri_release.chemical)

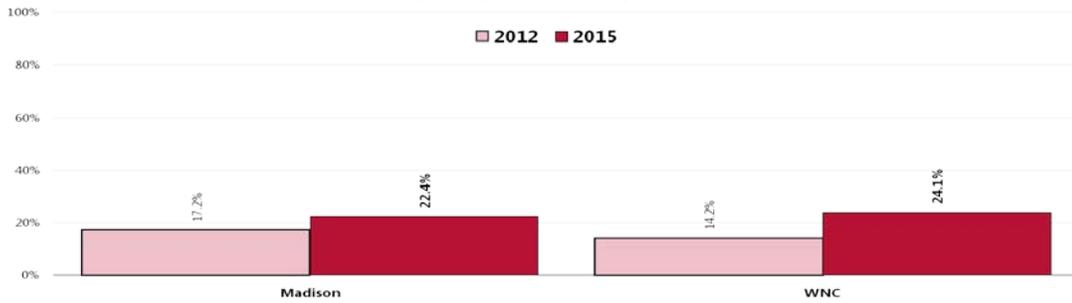
**Indoor Air Quality**

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: side stream 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 2012, 17.2% of Madison respondents reported that they had breathed someone else's cigarette smoke at work, in 2015, that number increased to 22.4%.

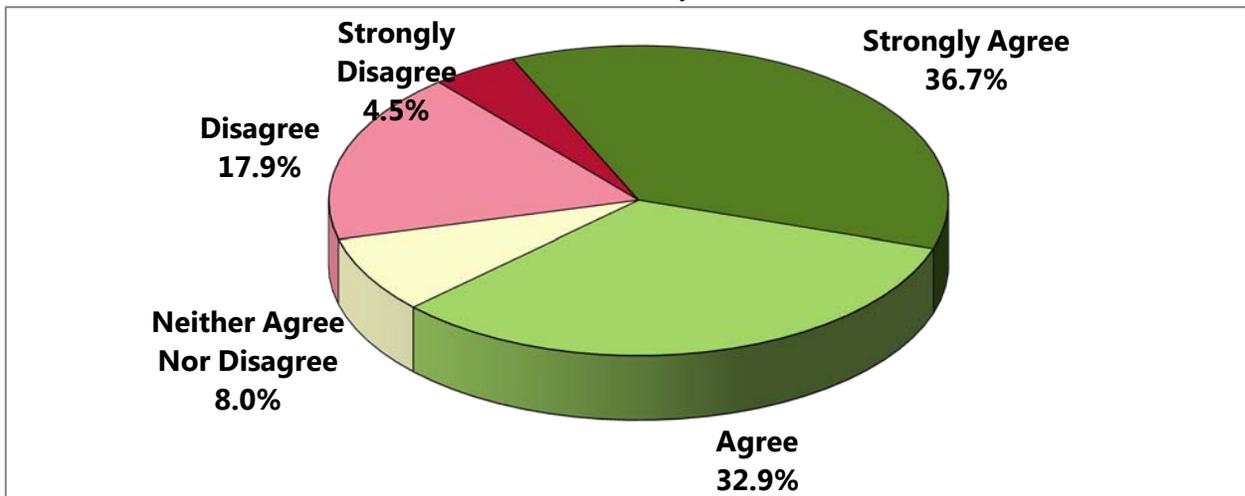
**Have Breathed Someone Else's  
Cigarette Smoke at Work in the Past Week**  
(Among Employed Respondents)



Sources: PRC Community Health Surveys, Professional Research Consultants, Inc. [Item 49]  
Notes: Asked of employed respondents.

In order to evaluate community members' perceptions about environmental tobacco smoke, survey respondents were given a series of two 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 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."

**"I believe it is important for government  
buildings and grounds to be 100% tobacco-free."**  
(Madison County, 2015)



Sources: 2015 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 52]

Notes: Asked of all respondents.

## 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 2014, a regional mean of 55% of the WNC population was being served by community water systems and 33.1% in Madison County (WNC Healthy Impact Data Workbook). The remaining presumably were being served by wells or by some other source, such as springs, creeks, rivers, lakes, ponds or cisterns.

## 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.

According to one recent assessment, the regional mean indoor radon level for the 16 counties of WNC was 4.1 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 2.9 pCi/L, over twice the national indoor radon level (WNC Healthy Impact Data Workbook).

## Access to Healthy Food & Places

Good nutrition is essential for health. Insufficient nutrition can hinder growth and development. Excessive calorie consumption, however, can lead to overweight and obesity, especially when paired with too little physical activity. Inadequate physical activity itself also contributes to increased risk of a number of conditions including coronary heart disease, diabetes, and some cancers.

Healthy food and regular exercise are important to health. American adults walk less than adults in any other industrialized country. As of 2013, 29 million Americans lived in a food desert, without access to affordable, healthy food. Those with lower education levels, already at-risk for poor health outcomes, frequently live in food deserts.

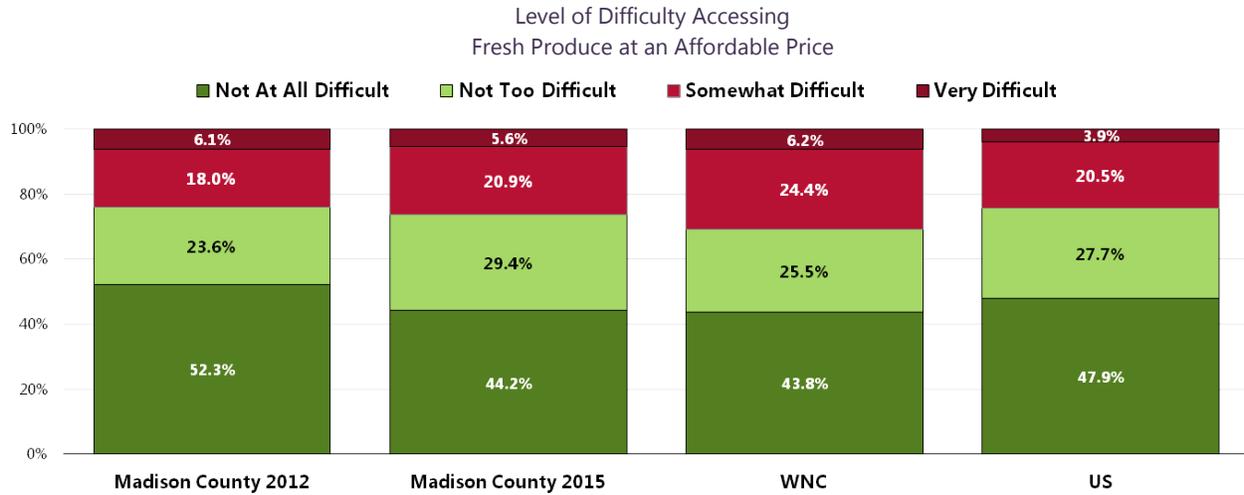
More than two-thirds of all American adults and approximately 32% of children and adolescents are overweight or obese. Obesity is one of the biggest drivers of preventable chronic diseases in the US. Being overweight or obese increases the risk for many health conditions, including type 2 diabetes, heart disease, stroke, hypertension, cancer, Alzheimer's disease, dementia, liver disease, kidney disease, osteoarthritis, and respiratory problems.

Unhealthy food intake and insufficient exercise have economic impacts for individuals and communities. Current estimates for obesity-related health care costs in the US range from \$147 billion to nearly \$210 billion annually, and productivity losses due to job absenteeism cost an additional \$4 billion each year.

Increasing opportunities for exercise and access to healthy foods in neighborhoods, schools, and workplaces can help children and adults eat healthy meals and reach recommended daily physical activity levels. (County Health Rankings, <http://www.countyhealthrankings.org/our-approach/healthfactors>)

Survey respondents in Madison County were asked, "How difficult is it for you to access fresh produce at an affordable price?" Those who found it not at all difficult and very difficult decreased

from 2012 to 2015. However, those who found it not too difficult and somewhat difficult increased during this same period.



Sources: 2015 PRC Community Health Surveys, Professional Research Consultants, Inc. [Item 66]  
2013 PRC National Health Survey, Professional Research Consultants, Inc.

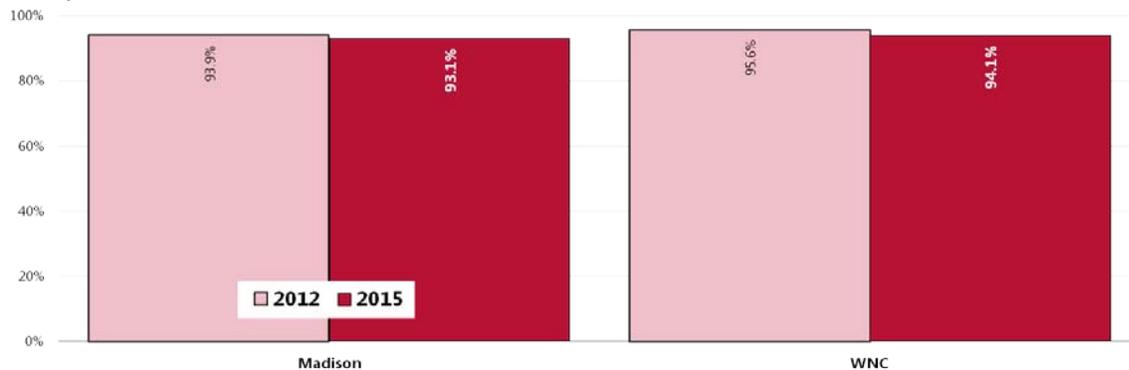
Notes: Asked of all respondents.

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 55, in 2009, a decrease of 32%. In Madison County the number of recreational and fitness facilities fell from 1 to 0 over the same period (WNC Healthy Impact 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.

**Believe It Is Important That Community Organizations Make Physical Activity Spaces Available for Public Use After Hours**

("Very Important" and "Somewhat Important" Responses)



Sources: PRC Community Health Surveys, Professional Research Consultants, Inc. [Item 77]

Notes: Asked of all respondents.

# CHAPTER 7- HEALTH RESOURCES

## Health Resources

### Process

The process used to review health resources available to meet community needs in Madison County consisted of reviewing the 2-1-1 datasets that WNC Healthy Impact provided to our CHA team. Our team also reported back any gaps to 2-1-1, so that (2-1-1) can continue to serve as the updated resource list accessible via phone and web 24/7 to our residents.

### Findings

There is no hospital located in Madison County. The Madison County Health Department offers WIC, immunizations, child health, dental services, family planning, maternity care, BCCCP, health education, community outreach, employee health services and more.

There is one private non-profit medical practice, the Hot Springs Health Program, with four offices located throughout the county. They provide primary health care by a staff of family medicine, internal medicine, and pediatric physicians. They also manage a home health and hospice program along with an in-home rehabilitation program for Madison County residents.

The Madison County Emergency Medical Services offers ambulance transportation from all points in the county. Emergency medical helicopter transport is available from Mission Hospitals in Asheville. The hospital also manages the county's emergency medical services.

There are now three dental offices in the county. The dental clinic at the health department has increased access to care for low income individuals. Mental health services are available through RHA.

Optical and chiropractic services are also available. There is one fitness center in the county. Walking trails can be found across the county. The county has two licensed nursing home facilities, one retirement home, and several group homes.

## Resource Gaps

Some resource gaps that were identified by key informants include; affordable health care, specialty and urgent care, indoor/outdoor recreation facilities, affordable healthy foods, alcohol and drug treatment, geriatric services, mental health services, and transportation.

These identified gaps relate directly to our priority health areas. Lack of affordable healthy foods and indoor/outdoor recreation facilities contribute to obesity and lead to the occurrence of many chronic diseases. Having access to mental health and substance abuse services for residents when they are needed as well as affordable health care services is essential for health improvement in our community. Specialty and urgent care services are also lacking in Madison County, forcing residents to travel to Buncombe County or Tennessee to receive the care they need. Traveling out of the

county is often difficult due to affordability and limited transportation options. The need for more geriatric services is increasing in Madison County as the aging population is also increasing.

## CHAPTER 8 – IDENTIFICATION OF HEALTH PRIORITIES

### Health Issue Identification

#### **Process**

To identify the significant health issues in our community, our key partners reviewed data and discussed the facts and circumstances of our community. We used the following criteria to identify significant health issues:

- County data deviates notably from the region, state or benchmark
- Significant disparities exist
- Data reflects a concerning trend related to burden, scope or severity
- Surfaced as a priority community concern

#### **Identified Issues**

The following health issues were surfaced through the above process:

- Healthy Weight: increase the incidence of healthy weight for all ages
- Substance Use: prevent substance abuse and misuse for all ages
- Mental Health: improve access to mental health services for all ages
- Child Health: decrease child abuse and increase children's oral health
- Chronic Disease: improve access to preventative care and treatment of chronic disease
- Elderly Population: improve access to services for those age 65 and older
- Falls Among Older Adults: reduce falls among older adults
- Social Determinants of Health: improve social determinants of health
- Tobacco Use and Secondhand Smoke Exposure: reduce tobacco use and secondhand smoke exposure

## Priority Health Issue Identification

### Process

During our group process, the following criteria were used to select priority health issues of focus for our community over the next three years:

- Criteria 1 – Indicator not trending in the desired direction
- Criteria 2 – Notably different from meaningful comparator (WNC region and NC)
- Criteria 3 – Health Disparity
- Criteria 4 – Significant/emerging community concern

### Identified Priorities

The following priority health issues are the final community-wide priorities for our county that were selected through the process described above:

- [Priority 1](#) – Healthy Weight

Nearly one-fourth of children ages 5-13 are obese (BMI  $\geq$  95)  
Source: Madison County BMI Assessments 2009-2015

The average self-reported prevalence of Madison County adults considered “obese” on the basis of height and weight (BMI > 30) was 27.7% in the period from 2005 - 2011. Over the same period the WNC average prevalence was 27.1%. The prevalence of adult obesity has been increasing in both WNC and Madison County, but at a higher rate in the county.  
Source: Centers for Disease Control and Prevention, via BRFSS

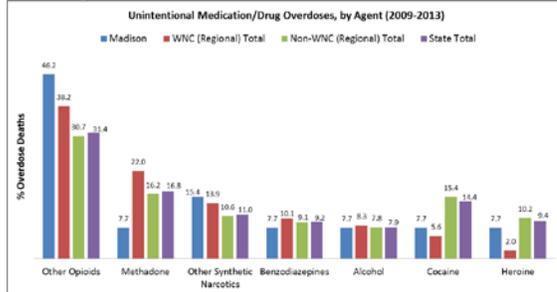
According to County Health Rankings (2014) for NC, Madison County was ranked 38<sup>th</sup> overall among the 100 NC counties. Madison County health factors rankings out of 100 (where 1 is best): 86<sup>th</sup> for physical environment  
Sources: America’s Health Rankings and County Health Rankings and Roadmaps websites

The percentage of individuals reporting difficulty accessing fresh produce at an affordable price is increased in 2015.  
Source: PRC Community Survey, Madison County 2015

2012-2015 Over 93% of residents surveyed responded it is important to increase physical activity spaces for public use after hours.  
Source: PRC Community Survey, Madison County 2015

Nutrition, Physical Activity & Weight was reported as a “major problem” by key informants. Top concerns were access to affordable healthy foods, culture, affordable/safe opportunities for physical activity, lack of education, lifestyle choices  
Source: PRC Key Informant Survey, Madison County 2015

- [Priority 2](#) – Substance Use



Source: NC DPH, Chronic Disease and Injury Section, Injury and Violence Prevention Branch

Other Opioids” caused the highest proportion of drug overdose deaths (46.2%) in Madison County in the period 2009-2013. "Other opioids" could include: hydrocodone (e.g., Vicodin), oxycodone (e.g., OxyContin, Percocet), morphine (e.g., Kadian, Avinza), codeine, and related drugs. Benzodiazepines could include anti-anxiety medications, sleeping pills, anti-seizure drugs, muscle relaxers (e.g., Xanax, Klonopin, Valium, Rohypnol, Ativan, among many others). Other synthetic narcotics could include: bath salts, synthetic marijuana, incense, air fresheners, and things known as “designer drugs”.

Of the 11 unintentional poisoning deaths in the county in that period, 11 (100%) were due to medication or drug overdoses.

The percentage of Binge Drinkers (single occasion- 5+ drinks men, 4+ women) is increased from 2012.

Source: PRC Community Survey, Madison County 2015

The percentage of individuals that reported ever sharing a prescription medication with someone else is slightly higher than the WNC rate.

Source: PRC Community Survey, Madison County 2015

Substance Abuse was reported as a “major problem” by key informants. Top concerns were prevalence/incidence, self-medicating, current laws, poverty, crime, lack of education.

Source: PRC Key Informant Survey, Madison County 2015

- [Priority 3](#) – Mental Health

Between 2006 and 2013, the number of Madison County residents served annually by the Area Mental Health Program increased overall from 840 to 1,921

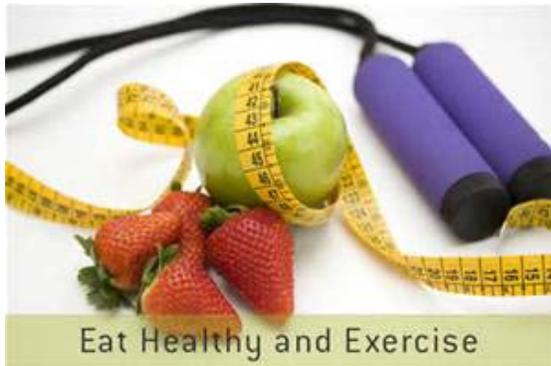
Over the same 8-year period the number of Madison County residents served annually in State Psychiatric Hospitals decreased from 46 to 1

During the same 8-year period a total of 115 Madison County residents were served in NC State Alcohol and Drug Abuse Treatment Centers (ADATCs), with the number varying considerably but averaging 14 persons annually.

Source: NC Office of State Budget and Management, State Data Center, Log Into North Carolina (LINC)

Mental Health was reported as a "major problem" by key informants. Top concerns were lack of resources, access barriers, and lack of providers.  
Source: PRC Key Informant Survey, Madison County 2015

## PRIORITY ISSUE #1 HEALTHY WEIGHT



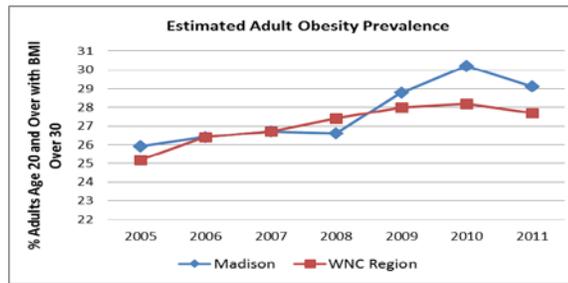
Obesity prevention for children has been a priority issue for several years in Madison County. There has been a history of collaboration with community partners to identify and implement strategies within schools and the community to provide nutrition and physical activity education to school age children. Collaborative strategies have included annual BMI assessments for K-5 students at health fairs, partnership with the School Health Advisory Council to develop a healthy snack procedure which was adopted and approved by the school board in the fall of 2013, along with support and promotion of other county and community agency programs that also implement physical activity and nutrition education programs for children and youth. The 2015 CHA data revealed a need to also include adult focused prevention strategies as well to reach the desired community outcomes for all citizens. Overweight and obesity pose significant health concerns for both children and adults. They are risk factors for a range of chronic diseases, including heart disease and type 2 diabetes. Rural areas experience higher rates of obesity and overweight than the nation as a whole, yet many rural communities do not have the resources to address this critical health concern. Rural healthcare facilities are less likely to have nutritionists, dietitians, or weight management experts available. Rural areas may lack exercise facilities and infrastructure to encourage physical activity. Access to healthy and affordable food is also limited in many rural communities. To address these challenges, rural communities can develop programs and services that help residents learn about and adopt healthy habits to control their weight. As a community, we must commit to creating an environment that helps residents of all ages make healthy choices and take responsibility for decisions that support good health in our homes, neighborhoods, schools, and workplaces.

### Data Highlights

#### Health Indicators

##### **Adult Obesity**

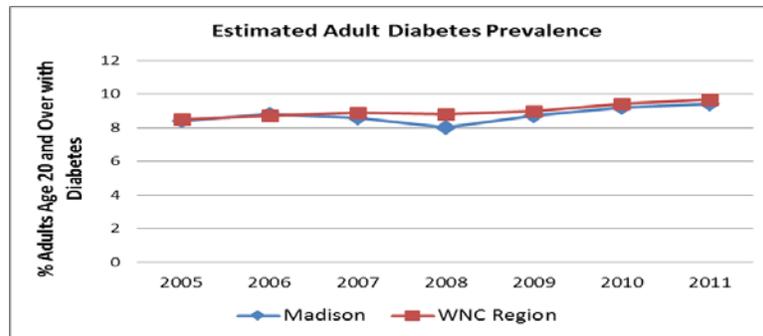
The average self-reported prevalence of Madison County adults considered “obese” on the basis of height and weight (BMI > 30) was 27.7% in the period from 2005 - 2011. Over the same period the WNC average prevalence was 27.1%. The prevalence of adult obesity has been increasing in both WNC and Madison County, but at a higher rate in the county.



Source: Centers for Disease Control and Prevention, via BRFSS

## Adult Diabetes

The average self-reported prevalence of Madison County adults with diabetes was 8.7% in the period from 2005 - 2011. Over the same period the WNC average was 9.0%. Prevalence of self-reported adult diabetes has been rising over time in both WNC and Madison County.



Source: Centers for Disease Control and Prevention, via BRFSS

The prevalence of borderline or pre-diabetes is increased from 2012 for Madison County and WNC

2012	Madison 7.6%	WNC 7.6%	
2015	Madison 11.1%	WNC 12.2%	US 5.8%

Source: PRC Community Survey, Madison County 2015

## Child Obesity

Nearly one-fourth of children ages 5-13 are obese (BMI  $\geq$  95).

Source: Madison County BMI Assessments 2009-2015

BMI data showed there has been fluctuation in the number of students overweight (85<sup>th</sup> percentile) but the percent comparison from 2009 -2015 is basically the same and remains higher than the state which is 31%. There has been an increase in the students in the upper 95<sup>th</sup> percentile (obese) category over the same time period.

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 individuals reduce their risks for many health conditions, including: overweight and obesity; malnutrition; iron-deficiency anemia; heart disease; high blood pressure; type 2 diabetes; and some cancers.

## Madison County Leading Causes of Death: Overall

- **Color**

- **Red** indicates a “worse than” or negative difference
- **Green** indicates a “better than” or positive difference

Age-Adjusted Rates (2009-2013)	Madison No. of Deaths	Madison Mortality Rate	Rate Difference from NC
1. Diseases of the Heart	268	189.9	+11.7%
2. Cancer	210	143.8	-17.0%
3. Chronic Lower Respiratory Disease	84	59.5	+29.1%
4. Cerebrovascular Disease	73	50.8	+16.2%
5. Alzheimer’s Disease	47	32.6	+12.8%

Source: NC State Center for Health Statistics

According to this data, people in Madison County have lower mortality than the population statewide only for cancer among of the five leading causes of death for which there are stable county rates.

Heart Problems, Mental/Depression, and Fracture/Bone/Joint Injury were the top three self reported health problems among those reporting activity limitations.

Source: PRC Community Survey, Madison County 2015

### Understanding the Issue

Prevention 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. The greatest share of the key informants surveyed during 2015 in Madison County characterized Nutrition, Physical Activity, and Weight as a “major problem”. Top concerns included access to affordable healthy foods, culture, affordable/safe opportunities for physical activity, lack of education, lifestyle choices, lack of resources, and obesity.

Increased physical activity and improved nutrition are among the many factors that can help individuals reach and maintain a healthy weight. (Healthy NC 2020)

In Madison County, the percentage of individuals reporting difficulty accessing fresh produce at an affordable price is increased in 2015. Source: PRC Community Survey, Madison County 2015

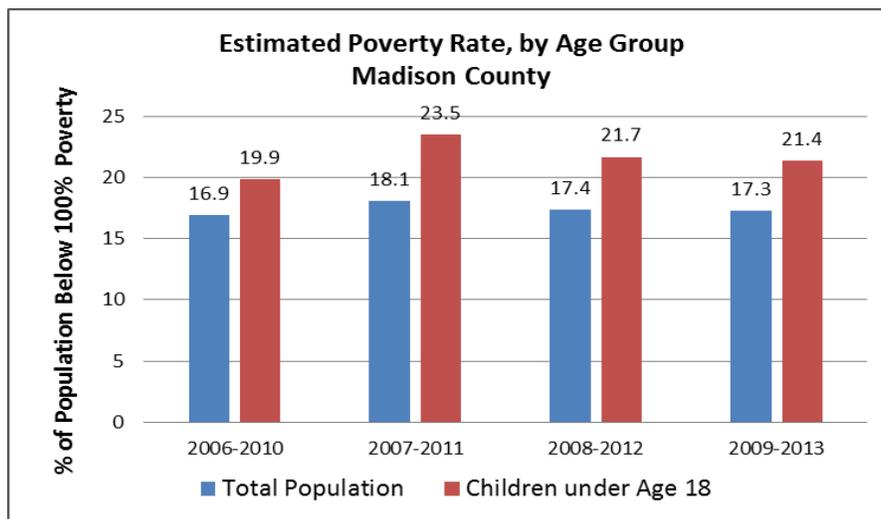
In addition, Nutrition, Physical Activity & Weight was reported as a “major problem” by key informants surveyed in Madison County 2015. Top key informant concerns were: access to affordable healthy foods, culture, affordable/safe opportunities for physical activity, lack of education, lifestyle choices. Source: PRC Key Informant Survey, Madison County 2015

2012-2015 Over 93% of residents surveyed responded it is important to increase physical activity spaces for public use after hours Source: PRC Community Survey, Madison County 2015

### **Specific Populations At-Risk**

#### **Poverty and Age**

In Madison County as in much of NC, children suffer significantly and disproportionately from poverty. In Madison County the estimated poverty rate among children under age 18 ranged from between 18% to 30% higher than the overall rate throughout the period cited. Almost two-thirds of children in school receive free or reduced meals.



Source: US Census Bureau

In WNC and NC the total poverty rate increased 2006-2013. The total poverty rate in Madison County decreased in each of the two most recent periods. The total poverty rate in Madison County was the highest among comparators in every period cited except the last. It is interesting to note that Madison County was one of only few WNC counties that actually saw a decrease in poverty in the period cited. Regardless of the trend, the endpoint – 17.3% poverty – is significant. While the poverty rate is decreased slightly, it remains a factor to consider when developing community strategies to increase access to healthy foods and physical activity opportunities. Source: Us Census Bureau

## **Family Composition**

In the 5-year period from 2009-2013, an estimated 253 Madison County grandparents living with their minor-aged grandchildren also were financially responsible for them. With the projected growth over the next two decades of the population in Madison over the age of 65, these numbers may increase. This family composition presents financial challenges to access healthier food options in some cases due to fixed incomes. Over the same period there were an estimated 8,207 households in Madison County, 1,951 of them with children under 18 years of age. Among the households with minor-age children, 68% were headed by a married couple. An additional 22% were headed by a female single parent, and 10% were headed by a male single parent. Source: US Census Bureau

## **Health Resources available/needed**

According to County Health Rankings (2014) for NC, Madison County was ranked 38<sup>th</sup> overall among the 100 NC counties. Madison County health factors rankings out of 100 (where 1 is best): 86<sup>th</sup> for physical environment Sources: America's Health Rankings and County Health Rankings and Roadmaps websites One fitness center is located in Mars Hill only. There are some walking trails across the county and there is ongoing discussion with the public school system to establish a formal joint use agreement to allow the general public to utilize outside tracks and trails at the schools. Due to the geography of Madison County, people are isolated because of the rugged terrain in many areas. Consideration needs to be given to make resources available in multiple areas of the county. *Eat Smart /Move More/ Weigh Less* classes have been offered in the community in partnership with NC Cooperative Extension and Madison County Health Department staff. Classes were well attended, however due to budget changes and staff availability this program may not be offered as often in the future. There is continued partnership with *WNC Healthy Kids* to promote the *5-2-1 almost none* message with children during school health fairs, on materials for parents, and in other outreach efforts in the community. The *It's OK to Play* campaign was implemented in the fall of 2014 to increase access to safe places for children to be physically active. A total of 8 community centers, town and county parks, and churches have participated. *Steps for Health* nutrition education curriculum is provided by NC Cooperative Extension staff annually to 3<sup>rd</sup> graders.

Additional resources needed to address this priority issue include increased funding to support existing and future evidence based programs that focus on education about the connection between healthy eating and physical activity to chronic disease prevention as well as funds to enhance and build sidewalks or greenways in other areas of the county. Increased community education is needed for all age groups to increase knowledge of basic nutrition issues, and ongoing issues with overweight and obesity.

## PRIORITY ISSUE #2 MENTAL HEALTH



Mental health and physical health are closely connected. 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. 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. Changes in Western North Carolina include the late 2013 consolidation of Western Highlands Network with Smoky Mountain Center which follows a one provider model. Addressing Mental Health is complex and will require the collaborative planning, action, and coordination of multiple partners in our community. Access to preventative mental health services has been a priority issue in Madison for a number of years. The Mental Health Committee of the Madison Community Health Consortium was formed in 2008 and has played an important role in promoting dialogue between area mental health providers to identify community issues and concerns needing to be addressed in Madison County. Members work to improve access to preventative mental health services with strategies to increase the community awareness of services offered and available while also collaborating to share information among providers, identify service gaps and facilitate collaboration to address identified gaps. While capacity building among behavioral health providers has been very successful, the desired result for the community has not yet been reached. The community must continue to combine resources to help in meeting this critical need.

### Data Highlights

#### Health Indicators

##### **Trend: Persons Served in Area Mental Health Programs (2006 through 2013)**

Between 2006 and 2013, the number of Madison County residents served annually by the Area Mental Health Program increased overall from 840 to 1,921 ( ▲ 129%) No clear pattern of service utilization is apparent from this data and may represent either increased community awareness of area mental health programs or increasing need to access these programs.

County	# Persons Served in Area Mental Health Programs							
	2006	2007	2008	2009	2010	2011	2012	2013
Madison	840	844	590	665	1,133	1,290	1,284	1,921
WNC (Regional) Total	30,952	31,271	28,380	24,527	28,453	29,742	33,258	31,290
WNC (Regional) Arithmetic Mean	1,935	1,954	1,774	1,533	1,778	1,859	2,079	1,956
State Total	322,397	315,338	306,907	309,155	332,796	360,180	315,284	306,080

Source: NC Office of State Budget and Management, State Data Center

Over the same 8-year period the number of Madison County residents served annually in State Psychiatric Hospitals decreased from 46 to 1 (▼ 98%).

County	# Persons Served in NC State Psychiatric Hospitals							
	2006	2007	2008	2009	2010	2011	2012	2013
Madison	46	47	43	35	13	7	0	1
WNC (Regional) Total	1,509	1,529	1190	818	564	355	27	27
WNC (Regional) Arithmetic Mean	94	96	74	51	35	22	2	2
State Total	18,292	18,498	14643	9,643	7,188	5,754	4,572	3,964

Source: NC Office of State Budget and Management, State Data Center

### **Understanding the Issue**

The 2015 PRC Community survey self reported information regarding poor mental health days, access to social/emotional support, and mental health care or counseling has improved since 2012. However, it is important to note mental health issues can be exacerbated by unemployment, family stress, housing problems, etc.

The percentage of Madison County residents self reporting of >7 Days of Poor Mental Health in the Past Month is decreased from 2012 Source: PRC Community Survey, Madison County 2015

The percentage of Madison County residents reporting "Always" or "Usually" Get Needed Social/Emotional Support is increased from 2012 Source: PRC Community Survey, Madison County 2015

The percentage of individuals reporting being Unable to Get Needed

Mental Health Care or Counseling in the Past Year is decreased from 2012 Source: PRC Community Survey, Madison County 2015

The greatest share of key informants surveyed in Madison County 2015 characterized Mental Health as a "major problem". Top key informant concerns included lack of local resources, access barriers, lack of providers, prevalence/incidence, environment/family, and cost. Concerns regarding lack of resources were many people of all ages are receiving treatment, or need

treatment and are not able to get what they need. Lack of mental health treatment leads to increase in violence, crime and instability in homes and workplaces

PRC Key Informant Survey Madison County 2015 Other Health Provider/Community/Business Leader

### **Specific Populations At-Risk**

Individuals with Medicare experience access barriers to mental health services. In addition, there are no choices in providers for the Medicaid population. This may be contributed to the lack of additional behavioral health providers in Madison County and the local LME, Smoky Mountain Center, single provider model for service.

### **Health Resources available/needed**

The Mental Health Committee of the Madison Community Health Consortium was formed in 2008 and has played an important role in promoting dialogue between area mental health providers to identify community issues and concerns needing to be addressed in Madison County. Members collaborate for a media campaign each May to increase awareness of behavioral health and substance abuse services. In 2015, members worked with local clerk of court and magistrates to organize a community forum with speakers from local LME, behavioral health providers and hospital to assist in educating the community about how to navigate behavioral health services. There are very few private providers since Smoky Mountain Center (SMC) model is to contract with only a single provider for all services. There are a variety of trainings that are available from SMC for both community and agencies which is a great resource. Community members and staff at Madison Middle School received Youth Mental Health First Aid training in 2015 which educates individuals on warning signs of behavioral health issues and training to connect with services. Due to the geography challenges of Madison County, there is ongoing need to have more services available throughout the county as transportation is often a barrier for individuals to access existing services.

## **PRIORITY ISSUE #3    SUBSTANCE USE**



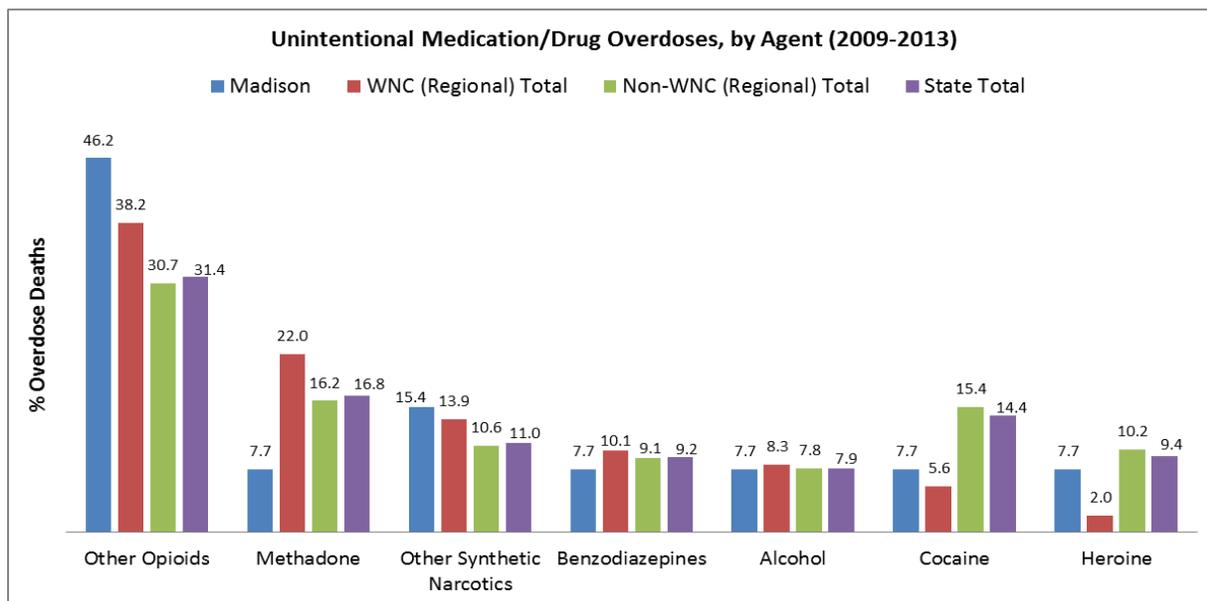
Substance use and abuse are major contributors to death and disability in North Carolina. Addiction to drugs and/or alcohol is a chronic health problem. People who suffer from abuse or dependence are at risk for premature death, injuries and disability. Prevention of misuse and abuse of substances is critical. In addition, substance use and misuse can have adverse consequences for families, communities, and society. There has been increasing community concern in Madison County about substance use and

misuse. In 2014 the Madison Substance Awareness Coalition formed with two year grant funding from Wake Forest School of Medicine and the North Carolina Coalition Initiative (NCCI) to survey and identify community strategies to reduce substance use and misuse of prescription medication. There has been capacity built with multiple sectors in the community including law enforcement, health department, local health providers, faith community, etc. Through both the NCCI and 2015 Community Health Assessment data results, it is clear there are increasing focus areas around substance use and the need for additional strategies in multiple levels of the community.

### **Data Highlights**

### **Health Indicators**

## Unintentional Medication/Drug Overdoses



Of the 11 unintentional poisoning deaths in the county in that period, 11 (100%) were due to medication or drug overdoses. "Other Opioids" caused the highest proportion of drug overdose deaths (46.2%) in Madison County in the period 2009-2013. Methadone is a synthetic opioid usually associated with treatment for drug abuse. "Other opioids" could include: hydrocodone (e.g., Vicodin), oxycodone (e.g., OxyContin, Percocet), morphine (e.g., Kadian, Avinza), codeine, and related drugs. Benzodiazepines could include anti-anxiety medications, sleeping pills, anti-seizure drugs, muscle relaxers (e.g., Xanax, Klonopin, Valium, Rohypnol, Ativan, among many others). Other synthetic narcotics could include: bath salts, synthetic marijuana, incense, air fresheners, things known as "designer drugs".

Source: NC DPH, Chronic Disease and Injury Section, Injury and Violence Prevention Branch

The percentage of individuals that reported ever sharing a prescription medication with someone else is slightly higher than the WNC rate Source: PRC Community Survey, Madison County 2015

A total of 115 Madison County residents were served in NC State Alcohol and Drug Abuse Treatment Centers (ADATCs) from 2006 to 2013 with the number varying considerably but averaging 14 persons annually.

County	# Persons Served in NC Alcohol and Drug Treatment Centers							
	2006	2007	2008	2009	2010	2011	2012	2013
Madison	19	13	13	9	22	13	13	13
WNC (Regional) Total	664	604	774	751	921	861	805	830
WNC (Regional) Arithmetic Mean	42	38	48	47	58	54	50	52
State Total	4,003	3,733	4,284	4,812	4,483	4,590	4,265	4,343

Source: NC Office of State Budget and Management, State Data Center

## **Tobacco Use**

The percentage of current smokers reported (includes regular and occasional smokers) is slightly increased from 2012 Source: PRC Community Survey, Madison County 2015

Individuals reporting exposure to someone else's cigarette smoke at work in the past week is increased from 2012 Source: PRC Community Survey, Madison County 2015

Almost 70% of survey respondents believe it is important for government buildings and grounds to be 100% tobacco-free Source: PRC Community Survey, Madison County 2015

Self reported use of E-Cigarettes is slightly higher the WNC rate Source: PRC Community Survey, Madison County 2015

Individuals reporting current use of smokeless tobacco products is decreased from 2012 but remains higher than the WNC rate Source: PRC Community Survey, Madison County 2015

## **Understanding the Issue**

The greatest share of key informants characterized Substance Abuse as a "major problem" in Madison County. Among those rating this issue as a major concern, the greatest barriers to accessing substance abuse treatment as prevalence/incidence, self-medicating, poverty, crime, lack of treatment facilities/programs and prevalence of overdose. Concerns regarding prevalence/incidence focus on Madison County's history of substance use struggles. Like many rural NC counties, prescription drug misuse and trafficking has become a major issue. Additionally, only one treatment provider is currently allowed to provide substance abuse treatment; RHA. Source: PRC Key Informant Survey Madison County 2015 Other Health Provider Theft Report from Madison County Sheriff's Office 2014 revealed 93% of all thefts in Madison County involved drugs. More than ½ of these thefts involved prescription medication; whether stealing drugs, stealing money or items to pawn for drugs or found with drugs on their person. This same statistic is what keeps child protective services busy and what also fuels poor health and mental health. Many of the folks abusing substances are doing so due to untreated mental health which creates a viscous circle. Source: PRC Key Informant Survey Madison County 2015 Social Service Provider

Tobacco Use was reported as a "major problem" by key informants. Top concerns included culture, prevalence/incidence, lack of resources & education, and addiction Source: PRC Key Informant Survey, Madison County 2015

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). Madison County has a long history of farming tobacco as a main source of income and the culture here does not encourage smoking cessation and addiction is hard to break.

### **Specific Populations At-Risk**

Low-income, uneducated and unemployed individuals are frequently at risk for developing substance use issues. According to the Madison County Drug Screening Report for 2013-2014, there was a 17% increase in positive drug screens for individuals referred by the Department of Social Services. Youth and adults are at risk a at risk populations for tobacco use by smoking or using smokeless tobacco and also exposure to second hand smoke.

### **Health Resources available/needed**

Madison Substance Awareness Coalition formed October 2014 with representatives from law enforcement, pharmacy, health providers, social services, schools, public health, and faith community through grant funding from NC Coalition Initiative. Current community strategies are focused on educating the community about prescription medication safety related to safe storage, not sharing medication, and proper disposal at permanent drop boxes in the community. Funding for this initiative ends spring of 2016 and additional funding will be needed to continue these projects in the community. The Madison County Health Department has offered tobacco cessation programs to prenatal clients over the past three years and in 2015 implemented a Freedom From Smoking class in the community. Also, there has been tobacco education provided in the school system. These tobacco prevention and cessation programs are grant funded yearly and received decreased funding for 2015-2016 grant cycle. School administration has requested tobacco cessation programs with middle and high school students if future funding can be obtained.

## **CHAPTER 9 - NEXT STEPS**

### **Sharing Findings**

The 2015 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, and Mission Health will be instrumental in reviewing the report and assisting with development of action plans to address the identified health priorities over the next three 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. 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 at

local libraries.

### **Collaborative Action Planning**

Collaborative action planning with hospitals and other community partners will result in the creation of a community-wide plan that outlines what will be aligned, supported and/or implemented to address the priority health issues identified through this assessment process. There are current Mental Health and Substance Awareness action teams that will participate in community planning in those areas. A Healthy Weight action team is forming with members from former Child Health and Community Health committees along with volunteers from other agencies and organizations.

# Appendices

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## **Appendix A – Data Collection Methods & Limitations**

### **Appendix B – Secondary Data Profile**

- 2ndary Data Summary

### **Appendix C – County Maps**

### **Appendix D – Survey Findings**

- WNC Healthy Impact Survey Instrument
- Community Health Survey Results

### **Appendix E – Key-Informant Survey Findings**

## APPENDIX A - DATA COLLECTION METHODS & LIMITATIONS

### Secondary Data from Regional Core

#### **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 data past a certain date; in most cases that end-point was August 2015.

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; and NC DETECT. 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. The WNC regional comparison is used as “peer” for the purposes of this assessment. 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. 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 rates 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.

## **Gaps in Available Information**

There was a change in the format of women who smoke while pregnant was collected which did not allow for accurate comparison with 2012 data.

## **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, *2015 WNC Healthy Impact Survey* (a.k.a. 2015 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.

**Inc.**

**Professional Research Consultants,**



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.

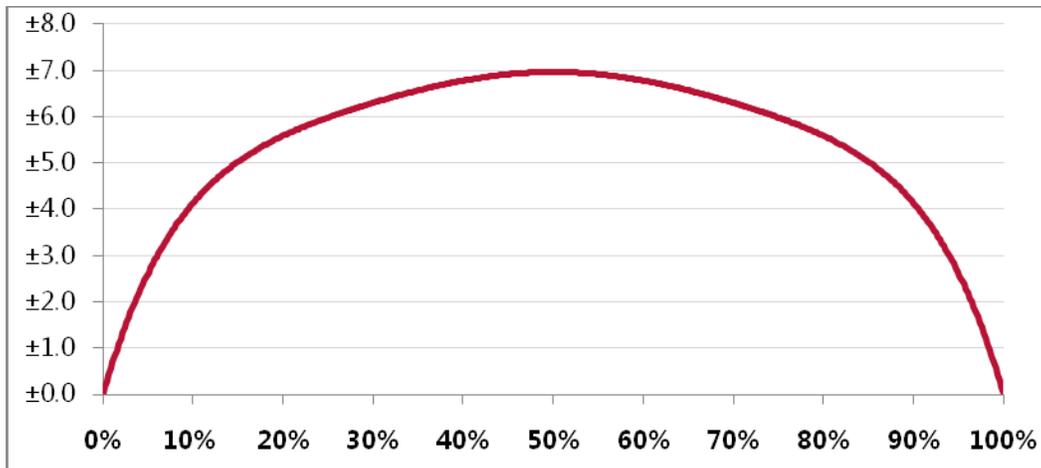
The sample design used for this regional effort consisted of a stratified random sample of 3,300 individuals age 18 and older in Western North Carolina, with 200 from our county. All administration of the surveys, data collection and data analysis was conducted by Professional

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 at the 95% confidence level 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.

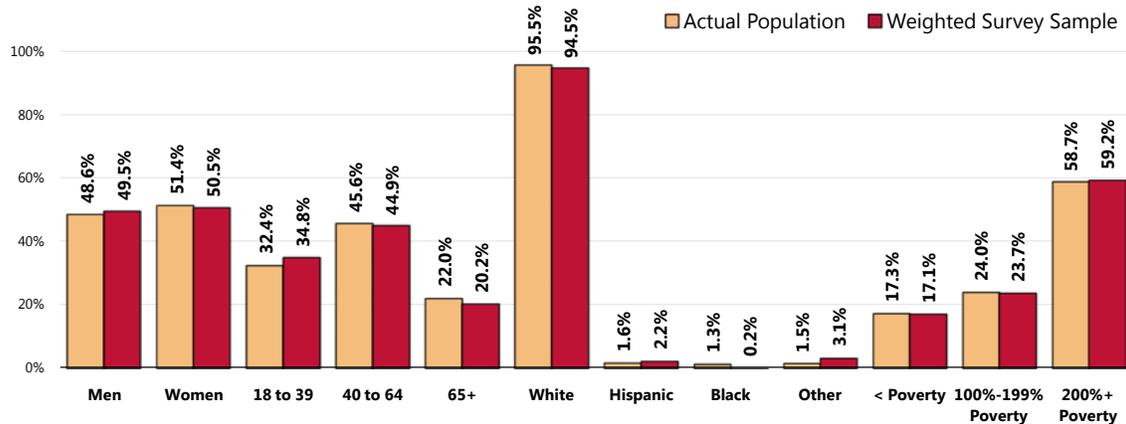
### **Sample Characteristics**

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 apply post-stratification weights to the raw data to improve this representativeness even further. 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.

**2015 PRC Community Health Needs Assessment**

**Population & Sample Characteristics**  
(Madison County, 2015)



Sources: 

- 2015 Census Estimates/Projections. Geolytics, Inc.
- 2015 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 2015 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 *2013 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**

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.

### ***Interviewing Protocols and Quality Assurance***

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.

Before going into the field in the latter half of February, 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 employs the latest CATI (computer-aided telephone interviewing) system technology in its interviewing facilities. The CATI system automatically generates the daily sample for data collection, retaining each telephone number until the Rules of Replacement are met. 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.

Interviewing for this study took place primarily during evening and weekend hours (Eastern Time: Monday-Friday 5pm-9pm; Saturday 10am-4pm; Sunday 2pm-9pm). Some daytime weekday attempts were also made to accommodate those for whom these times might be more convenient. Up to five call attempts were 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.

### ***Cell Phones***

Cell phone numbers were integrated into the sampling frame developed for the interviewing system for this project. Special protocols were followed if a cell phone number was drawn for the sample to ensure that the respondent lives in the area targeted and that (s)he is in a safe place to talk (e.g., not while driving). Using this dual-mode approach yielded a sample comprised of 6% cell phone numbers and 94% landline numbers. While this proportion is lower than actual cell phone penetration, it is sufficient in supplementing demographic segments that might otherwise be undersampled in a landline-only model, without greatly increasing the cost of administration.

### ***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 (see above for more detailed description).

**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.

## Online Key Informant Survey (Primary Data)

### Online Survey Methodology

#### ***Purpose and Survey Administration***

To solicit input from key informants (i.e., those individuals who have a broad interest in the health of the community) an Online Key Informant Survey was implemented. A list of recommended participants from our county was provided to PRC by WNC Healthy Impact along with those of other participating counties; this list included names and contact information for physicians, public health representatives, other health professionals, social service providers, and a variety of other community leaders. Potential participants were chosen because of their ability to identify primary concerns of the populations with whom they work, as well as of the community overall.

Key informants were contacted by email, introducing the purpose of the survey and providing a link to take the survey online; reminder emails were sent as needed to increase participation.

#### ***Online Survey instrument***

In the online survey, respondents had the chance to explain what view as most needed to create a healthy community, and how they feel that environment and social determinants impact health. Key informants were also asked to specifically rate the degree to which various health issues are a problem in our county; follow-up questions asked them to describe why they identify problem areas as such, and how these might be better addressed.

#### ***Participation***

In all, 32 community stakeholders took part in the Online Key Informant Survey for our county, as outlined below:

Local Online Key Informant Survey Participation		
Key Informant Type	Number Invited	Number Participating
Community/Business Leader	28	18
Other Health Provider	14	7
Physician	2	2
Public Health Representative	3	3
Social Service Provider	3	2

Through this process, input was gathered from several individuals whose organizations work with low-income, minority populations, or other medically underserved populations.

***Online Survey Limitations***

The Online Key Informant Survey was designed to gather input from participants regarding their opinions and perceptions of the health of the residents in the area. Thus, these findings are based on perceptions, not facts.

To collect this data, purposive sampling (i.e., a type of non-probability sampling which targets a specific group of people) was used. Unlike the random sampling technique employed in the telephone survey, the purpose is not to make generalizations or statistical inferences from the sample to the entire population, but to gather in-depth insights into health issues from a group of individuals with a specific perspective.