REPORT ON THE BURDEN OF CHRONIC DISEASES IN MISSISSIPPI

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Chronic Disease Burden in Mississippi

Introduction

Chronic diseases are defined broadly as conditions that last one year or more and require ongoing medical attention, limit activities of daily living, or both.[1] Chronic diseases are a leading cause of disability and death in the United States (US) and in Mississippi (MS). In 2020, seven of the ten leading causes of death in MS were due to chronic conditions including heart disease, cancer, chronic obstructive pulmonary disease (COPD), Alzheimer's disease, cerebrovascular disease, diabetes mellitus, and kidney disease. In 2020, 59.2% of Mississippi mortality was attributable to these chronic diseases. According to the US Census, in 2020, Mississippi had an estimated population of 2.96 million individuals. Within the state of MS, 56.2% of the population are Caucasian, and 37.6% of the population are African American (AA). Approximately 3.6% are of Hispanic or Latino ethnicity. Jackson, the capital city, and Gulfport are the two most heavily populated cities in Mississippi with approximately 156,803 and 72,468 residents respectively. The population aged 65 and older increased from 12.9% in 2010 to 16.4% in 2020. With the aging population and improved longevity, the burden of chronic diseases and the costs associated with treating those diseases is likely to increase over time.

Risk factors for chronic diseases can be categorized as modifiable or non-modifiable.[2] Modifiable risk factors associated with a higher prevalence of chronic disease are tobacco use, sedentary lifestyle, inadequate fruit and vegetable consumption, excessive alcohol use, and comorbidities of obesity, hypertension, high cholesterol, and diabetes. Non-modifiable risk factors are age, sex, family history or genetics, race, and ethnicity.

The social determinants of health (SDOH) are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality of life outcomes and risks.[3] The five domains of the SDOH are economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context. Social determinants of health contribute to disparities in the rates of chronic diseases and chronic disease related outcomes. In 2020, Mississippians had a median household annual income of $47,400 ($67,300 nationally). There is a wide racial disparity associated with poverty with 11.1% of Caucasians and 25.3% of African Americans in Mississippi living in poverty. Approximately 85.0% of those entering high school graduated in four years (86.0% nationally). The percentage of adults aged 25 to 44 with some post-secondary education ranged from 29% to 82% across counties with an average of 61% (67% nationally). Approximately 15% of all Mississippians lack health insurance (11% nationally). Mississippi also faces a shortage of healthcare providers in many regions across many disciplines. For example, in 2020, there was one primary care physician for 1,860 patients (1:1,310 nationally), one dentist for every 2,030 patients (1:1,400 nationally), one mental health provider for every 540 patients (1:350 nationally). One in five (19%) of Mississippians are food insecure (11% nationally). About one half (52%) of Mississippians live close to a park or recreation facility (80% nationally). In MS, between 2018 and 2020, the years of

potential life lost due to death before the age of 75 (YPLL) were 11,300 compared to 7,300 on average across the United States.

The purpose of this report is to describe the burden of chronic diseases in the state of MS across categories of race, sex, income, and education in order to highlight disparities in disease burden that exist within our state. Chronic diseases or conditions were chosen for this report based on their relevance to Mississippians and to the health of the state overall. Data for prevalence measures for leading chronic disease health indicators (Table 1) were collected from the Behavior Risk Factor Surveillance Survey (BRFSS), US mortality data were collected from the National Vital Statistics System (NVSS), and MS mortality data were collected from the Mississippi Vital Statistics System (MSVSS). For each chronic disease indicator presented, an overview is provided that includes a description of the disease or disease process, modifiable and non-modifiable risk factors associated with the disease, the percentage of MS adults reporting having been diagnosed with the disease along with a comparison to the burden at the national level, and a description of risk stratified by demographic categories within race, sex, income, and education level. Mortality rates for leading causes of death in MS are presented alongside rates for the counties in the MS Delta Region (MSDR) in order to illustrate the disparity experienced in this region. Further, US mortality rates for the same indicators are provided for context.

Chronic Disease Indicators

Table 1: List of Chronic Disease Indicators, Definitions, and Data Sources

Indicator	Definition	Data Source
Arthritis		
Self-reported arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia	Percentage of adults who report ever having physician diagnosed arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia	BRFSS
Asthma		
Self-reported Asthma	Percentage of adults who report ever having physician diagnosed asthma	BRFSS
Cancer		
Self-reported skin cancer	Percentage of adults who report ever having physician diagnosed skin cancer	BRFSS
Self-reported other cancers	Percentage of adults who report every having physician diagnosed cancers other than skin cancer	BRFSS
Screening for breast cancer	Percentage of women 40+ years who report having had a mammogram within the previous 2 years	BRFSS
Screening for cervical cancer	Percentage of women 21-65 years who report having had a Pap smear within the previous 3 years	BRFSS
Screening for colorectal cancer	Percentage of adults aged 50-75 years who met the US Preventive Service Taskforce recommendation for colorectal cancer screening	BRFSS
Cardiovascular Disease		
Self-reported angina or coronary heart disease (CHD)	Percentage of adults who report ever having physician diagnosed CHD	BRFSS

Self-reported myocardial infarction (MI) or heart attack	Percentage of adults who report ever having physician diagnosed MI or Heart Attack	BRFSS
Self-reported stroke	Percentage of adults who report ever having physician diagnosed stroke	BRFSS
Chronic Obstructive Pulmonary Disease (COPD)		
Self-reported COPD	Percentage of adults who report ever having physician diagnosed COPD	BRFSS
Depressive Disorder		
Self-reported depressive disorder	Percentage of adults who report ever having physician diagnosed depressive disorder	BRFSS
Diabetes and Related Complications		
Self-reported pre-diabetes	Percentage of adults who report ever having physician diagnosed pre-diabetes or borderline diabetes	BRFSS
Self-reported diabetes	Percentage of adults who report ever having physician diagnosed diabetes*	BRFSS
Self-reported kidney disease	Percentage of adults who report ever having physician diagnosed kidney disease	BRFSS
Oral Health		
Annual dental visit	Percentage of adults who visited the dentist or dental clinic within the past year for any reason	BRFSS
Any teeth extracted	Percentage of adults 65+ years of age who have had any permanent teeth extracted	BRFSS
All teeth extracted	Percentage of adults 65+ years of age who have had all permanent teeth extracted	BRFSS
Tobacco Use		
Current smoking	Percentage of adults who currently smoke every or some days	BRFSS
Current smokeless tobacco use	Percentage of adults who currently use smokeless tobacco every day or some days	BRFSS
Current e-cigarette use	Percentage of adults who currently use e-cigarettes or other electronic vaping products every day or some days	BRFSS
	Weight Status	
BMI Category	Obese: Percentage of adults who have a BMI > 30.0 kg/m^2 calculated from self-reported weight and height Overweight: Percentage of adults who have a BMI between 25.0 and < 30.0 kg/m^2 calculated from self-reported weight and height	BRFSS

	Normal: Percentage of adults who have a BMI between 18.5 and < 25.0 kg/m² calculated from self-reported weight and height Underweight: Percentage of adults who have a BMI < 18.5 kg/m² calculated from self-reported weight and height	
Overweight or Obesity BMI	Percentage of adults who have a BMI > 25.0 kg/m² calculated from self-reported weight and height	BRFSS
Mortality Due to Chronic Diseases		
Deaths related to cancer	Deaths with ICD-10 codes C00–C97 as the underlying cause of death among residents**	MS Vital Statistics
Deaths related to heart disease	Deaths with ICD-10 codes I00–I09, I11, I13, and I20–I51 as the underlying cause of death among residents**	MS Vital Statistics
Deaths related to stroke	Deaths with ICD-10 codes I60–I69 as the underlying cause of death among residents**	MS Vital Statistics
Deaths related to type 2 diabetes	Deaths with ICD-10 codes E10–E14 as an underlying or contributing cause of death among residents**	MS Vital Statistics

Note: All indicators refer to adults 18 years or older unless otherwise indicated.
Abbreviations: BRFSS=Behavioral Risk Factor Surveillance System; BMI=Body Mass Index; CDC=Centers for Disease Control and Prevention; ICD=International Classification of Diseases; MS=Mississippi.
*Excluding women who were told only when pregnant.
**During a calendar year.

Arthritis

Arthritis is a general term for conditions that affect the joints and connective tissue.[4] Symptoms vary by type of arthritis, but generally include joint pain and stiffness. Osteoarthritis, occurring in the hands, hips, or knees, is the most common form of arthritis.[5] When arthritis is severe, it can lead to reduced physical function and disability. Risk factors for arthritis include joint injury or overuse, increased age, being female, obesity, and genetics or a family history of arthritis. Arthritis can be prevented or managed by being physically active (at least 150 minutes of moderate physical activity per week). Low-impact exercises such as walking, or swimming are recommended. Maintaining a healthy weight also reduces pressure on joints, especially hips and knees.

An estimated 58.5 million adults in the United States (US) have arthritis.[6] As the US population ages, that number will increase. It is estimated that arthritis limits the usual activities of 25.7 million adults. Arthritis is more common among people with obesity, diabetes, and heart disease. In 2020, 30.4% of Mississippi adults reported being diagnosed with some form of arthritis, rheumatoid arthritis, gout, lupus or fibromyalgia compared to 24.2% nationally (Fig. 1). Females in Mississippi were 1.403 times more likely than males to report being diagnosed with arthritis (95% CI [1.393, 1.412]). African Americans were 0.636 times as likely as Caucasians to report being diagnosed with arthritis (95% CI [0.631, 0.641]). As income and educational attainment increase, arthritis decreases significantly ($p<0.05$) (Fig. 2). Those who were overweight or obese in Mississippi (BMI > 25.0) were 1.682 times more likely to report being diagnosed with arthritis when compared to those with a normal BMI. The percentage of Mississippi adults ever diagnosed with some form of arthritis

has remained relatively stable over the last decade and ranged from 28.6% in 2015 to 32.2% in 2018 (Fig. 3).

Figure 1: Percentage of Mississippi and US Adults Ever Diagnosed with Some Form of Arthritis, Rheumatoid Arthritis, Gout, Lupus, or Fibromyalgia, 2020

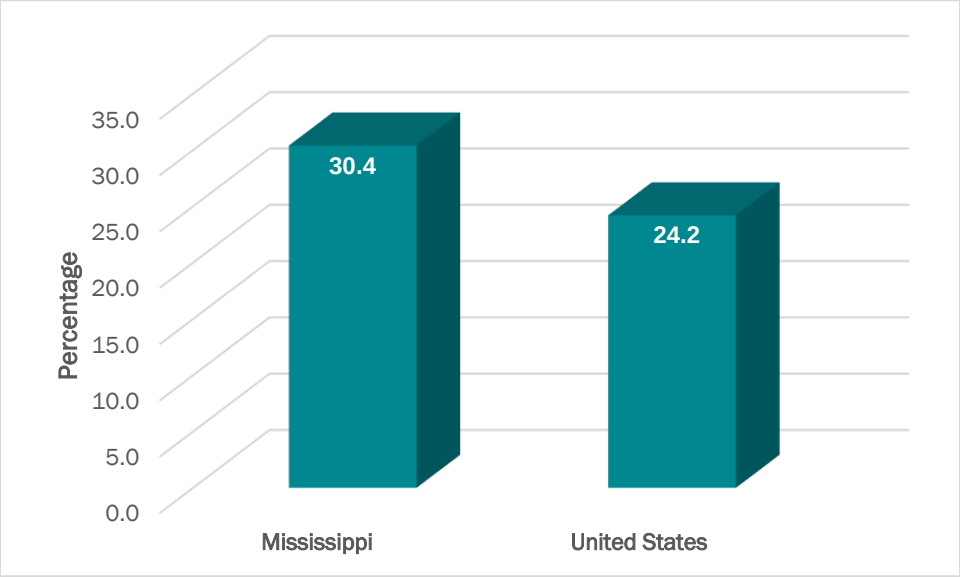


Figure 2: Percentage of Mississippi and US Adults Ever Diagnosed with Some Form of Arthritis, Rheumatoid Arthritis, Gout, Lupus, or Fibromyalgia by Income Level, Educational Attainment, Race, and Sex; 2020

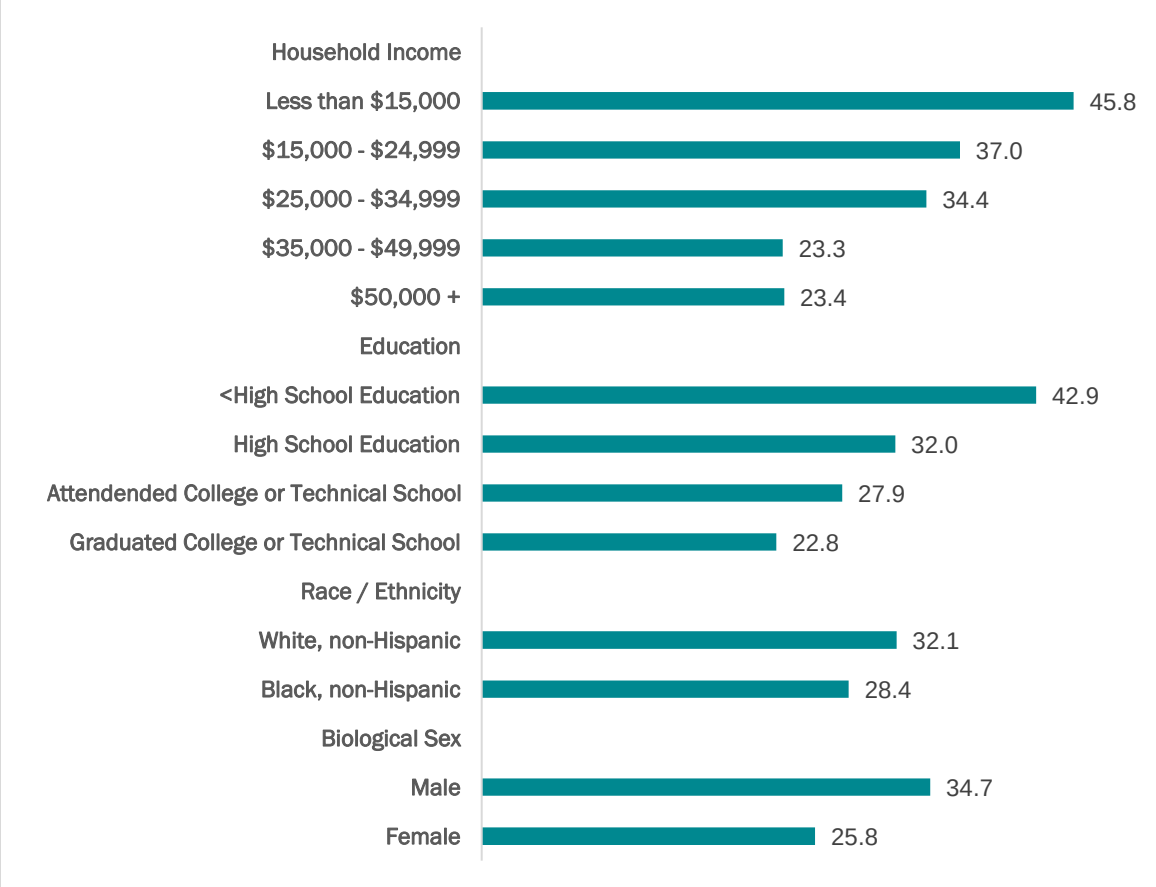
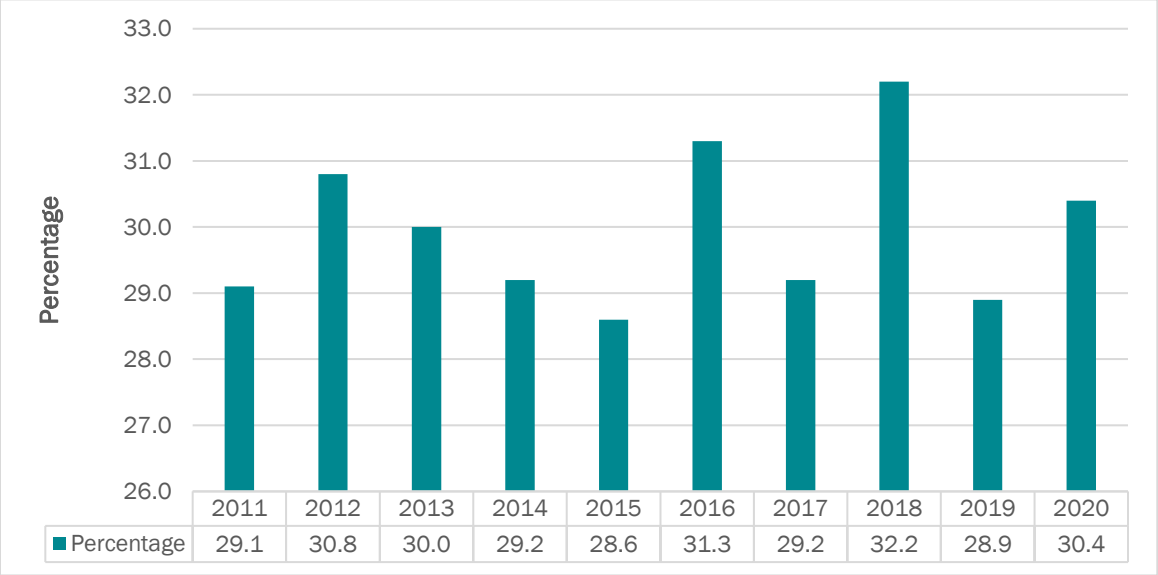


Figure 3: Percentage of Mississippi Adults Ever Diagnosed with Some Form of Arthritis, Rheumatoid Arthritis, Gout, Lupus, or Fibromyalgia by Income Level, Educational Attainment, Race, and Sex; 2011 - 2020



Asthma

Asthma is a chronic condition that affects the airways in the lungs. Asthma can cause airways to become inflamed and narrow, making it difficult to exhale. For some people, asthma "attacks" are sporadic and occur only when triggered by an environmental irritant. Others who have persistent asthma may have difficulty breathing more often than not. Symptoms vary with severity but most people who have asthma experience coughing, wheezing, chest tightness, or shortness of breath.[7] When asthma is severe, it can be life-threatening. Risk factors include having a family history of asthma, history of viral respiratory infections as a child, having an allergic condition such as eczema or allergic rhinitis, occupational exposures such as industrial or wood dusts or chemical fumes and vapors, smoking, exposure to air pollution and smog (ozone), and obesity.[8] Asthma can be brought under control by providing individual education around asthma self-management, decreasing tobacco use and exposure to second-hand smoke, identifying and reducing exposure to indoor, outdoor, and occupational triggers that bring about asthma "attacks."[9]

An estimated 21.0 million adults ages 18 and over in the US have asthma.[10] In Mississippi, 14.2% of adults reported being diagnosed with asthma compared to 13.9% nationally (Fig. 4). Females in Mississippi were 1.255 times more likely than males to report being diagnosed with asthma (95% CI [1.243, 1.266]). African Americans were 1.13 times more likely than Caucasians to report being diagnosed with asthma (95% CI [1.121, 1.139]). As income and educational attainment increase, there is an overall downward trend in asthma diagnosis. Individuals with an annual income of $15,000 or less, were 2.591 times more likely to have been diagnosed with asthma than individuals with $50,000 or more (95% CI [2.553, 2.628]), and those with a level of educational attainment less than a high school diploma were 1.163 times more likely to have been diagnosed with asthma than individuals who had graduated college or technical school (95% CI [1.145, 1.182]) (Fig. 5). The percentage of Mississippi adults ever diagnosed with asthma over the last decade ranged from

11.7% in 2012 and peaked at 15.2% in 2018. Mississippi experienced slight declines in 2019 (14.4%) and 2020 (14.2%) (Fig. 6).

Figure 4: Percentage of Mississippi and US Adults Ever Diagnosed with Asthma, 2020

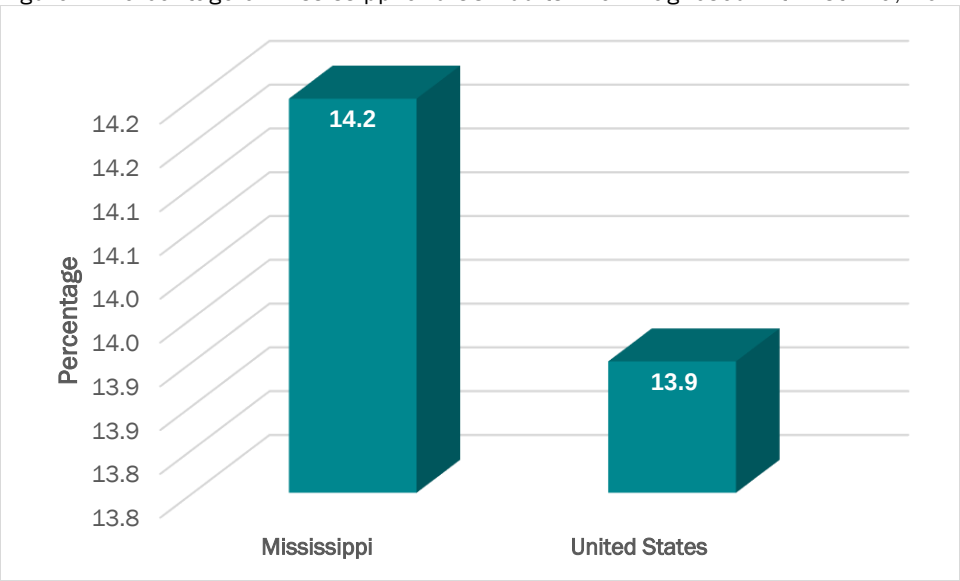


Figure 5: Percent of Mississippi Adults Ever Diagnosed with Asthma by Income Level, Educational Attainment, Race, and Sex; 2020

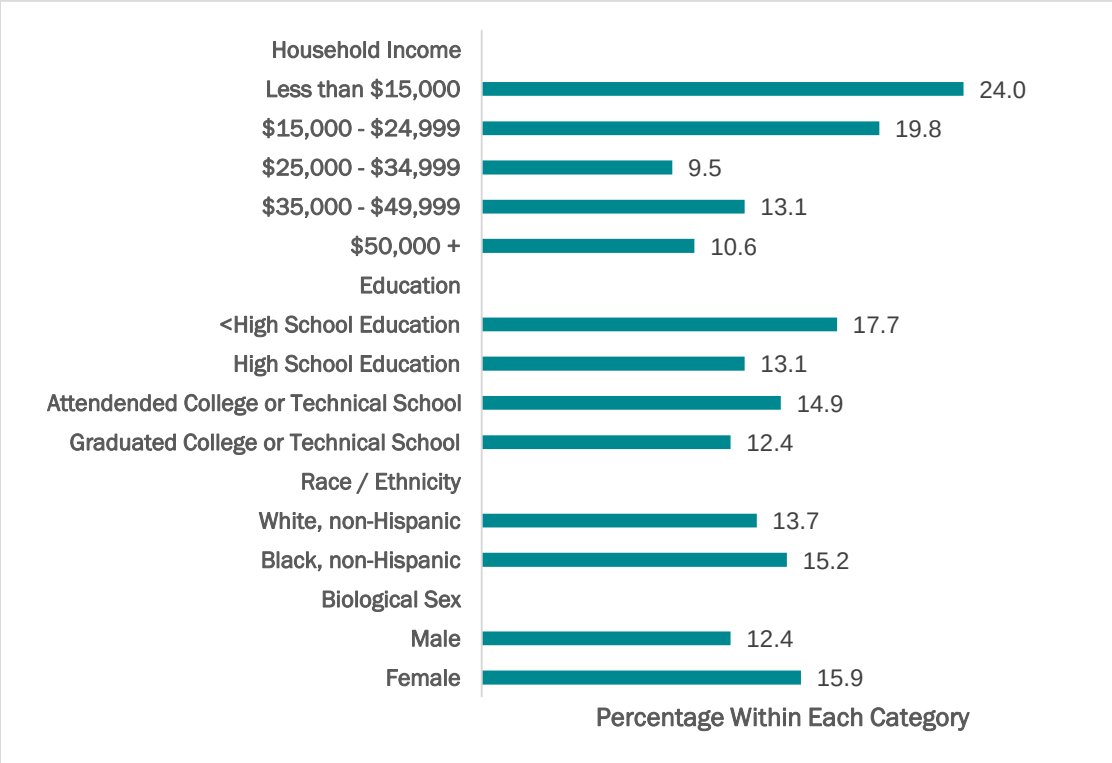
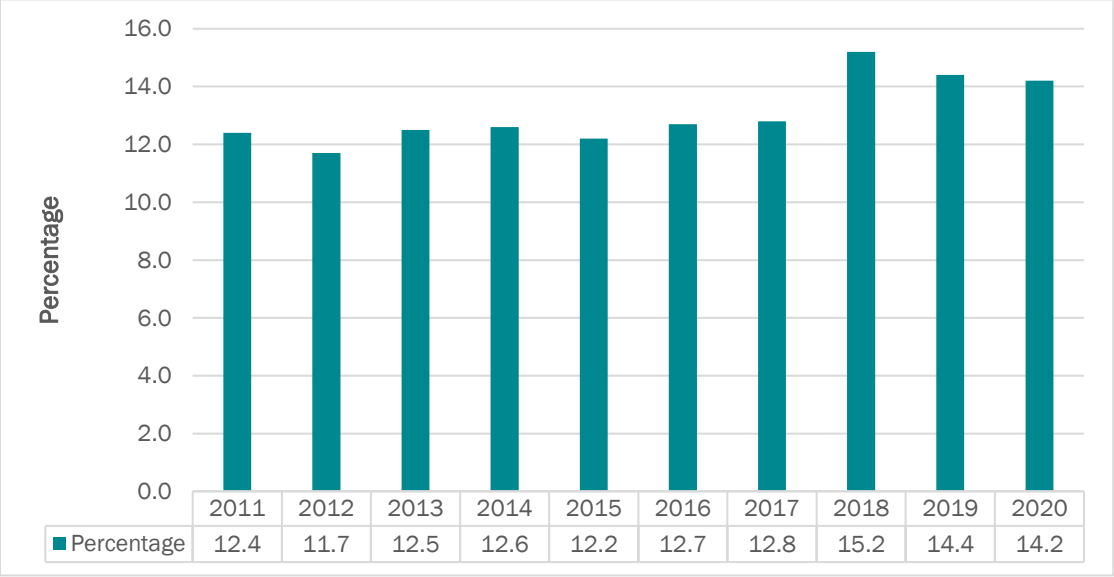


Figure 6: Percentage of Mississippi Adults Ever Diagnosed with Asthma, 2011-2020



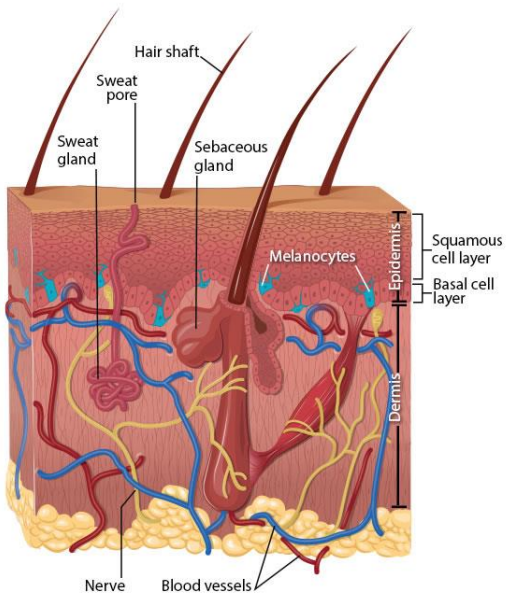
Cancer

Cancer is the second leading cause of death in the US.[11] Death rates are higher for some cancers and in some racial and ethnic minority groups. The burden of specific cancers, risk factors, and prevention strategies are provided below. Cancer screening, looking for signs of cancer before a person has symptoms, can help find cancer at an early stage. Mississippi mortality data attributed to specific cancers were collected from the MS Vital Statistics System (MS Statistically Automated Health Resource System). Data from indicators that capture individuals' participation in cancer screening were collected from the BRFSS.

Skin Cancer

Figure 7: Layers of Skin from Which Skin Cancer Can Originate[9]

Skin cancer is a disease in which malignant (cancer) cells form in the tissue in the skin (Fig. 7). Skin cancer is the most common form of cancer in the US.[12] The main types of skin cancer are squamous cell carcinoma, basal cell carcinoma, and melanoma.[13] Most basal cell and squamous cell skin cancers can be cured. Most deaths from skin cancer are caused by melanoma because melanoma is more likely to spread to nearby tissues and other parts of the body. Anyone can get skin cancer, but those with a lighter natural skin color or skin that burns, freckles, reddens easily are at higher risk for skin cancer.[14] Additionally, those with blue or green eyes, or blond or red hair, are at higher risk. Lastly, those with a personal or family history of skin cancer have a higher risk of developing new skin cancers. Skin cancer risk also increases with age. Skin cancer risk can be reduced by decreasing exposure to Ultraviolet (UV) waves.[15] The sun is a natural source of UV waves, and tanning beds and some nail polish curing lights are sources of artificial UV exposure. Avoiding exposure to artificial UV waves and utilizing proper sun protection such as wearing barrier clothing and applying sunscreen are useful skin cancer prevention strategies.



It is estimated that 5.4 million cases of basal cell and squamous cell carcinoma are diagnosed annually in the US. The US age-adjusted incidence rate of melanoma in 2020 was 22.6 per 100,000 population. Mississippi fared slightly better than the nation with an age-adjusted incidence rate of 17.9 per 100,000 population. The percentage of people in MS reporting ever being diagnosed with skin cancer was 5.6% compared to 6.1% nationally (Fig. 8). Males in MS were 1.494 times more likely than females to report being diagnosed with skin cancer (95% CI [1.464, 1.505]). Caucasians were 22.222 times more likely to report being diagnosed with skin cancer (95% CI [21.277, 23.256]). As income and educational attainment increase, there is an overall upward trend in skin cancer diagnosis (Fig. 9). The percentage of Mississippi adults ever diagnosed with skin cancer has remained stable over the last decade ranging from 5.4% in 2017 to 6.3% in 2019 (Fig. 10). This percentage decreased to 5.6% in 2020.

Figure 8: Percentage of Mississippi and US Adults Ever Diagnosed with Skin Cancer, 2020

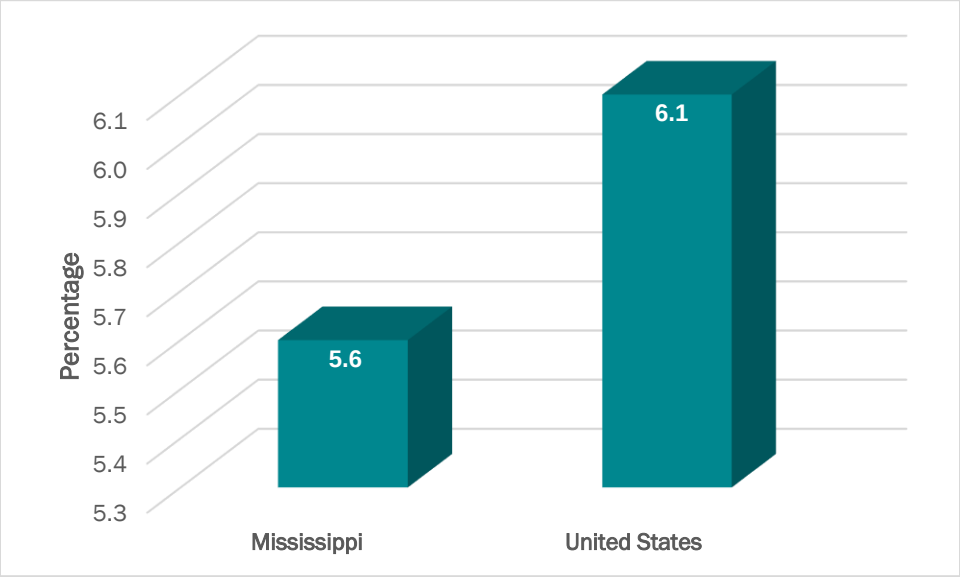


Figure 9: Percent of Mississippi Adults Ever Diagnosed with Skin Cancer by Income Level, Educational Attainment, Race, and Sex; 2020

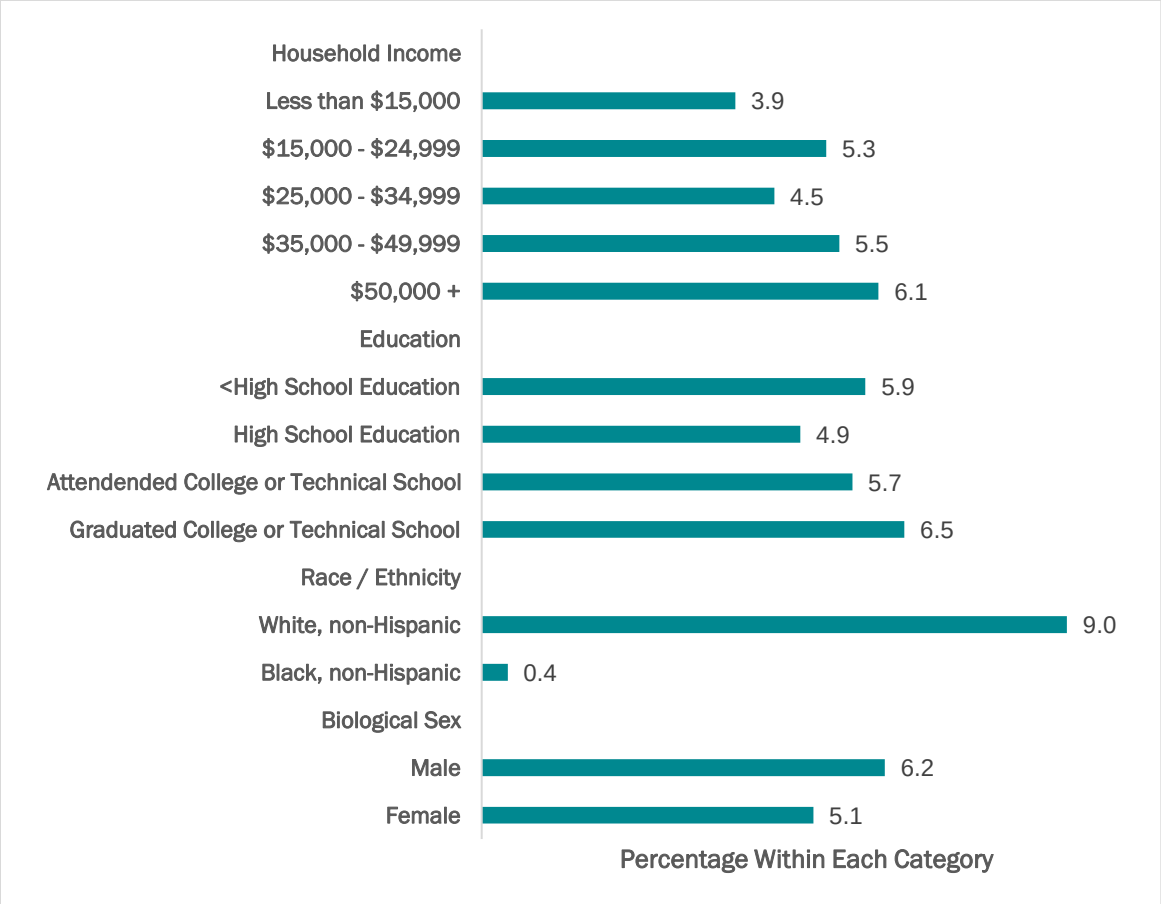
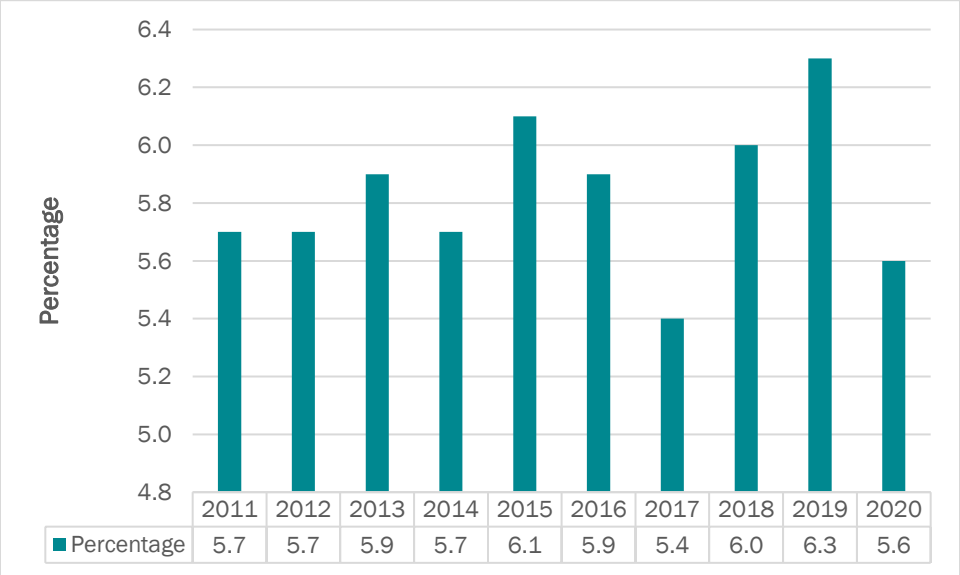


Figure 10: Percentage of Mississippi Adults Ever Diagnosed with Skin Cancer, 2011-2020



Other Cancers

In the US, the latest 5-year average (2014-2018) age-adjusted incidence rate of all cancers for which there is data available through the Surveillance, Epidemiology, and End Result (SEER) or the National Program of Cancer Registries was 448.6 per 100,000 population.[16] The same rate for the state of MS was 474.4 per 100,000 population. The BRFSS collects data around whether respondents have ever been diagnosed with a cancer other than skin cancer. Though not a measure of the burden associated with a specific cancer, the indicator serves as a representation of overall cancer burden. In Mississippi, 6.7% of BRFSS participants reported ever being diagnosed with a cancer other than skin cancer compared to 6.5% nationally (Fig. 11). In MS, there was not a significant difference in prevalence of all cancers between males and females, however there was an overall downward trend in prevalence of all cancers as educational attainment and income increased (Fig. 12). For example, those that had an annual income of $15,000 or less were 2.240 times as likely to have been diagnosed with a cancer other than skin cancer when compared to those who made $50,000 or more annually (95% CI [2.193, 2.288]). Further, those who had not earned a high school diploma or equivalent were 1.033 times more likely to have been diagnosed with a cancer other than skin cancer when compared to those who had graduated from a college or technical school (95% CI [1.011, 1.055]). The percentage of Mississippi adults ever diagnosed with cancer other than skin over the last decade ranged from 6.2% in 2011 to a peak of 7.1% in 2017 and 2018. In 2019, Mississippi experienced a decline in the percentage of adults reporting having a cancer diagnosis other than skin cancer (6.6%), and this percentage rose slightly in 2020 (6.7%) (Fig. 13).

Figure 11: Percentage of Mississippi and US Adults Ever Diagnosed with Cancer Other Than Skin Cancer, 2020

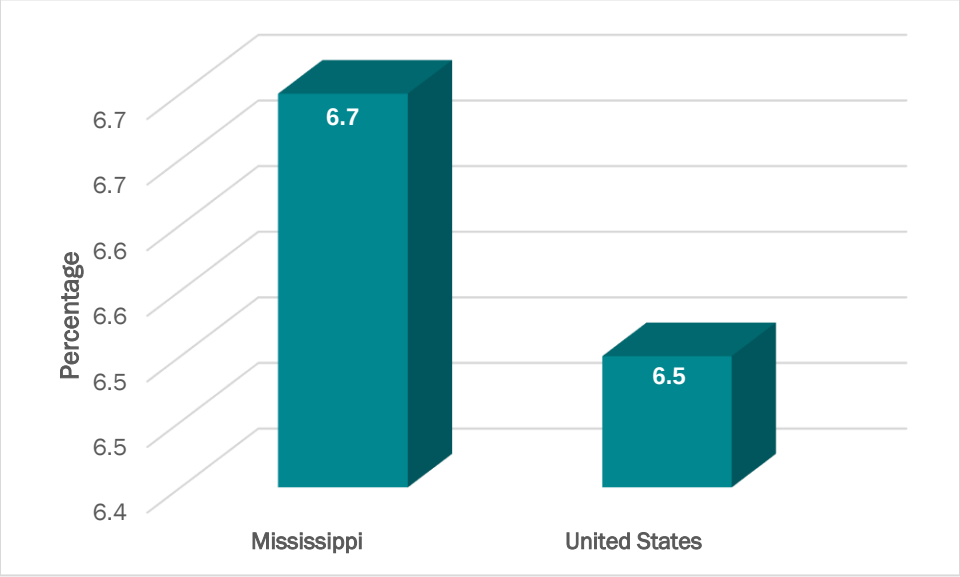


Figure 12: Percent of Mississippi Adults Ever Diagnosed with Cancers Other Than Skin Cancer by Income Level, Educational Attainment, Race, and Sex; 2020

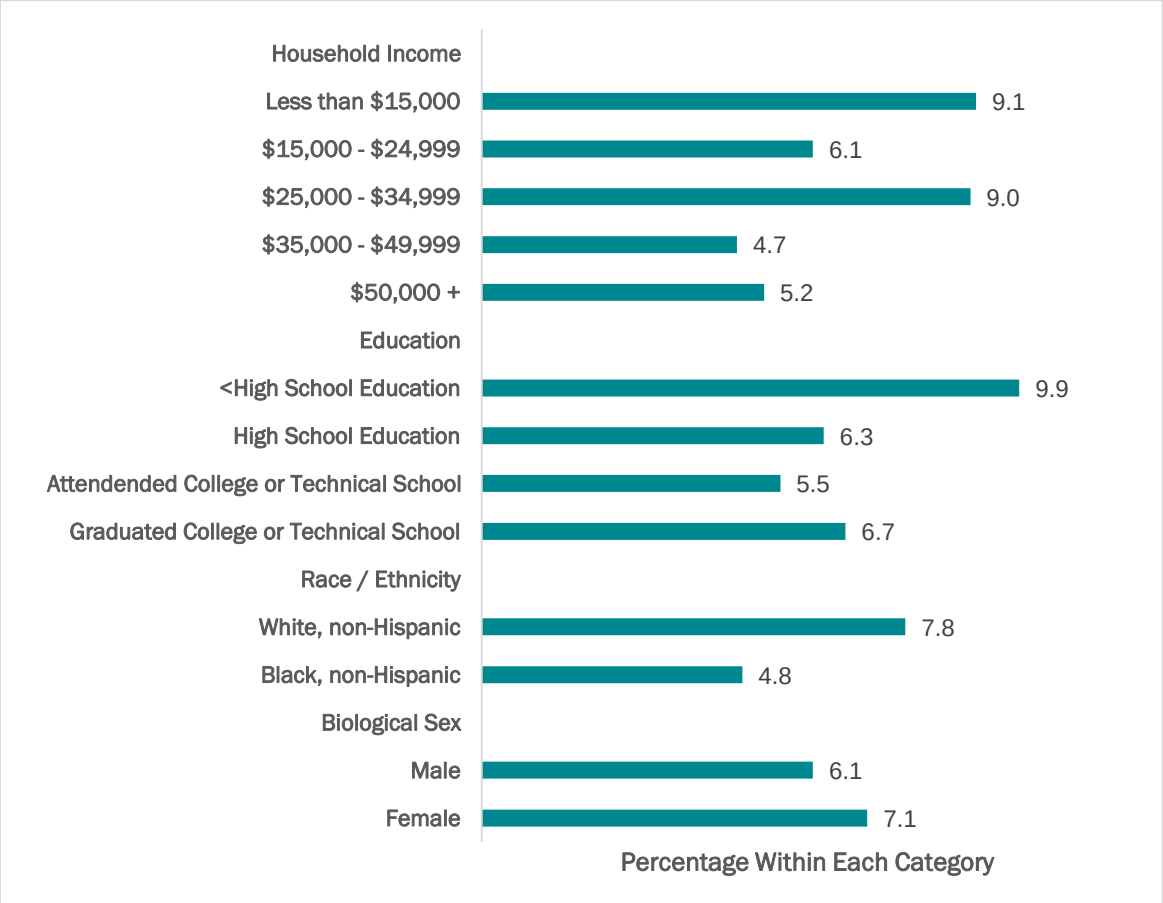
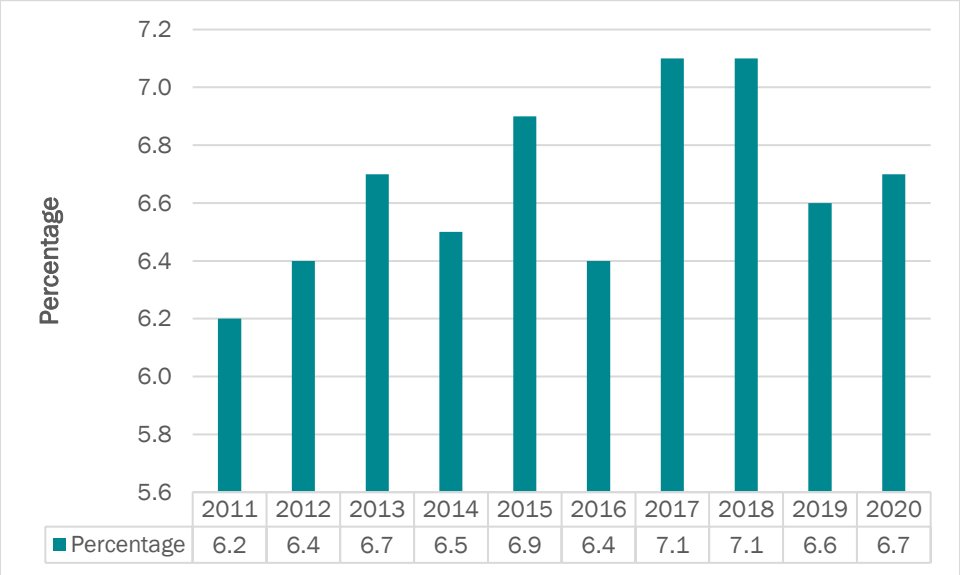


Figure 13: Percentage of Mississippi Adults Ever Diagnosed with Cancer Other Than Skin Cancer, 2011-2020



Screening for Breast Cancer

Breast Cancer is the second most common cancer in women after skin cancer. Risk factors for breast cancer include older age, a personal history of previous breast cancer or an inherited risk of breast cancer, dense breast tissue, a reproductive history resulting in greater exposure to estrogen including early onset of menstruation or starting menopause at a later age, taking hormone therapy for symptoms of menopause, radiation therapy to the breast or chest, obesity, and drinking alcohol.[17]

Breast cancer screening guidelines[18] suggest that women at average risk for breast cancer should have the option to start screening with a mammogram every year between the ages of 40 and 44, and women age 45 to 54 should get mammograms every year. Beyond the age of 55, a mammogram at least every two years is recommended.

The percentage of Mississippi women ages 40 and over who participated in mammogram screening in the last two years was 69.3% compared to 71.0% nationally (Fig. 14). Factors associated with mammogram screening participation were increased annual household income and higher educational attainment (Fig. 15). Efforts to engage African American women in mammogram screening have been successful in that they were 2.548 times more likely than Caucasian women to have had a mammogram in the last two years when models were adjusted for age, income, and educational attainment (95% CI [2.511, 2.585]).

The BRFSS module containing questions related to mammogram screening was administered bi-annually, and trends of mammogram participation for Mississippi adults can be found in Figure 16. Over the last decade, participation in mammogram screening was at its lowest in 2018 (65.3%) but rebounded considerably in 2020 (69.3%).

Figure 14: Percentage of Mississippi and US Women Age 40+ Who Participated in Mammogram Screening in the Last Two Years, 2020

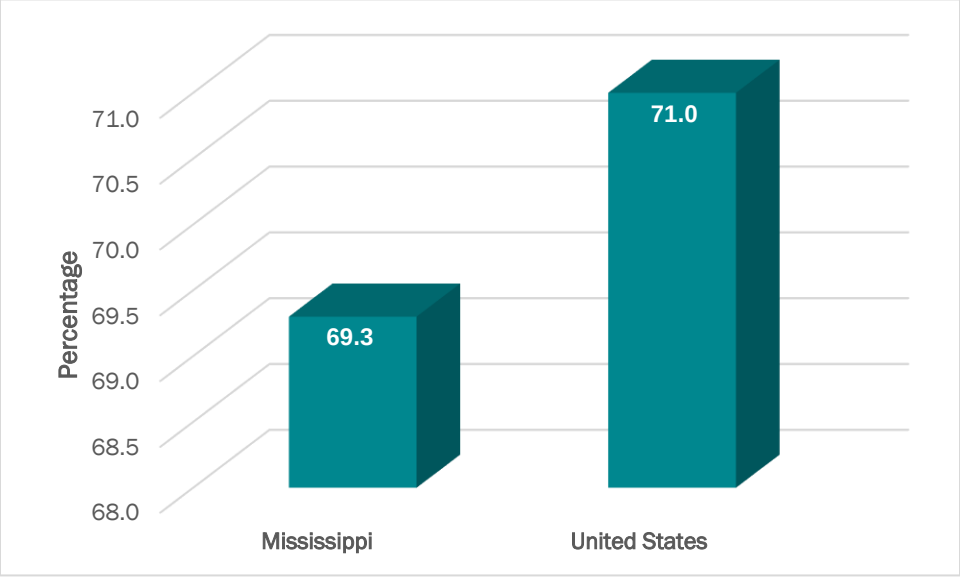


Figure 15: Percentage of Mississippi and US Women Age 40+ Who Participated in Mammogram Screening in the Last Two Years by Income Level, Educational Attainment, and Race; 2020

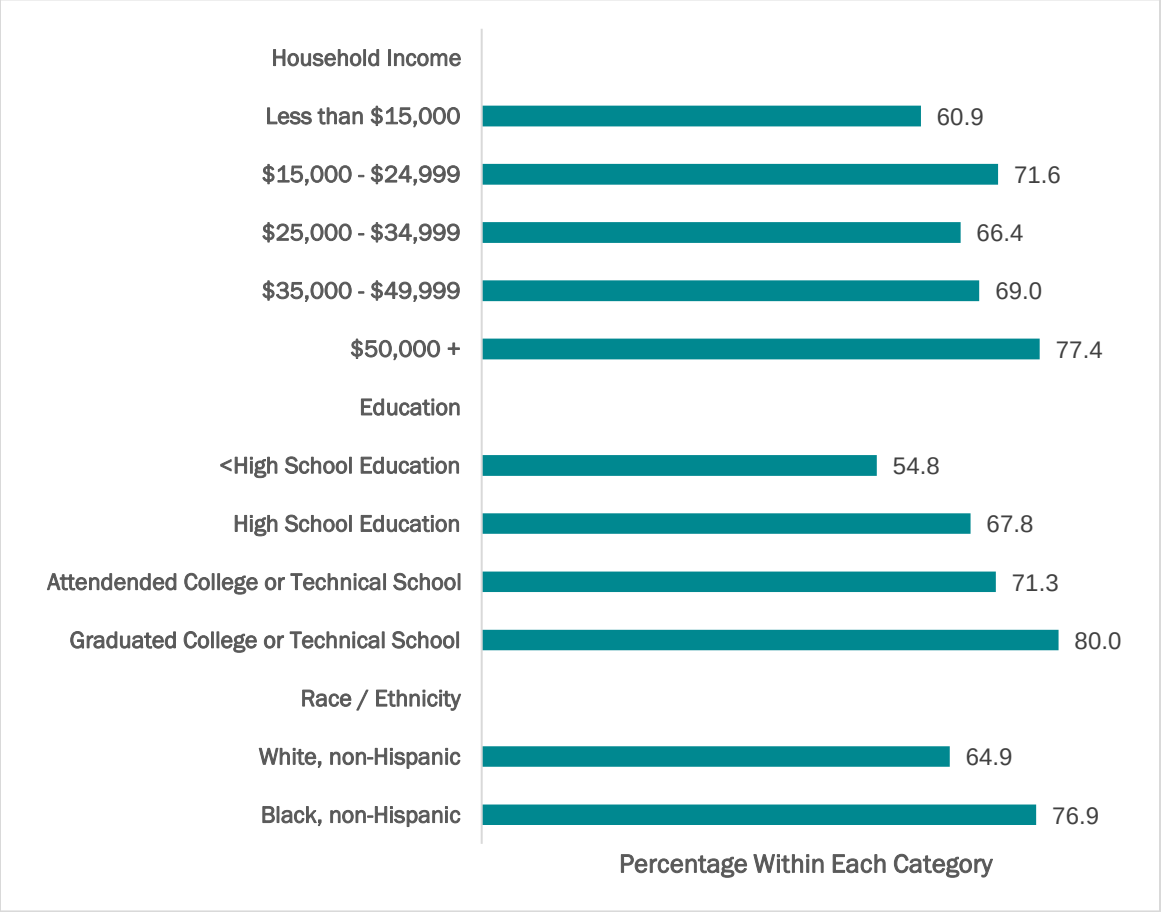
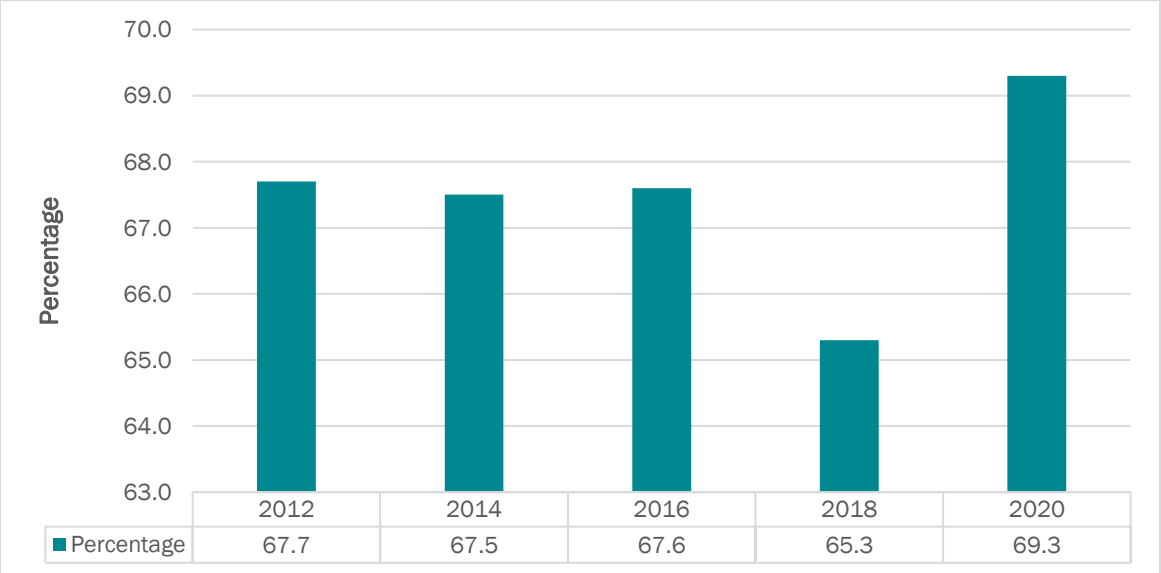


FIGURE 16: Percentage of Mississippi Women Age 40+ Who Participated in Mammogram Screening in the Last Two Years, 2012 – 2020



Screening for Cervical Cancer

Cervical Cancer is both preventable and curable if detected early. Risk factors for cervical cancer include having human papillomavirus (HPV), having HIV, smoking, using oral contraceptive for five or more years, having given birth to three or more children, and having multiple sexual partners.[19] Strategies to prevent cervical cancer include receiving the HPV vaccine, and participating in cervical cancer screening. Screening guidelines suggest that women should begin getting Pap tests at age 21 years old, and if their result is normal, they should receive subsequent tests at least every three years until age 65.

The percentage of Mississippi women ages 21-65 who participated in cervical cancer screening (Pap Test) in the last three years was 82.3% compared to 77.5% nationally (Fig. 17). Efforts to engage women in cervical cancer screening have been successful in that the MS participation rate is significantly higher than the US participation rate ($p<0.05$). African American women were 3.718 times more likely than Caucasian women to have had cervical cancer screening in the last three years when models were adjusted for age, income, and educational attainment (95% CI [3.650, 3.788]). As income and education increases, participation in cervical cancer screening increases significantly ($p<0.05$) (Fig. 18).

The BRFSS module containing questions related to cervical cancer screening was administered bi-annually, and trends of screening participation over the last decade for Mississippi adults can be found in Figure 19. Participation in cervical cancer screening was at its lowest in 2012 (78.3%) and peaked in 2014 (83.5%), but remained stable from 2018 to 2020 (82.3%) (Fig. 19).

Figure 17: Percentage of Mississippi and US Women Aged 21 – 65 Who Participated in Cervical Cancer Screening (Pap Test) in the Last Three Years, 2020

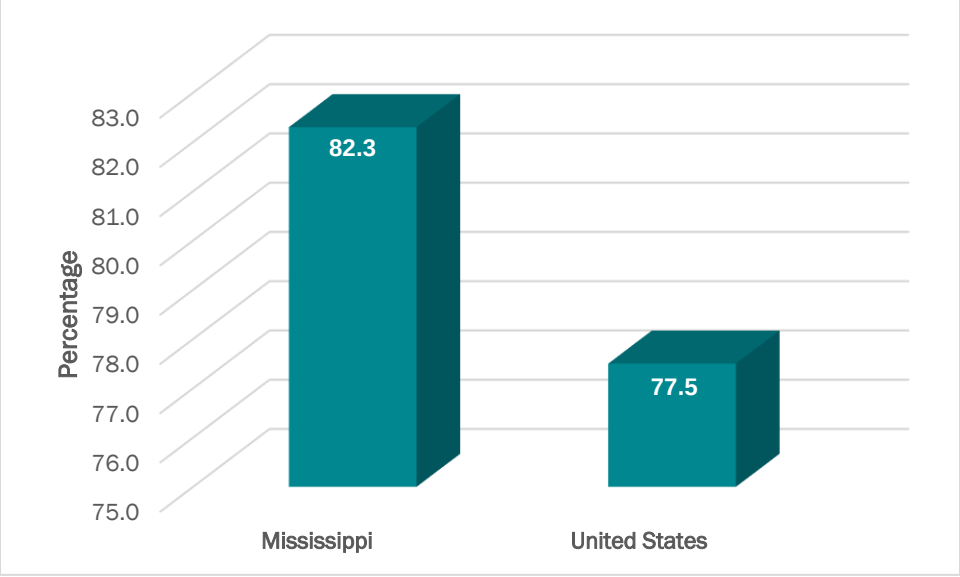


Figure 18: Percentage of Mississippi and US Women Aged 21 – 65 Who Participated in Cervical Cancer Screening (Pap Test) in the Last Three Years by Income Level, Educational Attainment, and Race; 2020

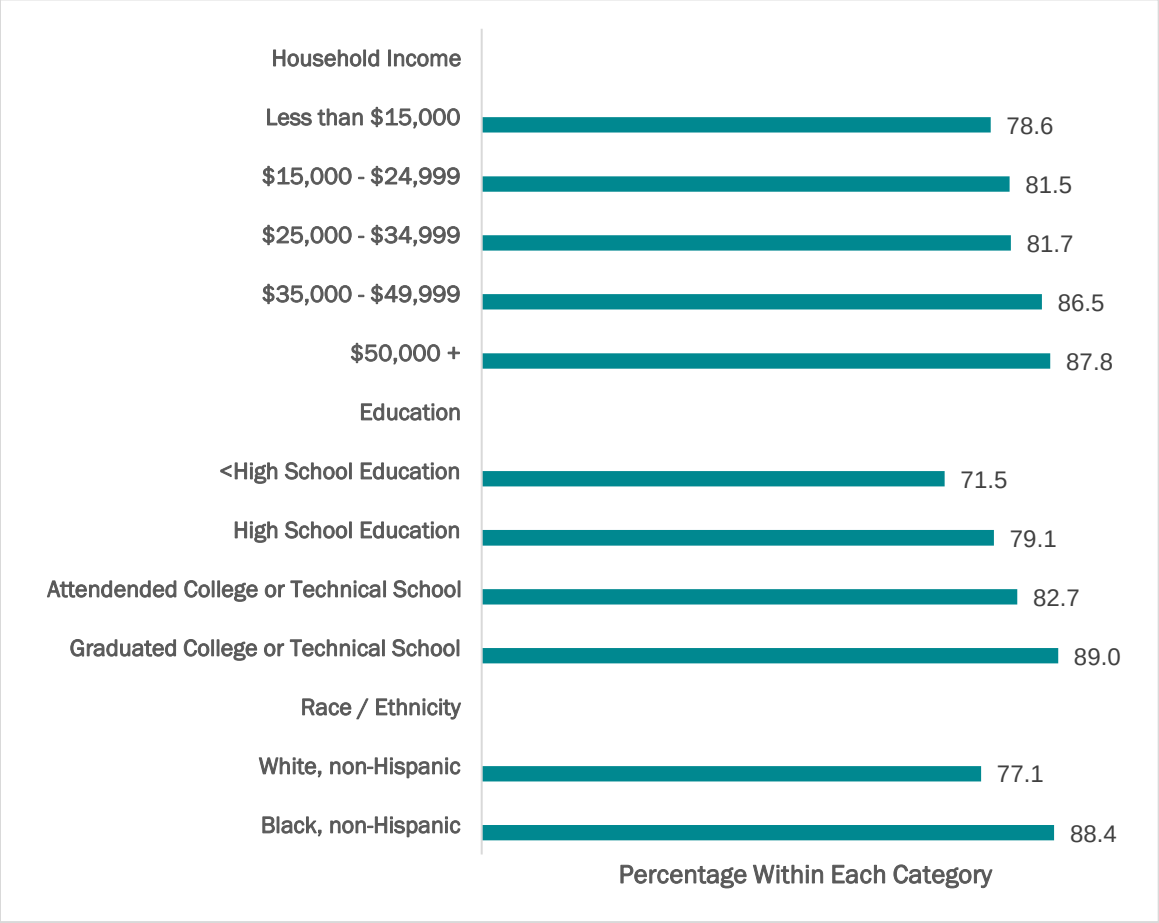
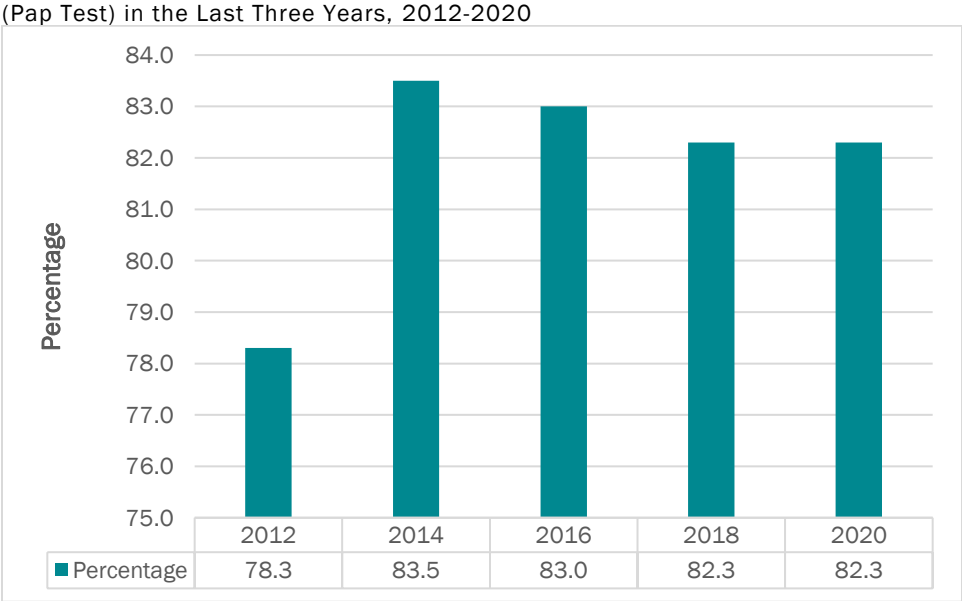


FIGURE 19: Percentage of Mississippi Women Aged 21 – 65 Who Participated in Cervical Cancer Screening (Pap Test) in the Last Three Years, 2012-2020



Screening for Colorectal Cancer

Colorectal cancer is the third leading cause of cancer death for both men and women. It is a disease in which cells in the colon or rectum grow out of control. Sometimes abnormal growth, called polyps, form in the colon or rectum and, over time, can become cancerous. Most colorectal cancers are diagnosed in people ages 65-74. Risk factors for colorectal cancer include age, having inflammatory bowel disease, or having a family history of colorectal cancer or colorectal polyps. Lifestyle factors such as lack of regular physical activity, a diet low in fruit and vegetables, overweight and obesity, alcohol consumption, and tobacco use may also contribute to risk of developing colorectal cancer.

Strategies to prevent colorectal cancer include identifying and removing precancerous polyps through screening. The USPSTF recommends[20] that all adults aged 45 to 75 years be screened for colorectal cancer. Several recommended screening tests are available, all with different frequencies of screening, location of screening (home or office), methods of screening (stool-based or direct visualization), preprocedural bowel preparation, anesthesia or sedation during the test, and follow-up procedures for abnormal findings.

Recommended screening strategies[20] include:

- High-sensitivity guaiac fecal occult blood test (HSgFOBT) or fecal immunochemical test (FIT) every year
- Stool DNA-FIT every 1 to 3 years • Computed tomography colonography every 5 years
- Flexible sigmoidoscopy every 5 years • Flexible sigmoidoscopy every 10 years + annual FIT
- Colonoscopy screening every 10 years

Selectively screen adults aged 76 to 85 years for colorectal cancer.

- Discuss together with patients the decision to screen, taking into consideration the patient's overall health status (life expectancy, comorbid conditions), prior screening history, and preferences.

The percentage of Mississippi adults ages 50-75 who met the USPSTF recommendations for colorectal screening within the recommended time interval was 70.9% compared to 72.4% nationally (Fig. 20). African American adults were 1.210 times more likely to participate in colorectal screening than Caucasian adults (95% CI [1.195, 1.226]), and as income and education increased, participation in colorectal cancer screening increased significantly ($p<0.05$) (Fig. 21).

The BRFSS module containing questions related to colorectal cancer screening was first administered in 2014 and has been administered bi-annually since that time. Mississippi experienced a consistent upward trend in colorectal cancer screening participation from 2014 (60.2%) to present (70.9%) (Fig. 22).

Figure 20: Percentage of Mississippi Adults and US Adults Aged 50 – 75 Who Met the United States Preventive Services Task Force (USPSTF) Recommendations for Colorectal Screening Within the Recommended Time Interval, 2020

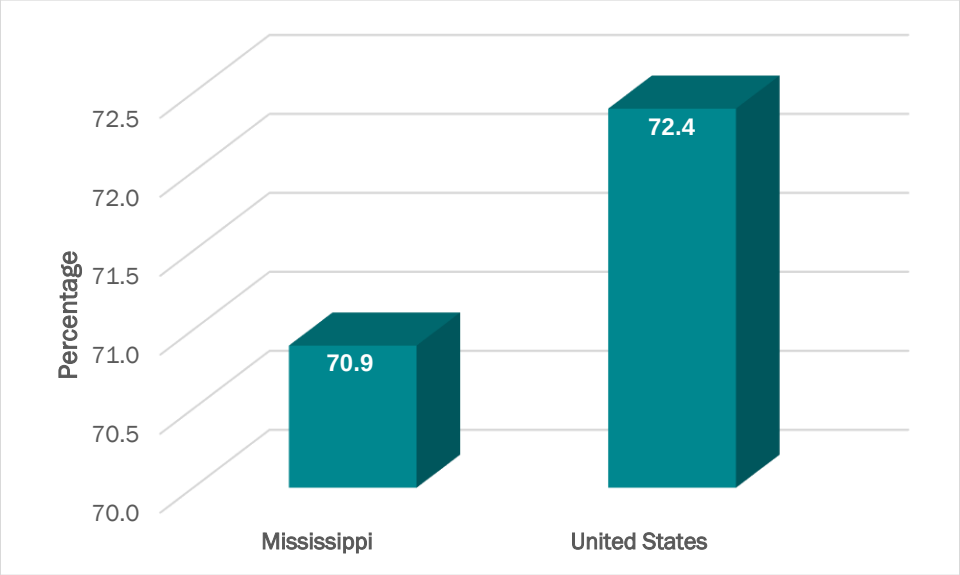


Figure 21: Percentage of Mississippi Adults Aged 50 – 75 Who Met the United States Preventive Services Taskforce Recommendations for Colorectal Screening Within the Recommended Time Interval by Income Level, Educational Attainment, Race, and Sex; 2020

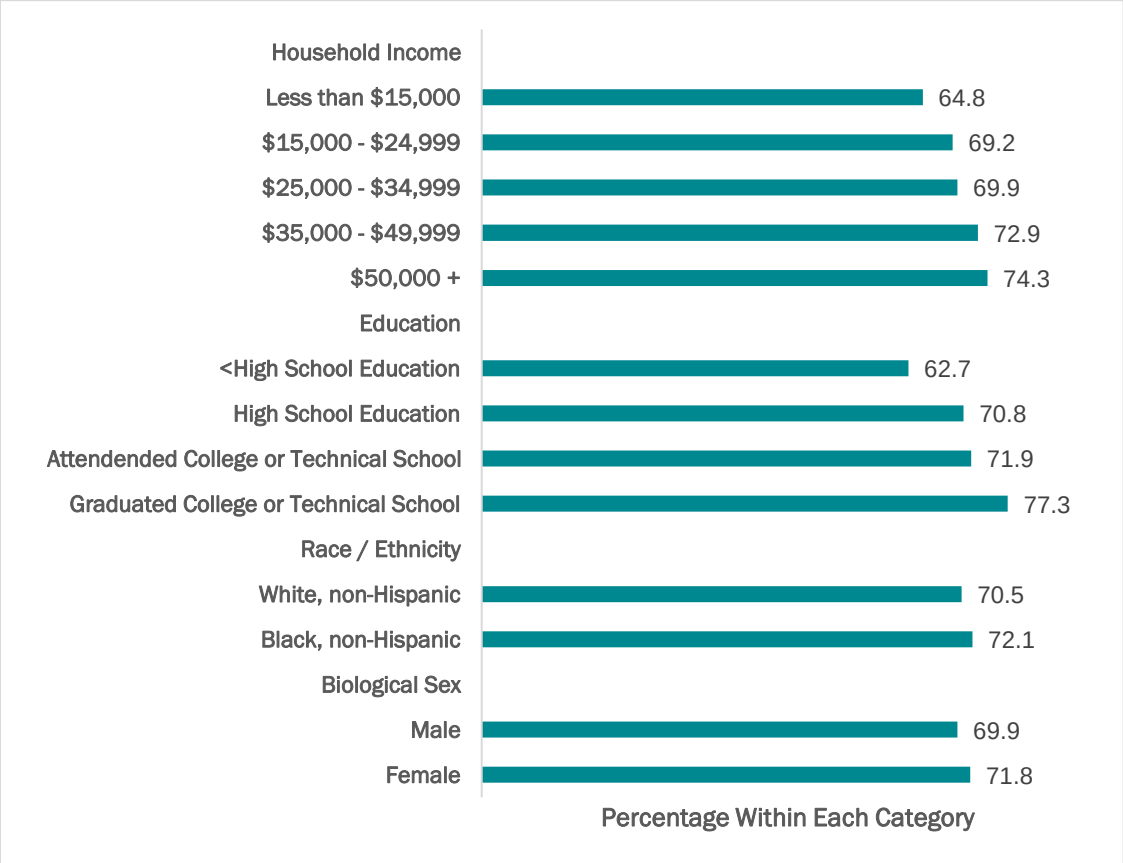
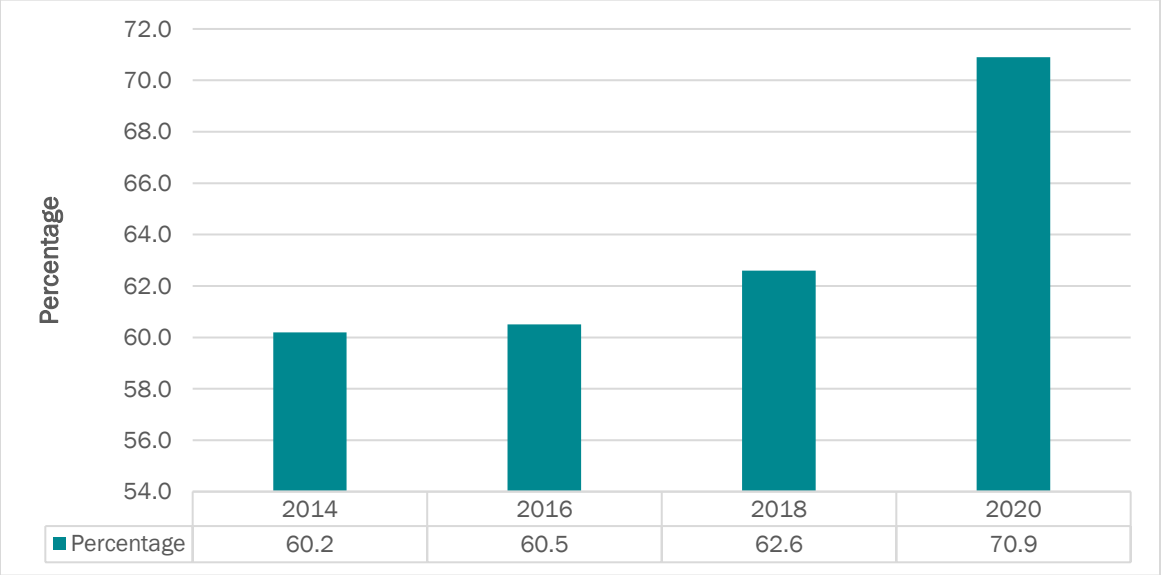


FIGURE 22: Percentage of Mississippi Adults Aged 50 – 75 Who Met the United States Preventive Services Task Force (USPSTF) Recommendations for Colorectal Screening Within the Recommended Time Interval, 2014-2020



Cardiovascular Disease

Cardiovascular disease refers to several types of heart conditions, the most common of which is coronary artery disease (CAD). CAD affects blood flow to the heart and decreased blood flow can lead to Angina (chest pain caused by reduced blood flow to the heart), or a Myocardial Infarction (Heart Attack). Symptoms[21] of a heart attack may include chest pain or discomfort, upper back or neck pain, indigestion, heartburn, nausea or vomiting, extreme fatigue, upper body discomfort, dizziness, or shortness of breath. Risk factors for heart disease include high blood pressure, high cholesterol, diabetes, and being overweight or obese. Lifestyle-related risk factors include smoking, unhealthy diet, lack of physical activity, and excessive alcohol use.

Cardiovascular disease is the leading cause of death in the US and in MS. The age-adjusted rate of mortality attributed to cardiovascular disease in MS in 2020 was 245.7 per 100,000 population compared to a national rate of 167.0 per 100,000 population.[22] The percentage of MS adults ever diagnosed with angina or Coronary Heart Disease (CHD) in 2020 was 5.7% compared to 4.1% nationally (Fig. 23). MS males were more likely than females to have ever been diagnosed with Angina or CHD (OR: 1.854 95% CI [1.829, 1.879]), and Caucasians were 3.367 times more likely than African Americans to have ever been diagnosed with Angina or CHD (95% CI [3.311, 3.424]). As income and educational attainment increased, the percentage diagnosed with angina or CHD decreased significantly ($p < 0.05$) (Fig. 24).

Data reflecting the percentage of MS adults ever diagnosed with Angina or CHD over the last decade can be found in Figure 25. The lowest percentage occurred at the beginning of the decade in 2011

(4.6%) and peaked in 2016 at 5.9%. From 2016 through 2019, substantial reductions were seen as the percentage decreased to 5.0%, however in 2020 those gains were largely erased with the percentage of those ever diagnosed with Angina or CHD was found to be 5.7%.

Similar trends were seen with regard to heart attacks. The percentage of MS adults ever diagnosed with heart attacks in 2020 was 5.5% compared to 4.2% nationally (Fig. 26). MS males were more likely than females to have ever been diagnosed with heart attack (OR: 2.495 95% CI [2.460, 2.532]), and Caucasians were 2.899 times more likely than African Americans to have ever been diagnosed with heart attack (95% CI [2.849, 2.950]). As income and educational attainment increased, the percentage diagnosed with heart attack decreased significantly ($p < 0.05$) (Fig. 27).

Data reflecting the percentage of MS adults ever diagnosed with MI or Heat Attack over the last decade is presented in Figure 28. The lowest percentage occurred in 2014 (4.9%) and the percentage peaked in 2016 (5.7%). The percentage remained stable at 5.5% from 2018 through 2020.

Angina or Coronary Heart Disease (CHD)

Figure 23: Percentage of Mississippi and US Adults Ever Diagnosed with Angina or CHD, 2020

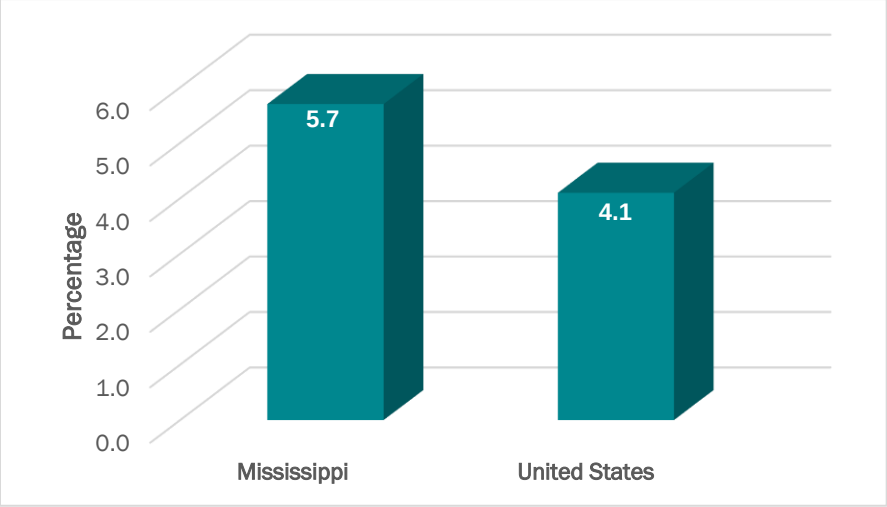


Figure 24: Percent of Mississippi Adults Ever Diagnosed with Angina or CHD by Income Level, Educational Attainment, Race, and Sex; 2020

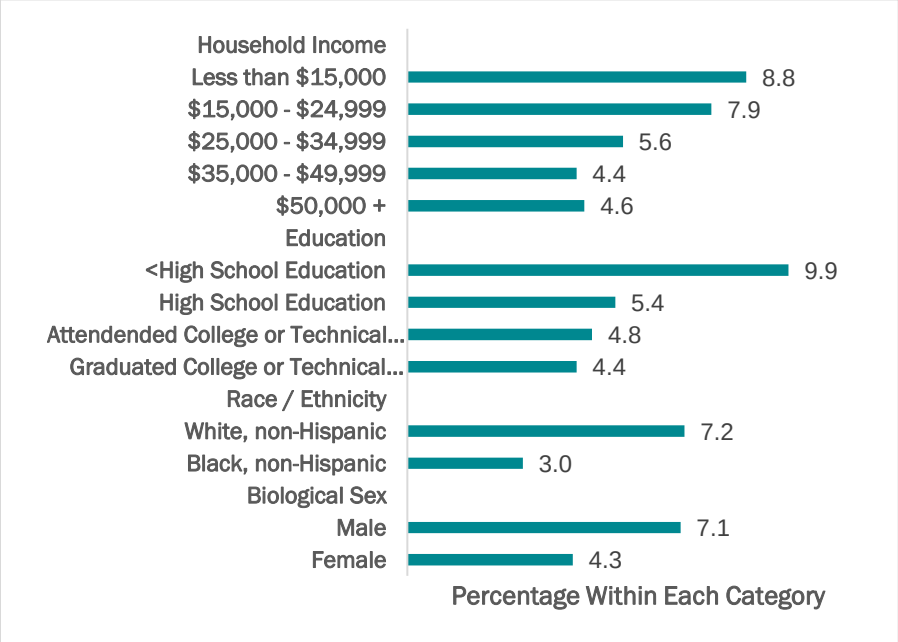
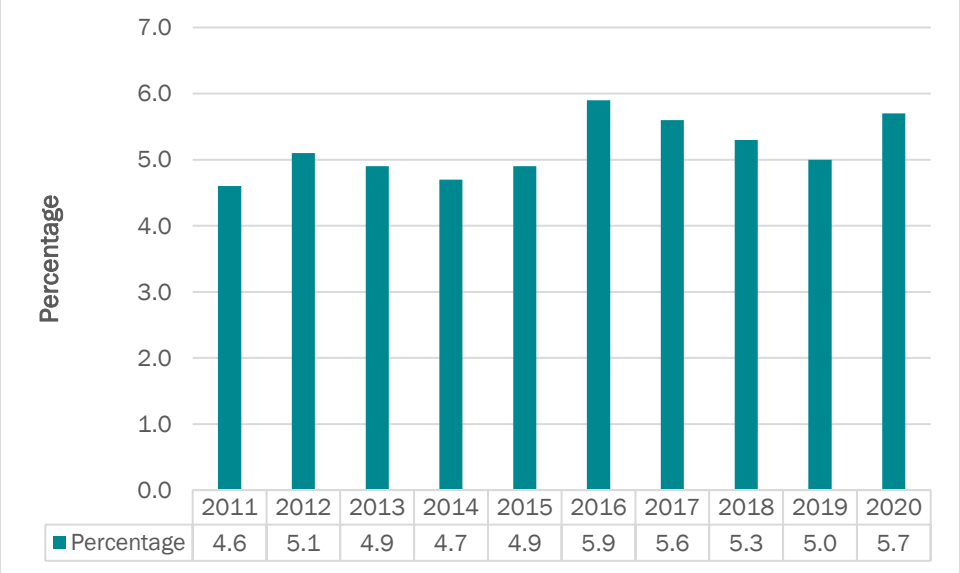


FIGURE 25: Percentage of Mississippi Adults Ever Diagnosed with Angina or CHD, 2011-2020



Myocardial Infarction (MI) or Heart Attack

Figure 26: Percentage of Mississippi and US Adults Ever Diagnosed with MI or Heart Attack, 2020

Figure 27: Percent of Mississippi Adults Ever Diagnosed with MI or Heart Attack by Income Level, Educational Attainment, Race, and Sex; 2020

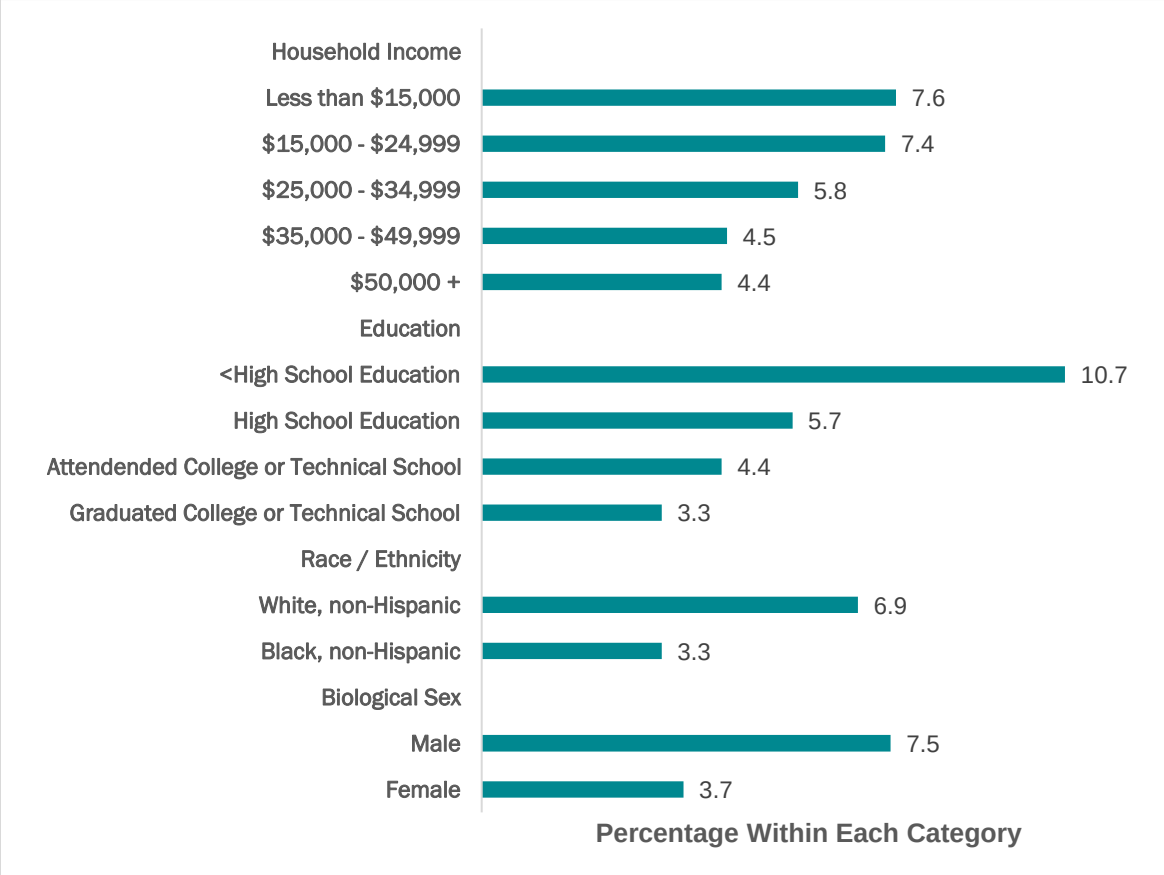
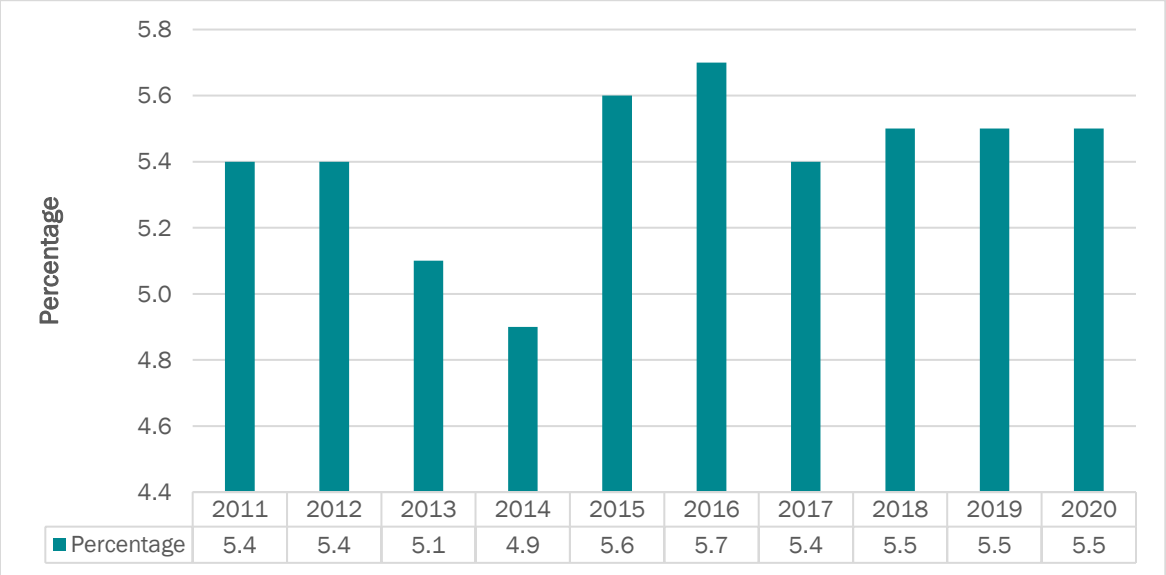


Figure 28: Percentage of Mississippi Adults Ever Diagnosed with MI or Heart Attack, 2011-2020



Stroke

A stroke occurs when something blocks blood supply to a part of the brain, or when a blood vessel in the brain bursts. This can cause lasting brain damage, long-term disability, or even death. Symptoms[23] of stroke may include numbness or weakness in the face, arm, or leg, especially on one side of the body; sudden confusion, trouble speaking, or difficulty understanding speech; sudden trouble seeing in one or both eyes; sudden trouble walking; or severe headache with no known cause. Risk factors for stroke include previous stroke or transient ischemic attack (TIA), high blood pressure, high cholesterol, heart disease, diabetes, obesity, and sickle cell disease, Lifestyle-related risk factors include tobacco use; unhealthy diet high in saturated fats, trans fat, and cholesterol; lack of physical activity; and excessive alcohol use.

Stroke is the fifth leading cause of death in the US and the seventh in MS. The age-adjusted rate of mortality attributed to stroke in MS in 2020 was 54.8 per 100,000 population compared to a national rate of 48.6 per 100,000 population.[24] The percentage of MS adults ever diagnosed with stroke in 2020 was 5.4% compared to 3.1% nationally (Fig. 29). MS males were more likely than females to have ever been diagnosed with stroke (OR: 1.447 95% CI [1.426, 1.468]), and Caucasians were 1.642 times more likely than African Americans to have ever been diagnosed with stroke (95% CI [1.616, 1.667]). Those with an annual income of $15,000 or less were 4.809 times more likely than those with an annual income of $50,000 to have ever been diagnosed with stroke (95% CI [4.699, 4.921]). Those with less than a high school diploma were 2.467 times more likely than those who graduated with a college or technical degree to have ever been diagnosed with stroke (95% CI [2.404, 2.532]) (Fig. 30). Over the last decade, Mississippi has experienced a consistent increase in the percentage of adults ever diagnosed with stroke which ranged from 4.0 in 2011 and is currently at its highest point, 5.4% (Fig. 31).

Figure 29: Percentage of Mississippi and US Adults Ever Diagnosed with Stroke, 2020

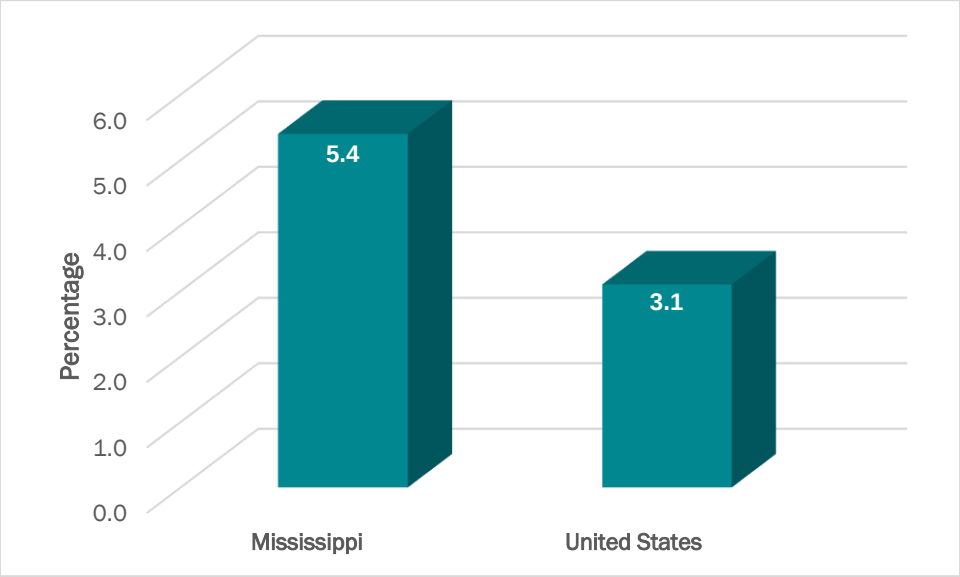


Figure 30: Percent of Mississippi Adults Ever Diagnosed with Stroke by Income Level, Educational Attainment, Race, and Sex; 2020

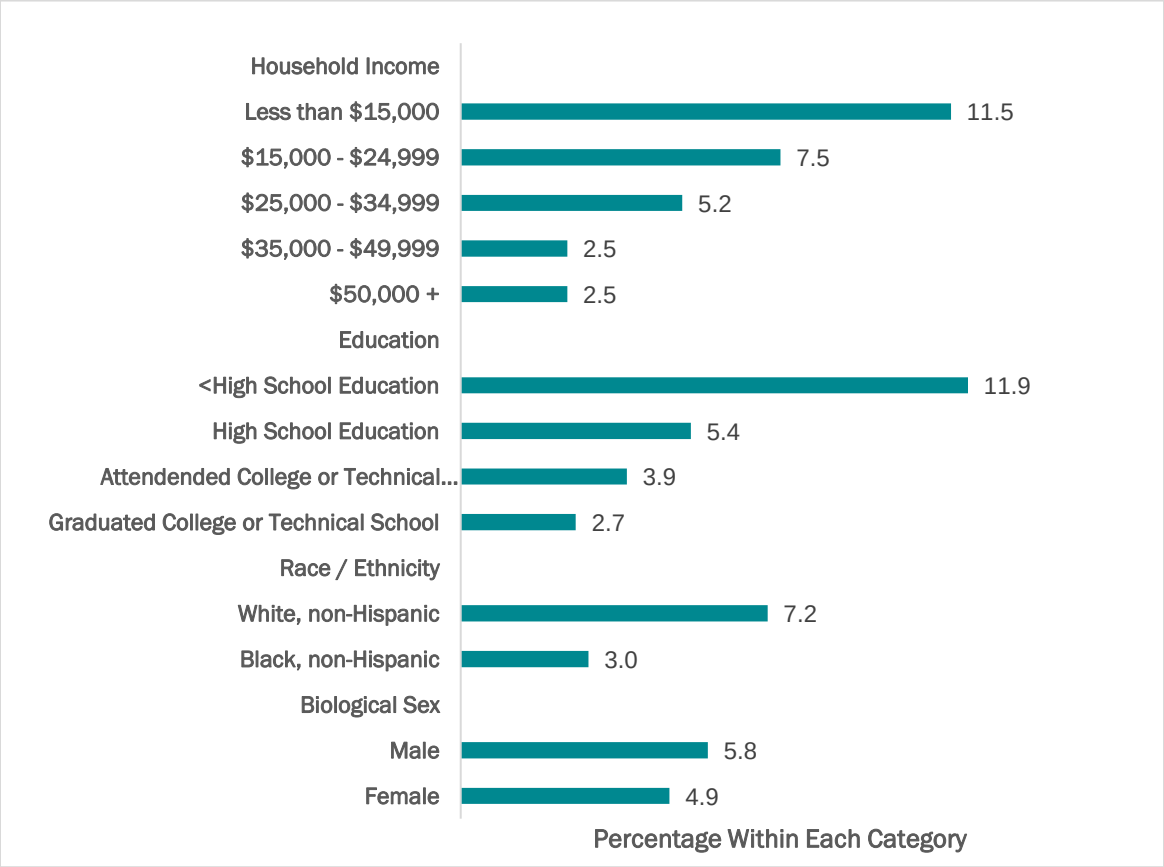
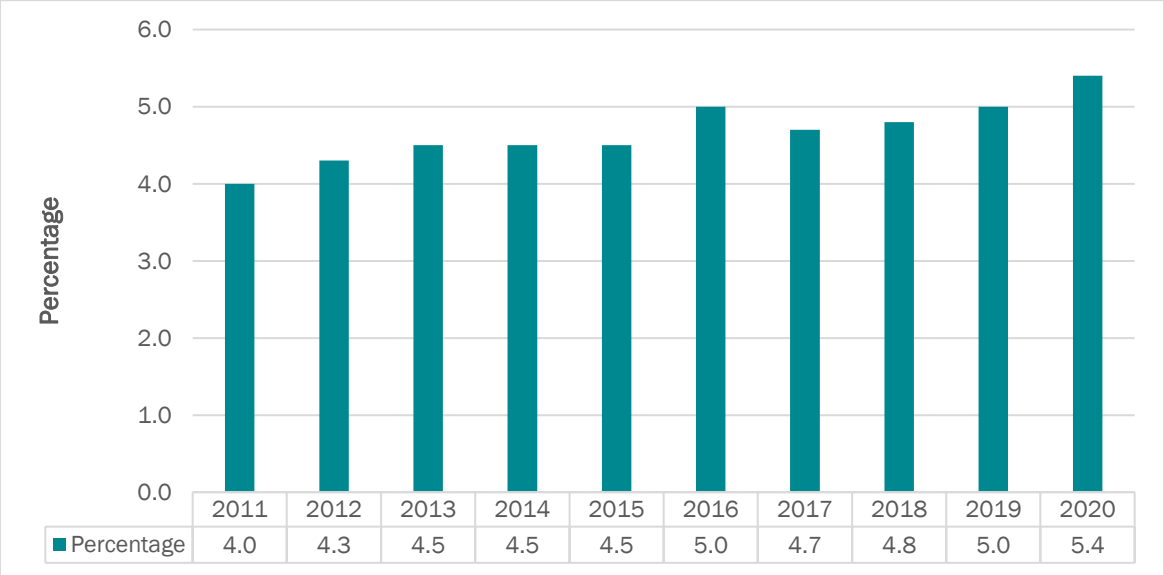


Figure 31: Percentage of Mississippi Adults Ever Diagnosed with Stroke, 2011-2020



COPD

Chronic Obstructive Pulmonary Disease (COPD) includes a group of diseases that cause airflow blockage and breathing-related problems. It includes emphysema and chronic bronchitis.[25] Approximately 16 million people in the US are currently living with COPD; however, many are undiagnosed. Symptoms of COPD may include frequent coughing or wheezing; excess phlegm, mucus, or sputum production; shortness of breath, or difficulty taking a deep breath. Risk factors include tobacco use (smoking), exposure to air pollutants in the home or workplace, genetic factors, and respiratory infections.

COPD is the fourth leading cause of death in the US and the fifth in MS. The age-adjusted rate of mortality attributed to COPD in MS in 2020 was 59.2 per 100,000 population compared to a national rate of 48.6 per 100,000 population.[24] The percentage of adults ever diagnosed with COPD in 2020 was 8.6% compared to 6.4% nationally (Fig. 32). MS females were more likely than males to have ever been diagnosed with COPD (OR: 1.280 95% CI [1.262, 1.299]), and Caucasians were 1.460 times more likely than African Americans to have ever been diagnosed with COPD (95% CI [1.389, 1.536]). Those with an annual income of $15,000 or less were 4.689 times more likely than those with an annual income of $50,000 to have ever been diagnosed with COPD (95% CI [4.583, 4.798]). Those with less than a high school diploma were 1.951 times more likely than those who graduated with a college or technical degree to have ever been diagnosed with COPD (95% CI [1.894, 2.011]), Those that reported current tobacco use were 1.280 times more likely to also report having been diagnosed with COPD (95% CI [1.262, 1.299) (Fig. 33). Over the last decade, the percentage of MS adults ever diagnosed with COPD ranged from 6.7% in 2012 to 9.7% in 2018. Since that peak, the percentage decreased in 2019 (9.4%) and 2020 (8.6%) (Fig. 34).

Figure 32: Percentage of Mississippi and US Adults Ever Diagnosed with COPD, 2020

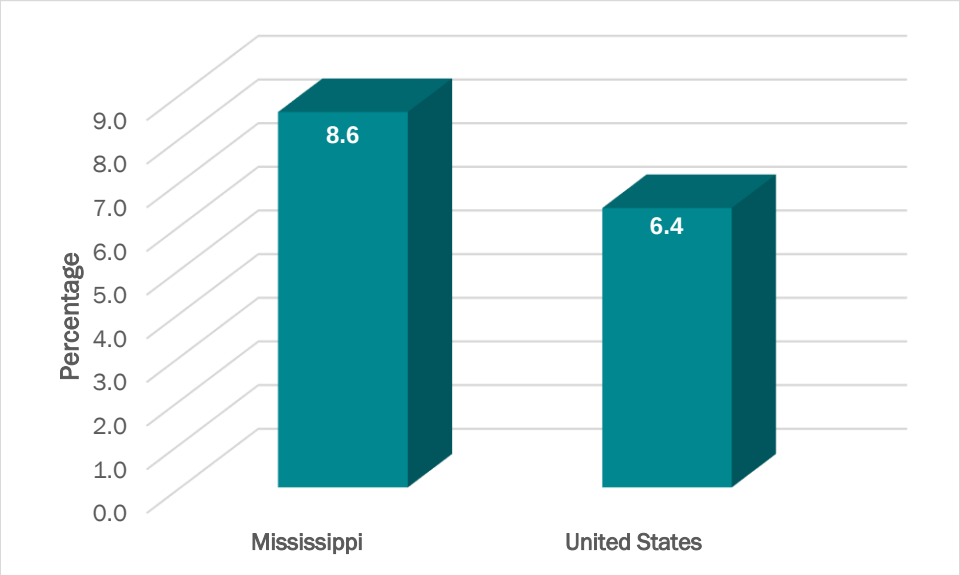


Figure 33: Percentage of Mississippi and US Adults Ever Diagnosed with COPD by Income Level, Educational Attainment, Race and Sex; 2020

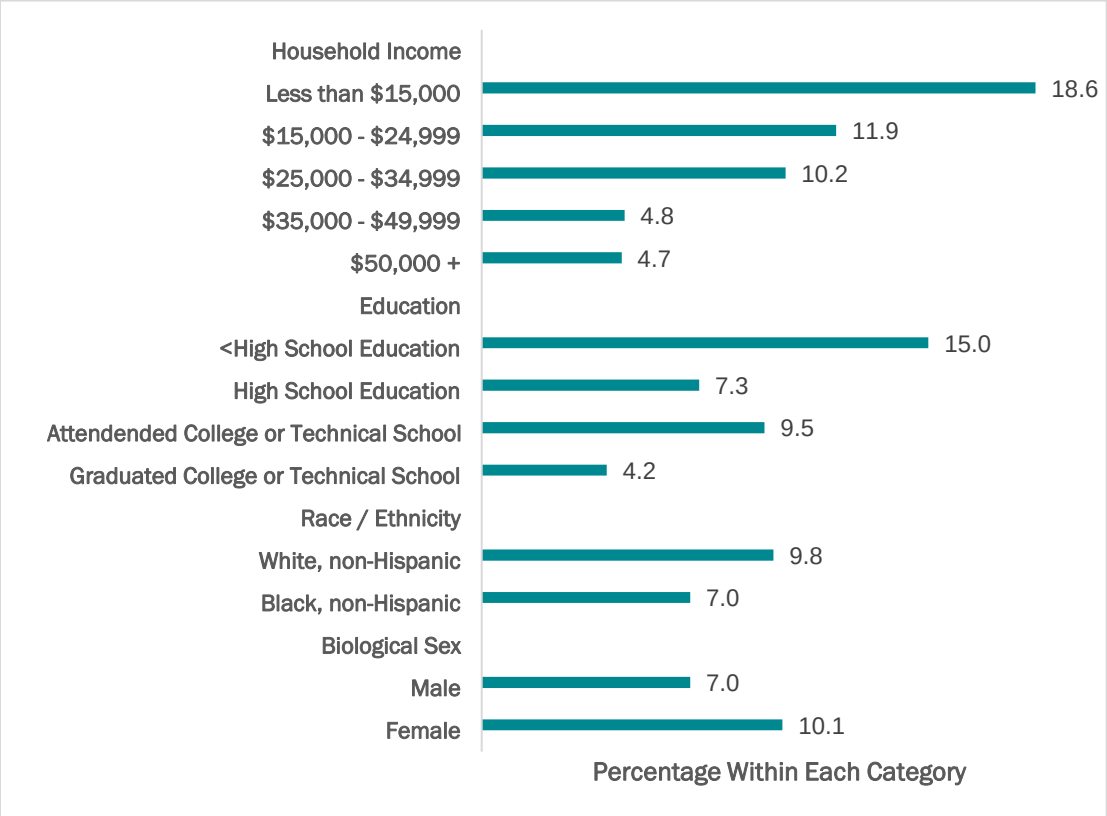
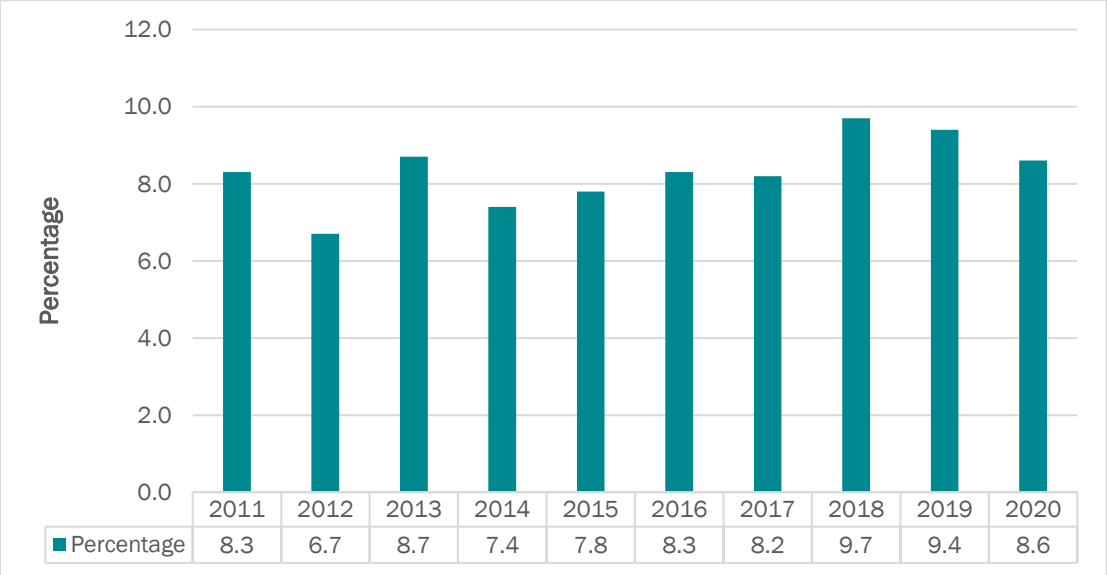


Figure 34: Percentage of Mississippi Adults Ever Diagnosed with COPD, 2011-2020



Depressive Disorder

Depressive disorder, or depression, is a commonly occurring mood disorder. In order to be diagnosed with major depression, an individual would experience symptoms of depression most of the time for at least two weeks that typically interfere with one's ability to work, sleep, study, and eat.[26] Symptoms of depression include persistent feelings of sadness, anxiety, hopelessness, irritability, guilt, loss of interest in hobbies or activities, difficulty concentrating, disturbances in sleep or appetite, aches or pains without a clear physical cause, or thoughts of death or suicide.

Research[26] suggests that genetic, biological, environmental, and psychological factors all play a role in depression, but specific risk factors may include a personal or family history of depression, major life changes that cause trauma or stress, and certain physical illnesses and medications.

Approximately 21.0 million people in the US are currently living with depression. The percentage of MS adults ever diagnosed with depressive disorder including depression, major depression, dysthymia or minor depression in 2020 was 20.9% compared to 18.3% nationally (Fig. 35). In MS, females were more likely than males to have been diagnosed with depression (OR: 2.166 95% CI [2.149, 2.184]), and Caucasians were 2.040 times more likely than African Americans to have been diagnosed with depression (95% CI [1.984, 2.096]). Twice the number of people in the lowest annual income category ($15,000 or less) reported being diagnosed with depression compared to those earning $50,000 annually. Those with less than a high school diploma were also significantly more likely to have been diagnosed with depression than those who had graduated from a technical school or college (OR: 1.599 95% CI [1.577, 1.622]) (Fig. 36). Over the last decade, the percentage of MS adults ever diagnosed with a Depressive Disorder ranged from 18.2% in 2015 to 21.7% in 2018. Since the peak in 2018, the percentage decreased in 2019 (20.7%) and then increased slightly in 2020 (20.9%) (Fig. 37).

Figure 35: Percentage of Mississippi and US Adults Ever Diagnosed with a Depressive Disorder (including Depression, Major Depression, Dysthymia, or Minor Depression), 2020

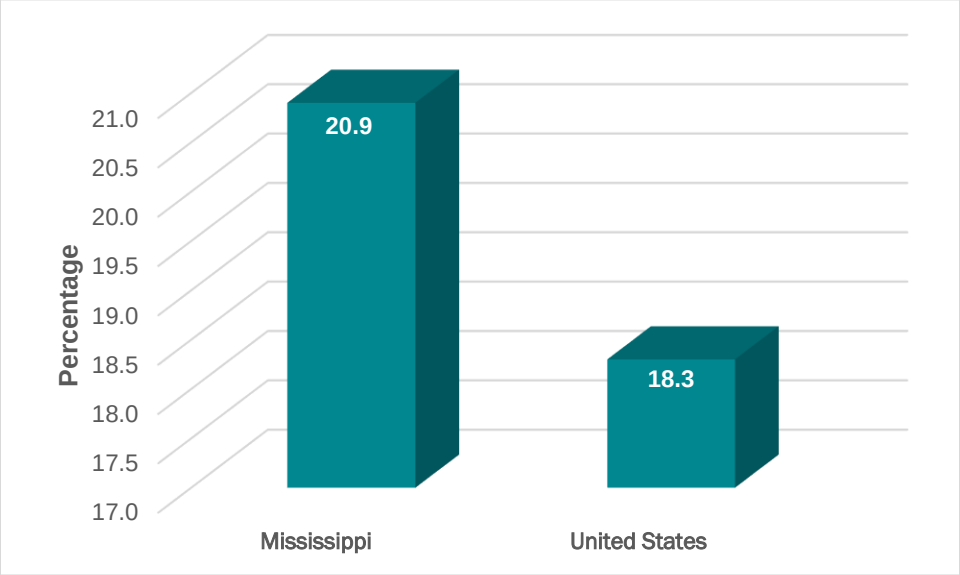


Figure 36: Percent of Mississippi Adults Ever Diagnosed with a Depressive Disorder (including Depression, Major Depression, Dysthymia, or Minor Depression) by Income Level, Educational Attainment, Race, and Sex; 2020

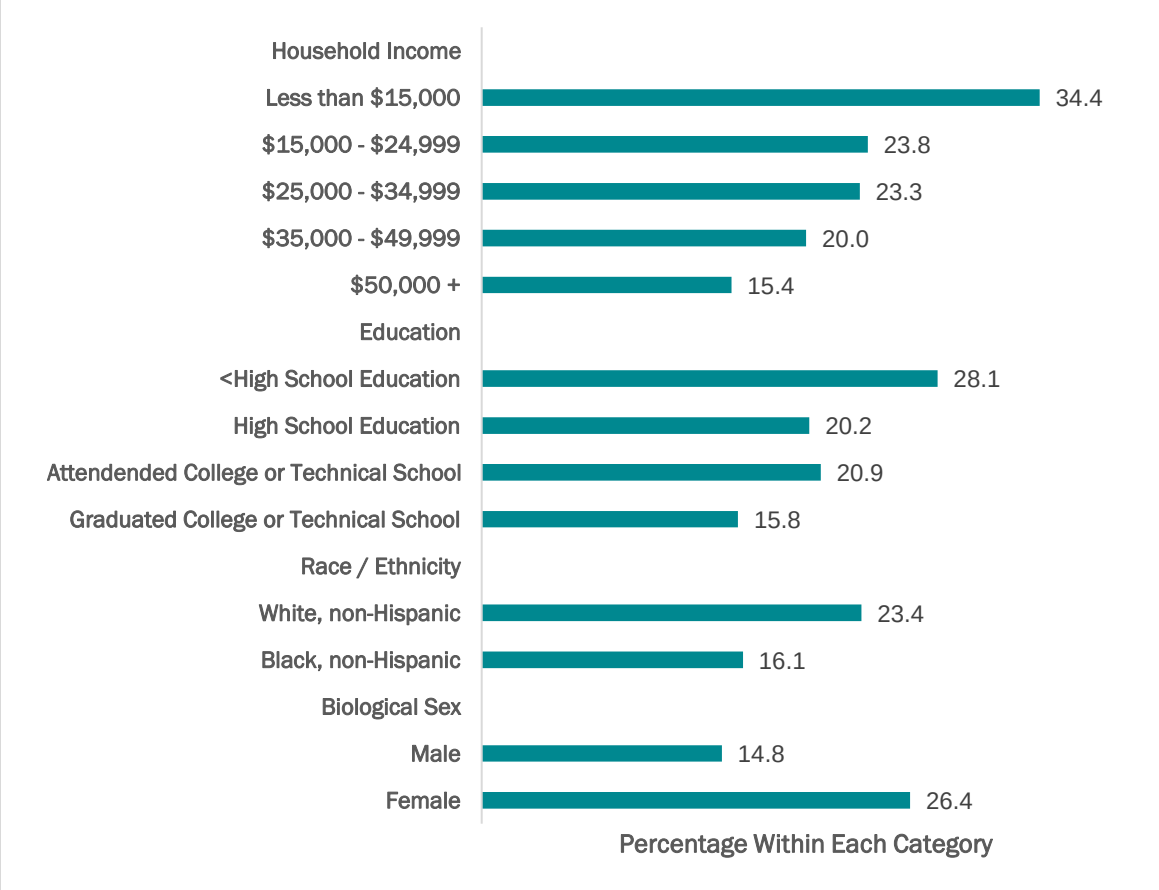
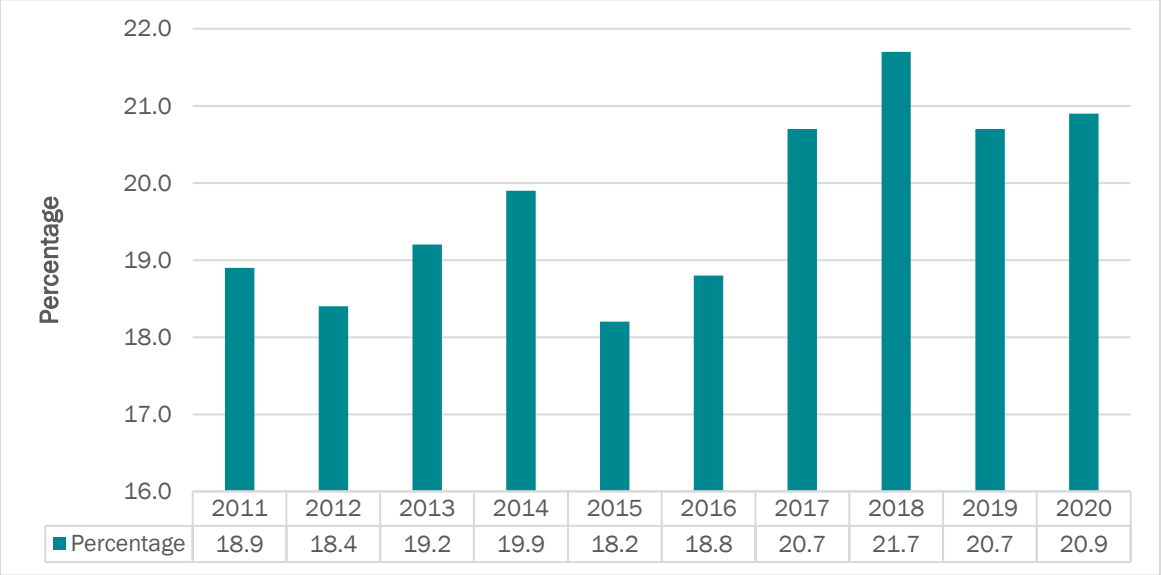


Figure 37: Percentage of Mississippi Adults Ever Diagnosed with a Depressive Disorder (including Depression, Major Depression, Dysthymia, or Minor Depression), 2011-2020



Diabetes and Related Complications

Diabetes[27] is a chronic illness that affects how the body processes food into energy. The body breaks down most food into sugar (glucose) and releases it into the bloodstream. When blood sugar increases, the pancreas releases insulin. With diabetes, the body doesn't make enough insulin, or can't use it as well as it should. This causes too much glucose to stay in the bloodstream. Overtime, this can contribute to heart disease, vision loss, and kidney disease.

The three main types of diabetes are Type 1, Type 2, and gestational diabetes. Type 1 diabetes is caused by an autoimmune reaction that stops the body from making insulin. This type of diabetes is usually diagnosed in children and requires insulin. Type 2 diabetes is usually diagnosed in adulthood and is associated with lifestyle factors that may contribute to insulin resistance or poor insulin production. Gestational diabetes is diagnosed in pregnancy and may resolve after delivery. It is also important to consider the burden of pre-diabetes because if not addressed, pre-diabetes most often leads to diabetes. Those who are in the pre-diabetic range should be screened for diabetes annually.

Diabetes and pre-diabetes are diagnosed[28] in one of three ways. A diagnosis can be made with a Fasting Plasma Glucose (FPG) test, a blood test taken after a minimum of an eight-hour fast; an Oral Glucose Tolerance Test (OGTT), a two-hour test that measures blood glucose before and two-hours after drinking a liquid with a high glucose content, and via a Hemoglobin A1c (HbA1c) test which is an indicator for average blood glucose over the last two to three months (Table 2).

Pre-diabetes is a risk factor for diabetes. Pre-diabetes and diabetes share the following risk factors:

- Being overweight or obese
- Being age 45 or older

- Having a parent or sibling with type 2 diabetes
- Being physically inactive
- Having a history of gestational diabetes
- Having non-alcoholic fatty liver disease
- Being African American, Hispanic or Latino, an American Indian or Alaskan Native. Some Pacific Islanders and Asian Americans are also at higher risk.

Table 2: Diagnostic ranges from FPG, OGTT, and HbA1c for Pre-diabetes and Diabetes[28]

Result	FPG	OGTT	HbA1c
Normal	100 mg/dl	< 140 mg/dl	< 5.7%
Prediabetes	100 - 125 mg/dl	140 - 199 mg/dl	5.7% - 6.4%
Diabetes	≥ 126 mg/dl	≥ 200 mg/dl	≥ 6.5%

Approximately 37 million people in the US are currently living with Diabetes. Diabetes is the seventh leading cause of death in the US and is the eighth leading cause of death in Mississippi. Nationally, it is the number one cause of kidney failure, lower-limb amputations, and adult blindness. [27] The age-adjusted rate of mortality attributed to diabetes in MS in 2020 was 41.0 per 100,000 population compared to a national rate of 31.0 per 100,000 population. The percentage of adults ever diagnosed with pre-diabetes in 2020 was 10.6% compared to 12.6% nationally (Fig. 38). This result should be interpreted with caution. Though it appears that MS is faring better than the national average for pre-diabetes diagnosis, this is likely due to people in the pre-diabetes stage going undiagnosed. This is evident when comparing the results for adults who have ever been diagnosed with diabetes. In 2020, the percentage was 14.8% in MS compared to 11.2% nationally (Fig. 40). MS females were more likely than males to have ever been diagnosed with diabetes (OR: 1.156 95% CI [1.145, 1.166]), and African Americans were more likely than Caucasians to have been diagnosed with diabetes (OR: 1.061 95% CI [1.021, 1.102]), Diabetes diagnosis decreased significantly as income and educational attainment increased ($p<0.05$), however the magnitude of change in risk across categories of income and education did not vary greatly. The results suggest that diabetes is prevalent throughout the state of MS and impacts individuals from all races and ethnicities, income categories, and educational levels (Fig. 41). Over the last decade, the percentage of MS adults ever diagnosed with a Diabetes rose consistently from 12.4% in 2011 to 14.8% in 2019. In 2020, the percentage remained stable (14.8%) from 2019 to 2020 (Fig. 42).

Chronic Kidney Disease (CKD) is one long-term consequence of diabetes. When people develop CKD, their kidneys become damaged and, over time, are not able to clear toxins from the body. This may also cause fluid accumulation in the body which can lead to high blood pressure, heart disease, stroke, and early death. In MS, the percentage of adults ever diagnosed with CKD was 2.9% compared to 3.0% nationally (Fig. 43). Women are 1.039 times more likely to have been diagnosed with CKD than males (95% CI [1.018, 1.059]), African Americans were less likely than Caucasians to have been diagnosed ((OR: 0.541 95% CI [0.512, 0.573]). Those with higher incomes and educational attainment were significantly less likely to have been diagnosed with CKD ($p <0.05$) (Fig. 44). Over the last decade, the percentage of MS adults ever diagnosed with Chronic Kidney Disease varied from 2.4% in 2011 to 4.0% in 2016. There was a downward trend in the percentage in 2017 (3.3%) and 2018 (2.5%), but Mississippi adults experienced an increase in 2019 (2.9%) that remained stable in 2020 (2.9%) (Fig. 45).

Pre-Diabetes

Figure 38: Percentage of Mississippi and US Adults Ever Diagnosed with Pre-Diabetes, 2020

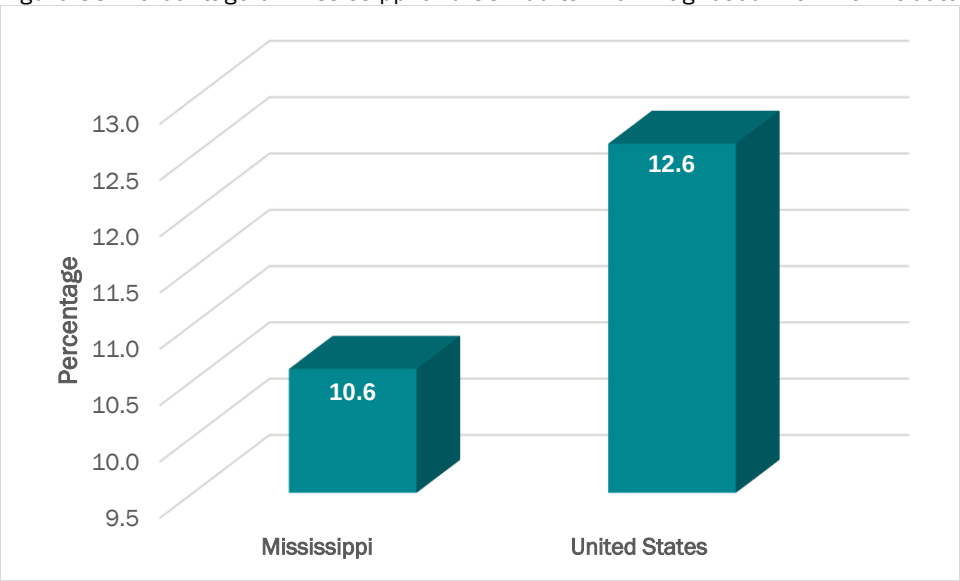
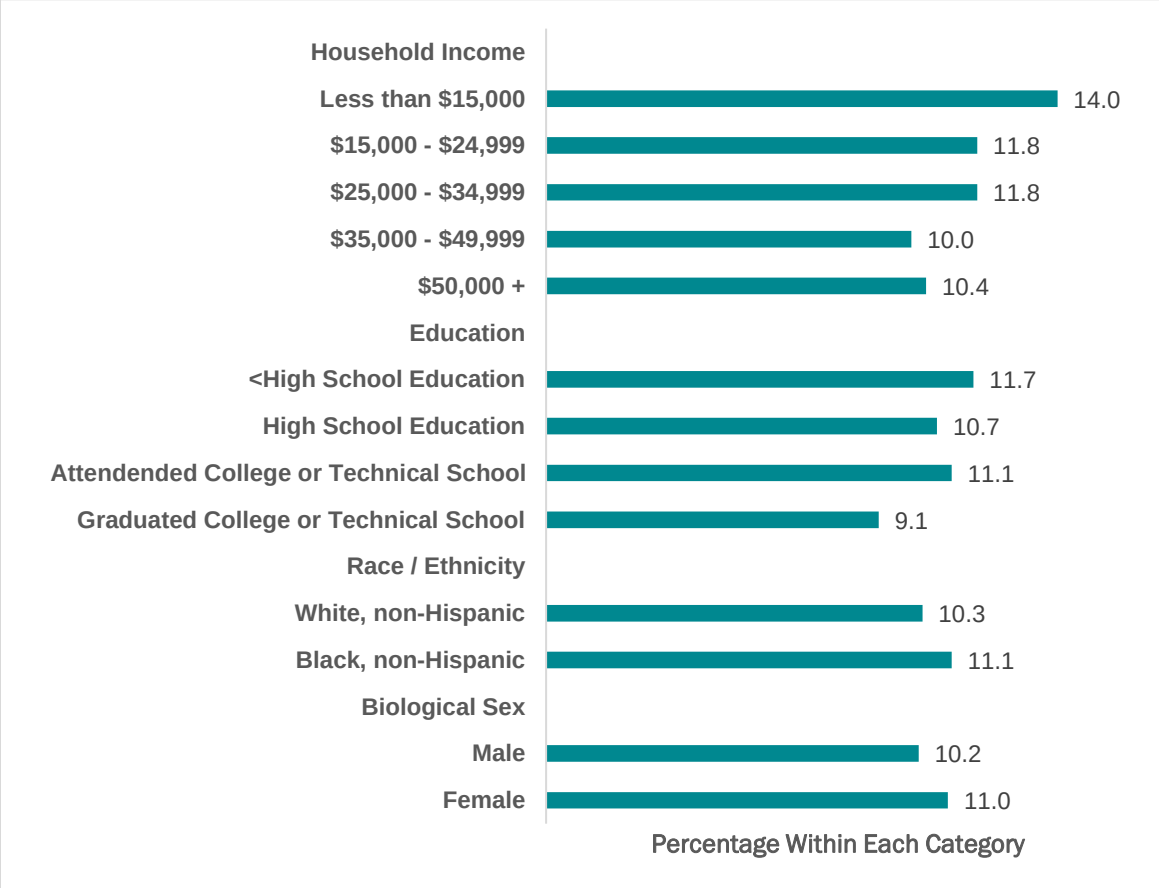


Figure 39: Percent of Mississippi Adults Ever Diagnosed with Pre-Diabetes by Income Level, Educational Attainment, Race, and Sex; 2020



Diabetes

Figure 40: Percentage of Mississippi and US Adults Ever Diagnosed with Diabetes, 2020

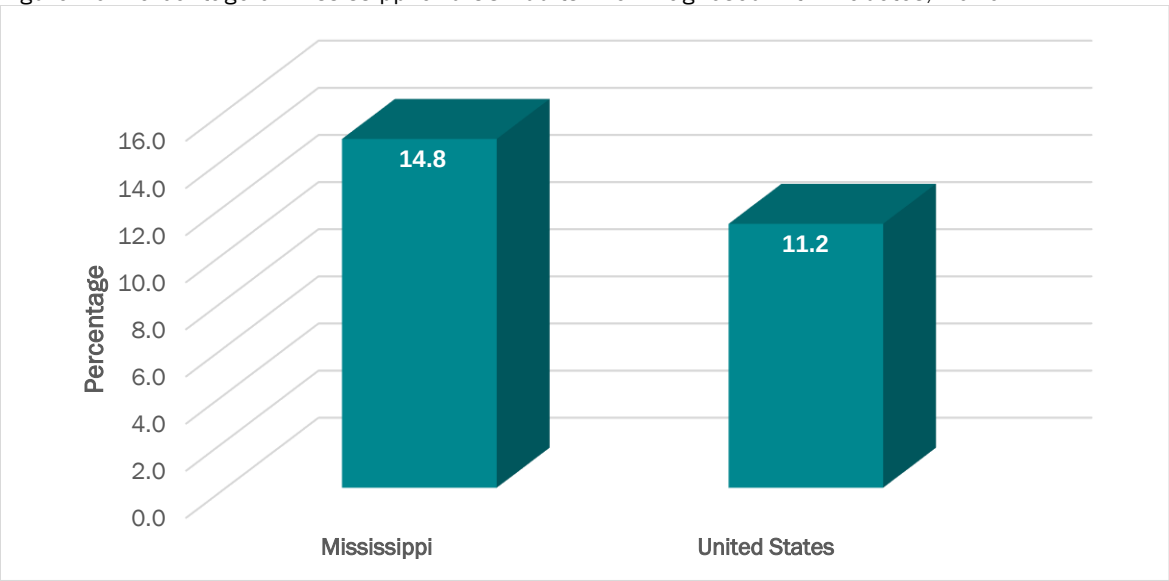


Figure 41: Percent of Mississippi Adults Ever Diagnosed with Diabetes by Income Level, Educational Attainment, Race, and Sex; 2020

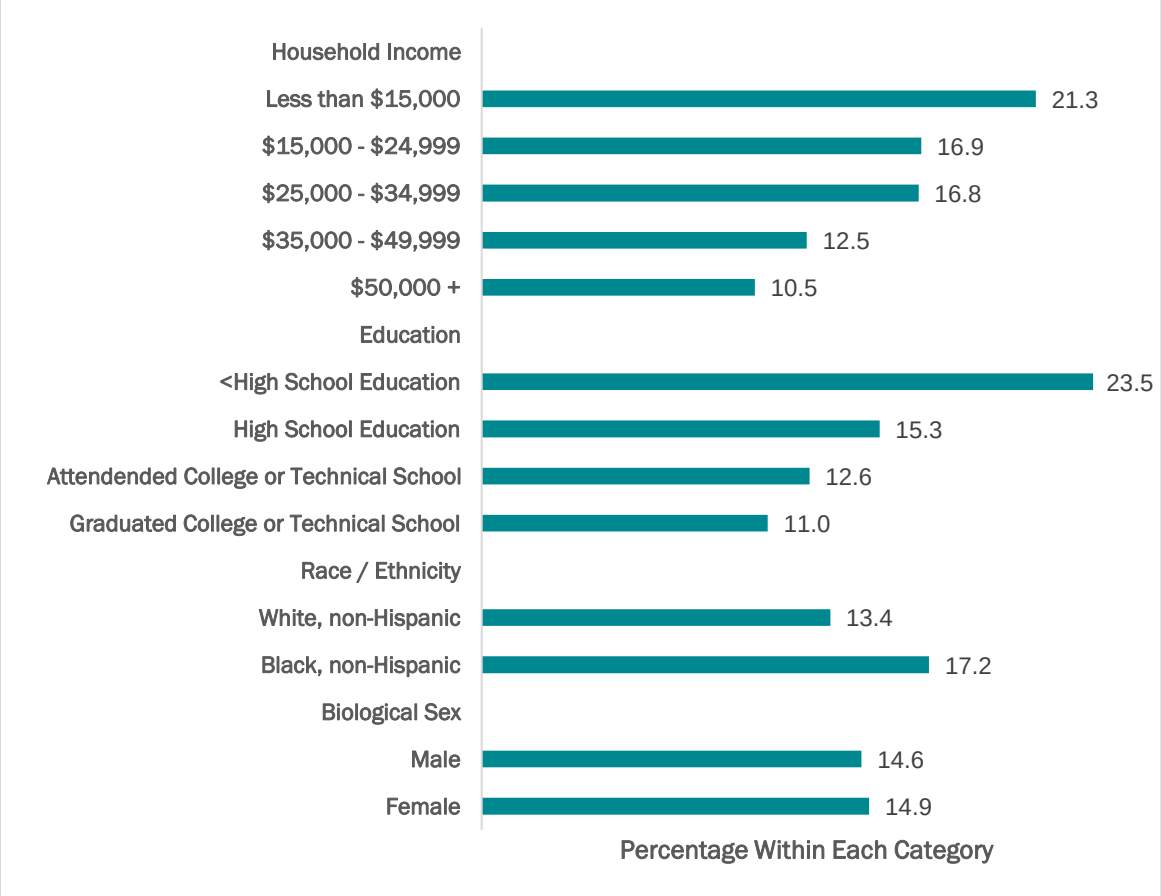
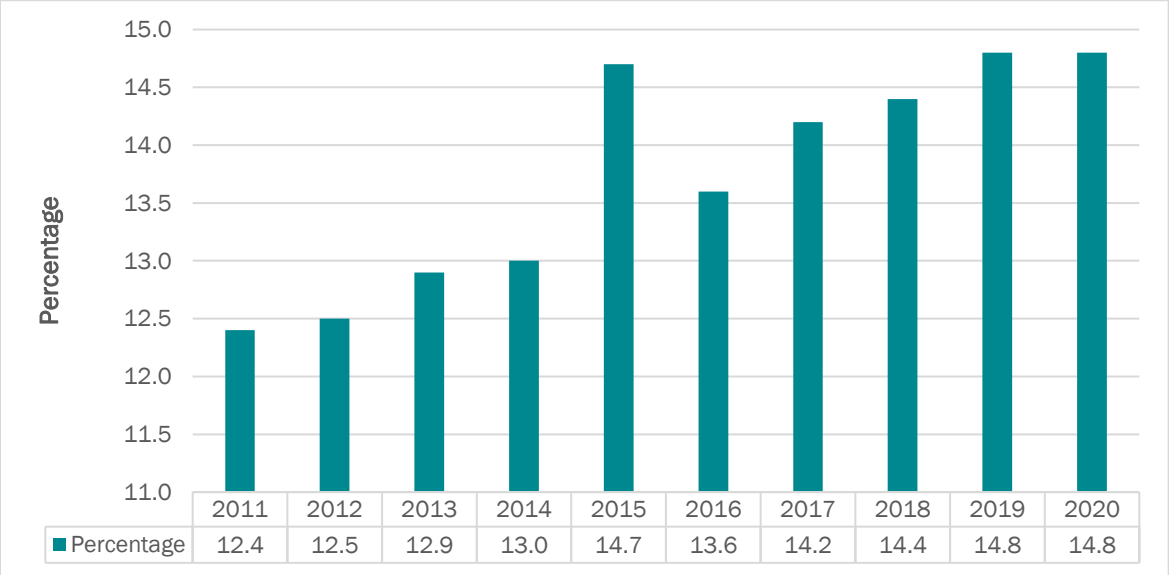


Figure 42: Percentage of Mississippi Adults Ever Diagnosed with Diabetes, 2011-2020



Chronic Kidney Disease

Figure 43: Percentage of Mississippi and US Adults Ever Diagnosed with Chronic Kidney Disease, 2020

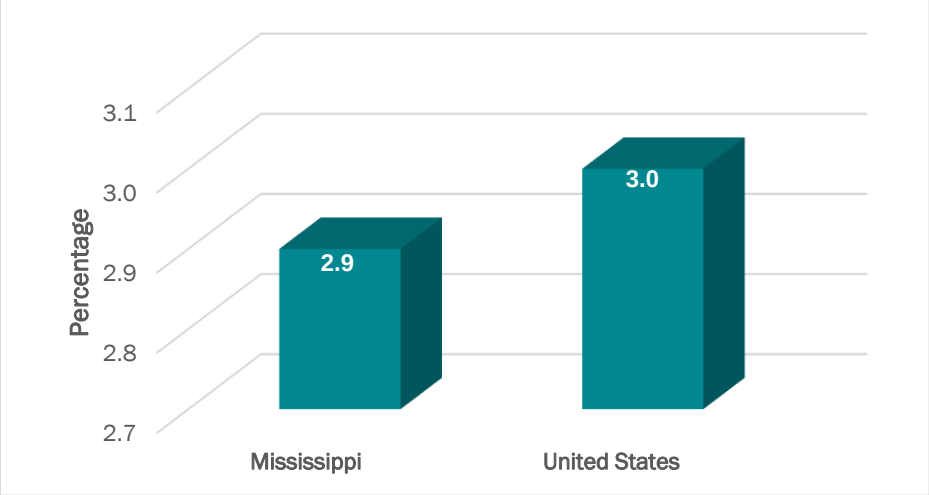


Figure 44: Percent of Mississippi Adults Ever Diagnosed with Chronic Kidney Disease by Income Level, Educational Attainment, Race, and Sex; 2020

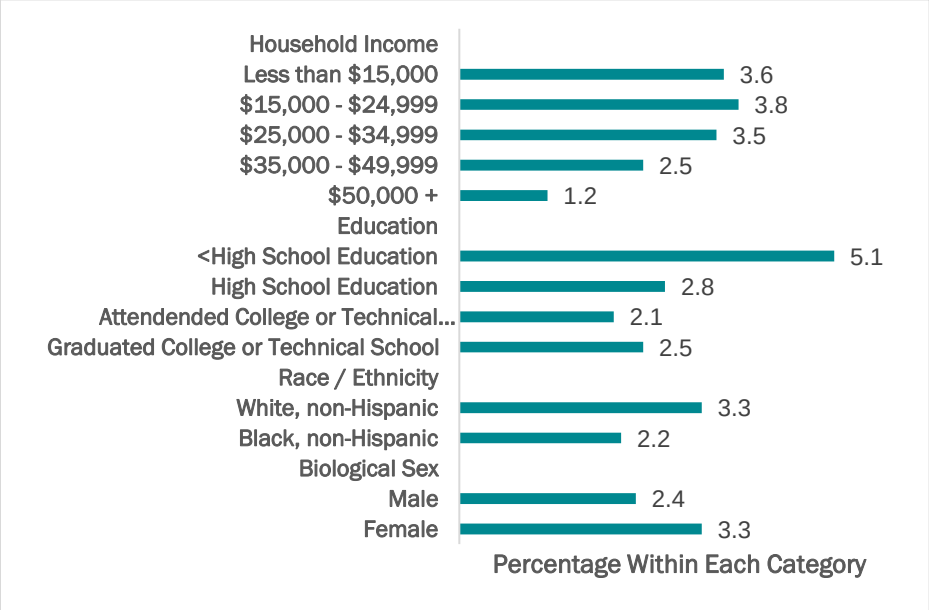
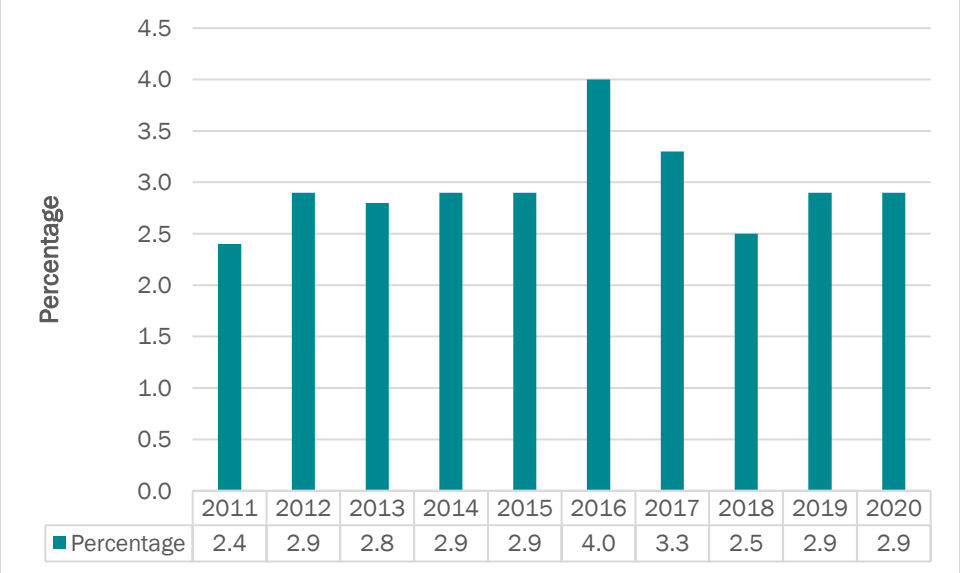


Figure 45:Percentage of Mississippi Adults Ever Diagnosed with Chronic Kidney Disease, 2020



Oral Health

Oral health refers to the health of the teeth, gums, and the entire oral-facial system that allow us to smile, speak, and chew. Oral health issues in adults include untreated cavities, gum disease, tooth loss, oral cancer, and chronic diseases. In fact, having a chronic disease such as arthritis, heart disease or stroke, diabetes, or obesity may increase a person's risk of having missing teeth or poor oral health.[29] Tooth decay is the most common chronic disease in children and adults in the US.[29,30]

Drinking fluoridated water and getting dental sealants in childhood prevent cavities. Risk factors for gum disease include tobacco use and diabetes. Severe tooth loss, having 8 or fewer teeth, impacts the ability to eat meats, fruits, and vegetables and may prevent an individual from eating a varied and healthy diet.[31]

The American Dental Association recommends that adults see a dentist regularly for an oral health exam. In 2020, 57.7% of MS adults reported visiting a dental care provider (orthodontist, oral surgeon, or dental hygienist) in the last year compared to 64.8% nationally (Fig. 46). Those least likely to visit the dentist were males, African Americans, those in the lowest category of annual income ($15,000 or less), and the those in the lowest category of educational attainment (competed less than a high school diploma) (Fig. 47). The BRFSS module that includes questions about dental care visits is administered bi-annually. Since 2012, the percentage of MS adults who visited any type of dental care provider increased every year except 2018. Participation in annual dental care visits increased from 55.4% in 2012 to 57.7% in 2020 (Fig. 48).

Delaying the treatment of cavities can result in tooth loss. The percentage of MS adults who reported losing one or more teeth due to tooth decay or gum disease in 2020 was 52.1% compared to 41.2% nationally (Fig. 49). Females and males were equally likely to lose one or more teeth. African Americans were at greater risk for tooth loss than Caucasians (OR: 2.222 95% CI [2.160, 2.285]). Those with an annual household income of $15,000 or less were 1.987 times more likely to experience tooth loss than those who earned an income of $50,000 (95% CI [1.964, 2.010]). Those with less than a high school diploma were 3.727 times more likely to experience tooth loss than those who graduated from a technical school or college (95% CI [3.681, 3.774]) (Fig. 50). The BRFSS module that includes questions about tooth loss due to decay or gum disease is administered bi-annually. Since 2012, the percentage of MS adults who lost one or more teeth decreased annually from 58.3% in 2012 to 52.1% in 2020. (Fig. 51).

Nationally, approximately 1 in 6 (16.7%) adults ages 65 and older have lost all of their teeth. [30] The percentage of MS adults ages 18 and over who reported losing all of their teeth due to tooth decay or gum disease in 2020 was 7.7% compared to 4.8% nationally (Fig. 52). Females were more likely to have lost all of their teeth (OR: 1.069 95% CI [1.056, 1.082]). African Americans were more likely than Caucasians to have lost all of their teeth (OR: 1.938 95% CI [1.832, 2.051]). There were large disparities in risk of tooth loss across income and education levels. For example, those with an annual household income of $15,000 or less were 5.041 times more likely to have lost all of their teeth when compared to those who earned an income of $50,000 (95% CI [4.933, 5.150]). Those with educational attainment less than a high school diploma were 9.324 times more likely to have lost all of their teeth than those who graduated from a technical school or college (95% CI [9.075, 9.579]). Clearly, educational attainment and income are significantly associated with good oral

health. It is likely that individuals in lower income brackets may lack dental insurance and may resort to tooth extraction rather than tooth repair (Fig. 53).

Annual Dental Visit

Figure 46: Percentage of Mississippi and US Adults Who Visited Any Type of Dental Care Provider (Orthodontist, Oral Surgeon, and Dental Hygienist) in the Last Year, 2020

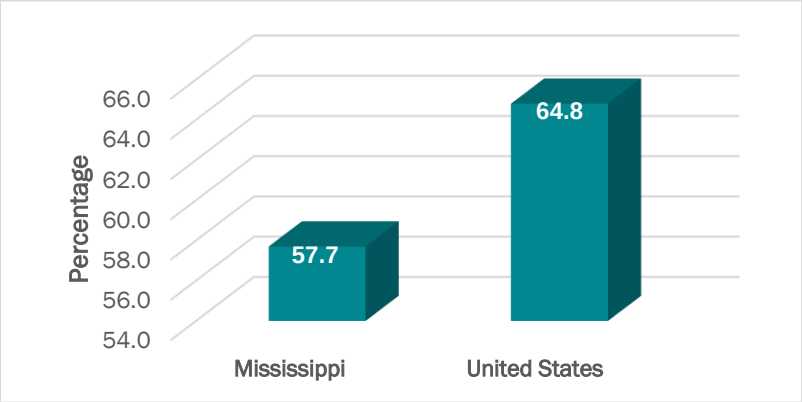


Figure 47: Percentage of Mississippi and US Adults Who Visited Any Type of Dental Care Provider (Orthodontist, Oral Surgeon, and Dental Hygienist) in the Last Year by Income Level, Educational Attainment, Race, and Sex; 2020

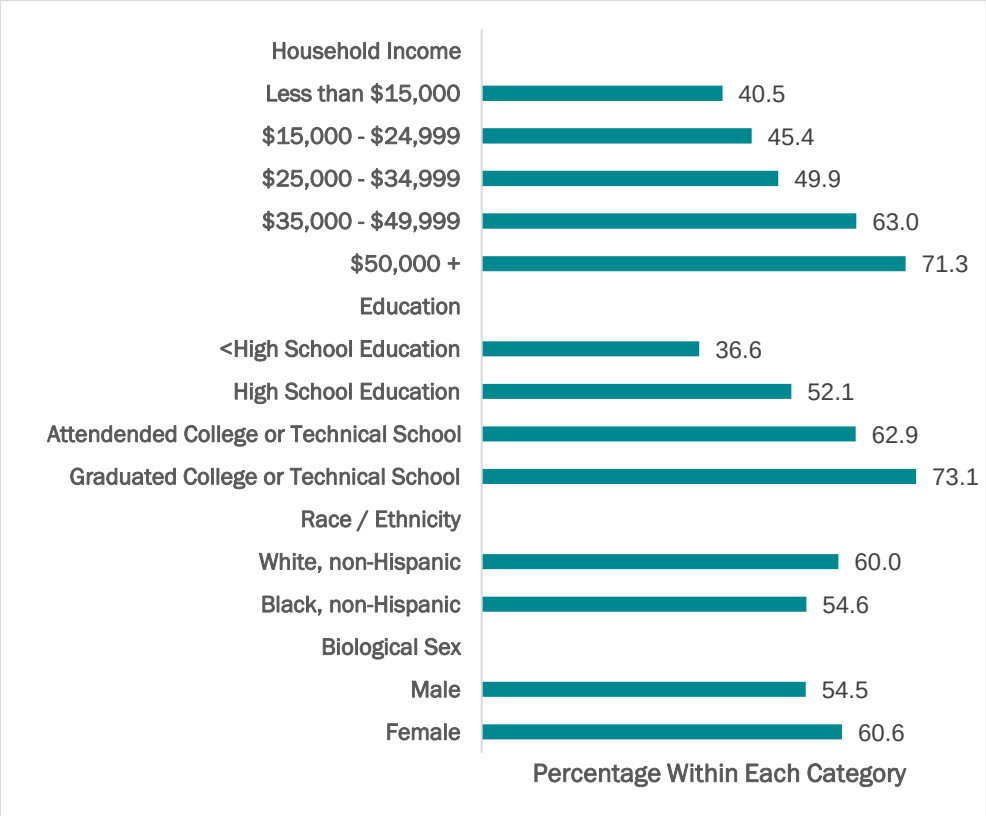
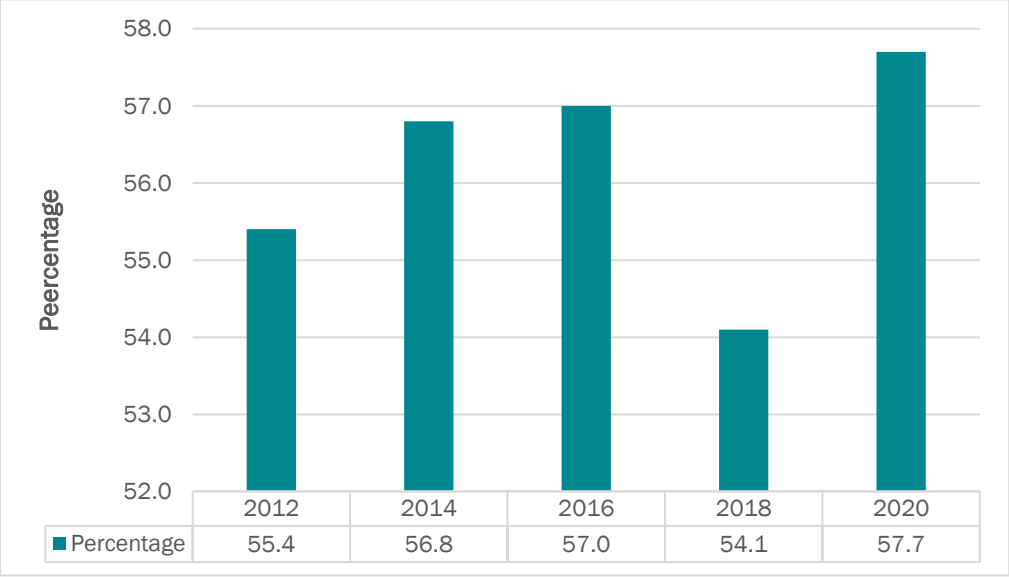


Figure 48: Percentage of Mississippi Adults Who Visited Any Type of Dental Care Provider (Orthodontist, Oral Surgeon, and Dental Hygienist) in the Last Year, 2012-2020



Any Teeth Extracted

Figure 49: Percentage of Mississippi and US Adults Who Lost One or More Teeth Due to Tooth Decay or Gum Disease, 2020

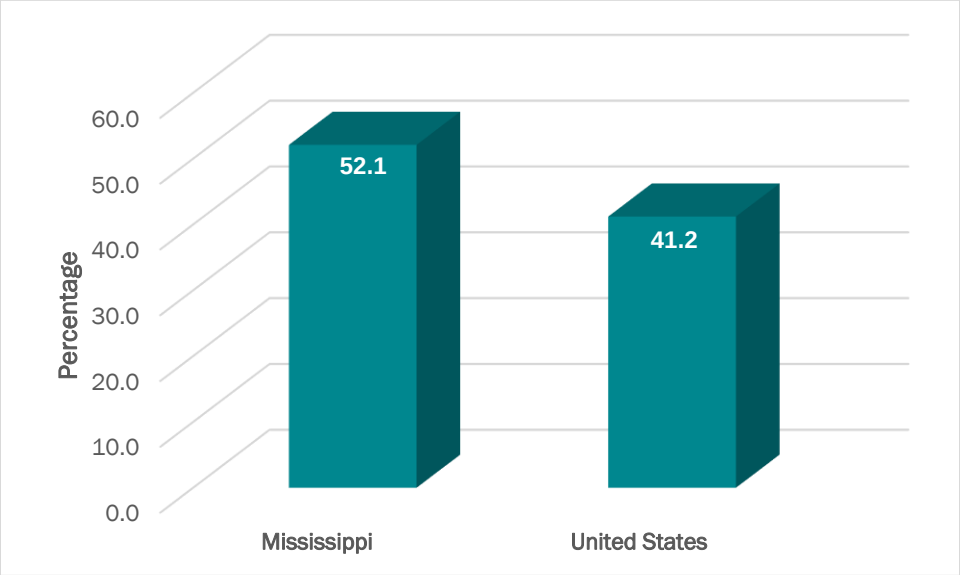


Figure 50: Percentage of Mississippi and US Adults Who Lost One or More Teeth Due to Tooth Decay or Gum Disease by Income Level, Educational Attainment, Race, and Sex; 2020

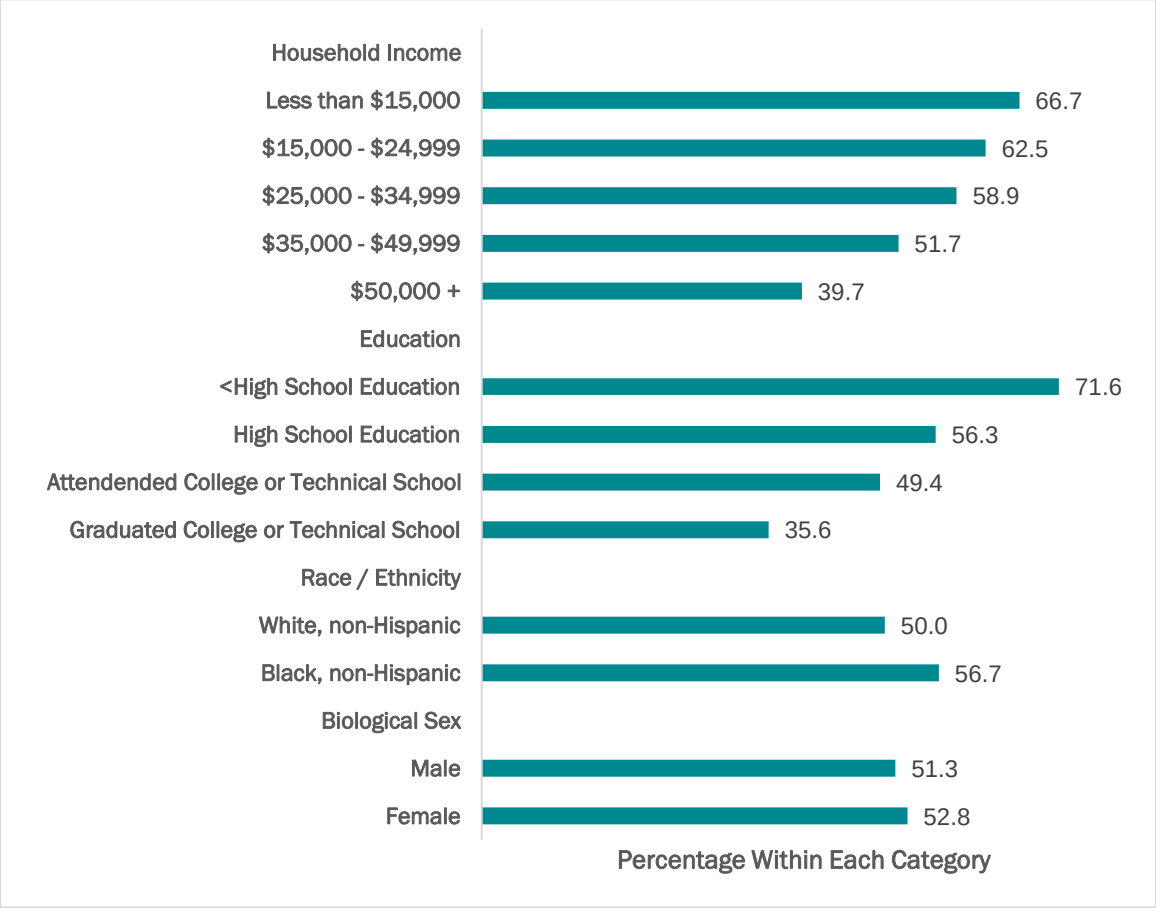
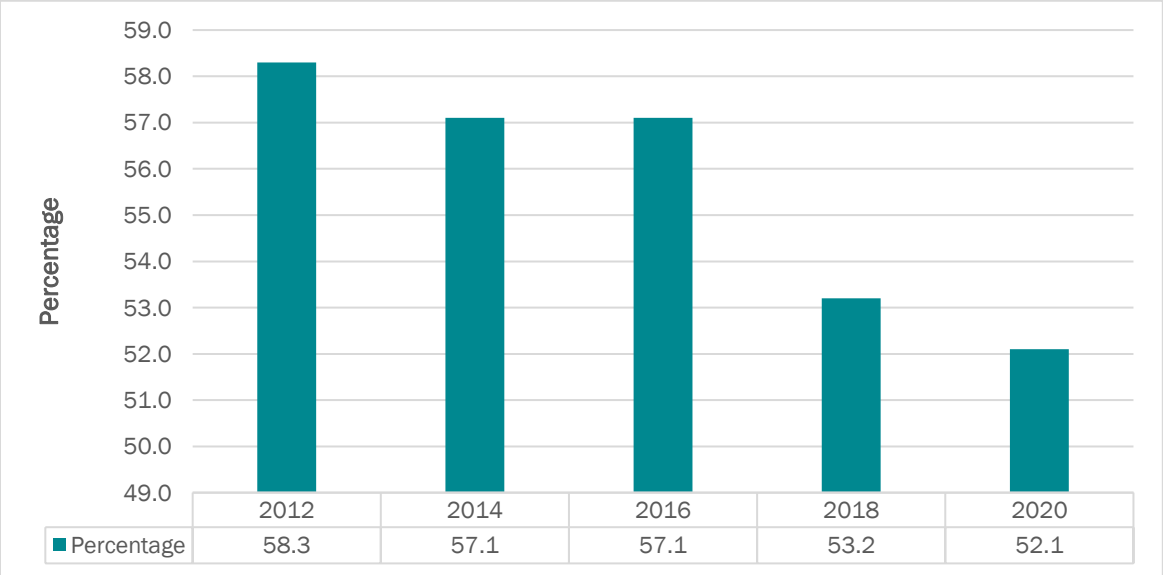


Figure 51: Percentage of Mississippi Adults Who Lost One or More Teeth Due to Tooth Decay or Gum Disease, 2012-2020



All Teeth Extracted

Figure 52: Percentage of Mississippi and US Adults Who Had All of Their Teeth Removed Due to Tooth Decay or Gum Disease, 2020

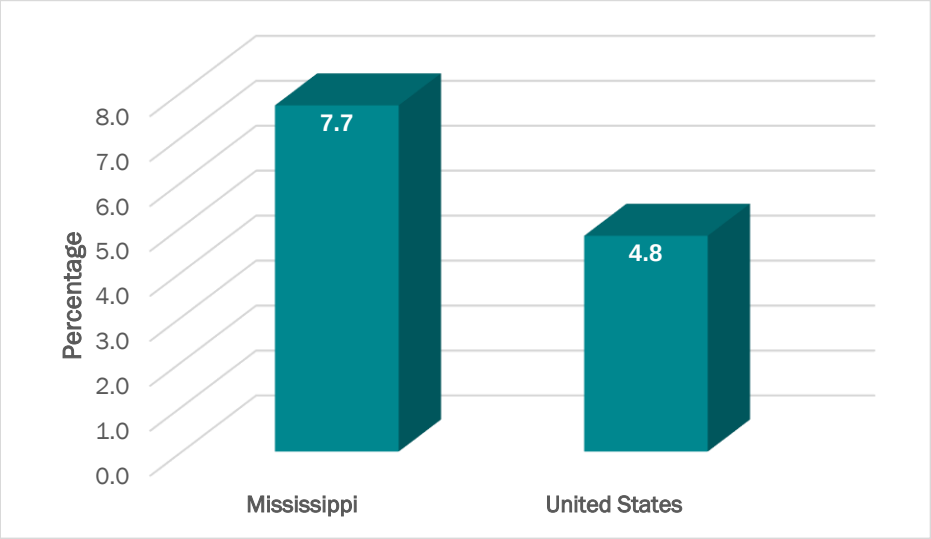
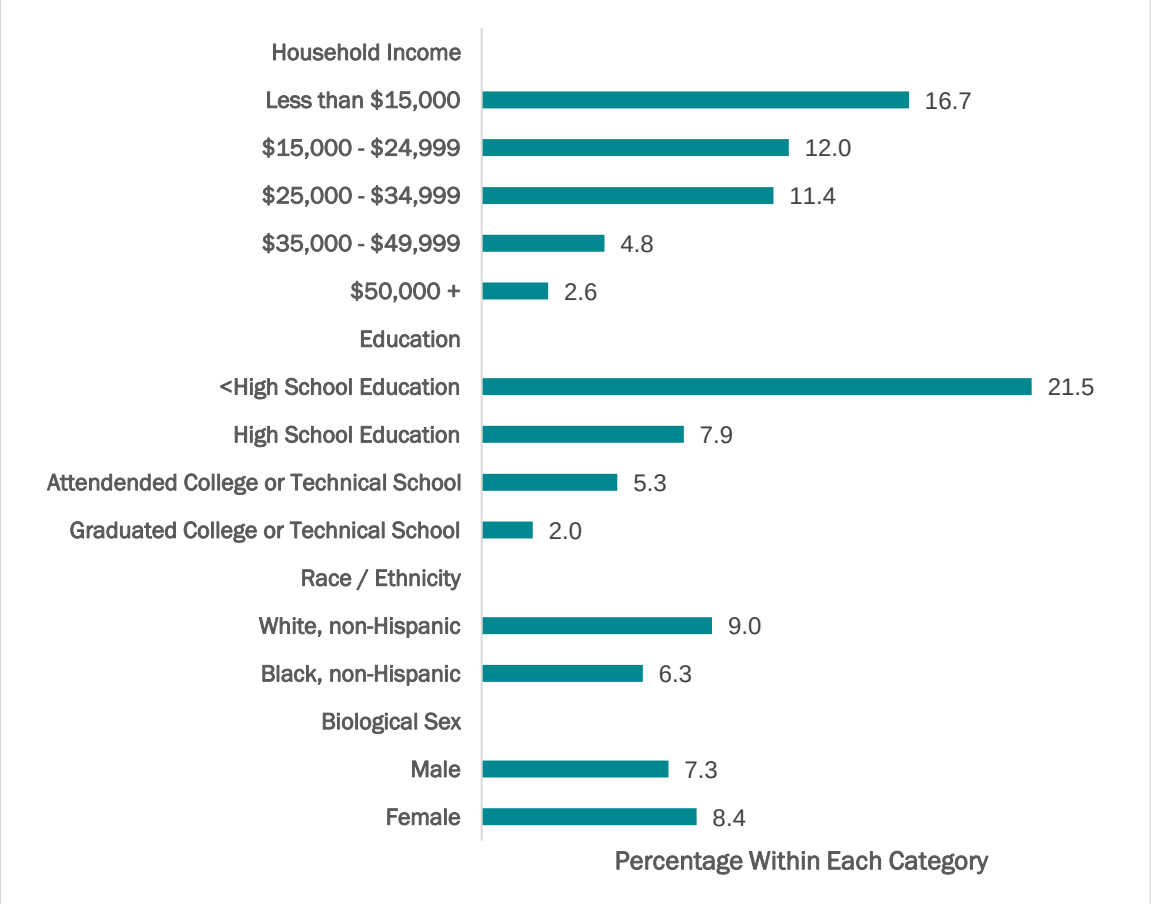


Figure 53: Percentage of Mississippi and US Adults Who Had All of Their Teeth Removed Due to Tooth Decay or Gum Disease by Income Level, Educational Attainment, Race, and Sex; 2020



Tobacco Use

More than 16 million adults in the US have a disease associated with smoking cigarettes.[32] Smoking has been directly linked to heart disease, cancer, stroke, lung disease, COPD, and diabetes.[33] Smoking-related illnesses lead to approximately half a million deaths each year, and most deaths and diseases from tobacco use in the US are associated with cigarette smoking.[34] The life expectancy of smokers is at least 10 years shorter than for non-smokers.[33] Several evidence-based strategies can help prevent and reduce tobacco use and secondhand smoke exposure. At the individual level, cessation counseling and medication can help people stop using tobacco. At the broader policy level, smoke-free ordinances and laws, and price increases can be deterrents.[34] Cigarette smoking remains the leading cause of preventable disease, disability, and death in the US.[33] Smokeless tobacco is a known cause of cancer. The percentage of MS adults who smoked cigarettes (some days or every day) in 2020 was 49.6% compared to 37.2% nationally (Fig. 54). Females (53.1%) reported smoking more often than males (47.0%). African American individuals were significantly more likely to smoke (63.0%) than Caucasians (44.1%). There were large disparities in the likelihood of smoking across income and education levels. Those with an annual household income of $15,000 or less were 2.649 times more likely to smoke than those who earned an income of $50,000 (95% CI [2.604, 2.695]). Those with educational attainment less than a high school diploma were 1.884 times more likely to smoke when compared to those who graduated from a technical school or college (95% CI [1.848, 1.920]) (Fig. 55). In 2020, the percentage of individuals who self-identified as current smokers reached an all-time low of 20.1%. At the beginning of the decade in 2021, the percentage was 26.0% (Fig. 56).

The nicotine in smokeless tobacco may increase the risk of ventricular arrhythmias (irregular heartbeat) which has been associated with sudden death. The percentage of MS adults who reported using smokeless tobacco (chewing tobacco, snuff, or snus) in 2020 was 7.1% compared to 3.3% nationally (Fig. 57). In MS, males were 6.543 times more likely to use smokeless tobacco than females ((95% CI [6.440, 6.648]). Caucasians were more likely to use smokeless tobacco than were African Americans (OR: 3.322 95% CI [3.268, 3.378]). Smokeless tobacco use varied across income levels such that there was no clear trend, however those who had the least educational attainment (less than high school diploma) were 2.341 times more likely to use smokeless tobacco than were those who graduated from a technical school or college (95% CI [2.289, 2.395]) (Fig. 58). Consistent with the downward trend in smoking, MS adults also reported lower percentages of smokeless tobacco use. Data indicate that as of 2020, smokeless tobacco use is also at an all-time low of 7.1%. In 2013, the first year of the current decade with available data, the percentage of MS adults reporting smokeless tobacco was 8.5% (Fig. 59).

E-cigarettes (e-cigs, vapes, e-hookahs, vape pens, and electronic nicotine delivery systems (ENDS)) come in many shapes and sizes. Most have a battery, a heating element, and a place to hold a liquid. They produce an aerosol by heating a liquid that usually contains nicotine and other chemicals that help make the aerosol. Users inhale the aerosol into their lungs. E-cigarettes are new, and their long-term health effects are still being studied. The nicotine in e-cigarettes is highlight addictive, and toxic to developing fetuses. Additionally, the aerosol that is produced can include cancer-causing chemicals and small sized particles that can travel deep into the lungs.

The percentage of MS adults who reported using e-cigarettes in 2020 (20.3%) was slightly lower than the national percentage (22.1%) (Fig. 60). In MS, males (20.4%) and females (20.2%) reported similar patterns of use. Caucasians were 2.110 times more likely to use e-cigarettes than African Americans (95% CI [2.066,2.155]). Smokeless tobacco use varied across income levels such that there was no clear trend, however those who had an annual household income of $25,000 - $34,999 were 2.094 times more likely to use e-cigarettes than those with an annual household income of at least $50,000 (95% CI [2.042, 2.148]). Those who attended college or technical school were 1.766 times more likely to use e-cigarettes than those who graduated college or technical school (95% CI [1.721, 1.812]) (Fig. 61). Trend data for e-cigarette use in MS BRFSS respondents is not available as it has only been collected for two years within the last decade.

Current Smoking

Figure 54: Percentage of Mississippi and US Adults Who Smoke Cigarettes Every day or Some Days, 2020

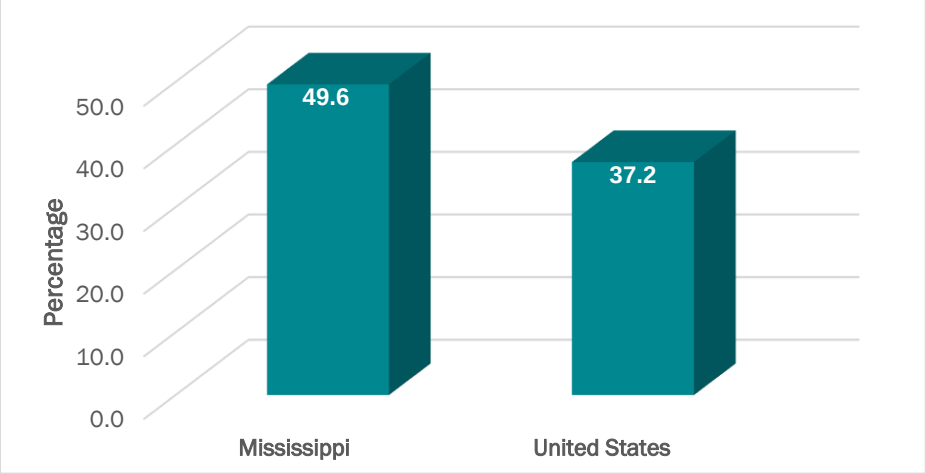


Figure 55: Percentage of Mississippi and US Adults Who Smoke Cigarettes Every day or Some Days by Income Level, Educational Attainment, Race, and Sex; 2020

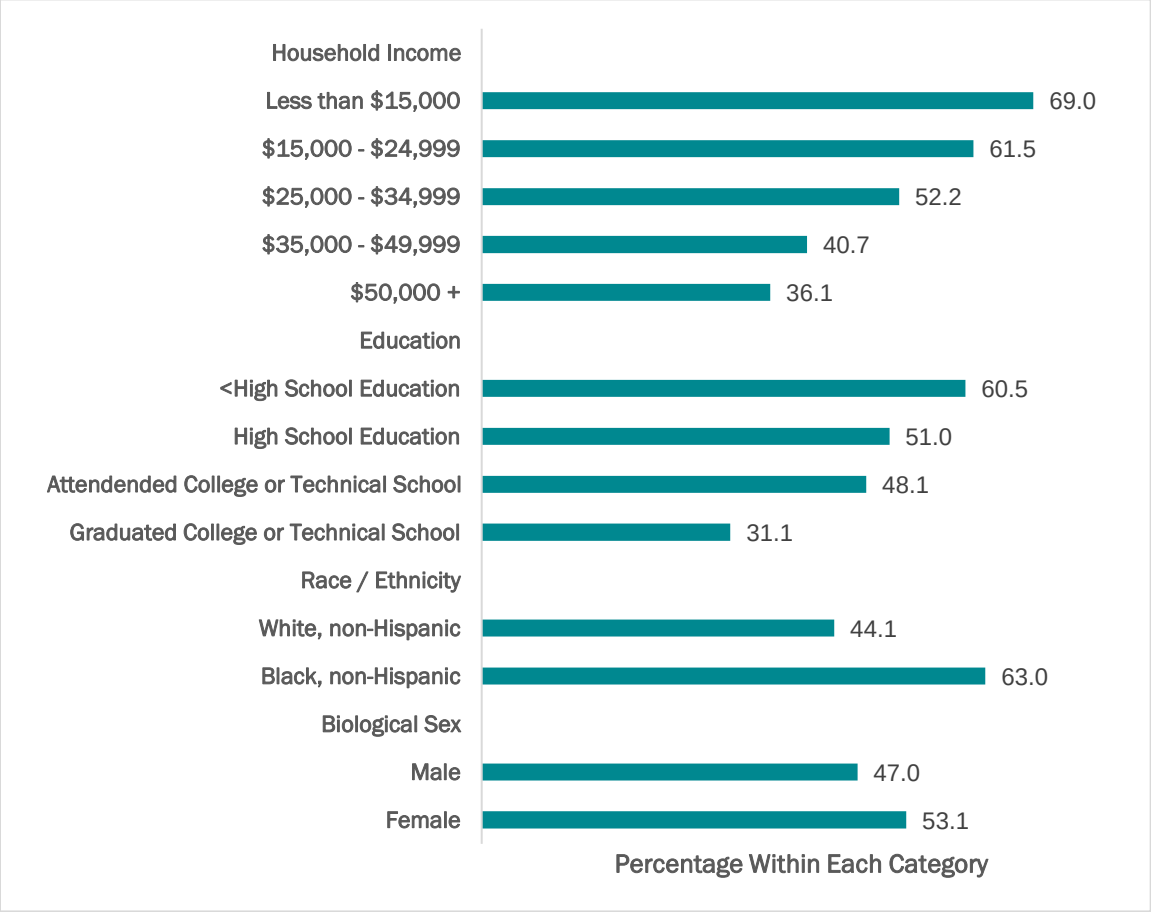
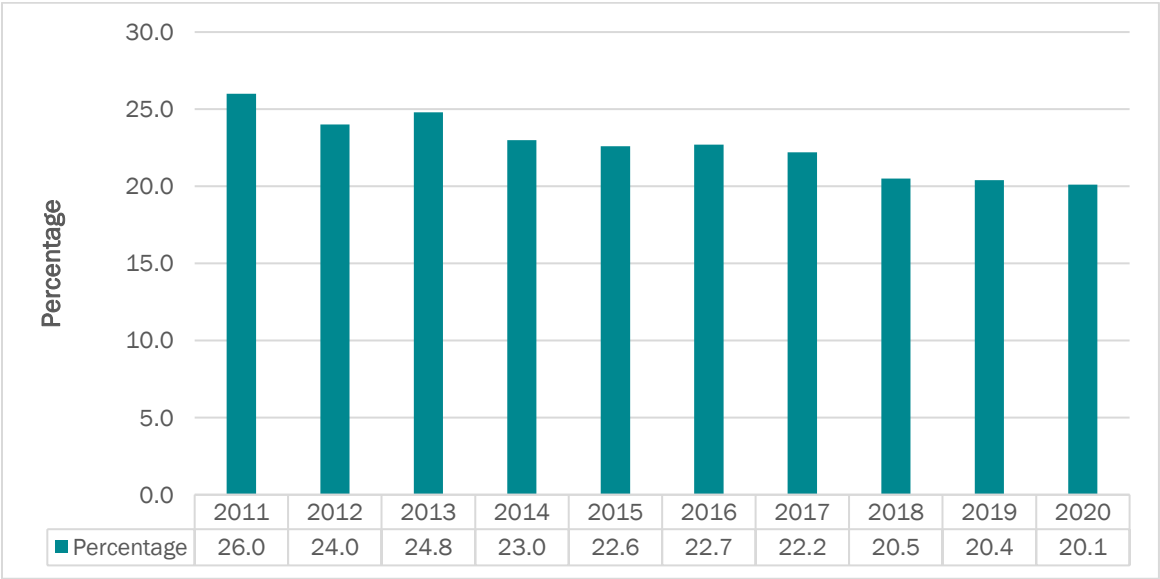


Figure 56: Percentage of Mississippi and US Adults Who Categorized Themselves as Current Smokers, 2011-2020



Current Smokeless Tobacco Use

Figure 57: Percentage of Mississippi and US Adults Who Currently Use Chewing Tobacco, Snuff, or Snus Every Day or Some Days, 2020

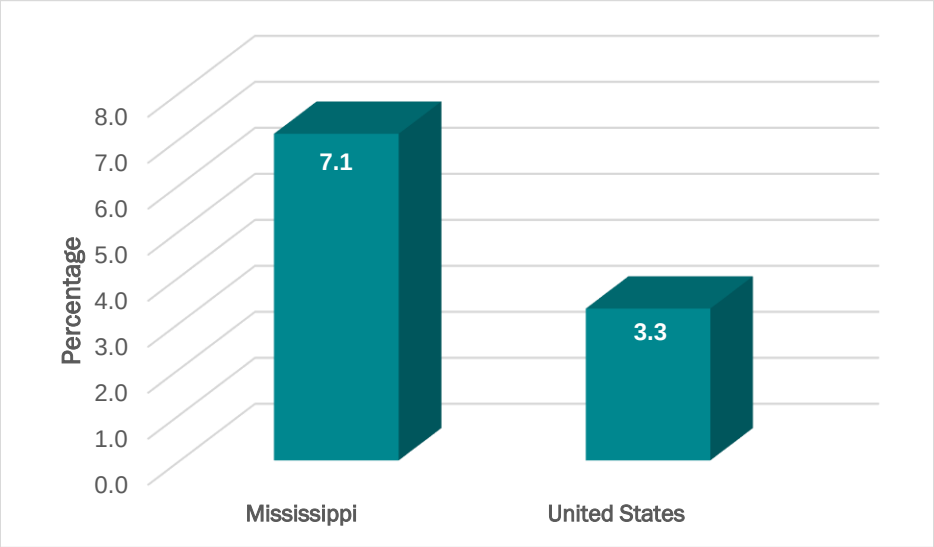


Figure 58: Percentage of Mississippi and US Adults Who Currently Use Chewing Tobacco, Snuff, or Snus Every Day or Some Days by Income Level, Educational Attainment, Race, and Sex; 2020

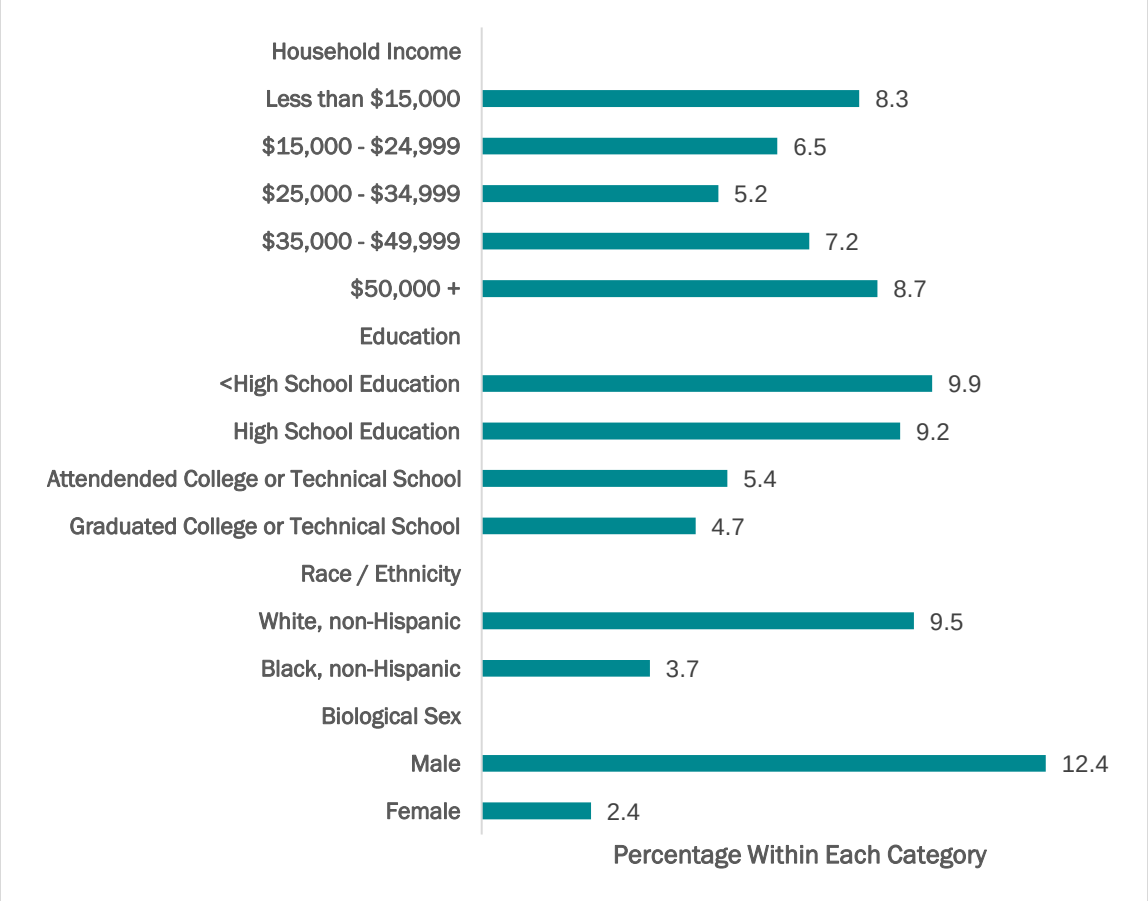
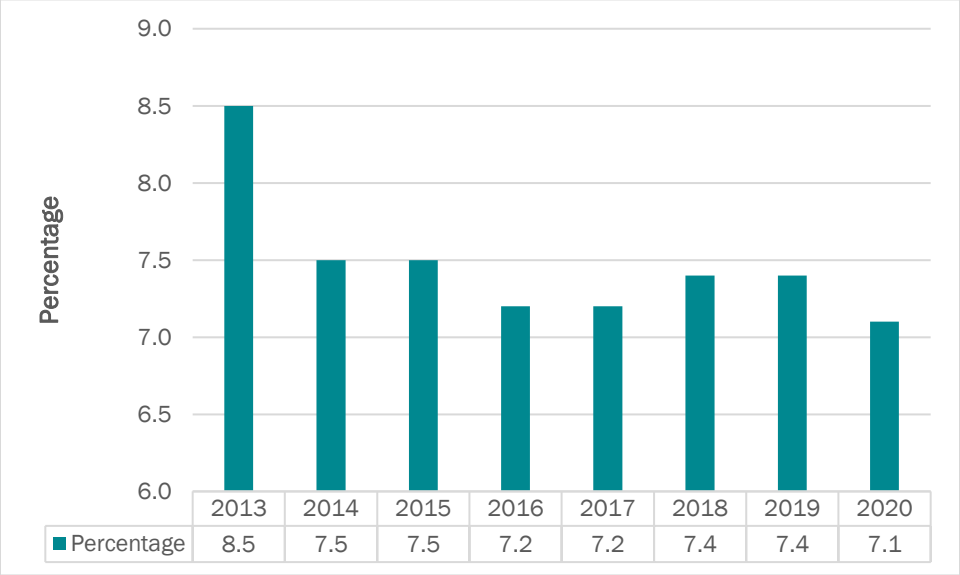


Figure 59: Percentage of Mississippi Adults Who Currently Use Chewing Tobacco, Snuff, or Snus Every Day or Some Days, 2013-2020



Current E-cigarette Use

Figure 60: Percentage of Mississippi and US Adults Who Currently Use E-cigarettes or Other Electronic Vaping Products Every Day or Some Days, 2020

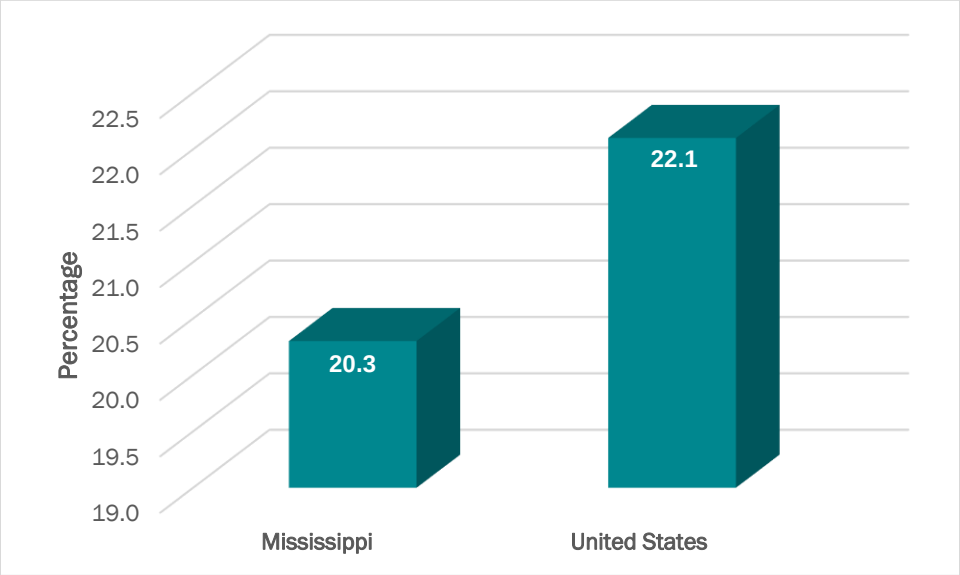
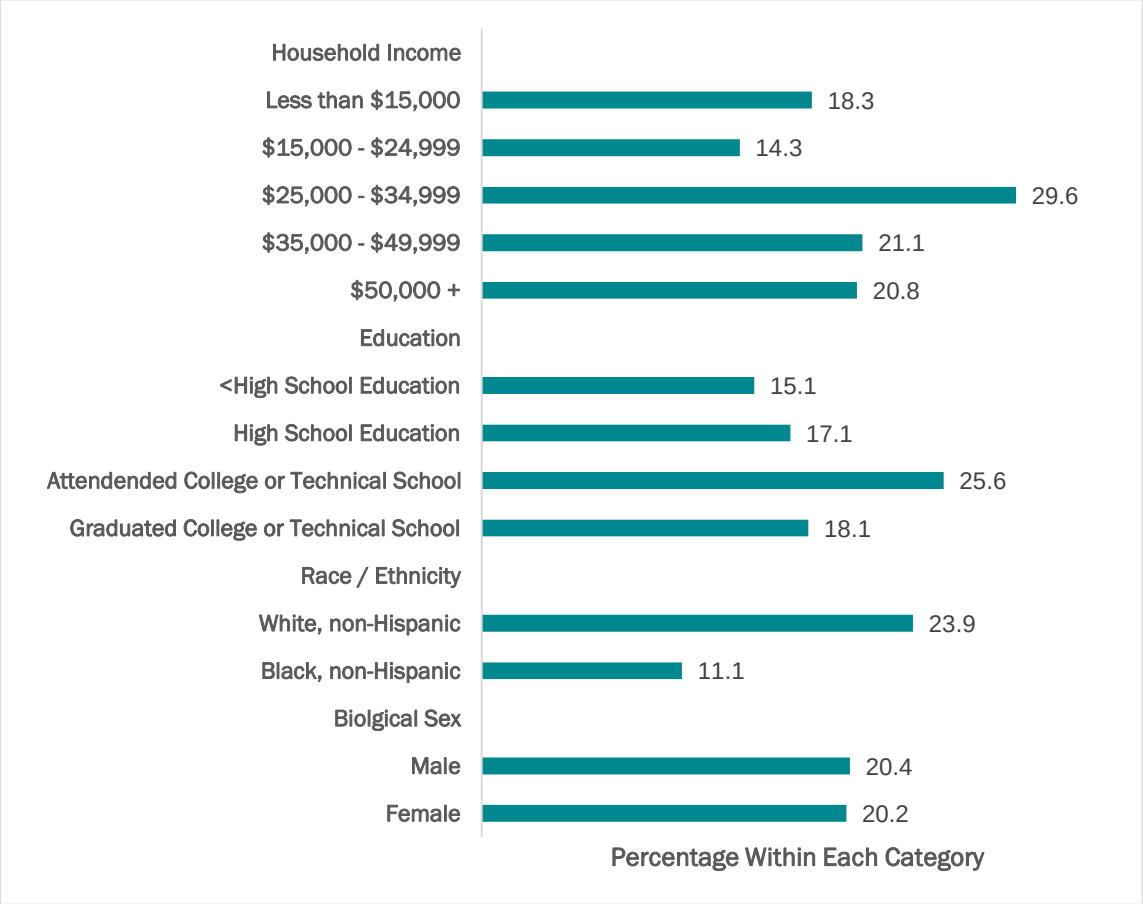


Figure 61: Percentage of Mississippi and US Adults Who Currently Use E-cigarettes or Other Electronic Vaping Products Every Day or Some Days by Income Level, Educational Attainment, Race, and Sex; 2020



Weight Status

Obesity is a complex disease that occurs when an individual's weight is higher than what is considered healthy for his or her height.[35] Body Mass Index (BMI) is calculated by dividing weight in kilograms by height in meters squared.

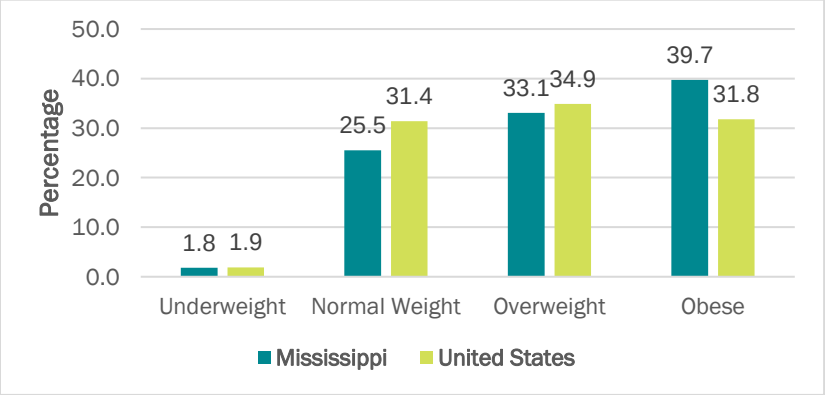
$BMI = \frac{Weight\ (kg)}{Height\ (m)^2}$ Once calculated, BMI is used to place individuals in the categories of underweight (BMI < 18.5 kg/m^2), normal weight (BMI 18.5 to < 25.0 kg/m^2), overweight (BMI 25.0 to < 30kg/m^2), and obese (BMI >30.0). Many factors can contribute to excess weight gain including eating patterns, physical activity levels, and sleep routines. The social determinants of health, conditions in which we live, learn work, and play, can contribute to obesity if they make it difficult to have access to healthy food choices and safe places to be physically active. Obesity prevention involves following healthy eating guidelines such as those found in *Dietary Guidelines for Americans*[36] which emphasizes the importance of eating a variety of vegetables and fruits, whole grains, a variety of lean protein foods, and low-fat and fat-free dairy products. It also suggests limiting foods and beverages with added sugars, solid fats, or sodium. Additionally, following the Physical Activity Guidelines for Americans,[37] which recommends adults participate in 150 minutes of moderate

intensity physical activity weekly can also work to prevent obesity. It is also recommended that adults get at least seven hours of sleep nightly.

Mississippi has the highest obesity rate in the nation with 39.7% of adults who have a BMI of 30 or more (Fig. 62). Among MS BRFSS respondents who provided their height and weight, 72.8% were overweight or obese compared to 66.7% nationally (Fig. 63). In MS in 2020, more males (73.7%) were overweight or obese than females (71.9%). The percentage of those overweight or obese across all categories of race, income, and educational attainment was higher than the national average. African Americans were 1.480 times more likely to be overweight or obese than Caucasians (95% CI [1.468, 1.491]). There was no trend of increased or decreased risk of obesity or overweight across categories of education. Obesity and overweight increased as annual household income increased. Those with an annual income of $50,000 or were 1.358 times more likely to be overweight or obese when compared to those with an annual income of $15,000 or less (95% CI [1.341, 1.375]) (Fig. 64). Since 2011, overweight and obesity has been on the rise among MS adults. In 2011, 68.9% of individuals were categorized as overweight or obese based on their self-reported height and weight. The highest percentage occurred in 2018 (73.3%), decreased to 72.7% in 2019, and increased slightly to 72.8% in 2020 (Fig. 65).

BMI Category

Figure 62: Percentage of Mississippi and US Adults Who Are in Each of Four Categories of Body Mass Index, 2020



Overweight or Obese BMI Based on Self-Reported Height and Weight

Figure 63: Percentage of Mississippi and US Adults Who Are Either Overweight or Obese Based on Body Mass Index Calculated from Self-Reported Height and Weight, 2020

Figure 64: Percentage of Mississippi and US Adults Who Are Either Overweight or Obese Based on Body Mass Index Calculated from Self-Reported Height and Weight by Income Level, Educational Attainment, Race, and Sex; 2020

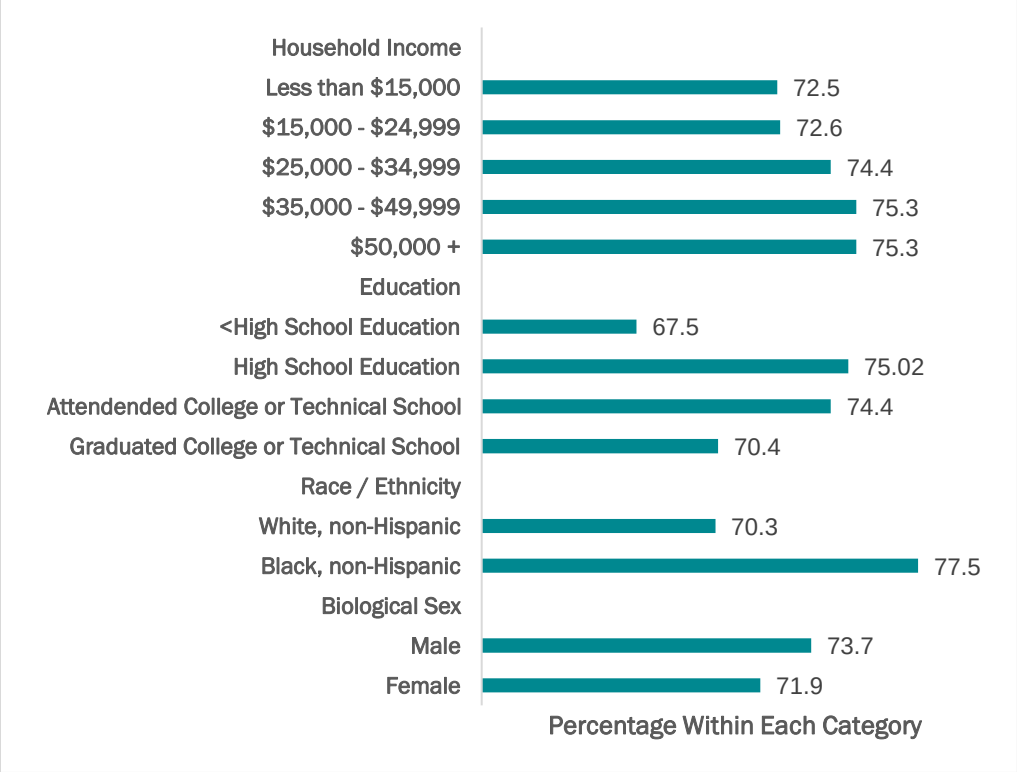
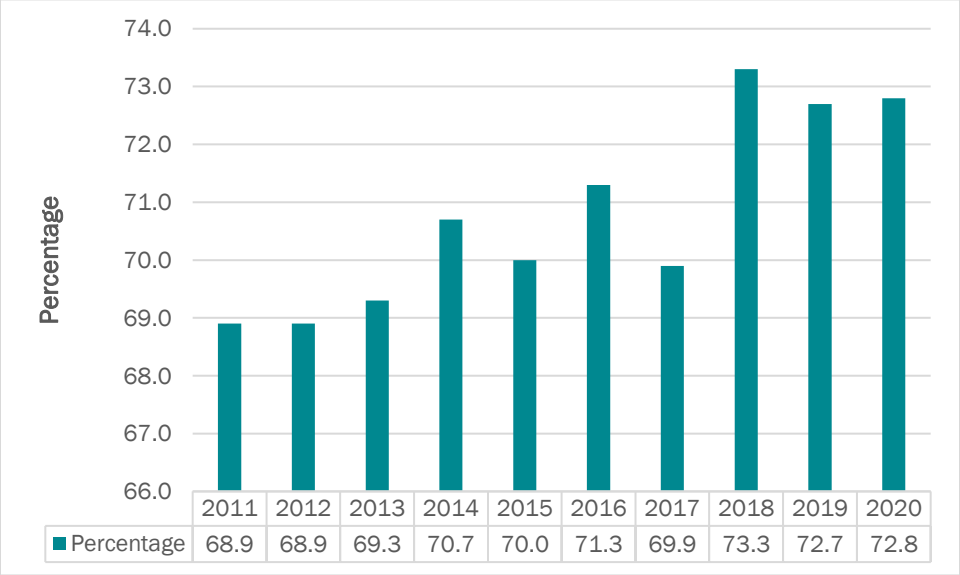


Figure 65: Percentage of Mississippi Adults Who Are Either Overweight or Obese Based on Body Mass Index Calculated from Self-Reported Height and Weight, 2011-2020



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Percentage	68.9	68.9	69.3	70.7	70.0	71.3	69.9	73.3	72.7	72.8

Mississippi Mortality

Leading Causes of Mortality in Mississippi

TABLE 3: Leading Causes of Mortality in Mississippi, 2020

Rank	Cause of Death	Frequency	Percentage of All Deaths	Rate
1	Heart Disease	8,810	21.9	245.7
2	Malignant Neoplasms (Cancer)	6,585	16.4	176.1
3	COVID-19	4,472	11.1	123.7
4	Unintentional Injury	2,212	5.5	73.1
5	Chronic Obstructive Pulmonary Disease (COPD) / Emphysema	2,198	5.5	59.2
6	Alzheimer's Disease	2,018	5.0	58.0
7	Cerebrovascular Diseases (Stroke)	1,948	4.8	54.5
8	Diabetes Mellitus	1,461	3.6	41.0
9	Pneumonia & Influenza	904	2.2	25.1
10	Kidney Disease	799	2.0	22.2
	All Other Diseases and Conditions*	8,797	21.9	

Leading Causes of Mortality in the Mississippi Delta Region

Table 4: Leading Causes of Death in the Mississippi Delta Region, 2020

Rank	Cause of Death	Frequency	Percentage of All Deaths	Rate per 100,000 Population*
1	Heart Disease	1,564	20.6	257.0
2	Malignant Neoplasms (Cancer)	1,245	16.4	194.2
3	COVID-19	976	12.9	159.1
4	Unintentional Injury	407	5.4	75.2
5	Chronic Obstructive Pulmonary Disease (COPD) / Emphysema	368	4.8	58.9
6	Cerebrovascular Diseases (Stroke)	361	4.8	59.3
7	Diabetes Mellitus	358	4.7	57.6
8	Alzheimer's Disease	282	3.7	49.1
9	Hypertension	178	2.3	29.0
10	Pneumonia & Influenza	169	2.2	28.4
	All Other Diseases and Conditions*	1,685	22.2	

*Age-Adjusted Rates

Mortality Attributed to Heart Disease

During 2020, heart disease was the leading cause of death in Mississippi, accounting for 21.9% of all deaths. In the Mississippi Delta Region (MSDR), 20.6% of mortality in 2020 was attributed to heart disease. Among the counties with the ten highest age-adjusted death rates per 100,000 population attributed to heart disease, four (4) were located in the MSDR. Overall, Mississippi ranked first (highest) in the nation for mortality due to heart disease. The Healthy People 2030 target related to heart disease mortality is to reduce coronary heart disease deaths to 71.1 per 100,000 population. In 2020, the age-adjusted death rate due to heart disease in MS was 245.7 per 100,000 population.

Table 5: Mississippi Counties with the Ten Highest Age-Adjusted Death Rates per100,000 Population Due to Heart Disease, 2020

County	Mortality Rate
Leflore†	471.2
Tunica†	448.3
Yalobusha	441.1
Claiborne	393.0
Sharkey†	382.9
Clarke	361.2
Neshoba	357.7
Quitman†	350.8
George	348.8
Tishomingo	336.2

- In 2020, MS had the highest rate of mortality due to heart disease in the nation.
- AA males in MS experience the highest burden of mortality due to heart disease (1.3 times that of AA nationally).

Figure 66: Mortality Attributed to Coronary Heart Disease in the US, Mississippi, and the Mississippi Delta Region, Overall and by Race and Sex, 2020

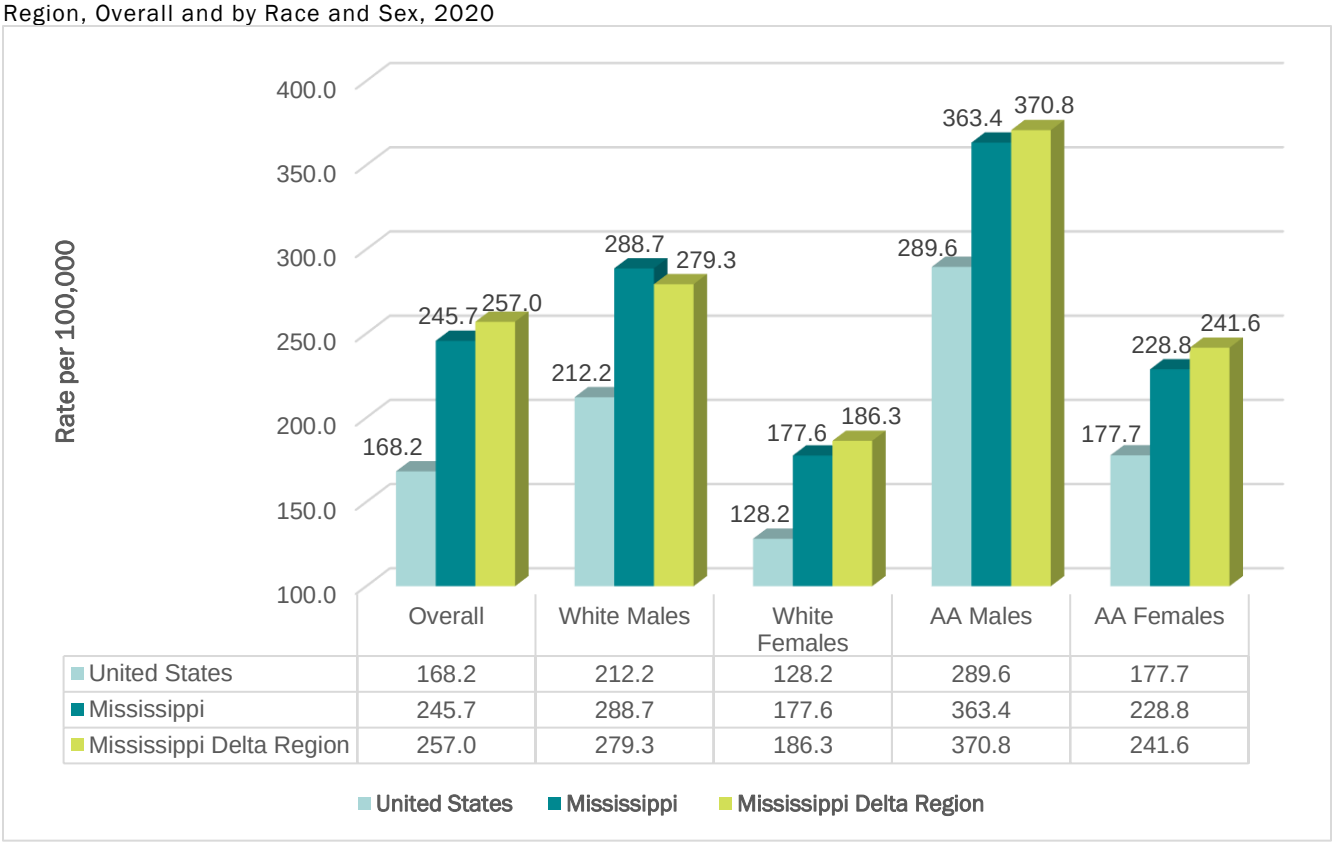
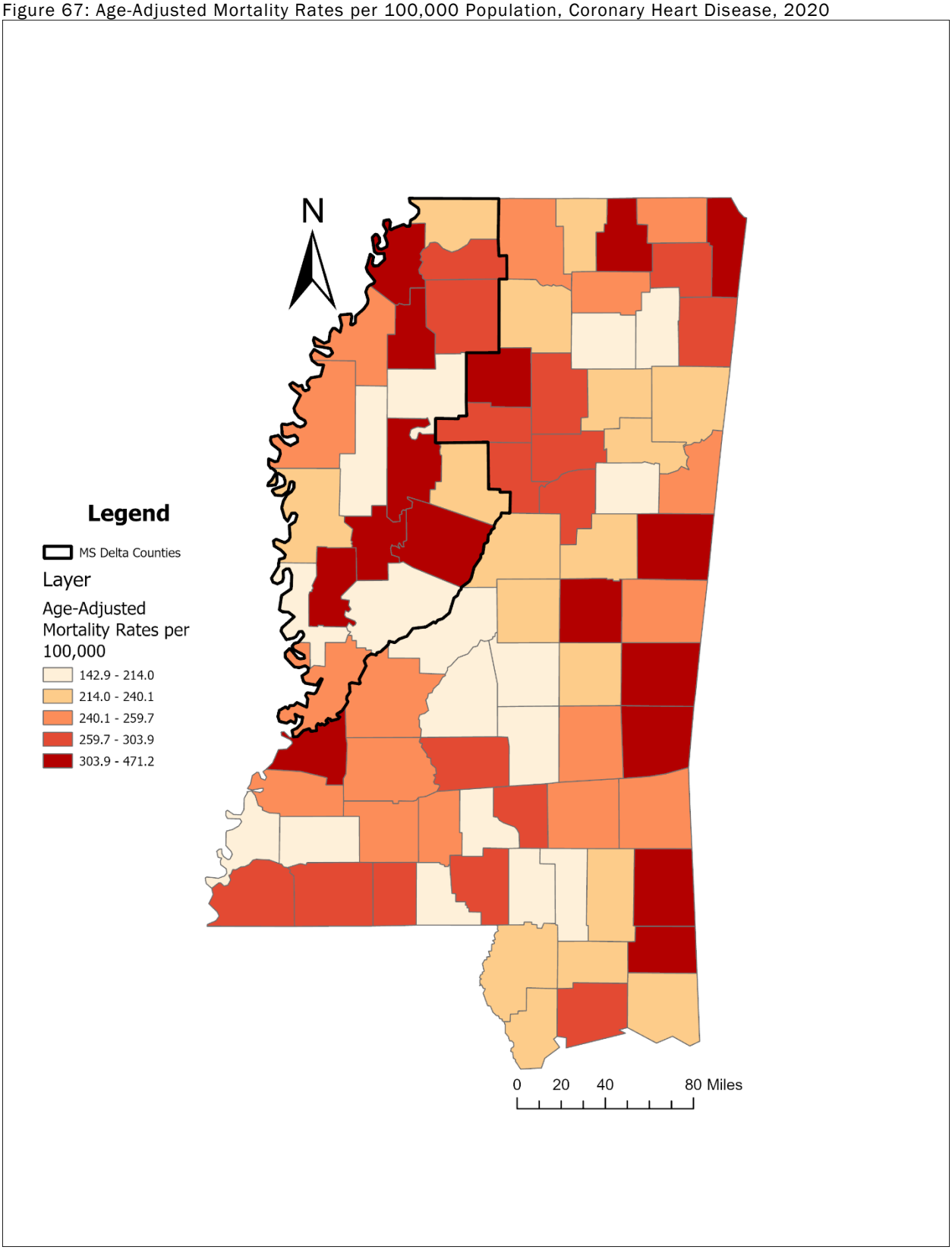


Figure 67: Age-Adjusted Mortality Rates per 100,000 Population, Coronary Heart Disease, 2020



Mortality Attributed to Cancer

During 2020, malignant neoplasms (cancers) were the second leading cause of death in Mississippi, accounting for 16.4% of all deaths across the state and in the MDR. Among the counties with the ten highest age-adjusted death rates per 100,000 population attributed to cancer, six (6) were located in the MSDR. Overall, Mississippi ranked third in the country with an age-adjusted death rate of 176.1 per 100,000, This represents an improvement from 2019 when they were ranked first in the nation. The Healthy People 2030 target related to cancer mortality is to reduce cancer-related deaths to 122.7 per 100,000 population. Mortality due to cancer of the trachea, lung, and bronchus in the MSDR was 2,4 times higher than the US rate of 26.8 per 100,000 and 1.4 times higher than the overall MS rate of 45.8 per 100,000 population.

Table 6: Mississippi Counties with the Ten Highest Age-Adjusted Death Rates per100,000 Population Due to Malignant Neoplasms (Cancer), 2020

County	Mortality Rate*
Bolivar†	267.8
Tunica†	258.2
Washington†	256.7
Leflore†	251.3
Quitman†	251.2
Stone	242.9
Grenada	233.7
Coahoma†	225.2
Jefferson	217.2
Yazoo†	216.9

*Age-Adjusted Rates per 100,000 population
†Delta County

- The burden of cancer mortality in the MSDR is 1.6 times that of cancer mortality nationally, and 1.3 times higher than the state overall.
- The burden of mortality associated with cancer of the trachea, lung, and bronchus is 2.4 times the national mortality rate, and 1.4 times that of the state mortality rate.

Figure 68: Mortality Attributed to Cancer in the US, Mississippi, and the Mississippi Delta Region; All Sites, Breast Cancer, Colorectal Cancer, Prostate Cancer, and Trachea, Lung, and Bronchus Cancer: 2020

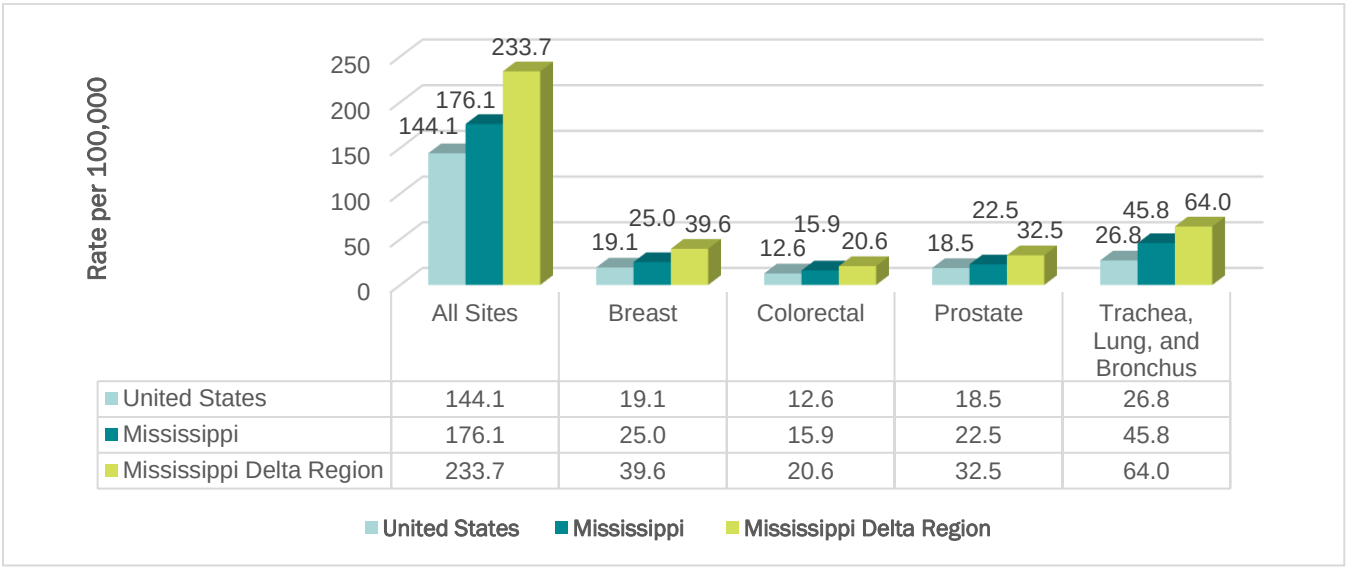
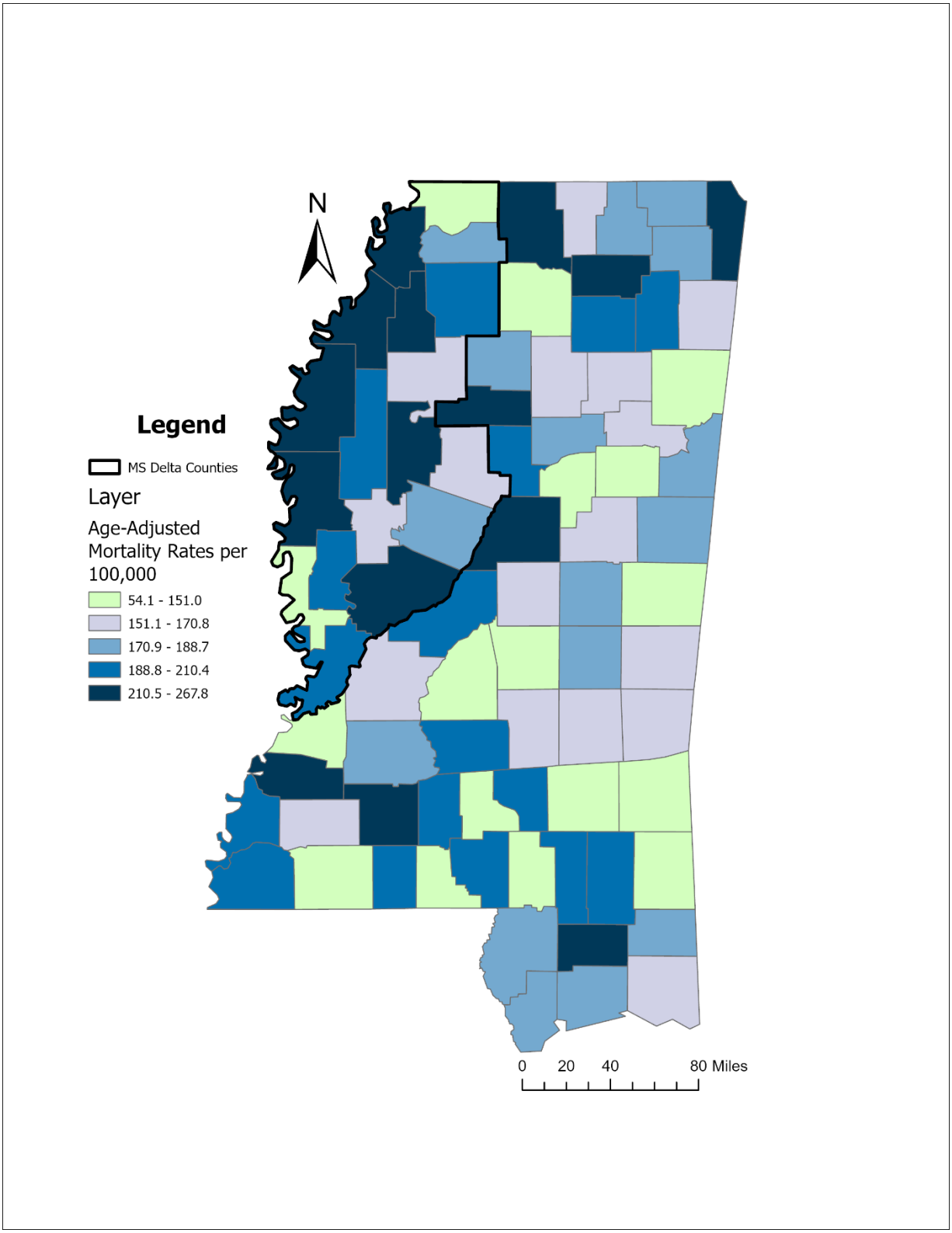


Figure 69: Age-Adjusted Mortality Rates per 100,000 Population, All Cancer, 2020



Mortality Attributed to Cerebrovascular Disease (Stroke)

During 2020, Cerebrovascular disease (stroke) was the fifth leading cause of death in Mississippi overall and the sixth leading cause of death in the MSDR, accounting for 4.8% of all deaths. Among the counties with the ten highest age-adjusted death rates per 100,000 population attributed to stroke, four (4) were located in the MSDR. Overall, Mississippi ranked first (highest) in the nation with an age-adjusted death rate due to stroke of 54.5 per 100,000 population. The Healthy People 2030 target is 33.4 per 100,000. African Americans experience the greatest burden of mortality due to stroke in the state (71.7 per 100,000 population) which is 1.5 times the stroke mortality rate experienced by Caucasians (47.2 per 100,000 population). There have been significant improvements in the MSDR with mortality rates due to stroke for AA males and Caucasian females falling below those of the overall state rate (Figure 70).

Table 7: Mississippi Counties with the Ten Highest Age-Adjusted Death Rates per 100,000 Population Due to Cerebrovascular Disease (Stroke), 2020

County	Mortality Rate*
Claiborne	126.4
Leflore†	121.1
Humphreys†	100.3
Jasper	98.3
Lawrence	91.7
Washington†	86.2
Coahoma†	82.3
Monroe	77.3
Jefferson Davis	77.2
Webster	74.9

*Age-Adjusted Rates per 100,000 population
†Delta County

- Mississippi has the highest rate of morality due to stroke in the nation.
- Mortality due to stroke among AA males and Caucasian females in the MSDR has dropped below the MS state mortality rate due to stroke.

Figure 70: Mortality Attributed to Cerebrovascular Disease (Stroke) in the US, Mississippi, and the Mississippi Delta Region, Overall and by Race and Sex, 2020

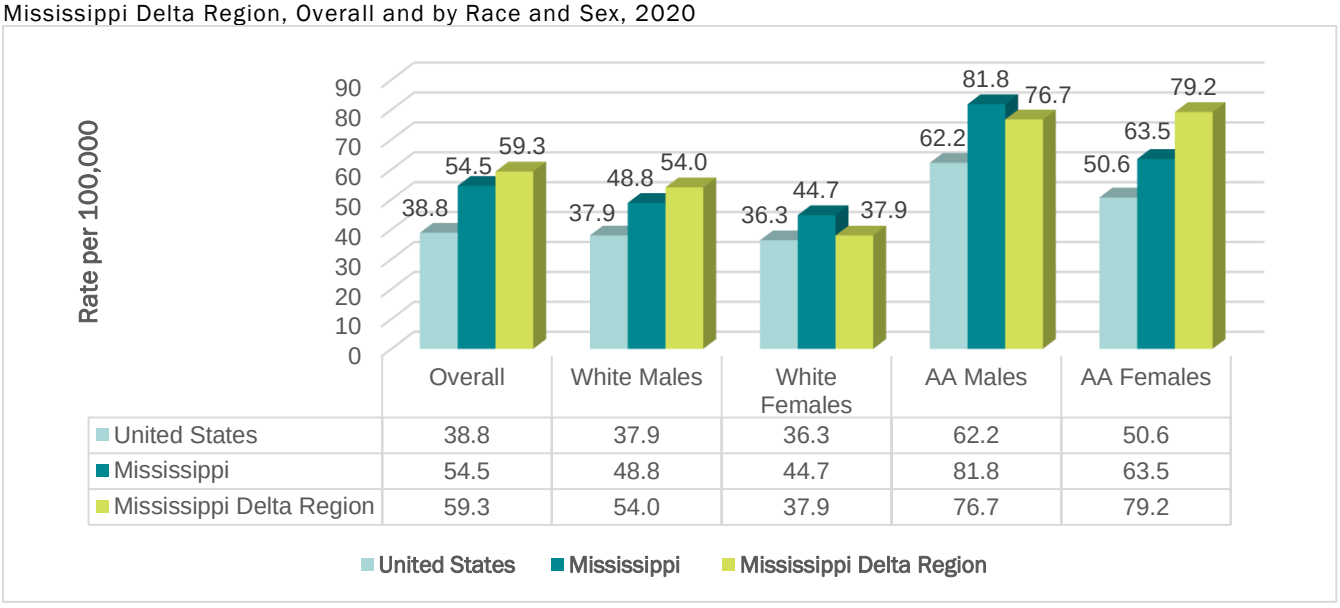
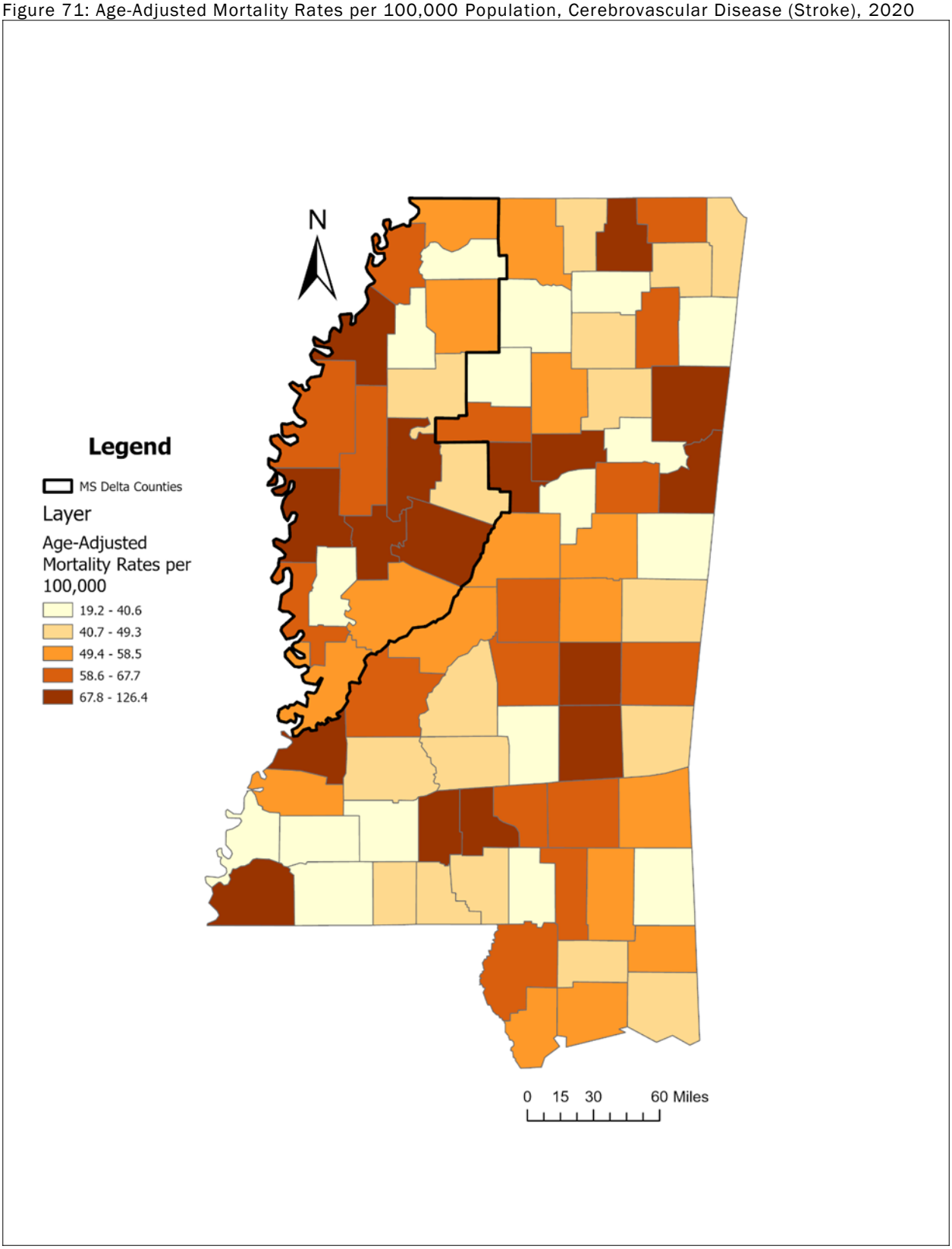


Figure 71: Age-Adjusted Mortality Rates per 100,000 Population, Cerebrovascular Disease (Stroke), 2020



Mortality Attributed to Type 2 Diabetes

During 2020, Diabetes Mellitus was the eight leading cause of death in Mississippi overall and the seventh leading cause of death in the MSDR, accounting for 3.6% of all deaths in the state, and 4.7% of all deaths is the MSDR. Among the counties with the ten highest age-adjusted death rates per 100,000 population attributed to diabetes, six (6) were located in the MSDR. Overall, Mississippi continued to rank second in the nation for mortality attributable to Diabetes, with an age-adjusted death rate of 41.0 per 100,000. African Americans experience the greatest burden of mortality due to diabetes in the state (87.7 per 100,000 population). More specifically, AA males in the MSDR have the highest mortality rate attributable to diabetes in the state at 115.0 per 100,000 population.

Table 8: Mississippi Counties with the Ten Highest Death Rates Due to Type 2 Diabetes Mellitus, 2020

County	Mortality Rate*
Sunflower†	150.7
Franklin	135.7
Coahoma†	124.3
Quitman†	119.7
Yazoo†	108.4
Scott	104.4
Humphreys†	101.1
Washington†	100.1
Benton	99.3
Newton	95.9

*Age-Adjusted Rates per 100,000 population
†Delta County

- AA females in the MSDR experience 3.5 times the mortality due to diabetes than Caucasian females in the MSDR
- AA males in the MSDR experience 3.3 times the mortality due to diabetes than Caucasian males in the MSDR
- AA females in the MSDR experience 2.3 times the mortality due to diabetes than AA females nationally.
- AA males in the MSDR experience 2.0 times the mortality due to diabetes than AA males nationally.

Figure 72: Mortality Attributed to Type 2 Diabetes Mellitus in the US, Mississippi, and the Mississippi Delta Region, Overall and by Race and Sex, 2020

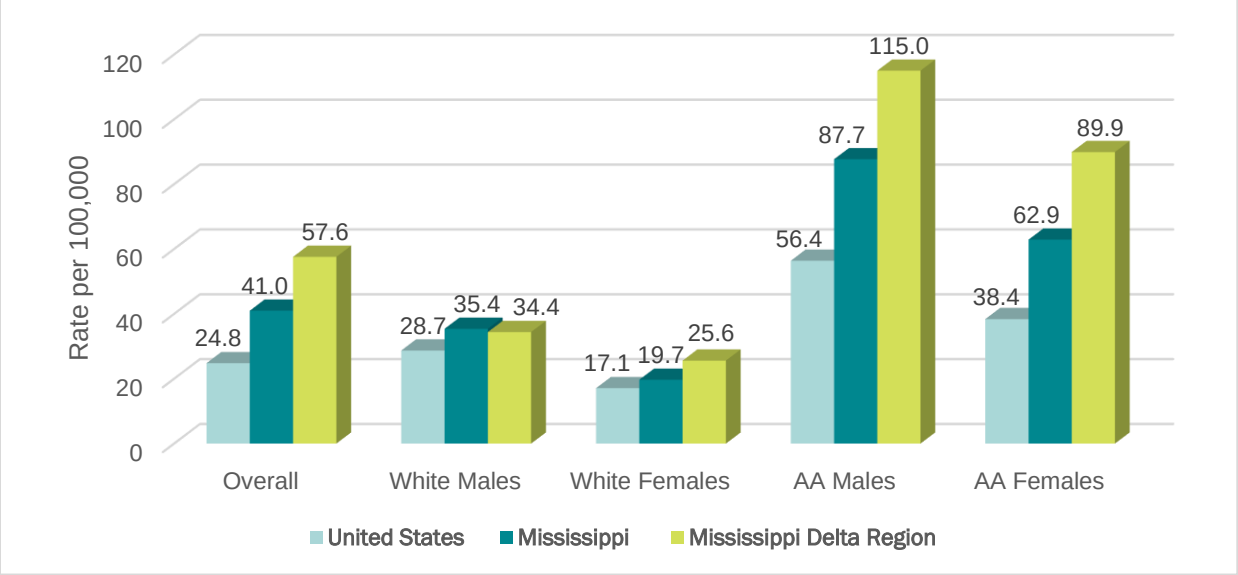
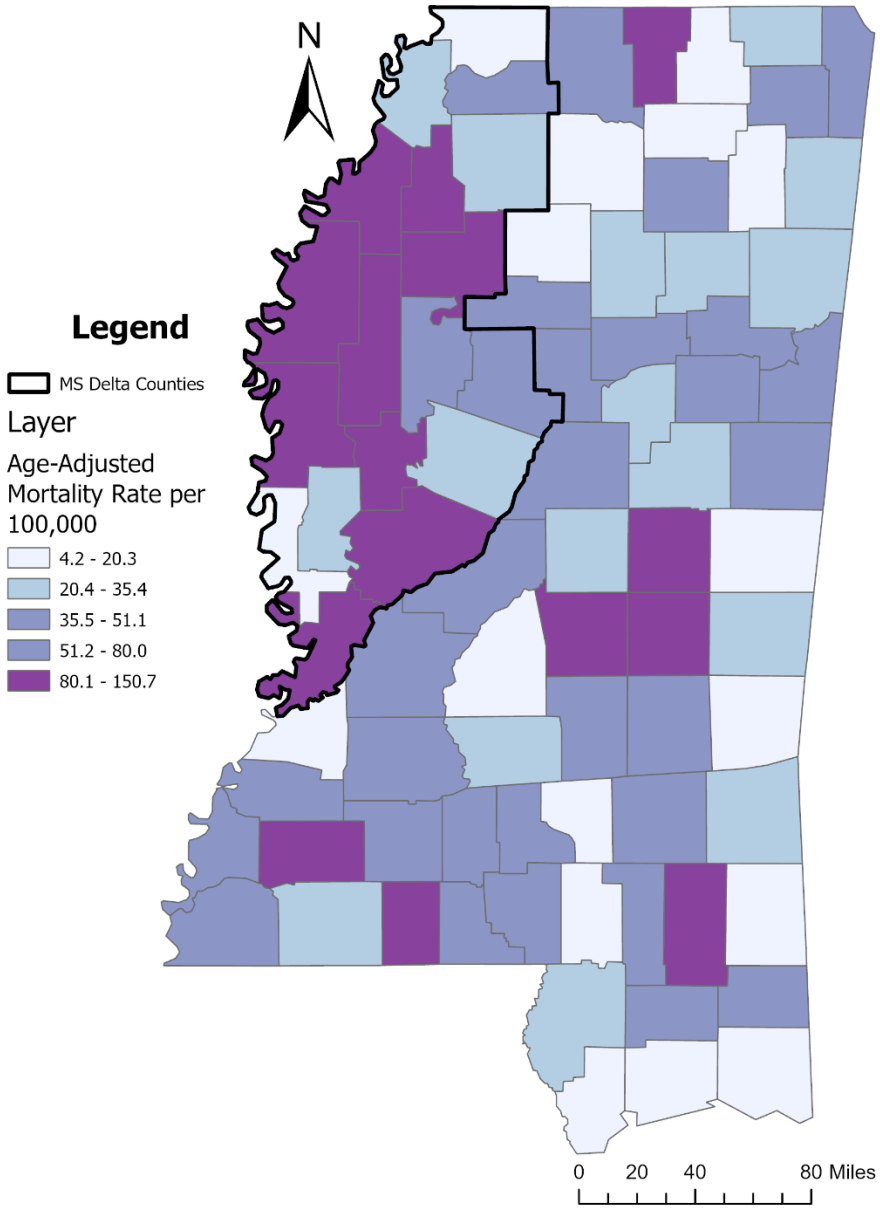


Figure 73: Age-Adjusted Mortality Rates per 100,000 population, Diabetes, 2020



Healthy People 2030

The mission of Healthy People[38] is to promote, strengthen, and evaluate the nation's efforts to improve the health and well-being of all people. The overarching goals are to:

- Attain healthy, thriving lives and well-being free of preventable disease, disability, injury, and premature death.
- Eliminate health disparities, achieve health equity, and attain health literacy to improve the health and well-being of all.
- Create social, physical, and economic environments that promote attaining the full potential for health and well-being for all.
- Promote healthy development, healthy behaviors, and well-being across all life stages.
- Engage leadership, key constituents, and the public across multiple sectors to take action and design policies that improve the health and well-being of all.

Healthy People identifies public health priorities to help individuals, organizations, and communities across the United States improve health and well-being. Healthy People 2030, the initiative's fifth iteration, builds on knowledge gained over the first 4 decades. To meet the Healthy People 2030 targets, Mississippi must decrease mortality attributed to coronary heart disease, cerebrovascular disease, and all cancers; and reduce the proportion of adults with obesity, adults who currently use tobacco, and adults ages 45 and over who have had all of their teeth extracted. To meet the Healthy People 2030 targets, Mississippi must increase the proportion of females ages 21-65 who participate in cervical cancer screening, and the proportion of adults ages 50-75 who are screened for colorectal cancer based on the most current USPSTF guidelines.

Table 9: Mississippi's Progress Toward Healthy People 2030 Targets, 2020

Healthy People 2030 Indicator	Mississippi Data*	Healthy People[34] 2030 Target*	Direction for Mississippi
Coronary Heart Disease Mortality Rate	245.7 per 100,000	71.1 per 100,000	Decrease needed
Cerebrovascular Disease Mortality Rate	54.5 per 100,000	33.4 per 100,000	Decrease needed
Overall Cancer Mortality Rate	176.1 per 100,000	122.7 per 100,000	Decrease needed
Breast Cancer Mortality Rate	25.0 per 100,000	15.3 per 100,000	Decrease needed
Proportion of Adults with Obesity	39.7%	36.0%	Decrease needed
Proportion of Females Ages 21-65 Who Received Cervical Cancer Screening Based on the Most Recent Guidelines	82.3%	84.3%	Increase needed
Colorectal Cancer Mortality Rate	15.9 per 100,000	8.9 per 100,000	Decrease needed
Proportion of Adults 50 – 75 Who Received Colorectal Screening Based on the Most Recent Guidelines	70.9%	74.4%	Increase needed
Prostate Cancer Mortality	22.5 per 100,000	16.9 per 100,000	Decrease needed
Proportion of Adults Ages 45 and Over Who Have Lost All of Their Teeth	12.6%	5.4%	Decrease needed
Current Tobacco use in Adults	49.6%	16.2%	Decrease needed

*All rates are age-adjusted; Target rates and percentages are age-adjusted to the year 2000 standard population

Summary and Future Directions

The *Report on the Burden of Chronic Diseases in Mississippi: 2020* provides a description of the current state of chronic diseases and associated risk and prevention behaviors practiced by Mississippians. In general, chronic diseases are more prevalent in MS than they are on nationally. More Mississippians engage in behaviors that increase their risk of developing chronic diseases when compared to the national average, and fewer engage in prevention and screening behaviors that may allow for early detection and intervention. As such, MS experiences some of the highest mortality rates attributable to chronic diseases in the nation.

In 2020, 8,810 Mississippians died of heart disease, the leading cause of death in MS. The age-adjusted death rate was 245.7 per 100,000, giving MS the ranking of first (highest) in the country (2nd in 2019). In 2020, 6,585 Mississippians died as a result of cancer. The age-adjusted death rate was 176.1 per 100,000, ranking MS third in the country. This represents an improvement from 2019 when they were ranked first in the nation. COPD claimed the lives of 2,198 Mississippians, with a rate of 59.2 per 100,000, ranking MS fourth in the country. In 2019, they were ranked fifth. Mississippi continued to rank first in the nation with regard to cerebrovascular disease having lost 1,948 individuals to stroke in 2020. The age-adjusted mortality rate for stroke was 54.5 per 100,000. Mississippi continued to rank second in the nation for mortality attributable to Diabetes, with an age-adjusted death rate of 41.0 per 100,000.

Mississippians experienced many notable improvements in chronic disease prevalence and participation in screening behaviors from 2019 to 2020. For example, the percentage of Mississippi adults ever diagnosed with skin cancer has remained stable over the last decade ranging from 5.4% in 2017 to 6.3% in 2019 (Fig. 10). This percentage decreased to 5.6% in 2020. Over the last decade, participation in mammogram screening among women 40 years of age and older was at its lowest in 2018 (65.3%) but rebounded considerably in 2020 (69.3%) (Figure 16). The percentage of Mississippi adults ages 50-75 who met the United States Preventive Services Task Force (USPSTF) recommendations for colorectal screening within the recommended time interval was 70.9% compared to 72.4% nationally (Fig. 20). Mississippi experienced a consistent upward trend in colorectal cancer screening participation from 2014 (60.2%) to present (70.9%) (Fig. 22). Over the last decade, the percentage of MS adults ever diagnosed with COPD ranged from 6.7% in 2012 to 9.7% in 2018. Since that peak, the percentage decreased in 2019 (9.4%) and 2020 (8.6%) (Fig. 34).

Though it is telling to compare the prevalence of chronic diseases in Mississippi to national levels, it is important to note that within the state of Mississippi, chronic diseases do not impact all populations equally. Throughout the report, there is evidence of racial, socioeconomic, and geographic disparities with regard to chronic disease burden and disease-related risk factors within the state. Specifically with regard to mortality attributable to chronic disease, AA males experienced a higher age-adjusted mortality rate due to heart disease (363.4 per 100,000 population) than did Caucasian males (288.7 per 100,000). This racial disparity is evident among females as well. It is further demonstrated in the MSDR when the age-adjusted mortality rate due to heart disease for AA males from the MSDR (370.8 per 100,000) is compared to the rate for Caucasian males from the MSDR (279.3 per 100,000 population). Similar trends were seen in age-adjusted mortality rates for cerebrovascular disease and diabetes.

Health disparities were also seen across categories of socioeconomic status such as income and education level. Compared to those with higher income and higher educational attainment, those in lower income and educational attainment categories were more likely to use tobacco products; less likely to participate in screening behaviors such as mammography, cervical cancer screening, and colorectal screening; less likely to have seen a dental health provider in the last year; and more likely to have lost teeth due to tooth decay or gum disease. Lower income and educational groups were also more likely to experience depression.

With regard to protective behaviors such as health screenings, there have been improvements in participation from those at highest risk for developing chronic diseases. For example, 76.9% of AA women in MS age 40+ reported participating in mammogram screening in the last two years (64.9% Caucasians). Similarly, 88.4% of AA women 21 to 65 had participated in cervical cancer screening in the last three years (77.1% Caucasians). Lastly, 72.1% of AAs age 50 to 75 met the USPSTF recommendations for colorectal screening within the recommended time interval (70.5% Caucasians).

Findings from this report, may be used to prioritize those populations at highest risk of developing chronic diseases by engaging them around prevention behaviors, and offering culturally and linguistically appropriate education around the importance of improving modifiable risk factors associated with chronic disease morbidity and mortality. These types of interventions are largely ineffective if more upstream approaches that improve areas related to social determinants of health are not also addressed. Broader issues such as food insecurity, access to medical care and health insurance, improvements in health literacy, safe places to live, learn, play and exercise, are all indirect determinants of chronic disease that must be addressed if meaningful improvements are to be made throughout the state. Prioritizing those most at risk, specifically minority communities and those with lower socioeconomic status and lower levels of education, may help to reduce health disparities and improve the health of the state as a whole.

For information on initiatives within the state that are working to reduce the rate of morbidity and mortality attributable to chronic disease, please visit https://msdh.ms.gov.

Appendices

Appendix A: Data Sources and Methodology

Indicators Derived from BRFSS

The BRFSS is an ongoing, state-based, random digit-dialed telephone survey of non-institutionalized U.S. adults aged 18 years or older. The survey collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. The BRFSS operates in 50 states, the District of Columbia, and three U.S. territories (Puerto Rico, U.S. Virgin Islands, and Guam). As with all self-reported sample surveys, BRFSS data might be subject to systematic error resulting from non-coverage (e.g., lower telephone coverage among populations of low socioeconomic status), non-response (e.g., refusal to participate in the survey or to answer specific questions), or measurement (e.g., social desirability or recall bias). All prevalence estimates from BRFSS were weighted to reflect the US population in 2020. Survey weights were applied as recommended in the survey methodology documentation. State (i.e., Mississippi) estimates reported are age-adjusted estimates. National (U.S.) estimates reported are median prevalence rates for all 50 states and D.C. Estimates were not reported for those categories in which there were fewer than 50 respondents. To determine how indicators differed between Mississippi and the US, frequencies and percent of responses in each category were calculated. Multivariate logistic regression models were utilized to determine risk associated with each indicator across categories of biological sex, income, educational attainment, and race.

Further information on BRFSS, including information on survey data quality, question history, or module information is available from the survey website at: http://www.cdc.gov/brfss/.

Mortality Rates

Mortality statistics are compiled from death certificates filed with the MSDH, Office of Vital Records as required by MS state law and regulation. Mortality data in the MS STatistically Automated Health Resource System (MSTAHRS) represents deaths of MS residents. Deaths from 1999 forward are coded using the Tenth Revision of the International Classification of Diseases (ICD-10). Compared to ICD-9, ICD-10 offers greater specificity on disease classification. Therefore, case count and rate calculation might be different for the same conditions using ICD-9 and ICD-10. Cautions are needed in comparing case counts and rates for years before and after 1999.

Age-Adjustment

Age adjustment is a method used to ensure comparability of estimates (e.g. mortality rates) accounting for age. The age distribution of a population may change over time and differ across location. Because some health conditions are more common in certain age groups, it can be misleading to compare estimates across populations if the age distribution of these populations is different. Age adjustment takes into account age-specific rates in a population, using the US 2000 Census population as the standard population.

Healthy People 2030

Healthy People 2030 includes 355 measurable core objectives, as well as developmental and research objectives. Data from indicators available in the 2020 BRFSS data set and mortality rates reported herein that aligned with those core objectives were compared in order to document Mississippi's progress toward the national targets for Healthy People 2030 objectives. More information about Healthy People can be found at: https://health.gov/healthypeople.

Appendix B: List of Abbreviations

AA	African American
BMI	Body Mass Index
BRFSS	Behavior Risk Factor Surveillance Survey
CAD	Coronary Artery Disease
CDC	Centers for Disease Control and Prevention
CHD	Coronary Heart Disease
CI	Confidence Interval
CKD	Chronic Kidney Disease
COPD	Chronic Obstructive Pulmonary Disease
ENDS	Electronic Nicotine Delivery Systems
FIT	Fecal Immunochemical Test
FPG	Fasting Plasma Glucose
HbA1c	Hemoglobin A1c
HPV	Human Papillomavirus
HSgFOBT	High-sensitivity guaiac Fecal Occult Blood Test
ICD	International Classification of Diseases
MI	Myocardial Infarction
MS	Mississippi
MSDH	Mississippi Department of Health
MSDR	MS Delta Region
MSTAHRS	MS Statistically Automated Health Resource System

MSVSS	Mississippi Vital Statistics System
NIMH	National Institute of Mental Health
NVSS	National Vital Statistics System
OA	Osteoarthritis
OGTT	Oral Glucose Tolerance Test
OR	Odds Ratio
SDOH	Social Determinants of Health
SEER	Surveillance, Epidemiology, and End Result
TIA	Transient Ischemic Attack
US	United States
USPSTF	United States Preventive Services Task Force
UV	Ultraviolet
YPLL	Years of Potential Life Lost

Appendix B: References

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