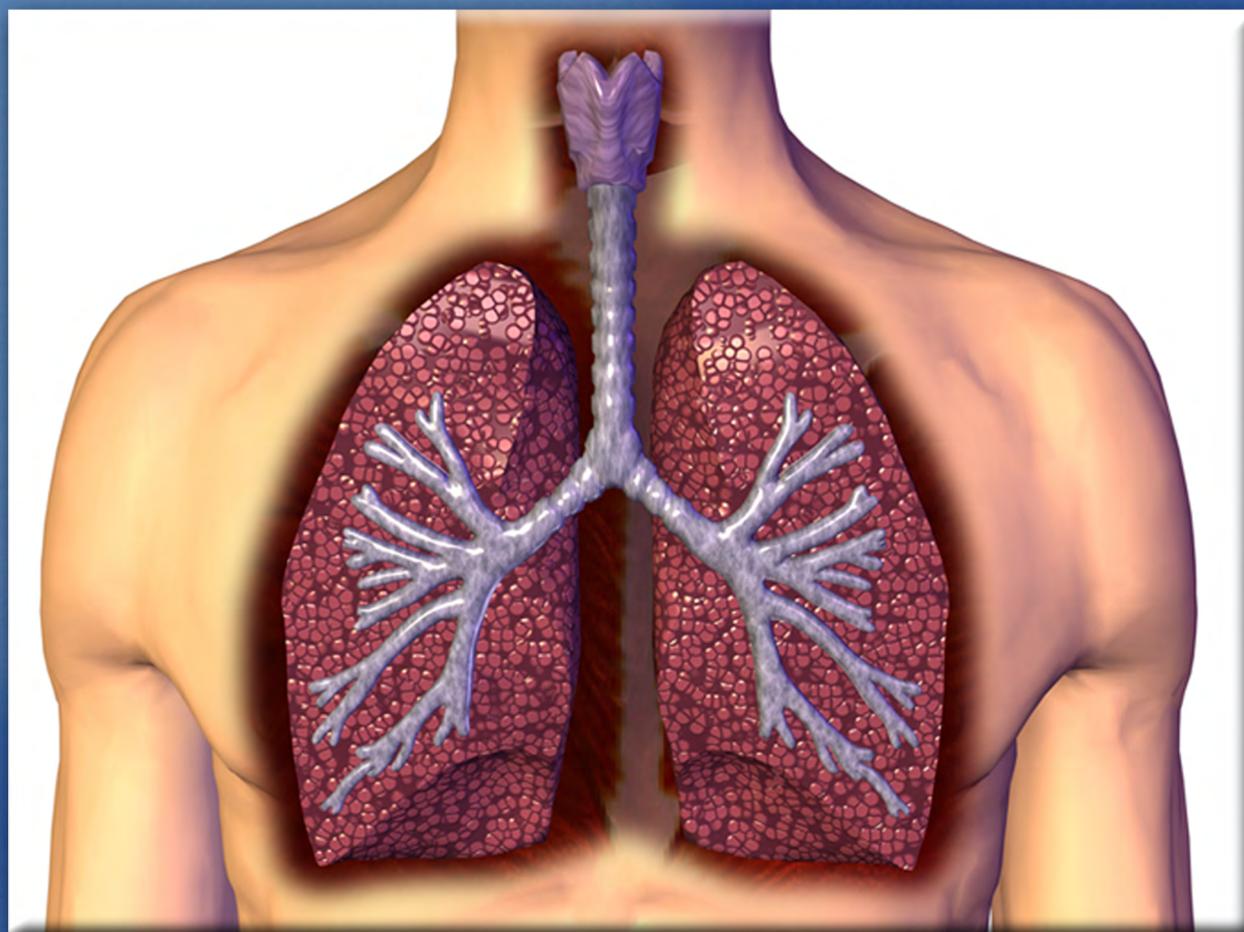


MISSISSIPPI STATE DEPARTMENT OF HEALTH

# The Burden of Asthma in Mississippi



Asthma Surveillance Summary Report 2014

# The Burden of Asthma in Mississippi: 2014 Asthma Surveillance Summary Report

December 2014

# The Burden of Asthma in Mississippi: 2014 Asthma Surveillance Summary Report

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## Table of Contents

<b>Executive Summary</b>	1
<b>Introduction</b>	4
<b>Section 1: Asthma Mortality</b>	6
Figure 1.1. Rate of asthma deaths per 100,000 population by year, Mississippi, 2001-2011	6
Figure 1.2. Rate of asthma deaths per 100,000 population by year and race, Mississippi, 2001-2011	7
Figure 1.3. Rate of asthma deaths per 100,000 population by year and sex, Mississippi, 2001-2011	7
Figure 1.4. Rate of asthma deaths per 100,000 population by age group, Mississippi, 2001-2011	8
<b>Section 2: Asthma Prevalence</b>	9
<b>Adult Asthma Prevalence</b>	10
Figure 2.1. Adult lifetime asthma prevalence, Mississippi vs. United States, 2011	10
Figure 2.2. Adult current asthma prevalence, Mississippi vs. United States, 2011	11
Figure 2.3. Adult current asthma prevalence by race, Mississippi, 2011	11
Figure 2.4. Adult current asthma prevalence by sex, Mississippi, 2011	12
Figure 2.5. Adult current asthma prevalence by age group, Mississippi, 2011	12
Figure 2.6. Adult current asthma prevalence by educational level, Mississippi, 2011	13
Figure 2.7. Adult current asthma prevalence by educational level and race, Mississippi, 2011	13
Figure 2.8. Adult current asthma prevalence by educational level and sex, Mississippi, 2011	14
Figure 2.9. Adult current asthma prevalence by annual household income, Mississippi, 2011	15
Figure 2.10. Adult current asthma prevalence by annual household income and race, Mississippi, 2011	15

Figure 2.11. Adult current asthma prevalence by socioeconomic status (SES), Mississippi, 2011	16
Figure 2.12. Adult current asthma prevalence by socioeconomic status (SES) and race, Mississippi, 2011	17
Figure 2.13. Adult current asthma prevalence by public health district, Mississippi, 2011	18
Figure 2.14. Percent of mothers who had ever been told by a doctor, nurse, or other health care worker that they have asthma by race, Mississippi, 2010	18
Figure 2.15. Percent of adults with current asthma by weight status, Mississippi, 2011	19
Figure 2.16. Percent of adults with current asthma by smoking status, Mississippi, 2011	20
Map 2. Mississippi Public Health Districts	21
<b>Childhood Asthma Prevalence</b>	21
Figure 2.17. Lifetime vs. current asthma prevalence among children aged 0-17 years, Mississippi, 2011	22
Figure 2.18. Lifetime vs. current asthma prevalence among high school students, Mississippi, 2011	23
Figure 2.19. Current asthma prevalence among children aged 0-17 years by race, Mississippi, 2011	23
Figure 2.20. Current asthma prevalence among high school students by race, Mississippi, 2011	24
Figure 2.21. Current asthma prevalence among children aged 0-17 years by sex, Mississippi, 2011	24
Figure 2.22. Current asthma prevalence among high school students by sex, Mississippi, 2011	25
Figure 2.23. Current asthma prevalence among children aged 0-17 years by age group, Mississippi, 2011	25
Figure 2.24. Current asthma prevalence among high school students by age group, Mississippi, 2011	26

Figure 2.25. Students with known asthma having an asthma action plan on file at their school, Mississippi, 2012	27
Figure 2.26. Schools that have not adopted a policy stating that students are permitted to carry and self-administer asthma medications, Mississippi, 2012	28
Figure 2.27. Schools that do not have a full-time nurse, Mississippi, 2012	29
Figure 2.28. During this school year, schools that did not provide parents and families with health information designed to increase parent and family knowledge on asthma, Schools that have not adopted a policy stating that students are permitted to carry and self-administer asthma medications, Schools that do not have a full-time nurse, Mississippi, 2012	30
Figure 2.29. Health education teachers who would not like to receive professional development course on asthma, Teachers in schools who have not tried to increase student knowledge on asthma in a required course in any of grades 6 through 12 during this school year, Mississippi, 2012	31
<b>Section 3: Asthma Symptoms, Severity and Disease Management</b>	32
Figure 3.1. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days by sex, Mississippi, 2011	33
Figure 3.2. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days by race, Mississippi, 2011	34
Figure 3.3. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep by sex, Mississippi, 2011	35
Figure 3.4. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep by race, Mississippi, 2011	36
Figure 3.5. Percent of adults with current asthma who were completely symptom-free in the past two weeks by sex, Mississippi, 2011	37
Figure 3.6. Percent of adults with current asthma who were completely symptom-free in the past two weeks by race, Mississippi, 2011	38
Figure 3.7. Percent of adults with current asthma who had an episode of asthma or asthma attack in the past 12 months by sex, Mississippi, 2011	39
Figure 3.8. Percent of adults with current asthma who had an episode of asthma or asthma attack in the past 12 months by race, Mississippi, 2011	39
Figure 3.9. Percent of adults with current asthma who had seen a doctor or	40

other health professional for a routine checkup for their asthma in the past 12 months by sex, Mississippi, 2011

Figure 3.10. Percent of adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months by race, Mississippi, 2011 41

Figure 3.11. Percent of adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months by sex, Mississippi, 2011 42

Figure 3.12. Percent of adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months by race, Mississippi, 2011 43

Figure 3.13. Percent of adults who were unable to work or carry out usual activities because of their asthma during the past 12 months by sex, Mississippi, 2011 44

Figure 3.14. Percent of adults who were unable to work or carry out usual activities because of their asthma during the past 12 months by race, Mississippi, 2011 45

Figure 3.15. Percent of adults who limited their usual activities due to asthma in the past 12 months not at all, a little, a moderate amount, or a lot, Mississippi, 2011 45

Figure 3.16. Percent of adults who were ever taught how to recognize early signs or symptoms of an asthma episode by sex, Mississippi, 2011 46

Figure 3.17. Percent of adults who were ever taught how to recognize early signs or symptoms of an asthma episode by race, Mississippi, 2011 46

Figure 3.18. Percent of adults who were ever taught what to do during asthma episode or attack by sex, Mississippi, 2011 47

Figure 3.19. Percent of adults who were ever taught what to do during asthma episode or attack by race, Mississippi, 2011 47

Figure 3.20. Percent of adults with current asthma who were not given an asthma action plan by a doctor or other health professional, Percent of adults with current asthma who were needed to see a primary care doctor during the past 12 months for their asthma but could not because of the cost, Percent of adults with current asthma who were needed to buy medications during the past 12 months for their asthma but could not because of the cost and percent of adults with current asthma whose asthma became worse by chemicals, smoke, fumes or dust in their current job, Mississippi, 2011 48

Figure 3.21. Percent of adults who were ever been told by a doctor or health professional that they have chronic obstructive pulmonary disease also known as COPD, Percent of adults with current asthma who had taken prescription asthma medicine using an inhaler, who had taken asthma medicine in the pill form and who had taken asthma medicines with a nebulizer during the past three months, Mississippi, 2011	49
<b>Section 4: Health Care Access and Utilization</b>	<b>50</b>
<b>Hospital Discharges with Asthma as the First Listed Diagnosis</b>	<b>51</b>
Figure 4.1. Estimated asthma hospital discharge rate per 10,000 population by year, Mississippi, 2007-2011	51
Figure 4.2. Estimated asthma hospital discharge rate per 10,000 population by year and race, Mississippi, 2007-2011	52
Figure 4.3. Estimated asthma hospital discharge rate per 10,000 population by year and sex, Mississippi, 2007-2011	53
Figure 4.4. Estimated asthma hospital discharge rate per 10,000 population by age group, Mississippi, 2007-2011	54
Figure 4.5. Estimated asthma hospital discharge rate per 10,000 population by age group and sex, Mississippi, 2007-2011	55
Figure 4.6. Estimated number of hospital discharges with asthma as the first listed diagnosis by month, Mississippi, 2011	55
Map 4.7. Estimated asthma hospital discharge rate per 10,000 population by public health district of residence, Mississippi, 2007-2011	56
Map 4.8. Estimated asthma hospital discharge rate per 10,000 population by county of residence, Mississippi, 2007-2011*	57
<b>Emergency Department Visit Rate with Asthma as the First Listed Diagnosis</b>	<b>58</b>
Figure 4.9. Estimated asthma emergency department visit rate per 10,000 population by year, Mississippi, 2007-2011	58
Figure 4.10. Estimated asthma emergency department visit rate per 10,000 population by year and race, Mississippi, 2007-2011	59
Figure 4.11. Estimated asthma emergency department visit rate per 10,000 population by year and sex, Mississippi, 2007-2011	60
Figure 4.12. Estimated asthma emergency department visit rate per 10,000 population	61

by age group, Mississippi, 2007-2011	
Figure 4.13. Estimated asthma emergency department visit rate per 10,000 population by age group and sex, Mississippi, 2007-2011	62
Figure 4.14. Estimated number of emergency department visits with asthma as the first listed diagnosis by month, Mississippi, 2011	63
Map 4.15. Estimated asthma emergency department visit rate per 10,000 population by public health district of residence, Mississippi, 2007-2011	64
Map 4.16. Estimated asthma emergency department visit per 10,000 population by county of residence, Mississippi, 2007-2011*	65
<b>At-Risk Based Asthma Discharge Rates</b>	66
<b>At-Risk Based Asthma Hospital Discharge Rates</b>	66
<b>Adult At-Risk Based Asthma Hospital Discharge Rates</b>	66
Figure 4.17. Estimated asthma hospital discharge rate per 1,000 adults with current asthma aged 18 years and above by race, Mississippi, 2011	66
Figure 4.18. Estimated asthma hospital discharge rate 1,000 adults with current asthma aged 18 years and above by sex, Mississippi, 2011	67
Figure 4.19. Estimated asthma hospital discharge rate per 1,000 adults with current asthma aged 18 years and above by age group, Mississippi, 2011	67
<b>Childhood At-Risk Based Asthma Hospital Discharge Rates</b>	68
Figure 4.20. Estimated asthma hospital discharge visit rate per 1,000 children with current asthma aged 0-17 years by race, Mississippi, 2011	68
Figure 4.21. Estimated asthma hospital discharge rate per 1,000 children with current asthma aged 0-17 years by sex, Mississippi, 2011	69
Figure 4.22. Estimated asthma hospital discharge rate per 1,000 children with current asthma aged 0-17 years by age group, Mississippi, 2011	69
<b>At-Risk Based Asthma Emergency Department Visit Rates</b>	70
<b>Adult At-Risk Based Asthma Emergency Department Visit Rates</b>	70
Figure 4.23. Estimated asthma emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by race, Mississippi, 2011	70
Figure 4.24. Estimated emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by sex, Mississippi, 2011	71

Figure 4.25. Estimated asthma emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by age group, Mississippi, 2011	71
<b>Childhood At-Risk Based Asthma Emergency Department Visit Rates</b>	72
Figure 4.26. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by race, Mississippi, 2011	72
Figure 4.27. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by sex, Mississippi, 2011	73
Figure 4.28. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by age group, Mississippi, 2011	73
<b>Conclusion</b>	74
<b>Appendix A. Data Sources</b>	76
<b>Appendix B. Methodology</b>	80
<b>Appendix C. Detailed Tables</b>	82
<b>References</b>	114

# Executive Summary

Asthma is a chronic lung disease characterized by recurrent and intermittent episodes or attacks in which the linings of the airways swell, mucus blocks the airways and the muscles around the airways tighten. During an episode, people with asthma may experience signs and symptoms such as chest tightness, difficulty breathing, wheezing, and coughing. Asthma symptoms may occur when an individual with asthma is exposed to certain triggers, such as pet dander, mold, dust mites, tobacco smoke, or wood smoke. Asthma symptoms can be controlled through appropriate use of medications and avoidance of identified triggers. However, poor management of the disease can lead to complications that result in poor health, hospitalization, and even death.

The overall goals of the Mississippi State Department of Health's Asthma Program are to:

1) Reduce the burden of asthma among Mississippians; 2) Reduce asthma related hospitalization and emergency room visit rates among children and adults; 3) Decrease asthma disparities in all Public Health Districts; 4) Increase provider and patient education related to asthma; 5) Encourage healthcare providers to use standard patient-specific Asthma Action Plans; and 6) Enhance community health education. This report summarizes data from the Mississippi State Department of Health's Asthma Surveillance System. It is the most comprehensive source of information about asthma in this state. The data presented in this report indicate that there are four populations in Mississippi with a high burden of asthma: 1) Children; 2) Blacks; 3) Adult women; and 4) Mississippians of low socioeconomic status. Listed below are some of the key observations of this report.

## **Asthma Mortality**

- Between 2001 and 2011, the overall asthma mortality rate stayed the same in Mississippi.
- The age-adjusted asthma mortality rate was higher among blacks compared to whites in Mississippi from 2001-2011.
- The age-adjusted asthma mortality rate was higher among females compared to males in Mississippi for the year of 2011.

## **Asthma Prevalence**

- Approximately 66,253 (8.5%) Mississippi children aged 0-17 years and 169,009 (7.6%) Mississippi adults aged 18 years and above currently have asthma.
- The current asthma prevalence was significantly higher among adult females than adult males.
- The current asthma prevalence was significantly higher among Mississippi adults with low socioeconomic status than adults with high socioeconomic status.
- The current asthma prevalence was significantly higher among female high school students than male high school students.

- The current asthma prevalence was significantly higher among black children compared to white children.

### **Asthma Comorbidities**

Asthma prevalence was significantly higher among adults who were overweight or obese.

### **Health Care Access and Utilization**

#### **Hospital Discharges with Asthma as the First Listed Diagnosis, Mississippi, 2007-2011**

- Asthma hospital discharge rates decreased significantly from the year 2007-2011.
- Asthma hospital discharge rates were significantly higher among black Mississippians than white Mississippians.
- Adult females aged 18 years and older had significantly higher asthma hospital discharge rates than adult males of same age group.
- Children aged 0-4 years had significantly higher asthma hospital discharge rates compared to any other age groups.
- Boys aged 0-11 years had significantly higher asthma hospital discharge rates than girls of same age group.
- Hospital discharges with asthma as the primary diagnosis peak in the winter months of January, March and November.
- At-risk based asthma hospital discharge rates were significantly higher among adult blacks and adult females aged 18 years and older.

#### **Emergency Department Visits with Asthma as the First Listed Diagnosis, Mississippi, 2007-2011**

- Asthma emergency department visit rates decreased significantly from the year 2007 to 2009 and then increased significantly from 2009 to 2011.
- Asthma emergency department visit rates were significantly higher among black Mississippians compared to white Mississippians.
- Adult females aged 18 years and older had significantly higher asthma emergency department visit rates than adult males.
- Children aged 0-4 years had the highest asthma emergency department visit rates compared to any other age groups.

- Boys aged 0-11 years had significantly higher asthma emergency department visit rates than girls of same age group.
- Asthma emergency department visits peak in the winter months of October and November.
- At-risk based asthma emergency department visit rates were significantly higher among adult blacks aged 18 years and older.

# Introduction

## Mississippi Demographics

Mississippi (MS) is a predominantly rural state with an estimated 2,978,512 residents, over half of whom live in rural areas. The estimated median household income, from 2007 to 2011 in MS was \$38,718, compared to \$52,762 nationwide. The racial composition of the MS population in 2011 was approximately 60.0% white and 37.3% black. The remaining 2.7% percent of the population are categorized as American Indian or Alaska Natives (0.6%); Asian (0.9%); Native Hawaiian and Other Pacific Islander (0.1%); and Two or More Races (1.1%). An estimated 2.9% of the MS population is of Hispanic/Latino ethnicity. Although the Mississippi Asthma Surveillance System (MASS) captures data on all race and ethnicity categories listed above, the people of races other than white and black captured by the MASS are too small to provide reliable estimates for measures of asthma burden among these groups. Data disaggregated by race within this report will therefore include only two racial categories: (1) white and (2) black.

## Asthma Defined

Asthma is a chronic respiratory disorder that involves reversible airflow obstruction, bronchial hyper responsiveness and inflammation. The interaction of these features of asthma determines the clinical manifestations, severity of asthma and response to treatment.<sup>1</sup>

## Asthma Surveillance in Mississippi

The first step in addressing asthma as a public health problem is to establish a surveillance system. Public health surveillance is the “ongoing, systematic collection, analysis, interpretation, and dissemination of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.”<sup>2</sup> The Mississippi State Department of Health (MSDH) Asthma Program has four main goals related to asthma surveillance in Mississippi:

- Annually collect data on asthma prevalence, symptoms, disease management, health care access and utilization, and mortality.
- Analyze and interpret asthma surveillance data in ways that will identify priority populations, direct program activities, and evaluate program effectiveness.
- Disseminate results to key targeted groups in a timely manner in newsletters, fact sheets, statistical briefs, and surveillance reports.
- Identify gaps in the asthma surveillance system and obtain or develop new data sources to fill these gaps.

Surveillance is important because knowledge of the epidemiologic aspects of asthma (e.g. geographic distribution, identification of groups with higher prevalence and mortality) is crucial in planning, implementation, and evaluation of programs that address the burden of asthma in the state. The Mississippi asthma surveillance system includes data from multiple sources, including the Behavioral Risk Factor Surveillance System (BRFSS), Asthma Call Back Survey (ACBS), the Youth Risk Behavior Survey (YRBS), the Mississippi Asthma Program's Hospital Discharge Database, and the Mississippi Vital Statistics System (see Appendix A for a description of all asthma data sources). The surveillance system includes data on asthma mortality, prevalence, symptoms, disease management, co-morbidities, and healthcare access and utilization. In addition, the collection of multiple years of data has enabled the Mississippi State Department of Health to analyze asthma trends and calculate regional asthma prevalence estimates.

### **Purpose of this Report**

The purpose of this report is to:

- Describe the types of data that comprise the Mississippi asthma surveillance system.
- Present results that identify high burden asthma populations to be targeted for health promotion program intervention.
- Identify areas in which additional data are needed to better understand the burden of asthma in Mississippi.

The main body of this report contains figures that present rates calculated from multiple data sources. Refer to the Appendices of this report for detailed tables of the data presented in the figures, additional information about the data sources, and a discussion of the methodologies used during analysis and interpretation. All stated comparisons (e.g. higher, lower, significant and not significant) are interpreted by using confidence intervals, which is a conservative test for statistical significance.

This report will be used by the MSDH, the Asthma Coalition of Mississippi, and key partners to guide asthma-related activities in the future years. Ultimately, it is our hope that this report will increase awareness of the health and economic burdens of asthma in Mississippi. Citizens of Mississippi, health professionals, and political leaders should know that asthma is a manageable disease and that much of the asthma mortality and morbidity described in this report are preventable and can be reduced through appropriate management practices.

# Section 1: Asthma Mortality

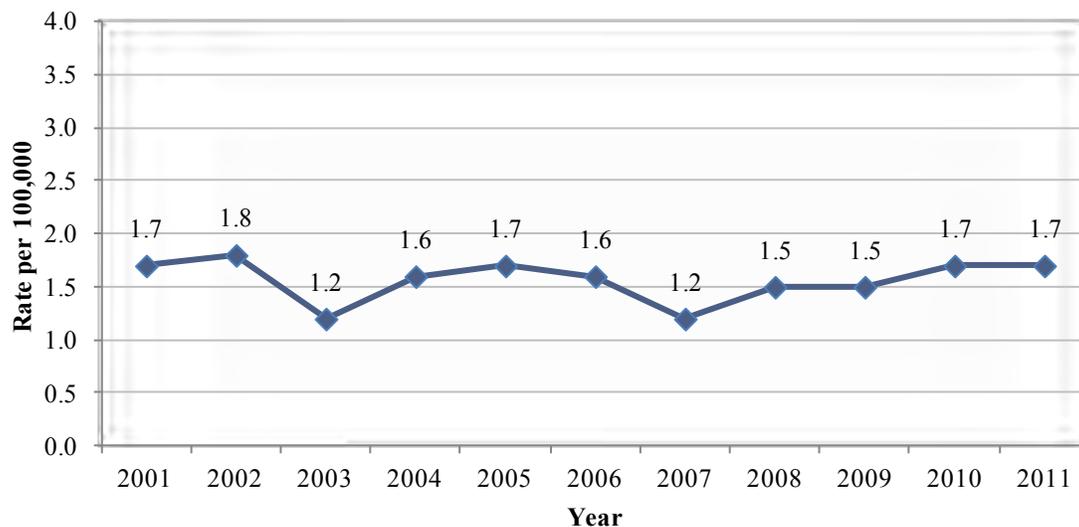
Asthma-related deaths represent the most extreme outcome for asthma and are usually a result of noncompliance and mismanagement. This section describes mortality data of Mississippi residents who died of asthma from 2001 to 2011. An asthma-related death is defined as a death with asthma listed as the primary cause. The information on death was obtained from official records submitted to the MSDH as required by statute and regulation. Responsibility for the preparation of death certificates was shared by hospitals, nursing homes and other institutions which provide care or custody, such as funeral homes, physicians, medical examiners, and medical examiner investigators.

Asthma mortality data can answer three important surveillance questions:

- How many people die from asthma?
- How has asthma mortality changed over time?
- Does the asthma mortality rate differ by demographic characteristics?

This chapter presents asthma mortality data for Mississippi residents by demographic characteristics (e.g. sex, race and age). The following figures include mortality rates per 100,000 population. All rates are age-adjusted using the United States 2000 Standard Population. Refer to Appendix C for a discussion of the methodologies used during analysis and interpretation.

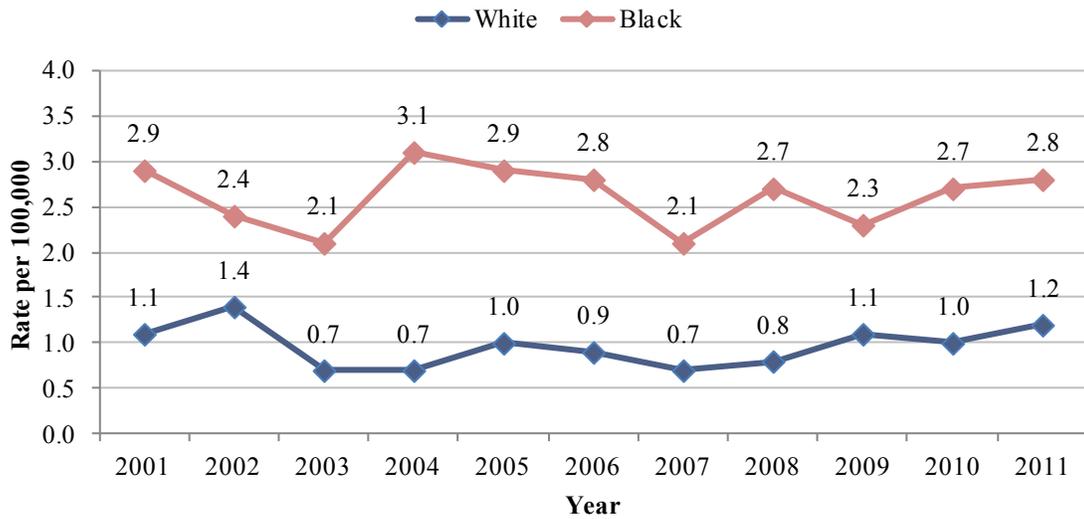
**Figure 1.1. Rate of asthma deaths per 100,000 by year, Mississippi, 2001-2011**



*Source: Mississippi Vital Statistics*

**Key Observations:** Between 2001 and 2011, the overall asthma mortality rate in Mississippi stayed the same.

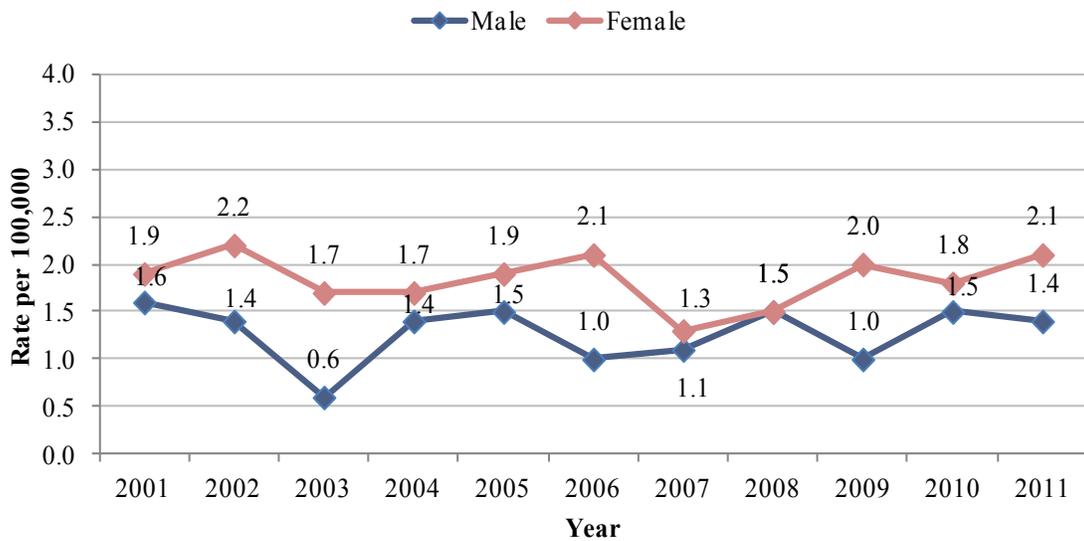
**Figure 1.2. Rate of asthma deaths per 100,000 by race, Mississippi, 2001-2011**



Source: Mississippi Vital Statistics

Key Observations: The age-adjusted asthma mortality rate was higher among blacks compared to whites in Mississippi from 2001-2011.

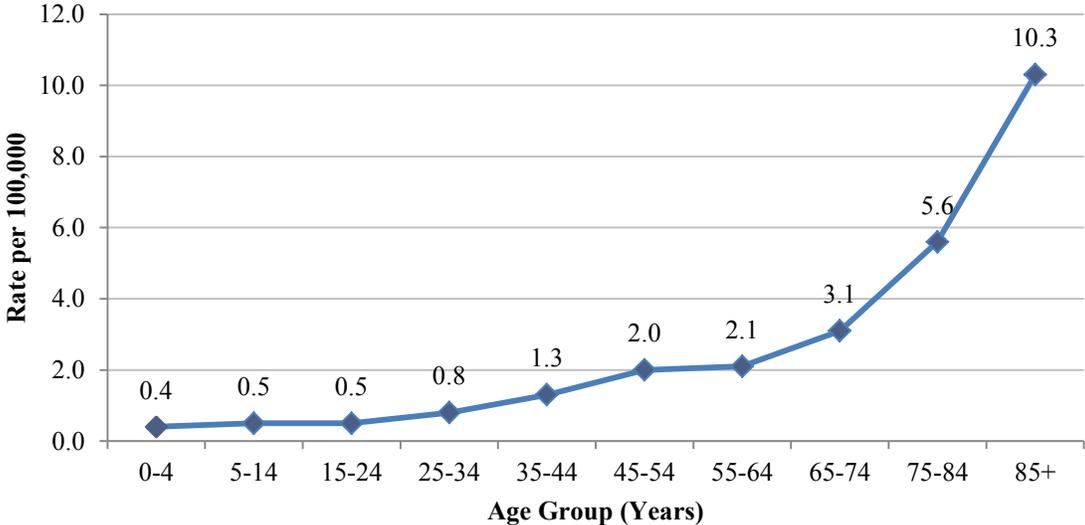
**Figure 1.3. Rate of asthma deaths per 100,000 by sex, Mississippi, 2001-2011**



Source: Mississippi Vital Statistics

Key Observations: The asthma mortality rate was higher among females compared to males in Mississippi from 2001-2011, except for 2008.

**Figure 1.4. Rate of asthma deaths per 100,000 by age group, Mississippi, 2001-2011\***



*Source: Mississippi Vital Statistics*  
*\*Aggregate data used to increase reliability of estimates*

Key Observations: The asthma mortality rate in Mississippi increases as age increases. Rates are age-adjusted to the 2000 U.S. Standard Population to account for differences in the age distribution of state populations.

## Section 2: Asthma Prevalence

### Prevalence Defined

Prevalence is the proportion or percentage of a population with a particular characteristic at a specific point in time. The prevalence of a chronic disease, such as asthma, is an indicator of the burden and distribution of the disease. Asthma prevalence indicators can answer three important questions:

- How many people have asthma?
- Who has asthma?
- Does the presence of asthma differ geographically?

### Asthma Prevalence Data

Asthma, like other chronic diseases, must be diagnosed by a health professional. The only way to know the true prevalence of asthma in Mississippi is to clinically examine all residents. This is incredibly expensive and time intensive. Surveys that are designed with scientifically based questions and sampling methodologies enable researchers to reliably estimate the prevalence of virtually any characteristic of a population in a much more efficient manner. In Mississippi, the prevalence of asthma is estimated from landline and cell phone surveys of randomly selected Mississippi residents.

Asthma among Mississippi children and adolescents has been measured by the 2011 Mississippi YRBS and the 2011 BRFSS. See Appendix A for a discussion of the methodologies and limitations of these surveys.

In Mississippi, we know more about the prevalence of asthma among adults than children. From 2000 until 2010 the adult asthma prevalence data from BRFSS is collected by using landlines, but starting from the year 2011 both landlines and cell phones were used, which makes it difficult to compare the new data accurately with the previous findings. In contrast, childhood asthma prevalence data have been collected intermittently and by multiple surveys, making it difficult to draw conclusions about asthma among Mississippi children.

The lifetime prevalence of asthma among the women who recently gave birth to a child is estimated from the year 2010 Pregnancy Risk Assessment Monitoring System (PRAMS), a surveillance project of the Centers for Disease Control and Prevention (CDC) and state health departments. PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy.<sup>13</sup>

## Asthma Definitions

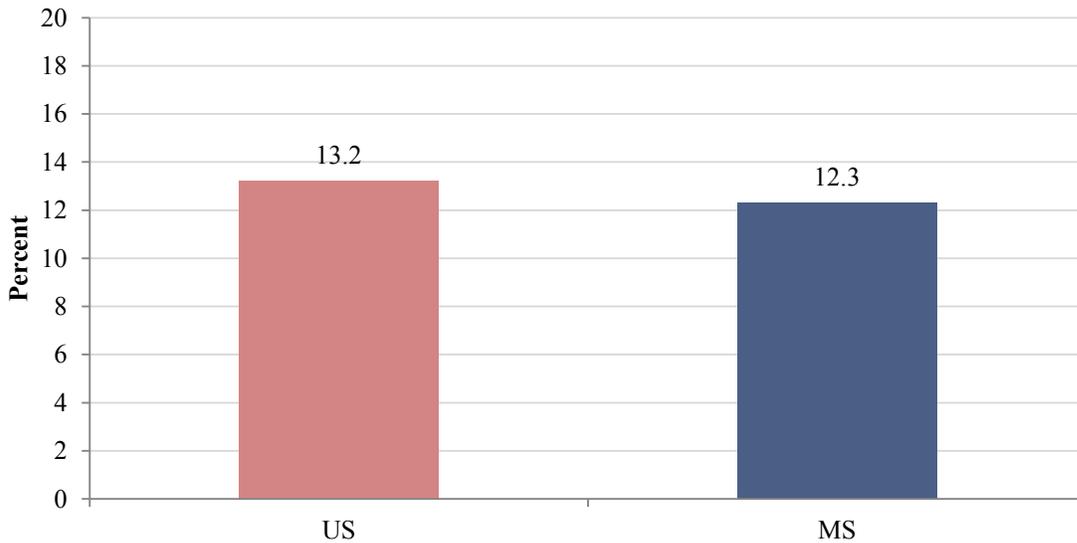
Asthma is a variable disease. Symptoms of the disease differ among individuals, can vary within an individual by time of day and year, and can change throughout the life span. This creates challenges when trying to diagnose and measure asthma. Therefore, two definitions of asthma are used to better understand the scope of the disease:

- Lifetime Asthma: Individuals who have ever been diagnosed with asthma.
- Current Asthma: Individuals who have ever been diagnosed with asthma and currently have asthma.

This chapter presents asthma prevalence data for Mississippi adults and children by demographic characteristics known to be associated with the disease (i.e., sex, age, race, and socioeconomic status). Refer to Appendix B for a discussion of the methodologies used during analysis and interpretation.

## Adult Asthma Prevalence

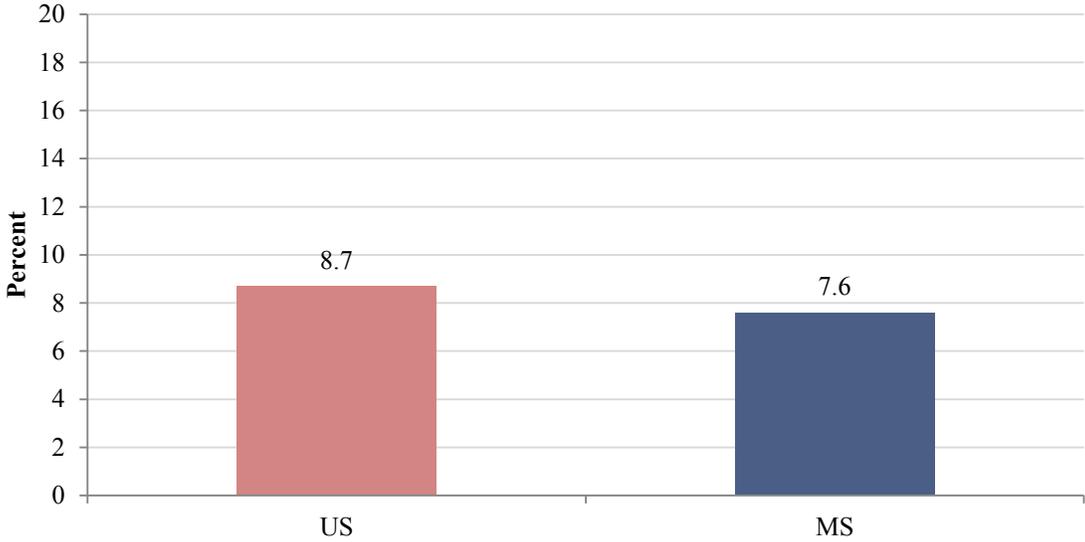
**Figure 2.1. Adult lifetime asthma prevalence, Mississippi vs. United States, 2011**



*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The adult lifetime asthma prevalence for the overall United States (US) was about 13.2% compared to Mississippi (MS) 12.3%.

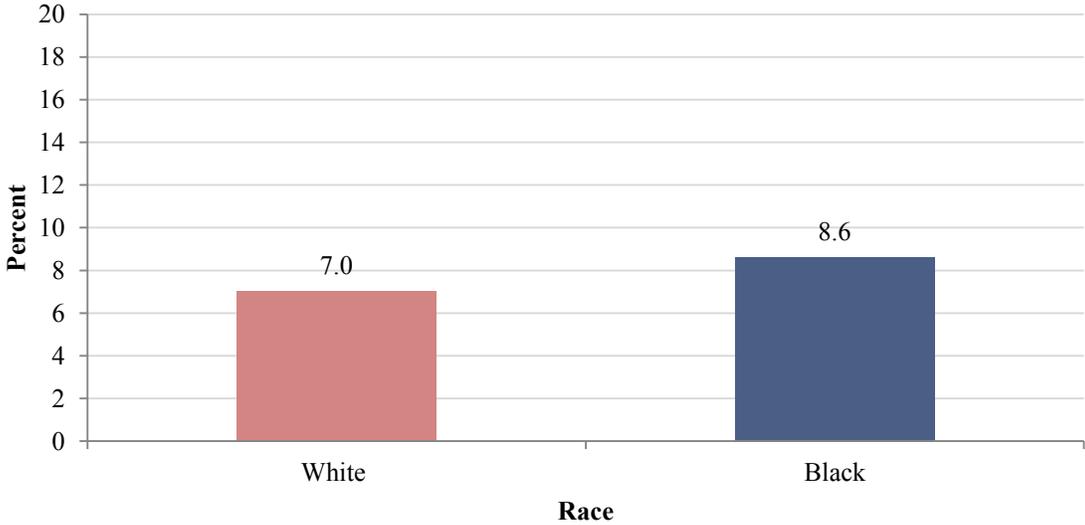
**Figure 2.2. Adult current asthma prevalence, Mississippi vs. United States, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The adult current asthma prevalence was significantly higher for the overall United States ( US) (8.7%) compared to Mississippi (MS) (7.6%).

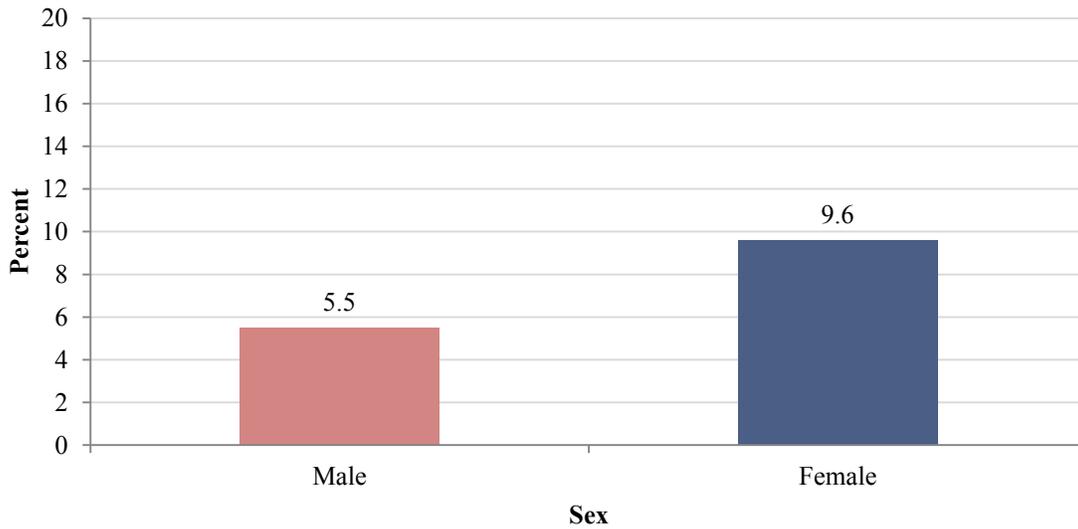
**Figure 2.3. Adult current asthma prevalence by race, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The adult current asthma prevalence among black population was 8.6% compared to white population 7.0%.

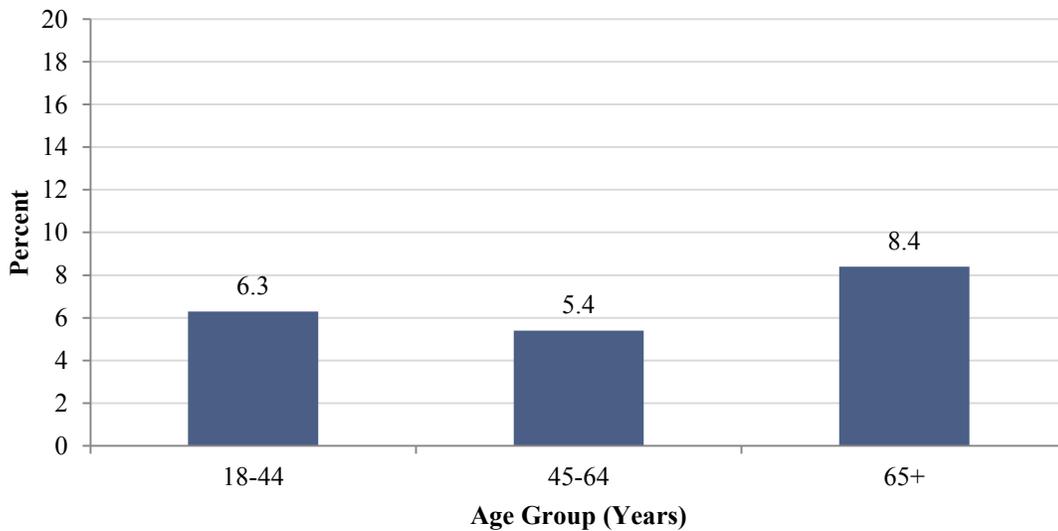
**Figure 2.4. Adult current asthma prevalence by sex, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The adult current asthma prevalence was significantly higher among females (9.6%) compared to males (5.5%).

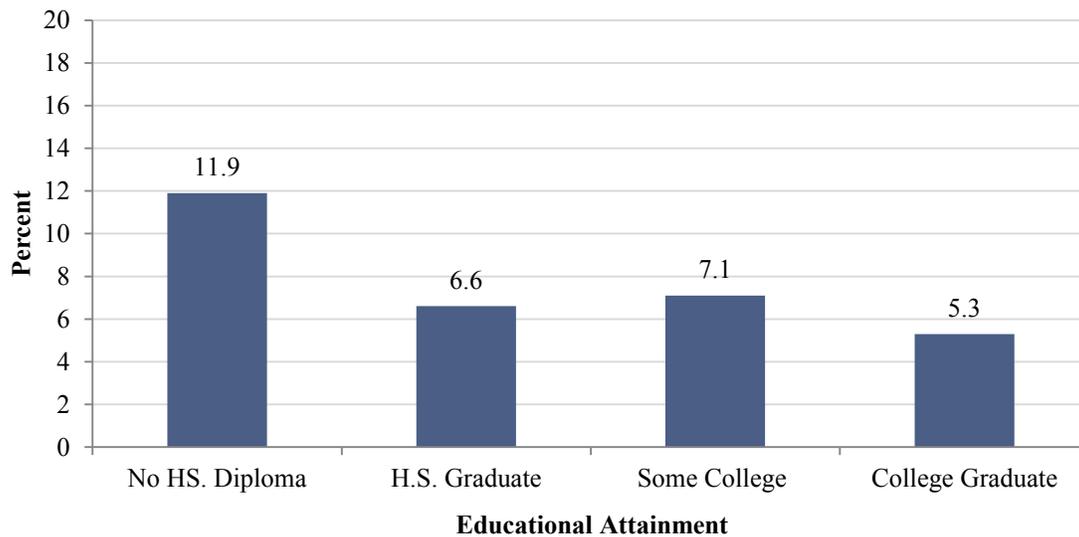
**Figure 2.5. Adult current asthma prevalence by age group, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The adult current asthma prevalence for age group 65+ was 8.4% compared to age groups 18-44 (6.3%) and 45-64 (5.4%).

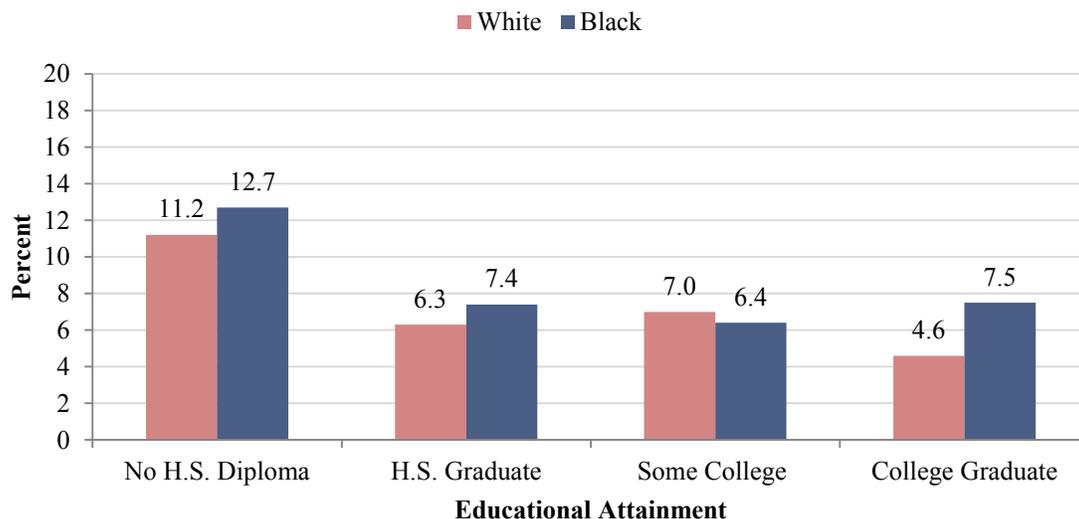
**Figure 2.6. Adult current asthma prevalence by educational level, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The adult current asthma prevalence was significantly higher among Mississippi adults with no high school (HS) diploma (11.9%) compared to the adults who have higher levels of education like high school graduates (6.6%), some college (7.1%) and college graduates (5.3%).

**Figure 2.7. Adult current asthma prevalence by educational level and race, Mississippi, 2011**

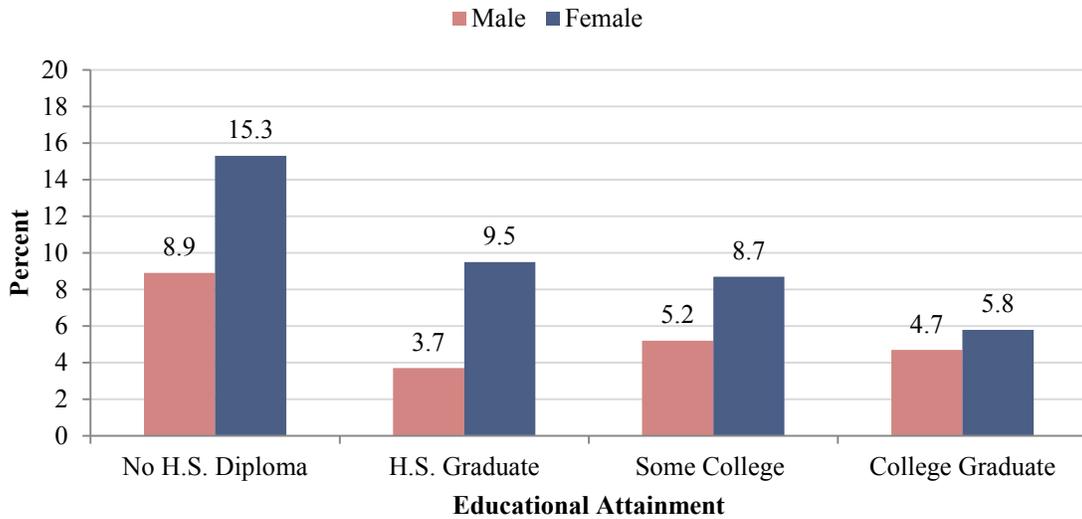


*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The adult current asthma prevalence was significantly higher among white Mississippi adults with no high school diploma (11.2%) compared to white Mississippi adults who have a high school diploma (6.3%). The adult current asthma prevalence among black

Mississippi adults with no high school diploma was 12.7 % compared to black adults who have a high school diploma (7.4%).

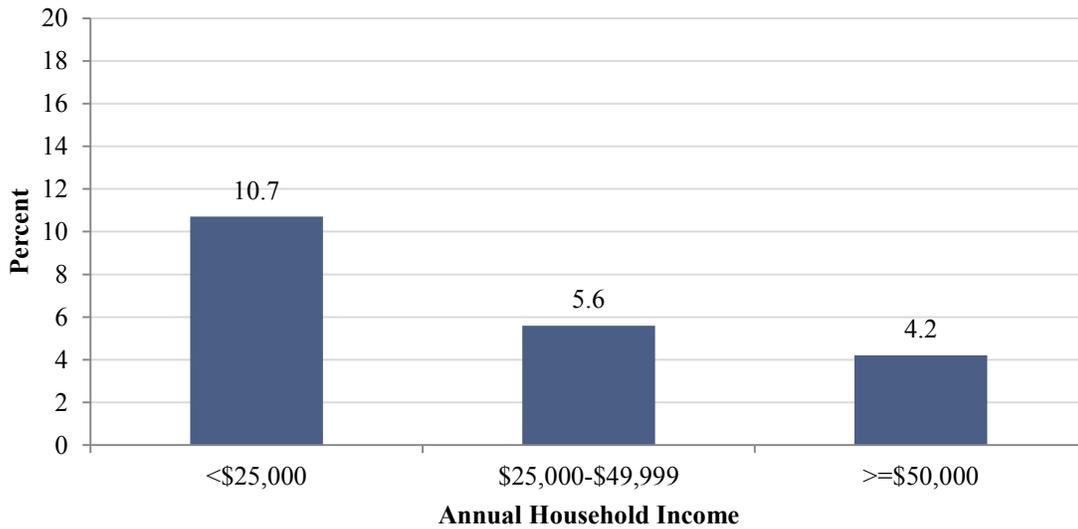
**Figure 2.8. Adult current asthma prevalence by educational level and sex, Mississippi 2011**



*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The adult current asthma prevalence was significantly higher among both male (8.9%) and female (15.3%) Mississippi adults with no high school diploma compared to male (3.7%) and female (9.5%) Mississippi adults who had a high school diploma.

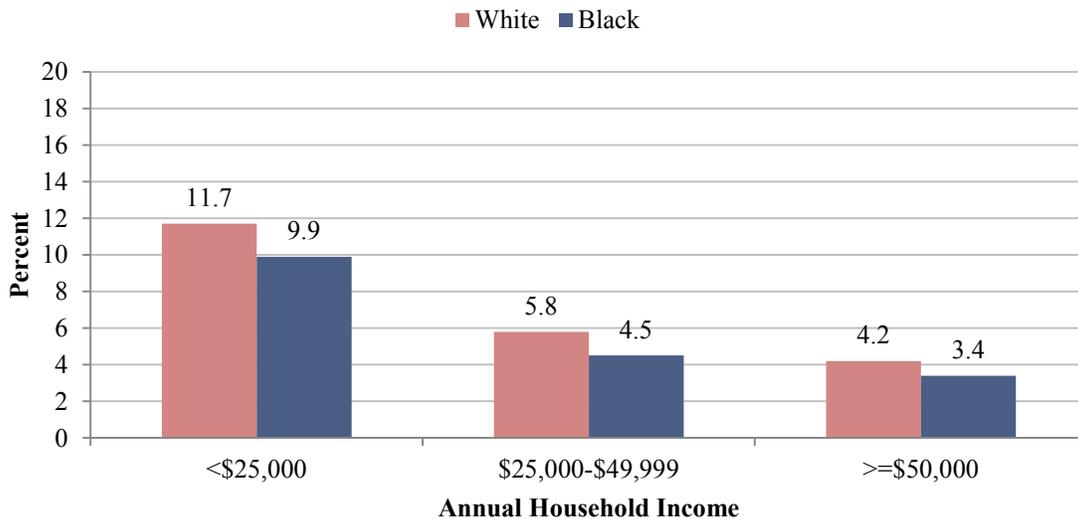
**Figure 2.9. Adult current asthma prevalence by annual household income, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The adult current asthma prevalence was significantly higher among Mississippi adults with an annual household income less than \$25,000 (10.7%) compared to adults with an annual household income from \$25,000-\$49,999 (5.6%) and adults with an annual household income \$50,000 or greater (4.2%).

**Figure 2.10. Adult current asthma prevalence by annual household income and race, Mississippi, 2011**

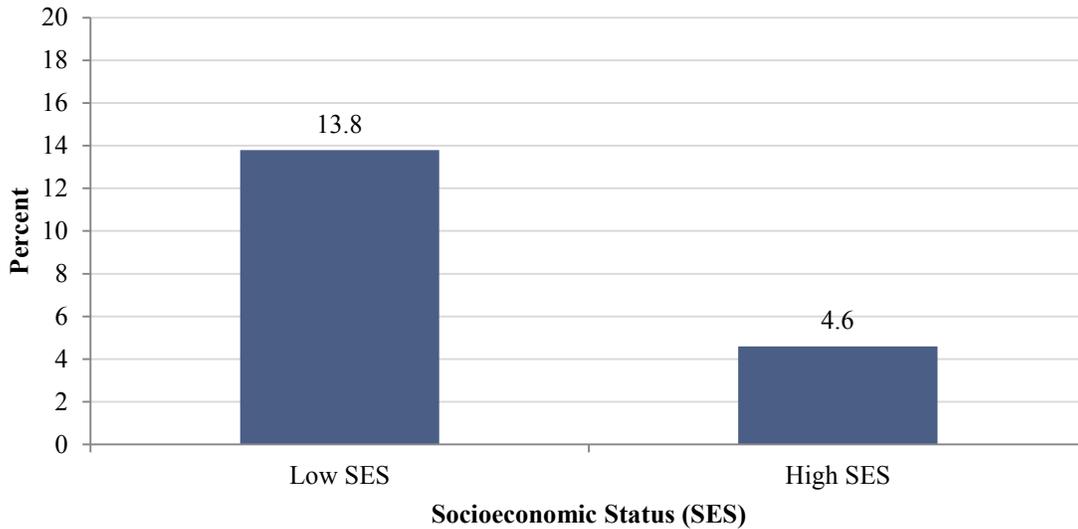


*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The adult current asthma prevalence was significantly higher among both white and black Mississippi adults with an annual household income less than \$25,000 compared

to white and black Mississippi adults with an annual household income greater than or equal to \$25,000.

**Figure 2.11. Adult current asthma prevalence by socioeconomic status (SES), Mississippi, 2011**



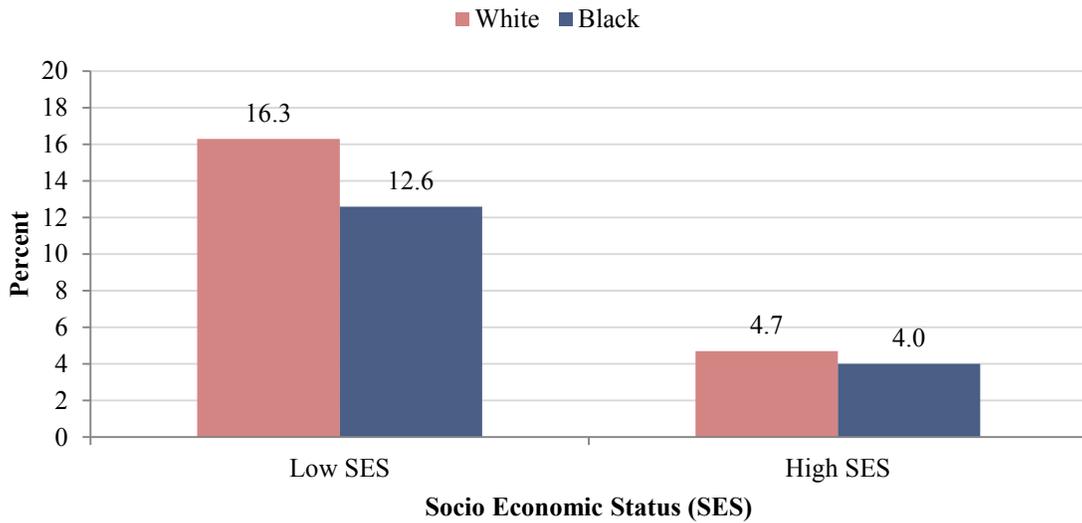
*Source: Behavioral Risk Factor Surveillance System*

Low SES = Fewer than 12 years of education and a household income <\$25,000

High SES = 12 or more years of education and a household income \$25,000 or higher

**Key Observations:** The adult current asthma prevalence was significantly higher among Mississippi adults with low socioeconomic status (13.8%) compared to Mississippi adults with high socioeconomic status (4.6%).

**Figure 2.12. Adult current asthma prevalence by socioeconomic status (SES) and race, Mississippi, 2011**



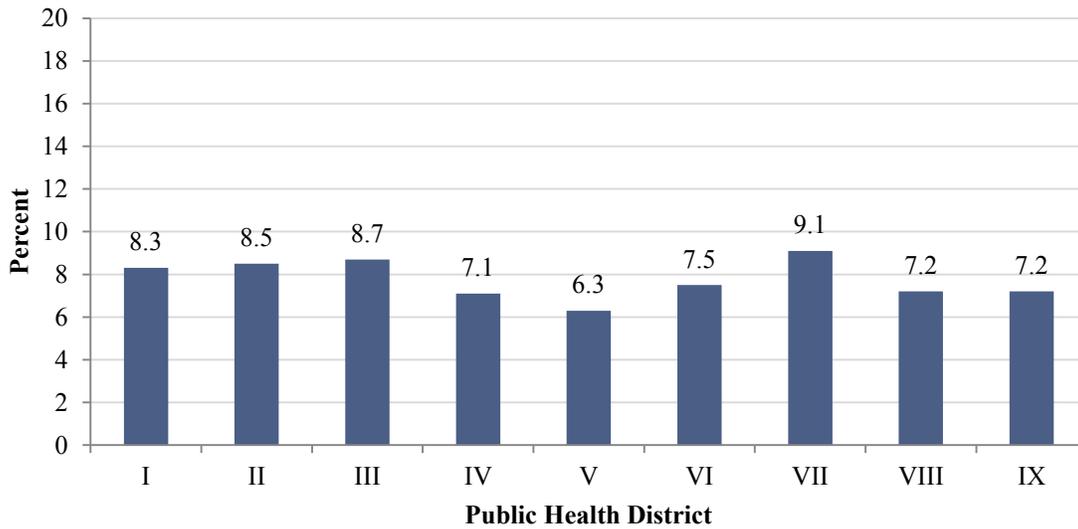
*Source: Behavioral Risk Factor Surveillance System*

Low SES= Fewer than 12 years of education and a household income <\$25,000

High SES= 12 or more years of education and a household income \$25,000 or higher

**Key Observations:** The adult current asthma prevalence was significantly higher among both white and black Mississippi adults with low socioeconomic status compared to white and black Mississippi adults with high socioeconomic status.

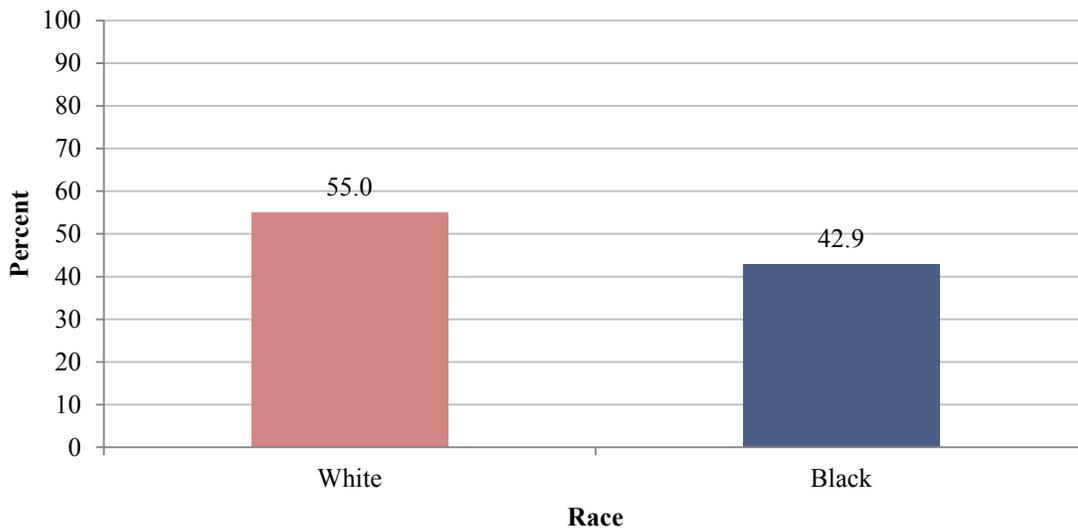
**Figure 2.13. Adult current asthma prevalence by public health district, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: Adult current asthma prevalence did not differ significantly by Public Health District.

**Figure 2.14. Percent of mothers who had ever been told by a doctor, nurse, or other health care worker that they have asthma by race, Mississippi, 2010**



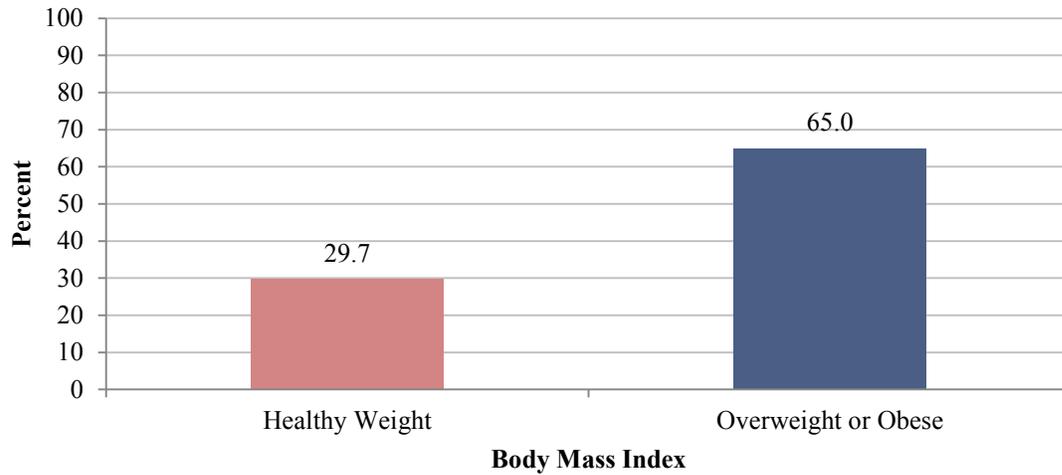
*Source: Pregnancy Risk Assessment Monitoring System*

Key Observations: No significant difference was observed among the mothers who were ever been told by a doctor, nurse, or other health care worker that they have asthma when compared by race.

## Asthma Comorbidities

Asthma prevalence is related to comorbid conditions and behaviors, such as overweight/obesity and smoking.

**Figure 2.15. Percent of adults with current asthma by weight status, Mississippi, 2011**

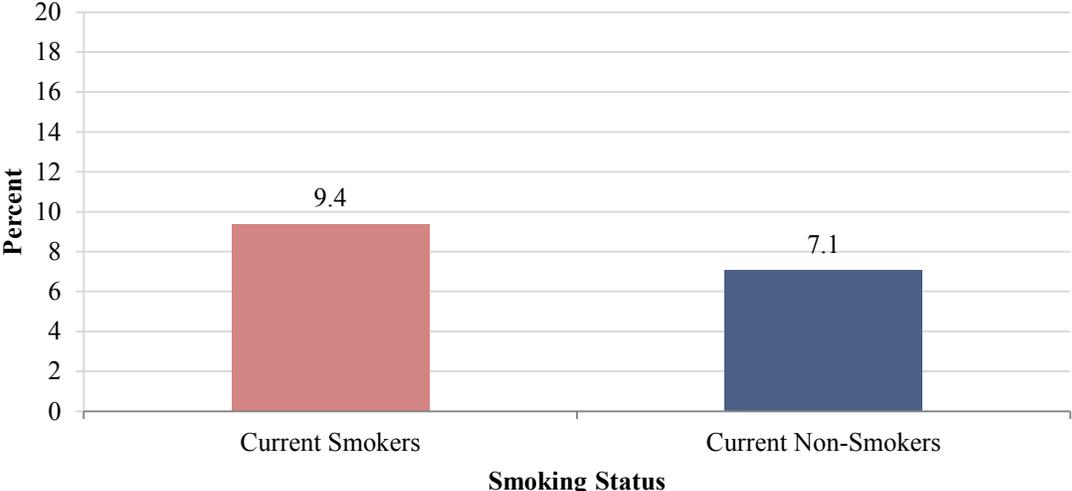


*Source: Behavioral Risk Factor Surveillance System*

Healthy Weight = 18.5-24.9; Overweight/Obese body mass index = 25.0 and greater.

**Key Observations:** Among adults with current asthma the percent who were overweight or obese (65.0 %) was significantly higher when compared to those with healthy weight (29.7%).

**Figure 2.16. Percent of adults with current asthma by smoking status, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The percent of adults with current asthma among smokers was about 9.4% compared to adults who were non-smokers 7.1%.

Map 2. Mississippi Public Health Districts

# PUBLIC HEALTH DISTRICTS

Northwest Public Health  
**District I**  
 662-563-5603

Northeast Public Health  
**District II**  
 662-841-9015

Delta/Hills Public Health  
**District III**  
 662-453-4563

Tombigbee Public Health  
**District IV**  
 662-323-7313

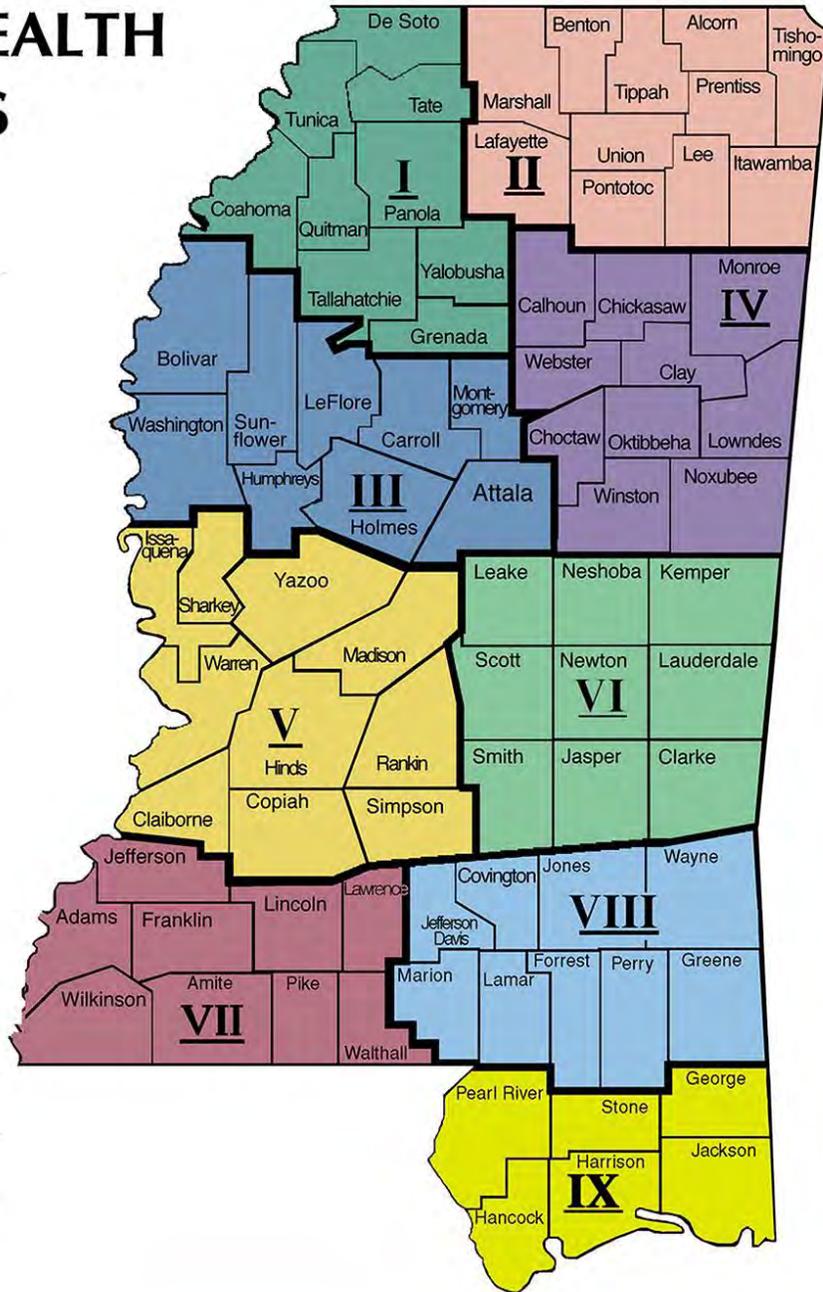
West Central Public Health  
**District V**  
 601-978-7864

East Central Public Health  
**District VI**  
 601-482-3171

Southwest Public Health  
**District VII**  
 601-684-9411

Southeast Public Health  
**District VIII**  
 601-271-6099

Coastal Plains Public Health  
**District IX**  
 228-436-6770

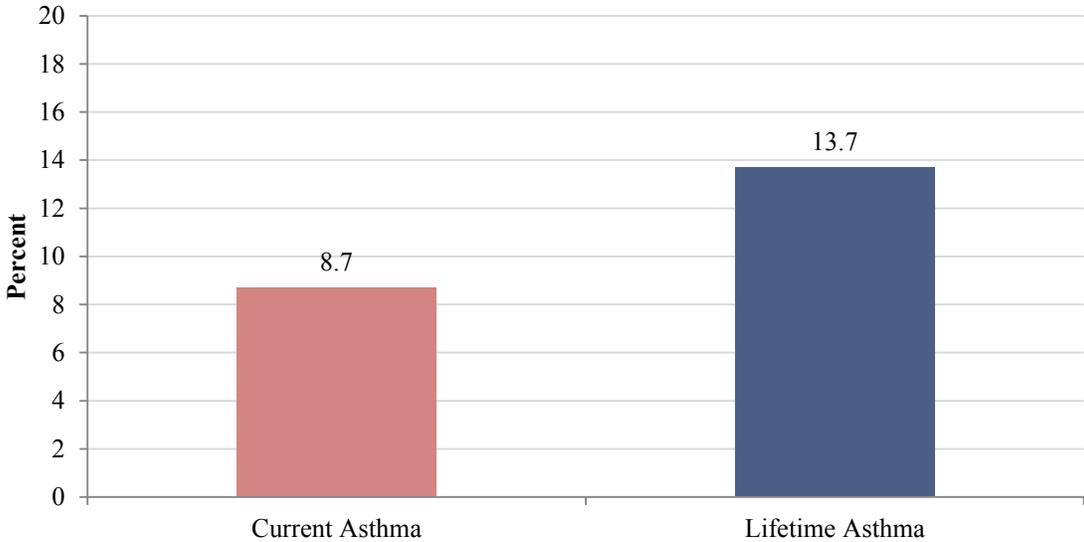


# Childhood Asthma Prevalence

Asthma is one of the most common childhood chronic diseases, affecting approximately 2.2 million children under 18 years of age in the United States.<sup>3</sup> To determine the prevalence of asthma among Mississippi children, the BRFSS childhood asthma module was used. This survey assesses childhood asthma by asking an adult respondent about the asthma status of a randomly selected child living in the household.

The School Health Profiles is a system of surveys assessing school health policies and practices in states, large urban school districts, territories, and tribal governments. Profile surveys are conducted every 2 years by education and health agencies among middle and high school principals and lead health education teachers.<sup>12</sup> The results of the survey are weighted and therefore provide information that can be generalized to the entire state.

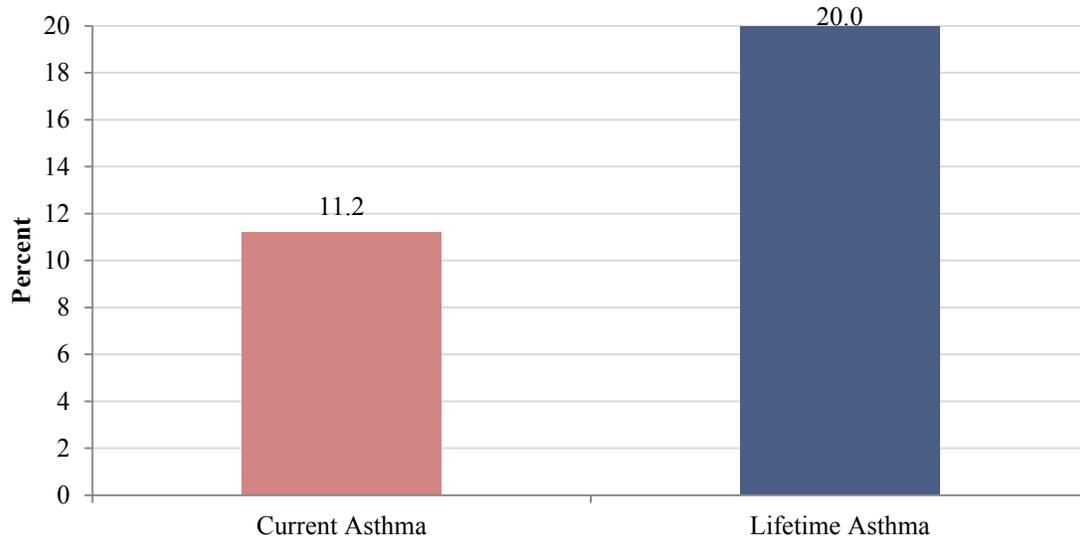
**Figure 2.17. Lifetime vs. current asthma prevalence among children aged 0-17 years, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: Lifetime asthma prevalence (13.7%) was significantly higher than current asthma prevalence (8.7%) among children aged 0-17 years.

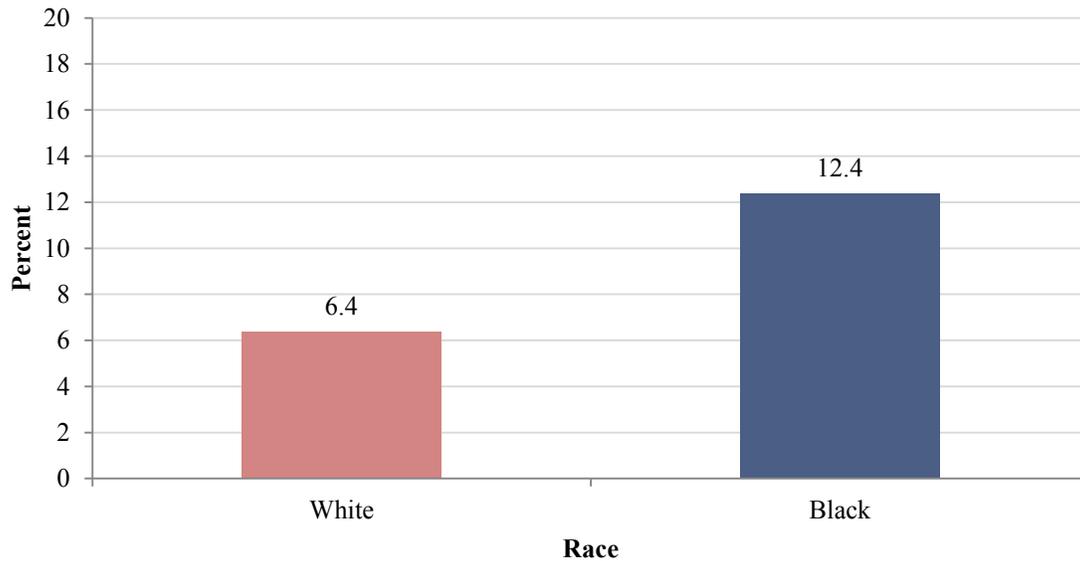
**Figure 2.18. Lifetime vs. current asthma prevalence among high school students, Mississippi, 2011**



*Source: Youth Risk Behavior Survey*

Key Observations: Lifetime asthma prevalence (20.0%) was significantly higher than current asthma prevalence (11.2%) among high school students.

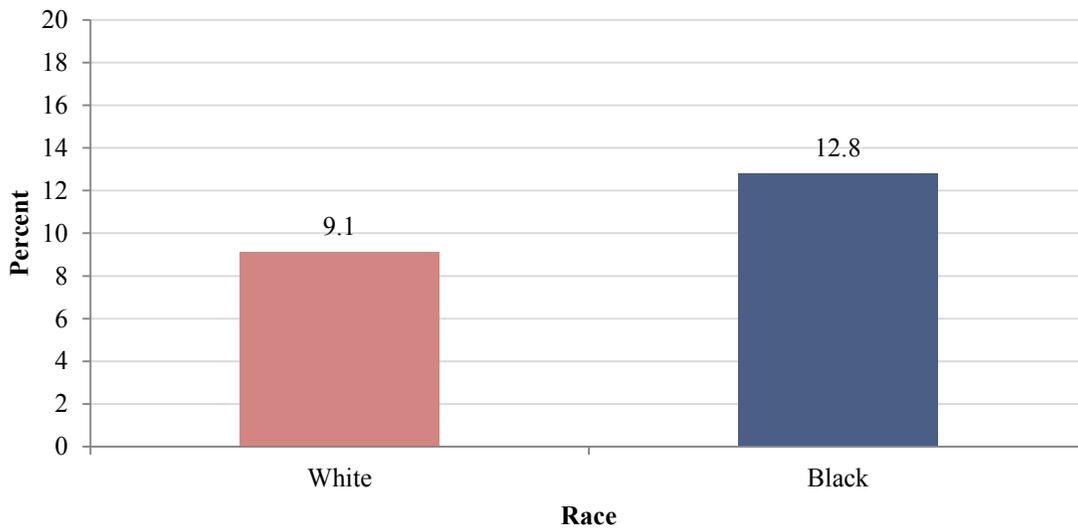
**Figure 2.19. Current asthma prevalence among children aged 0-17 years by race, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The current asthma prevalence was significantly higher among the black children (12.4%) aged 0-17 years compared to white children (6.4%) of same age group.

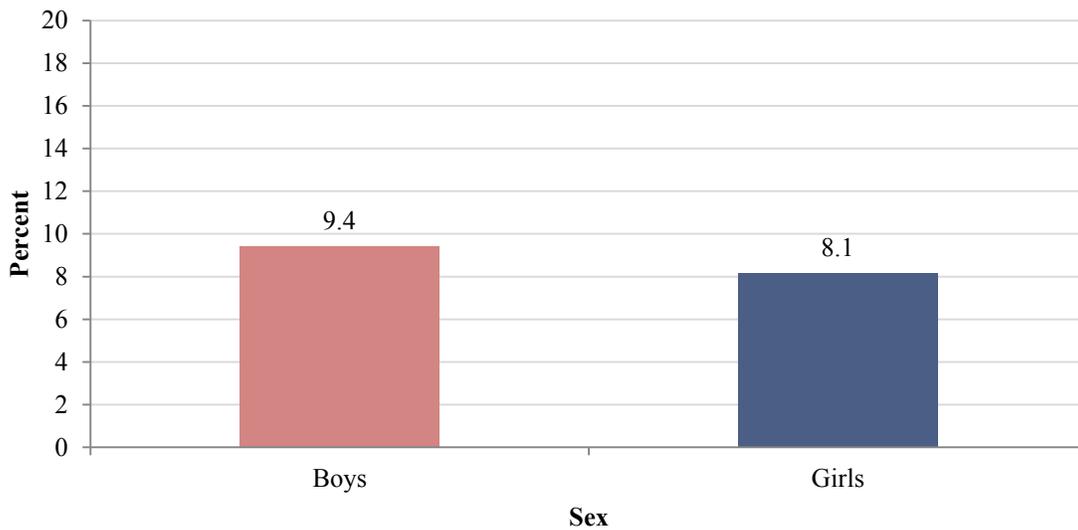
**Figure 2.20. Current asthma prevalence among high school students by race, Mississippi, 2011**



*Source: Youth Risk Behavior Survey*

Key Observations: The current asthma prevalence among the black high school students was 12.8% compared to white high school students 9.1%.

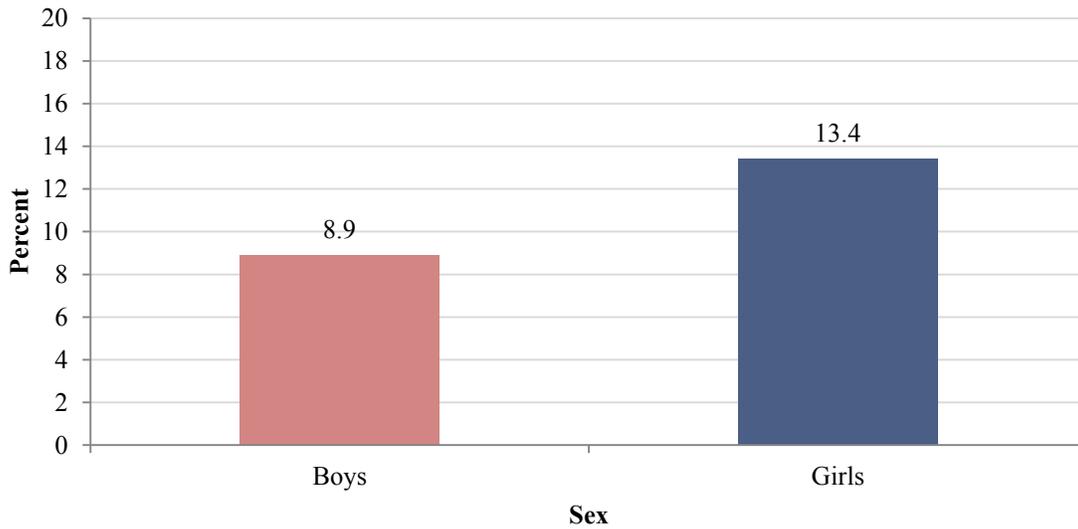
**Figure 2.21. Current asthma prevalence among children aged 0-17 years by sex, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

Key Observations: The current asthma prevalence among the boys aged 0-17 years was 9.4% compared to girls of the same age group 8.1%.

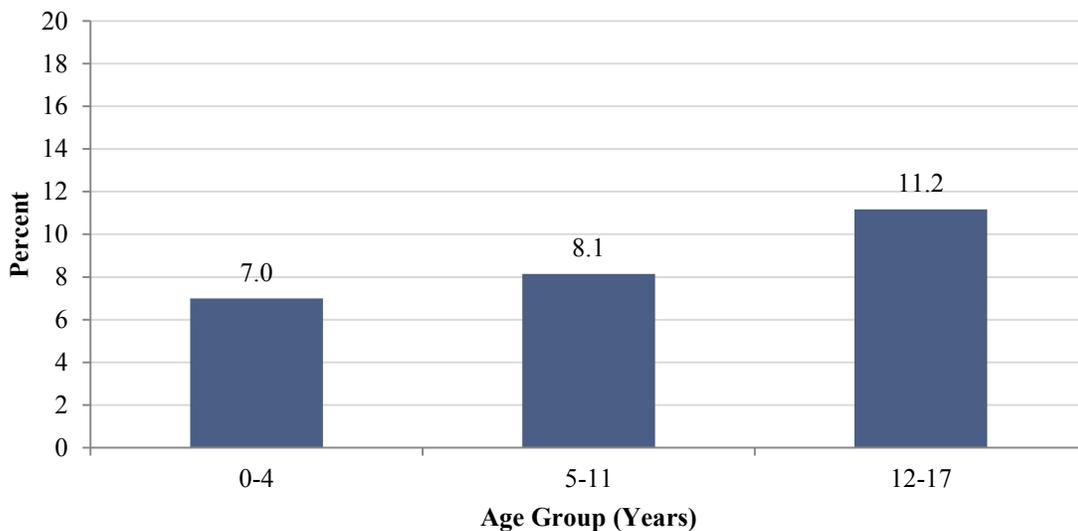
**Figure 2.22. Current asthma prevalence among high school students by sex, Mississippi, 2011**



*Source: Youth Risk Behavior Survey*

**Key Observations:** The current asthma prevalence was significantly higher among the high school girls (13.4%) compared to high school boys (8.9%).

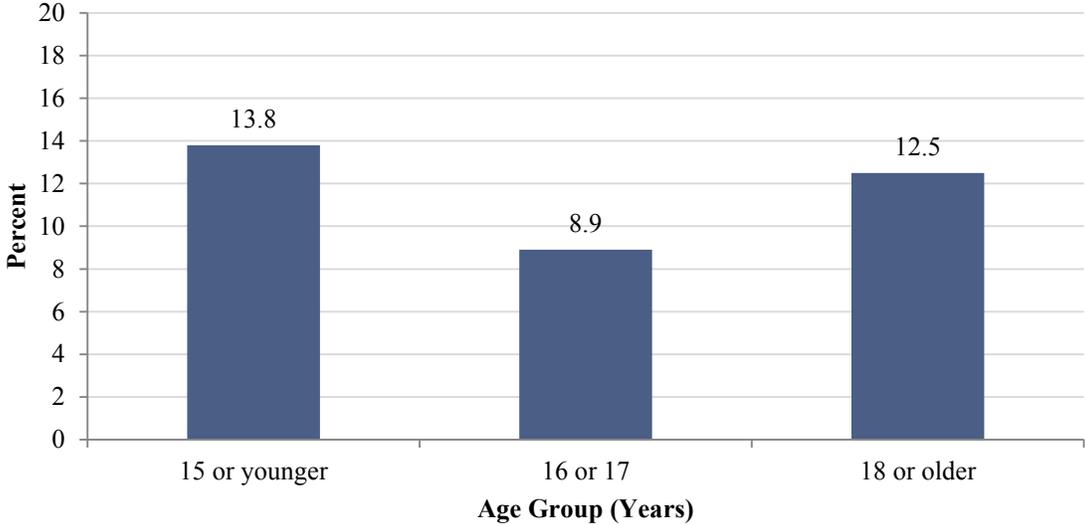
**Figure 2.23. Current asthma prevalence among children aged 0-17 years by age group, Mississippi, 2011**



*Source: Behavioral Risk Factor Surveillance System*

**Key Observations:** The current asthma prevalence among children aged 12-17 years was 11.2% compared to the children aged 5-11 years (8.1%) and children aged 0-4 years (7.0%).

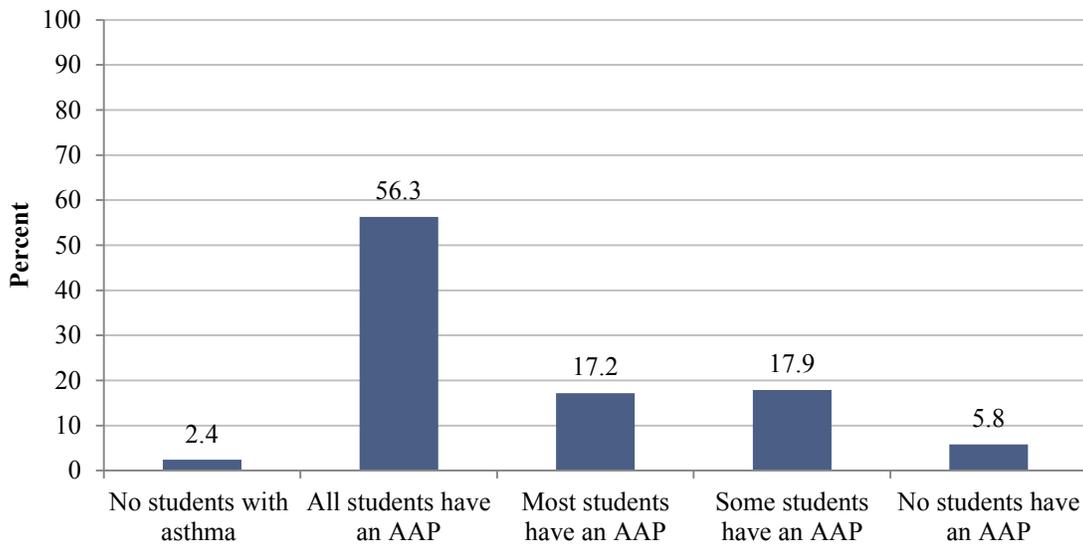
**Figure 2.24. Current asthma prevalence among high school students by age group, Mississippi, 2011**



*Source: Youth Risk Behavior Survey*

Key Observations: The current asthma prevalence among high school students aged 15 or younger was 13.8% compared to high school students aged 16 or 17 (8.9%) and high school students aged 18 or older (12.5%).

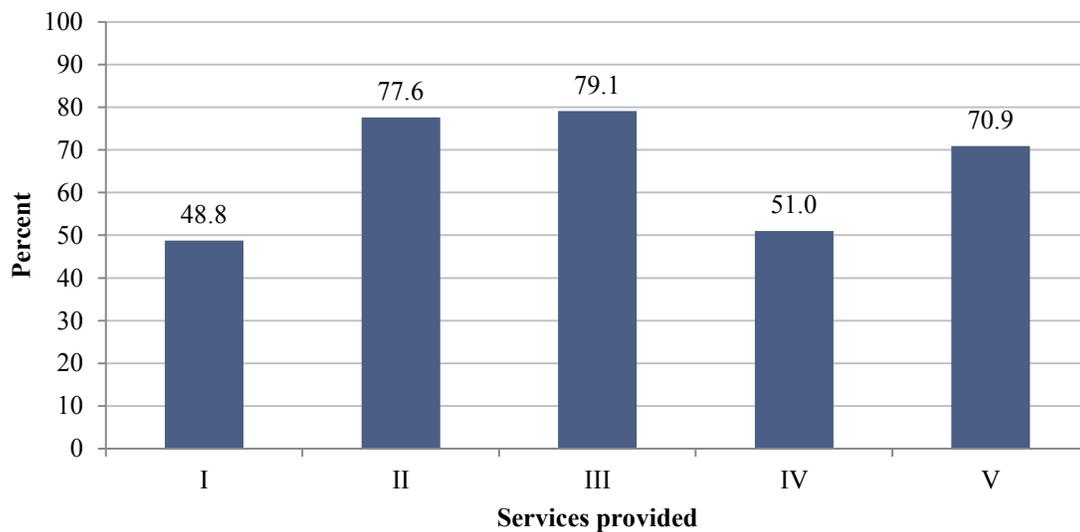
**Figure 2.25. Students with known asthma having an asthma action plan (AAP) on file at their school, Mississippi, 2012**



*Source: School Health Profiles Report, Principal*

**Key Observations:** A significant difference was observed among the schools that have an Asthma Action Plan for all the known asthmatic students in their schools (56.3%) when compared with schools that do not have any asthma action plans on their files for their known asthmatic students (5.8%).

**Figure 2.26. Services provided by the schools for students with poorly controlled asthma, Mississippi, 2012**

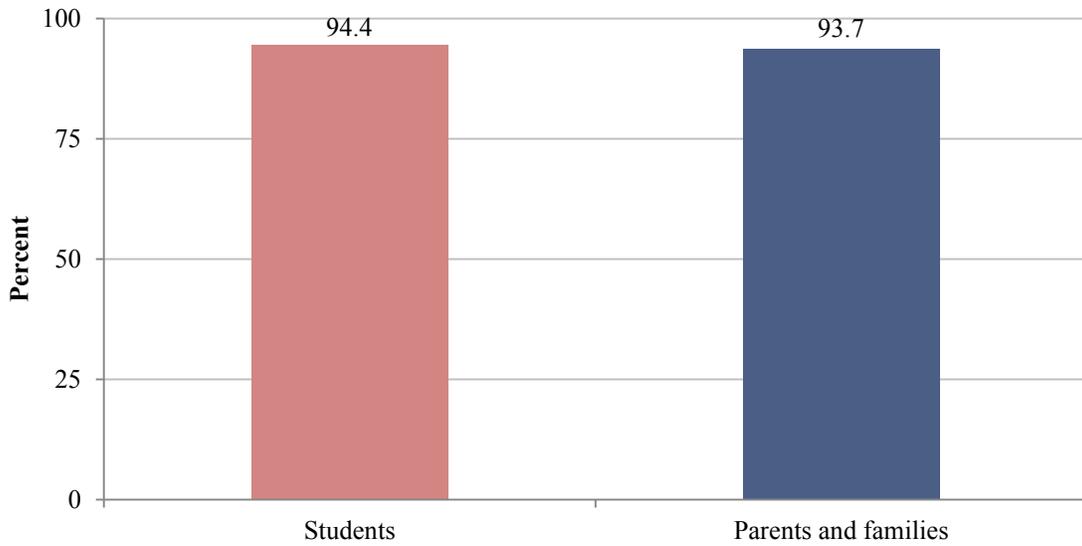


*Source: School Health Profiles Report, Principal*

- I) Providing referrals to primary health care clinicians or child health insurance programs
- II) Ensuring an appropriate written asthma action plan is obtained
- III) Ensuring access to and appropriate use of asthma medications, spacers, and peak flow meters at school
- IV) Offering asthma education for students with asthma
- V) Minimizing asthma triggers in the school environment

Key Observations: Ensuring access to and appropriate use of asthma medications, spacers, and peak flow meters at school is the most common service provided by the schools for students with poorly controlled asthma.

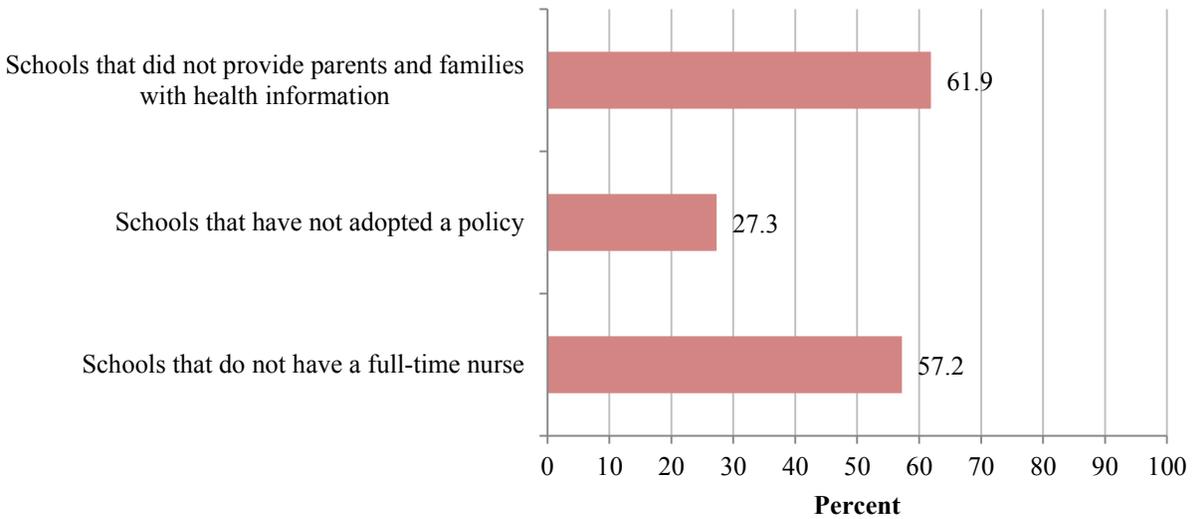
**Figure 2.27. Schools having procedures to inform the following groups about school’s policy permitting students to carry and self-administer asthma medications, Mississippi, 2012**



*Source: School Health Profiles Report, Principal*

Key Observations: 94.4% of the schools had the procedures to inform the students and 93.7 % of the schools had the procedures to inform the parents and families about school’s policy permitting students to carry and self-administer asthma medications.

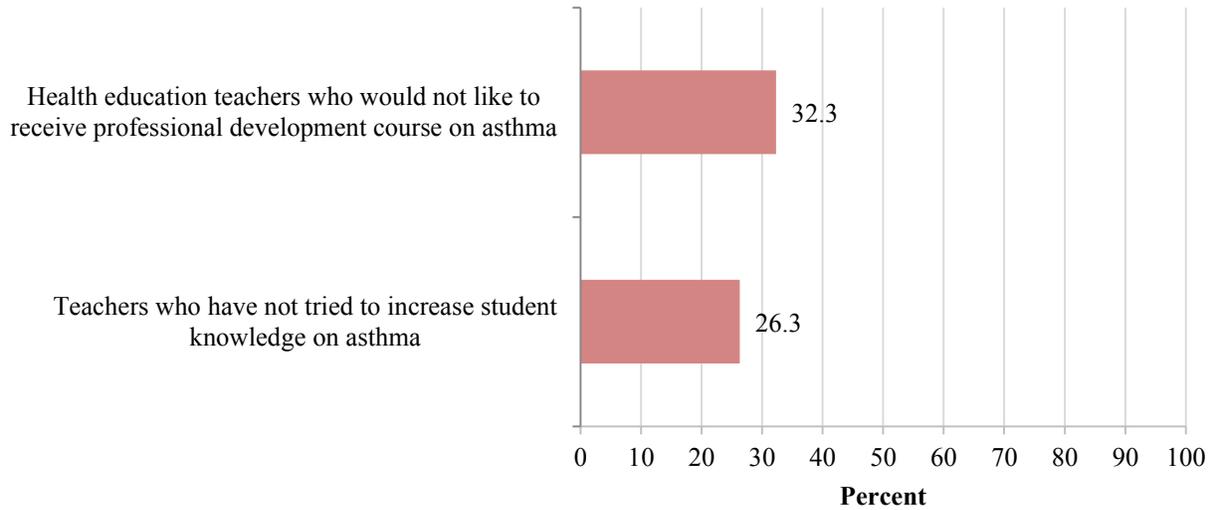
**Figure 2.28. During this school year, schools that did not provide parents and families with health information designed to increase parent and family knowledge on asthma, Schools that have not adopted a policy stating that students are permitted to carry and self-administer asthma medications, Schools that do not have a full-time nurse, Mississippi, 2012**



*Source: School Health Profiles Report, Principal*

Key Observations: 61.9% of schools did not provide parents and families with health information designed to increase parents and families knowledge on asthma, 27.3% of schools have not adopted a policy stating that students are permitted to carry and self-administer asthma medications and 57.2% of schools do not have a full time nurse.

**Figure 2.29. Health education teachers who would not like to receive professional development course on asthma, Teachers in schools who have not tried to increase student knowledge on asthma in a required course in any of grades 6 through 12 during this school year, Mississippi, 2012**



*Source: School Health Profiles Report, Health Education Teacher*

Key Observations: During this school year, 32.3% of health education teachers would not like to receive professional development course on asthma and 26.3% of teachers in schools have not tried to increase student knowledge on asthma in a required course in any of grades 6 through 12.

## Section 3: Asthma Symptoms, Severity and Disease Management

### Asthma Symptoms and Disease Management Defined

Asthma signs and symptoms may include wheezing, coughing, difficulty breathing, and chest tightness.<sup>1</sup> Asthma symptoms occur when an individual with asthma is exposed to certain triggers, such as allergens (e.g., pet dander, pollen, and mold) or irritants (e.g., tobacco smoke and strong odors). These symptoms can vary within an individual by time of day and can change throughout one's lifetime. Fortunately, asthma symptoms can be controlled, allowing many people with asthma to live healthy, active lives. However, poor asthma management can result in frequent symptoms, activity limitations, and decreased quality of life.

There are three essential components of a successful asthma management plan:

- **Determination of asthma severity.** The National Asthma Education and Prevention Program's (NAEPP) *Guidelines for the Diagnosis and Management of Asthma*<sup>1</sup> outlines the criteria for determining asthma severity. Asthma severity classifications are assigned by health care professionals based on frequency and severity of asthma symptoms, as well as the degree of lung functioning, before medical treatment. There are four severity classifications: intermittent, mild persistent, moderate persistent and severe persistent.
- **Appropriate asthma medication use.** The NAEPP *Guidelines for the Diagnosis and Management of Asthma*<sup>1</sup> also outlines the appropriate pharmacotherapy associated with each asthma severity classification. There are two types of asthma medications: quick-relief and long-term controller. Quick-relief medications are used to relieve symptoms during an asthma attack, whereas long-term controller medications are typically taken daily to prevent asthma attacks from occurring.<sup>4</sup> The guidelines recommend that individuals with persistent asthma take a daily long-term controller medication.
- **Avoidance of identified asthma triggers.** Individuals with asthma must identify and avoid the allergens, irritants, and behaviors that trigger their asthma symptoms.

### Asthma Symptoms and Disease Management Data

Information on asthma symptoms and disease management is obtained from self-reported surveys. In 2011, the Asthma Call-back Survey (ACBS), an optional Behavioral Risk Factor Surveillance System (BRFSS) module collected data on asthma control scale (symptoms, sleep disturbance, activity limitations ED visits and urgent visits), symptom free days, routine care visits, asthma medications, work-related asthma, environmental exposures, risk reduction scale, complementary and alternative therapy.

BRFSS respondents who reported that they had ever had asthma were asked to participate in a follow-up survey, containing detailed questions about their asthma symptoms, triggers,

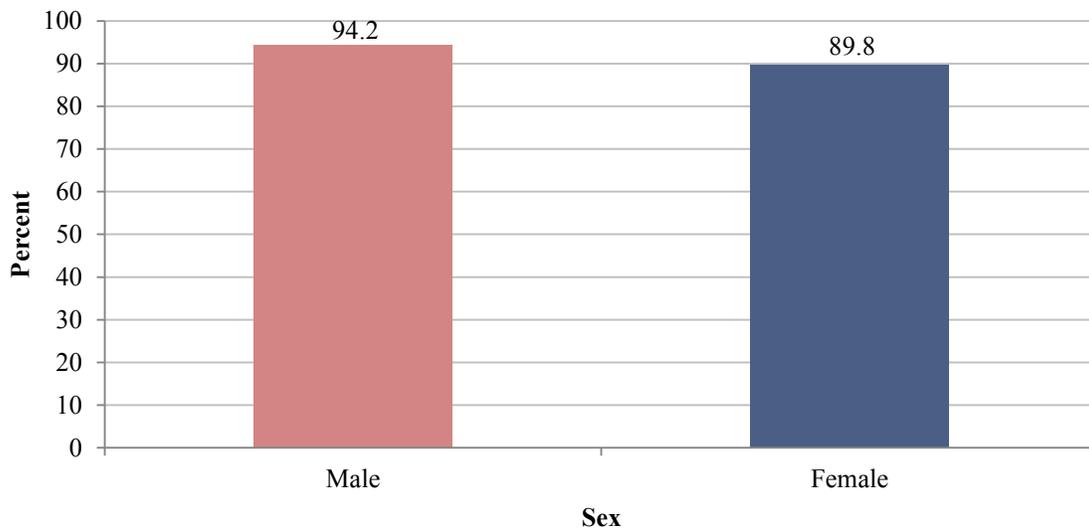
medications, and health care utilization. Questions on asthma severity classification are not included in the BRFSS. However, asthma severity can be estimated for adults based on responses to the ACBS asthma symptom questions.

This chapter presents data on asthma symptoms, severity and medications for Mississippi adults with asthma. The following figures include ACBS prevalence estimates. Refer to Appendix B for a discussion of the methodologies used during analysis and interpretation.

## Asthma Symptoms

Asthma symptoms include coughing, wheezing, and chest tightness. A high frequency of symptoms indicates that asthma is poorly controlled and may require additional medication and/or improved self-management activities such as environmental trigger control.

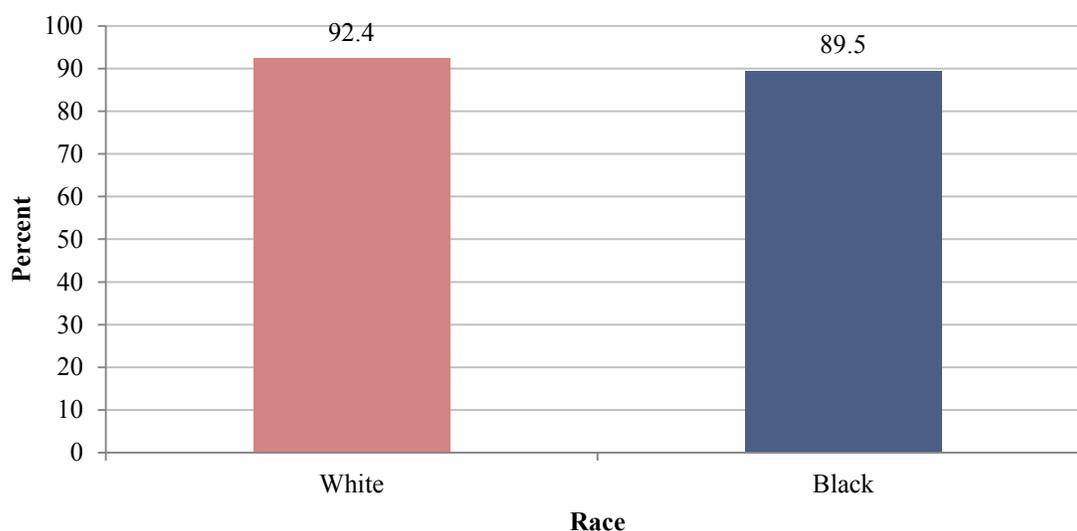
**Figure 3.1. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

**Key Observations:** No significant difference was observed in adults with current asthma experiencing one or more symptoms of asthma in the past 30 days when compared by sex.

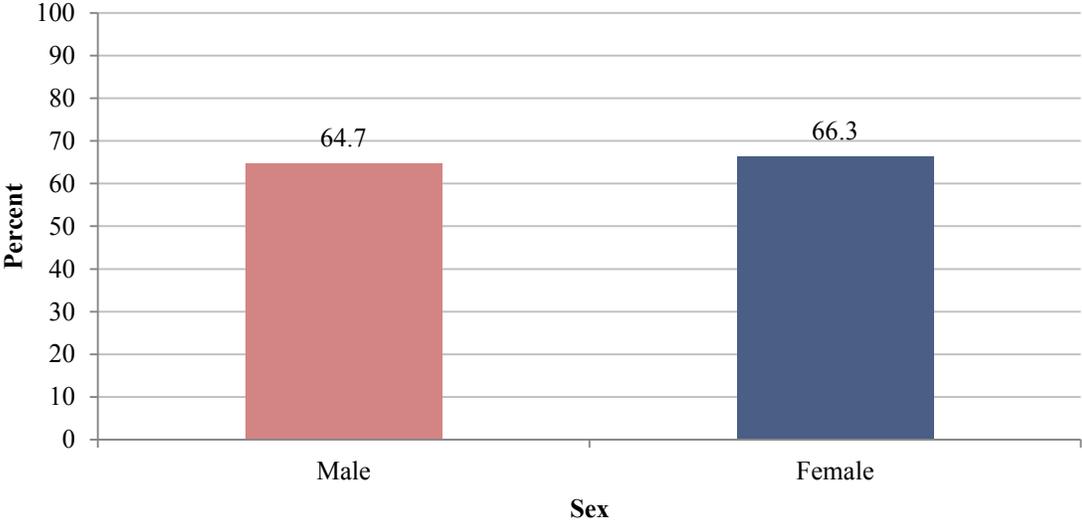
**Figure 3.2. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma experiencing one or more asthma symptoms in the past 30 days when compared by race.

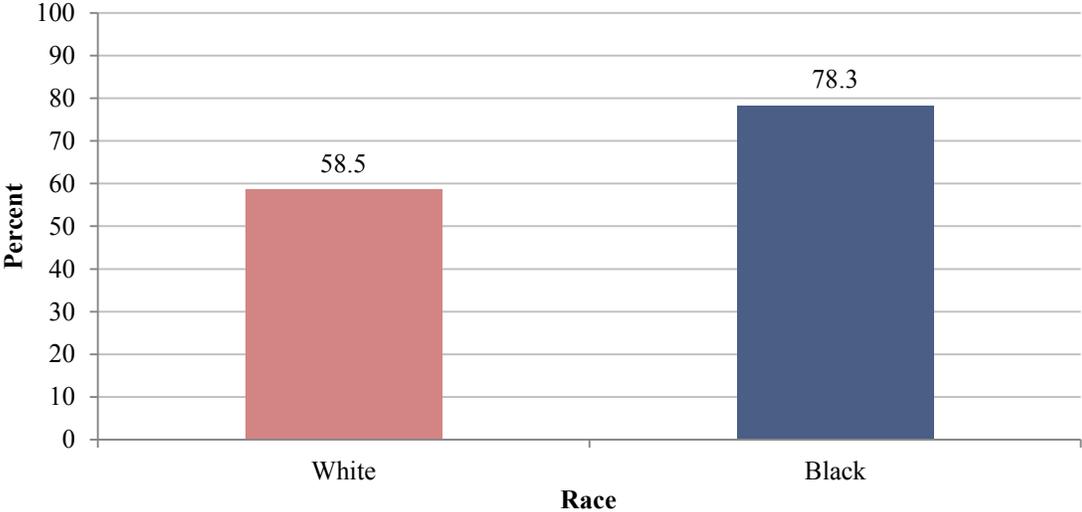
**Figure 3.3. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep when compared by sex.

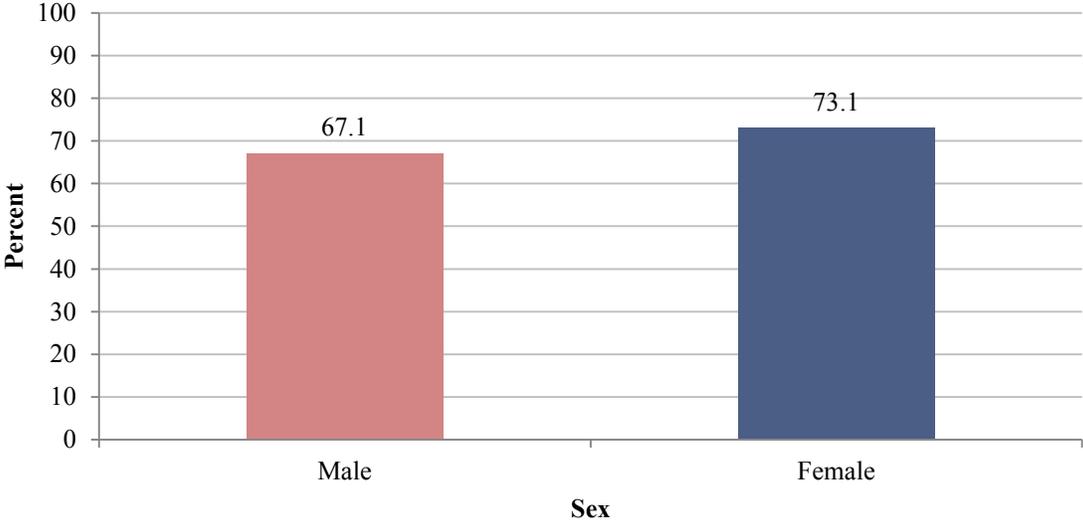
**Figure 3.4. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep when compared by race.

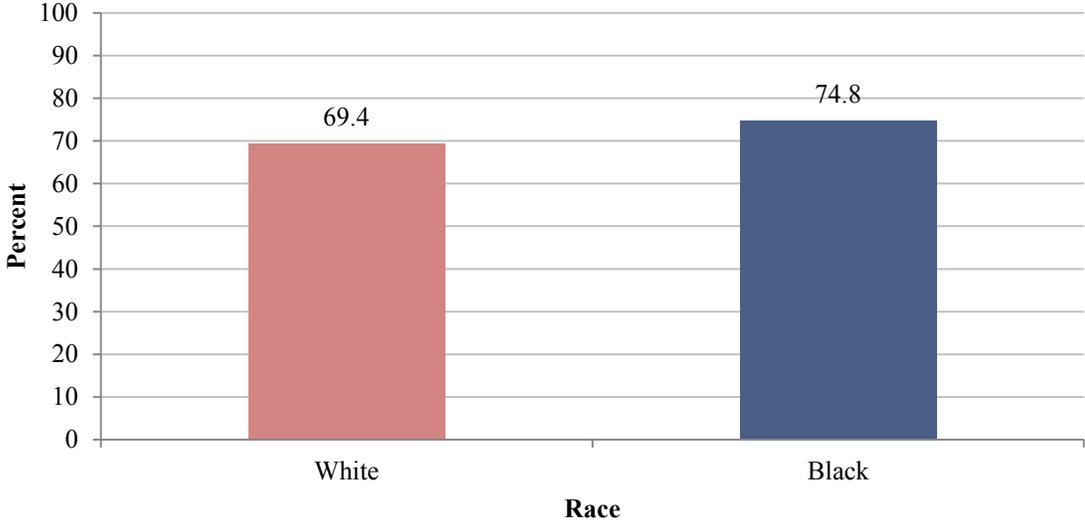
**Figure 3.5. Percent of adults with current asthma who were completely symptom-free in the past two weeks by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were completely symptom-free, that is no coughing, wheezing, or any other symptoms of asthma in the past two weeks when compared by sex.

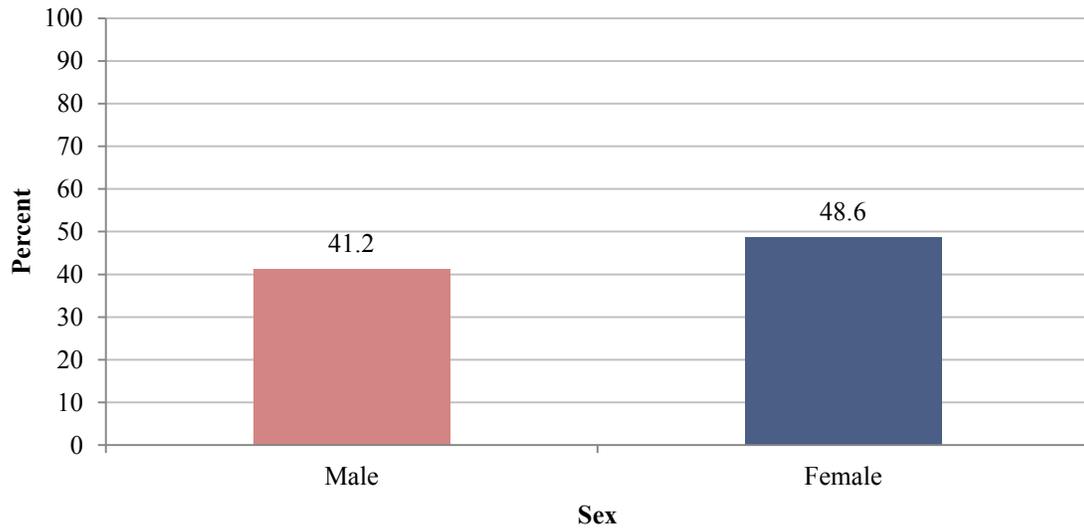
**Figure 3.6. Percent of adults with current asthma who were completely symptom-free in the past two weeks by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were completely symptom-free, that is no coughing, wheezing, or any other symptoms of asthma in the past two weeks when compared by race.

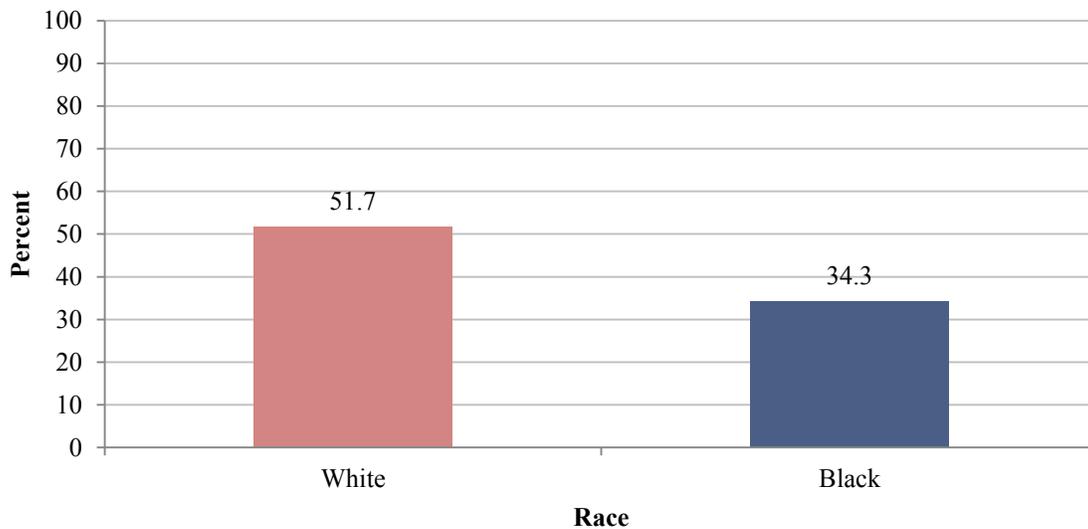
**Figure 3.7. Percent of adults with current asthma who had an episode of asthma or asthma attack in the past 12 months by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who had an episode of asthma or asthma attack in the past 12 months when compared by sex.

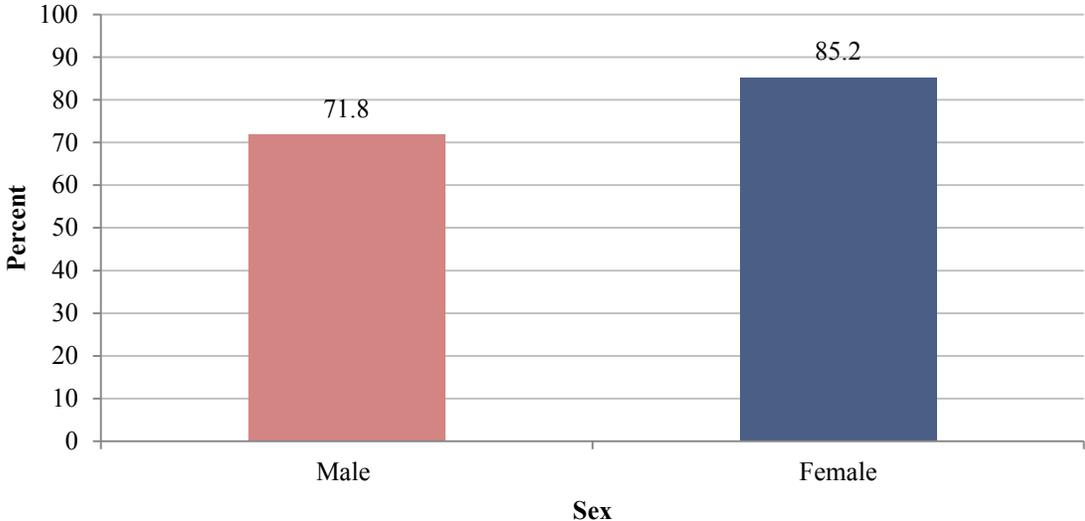
**Figure 3.8. Percent of adults with current asthma who had an episode of asthma or asthma attack in the past 12 months by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who had an episode of asthma or asthma attack in the past 12 months when compared by race.

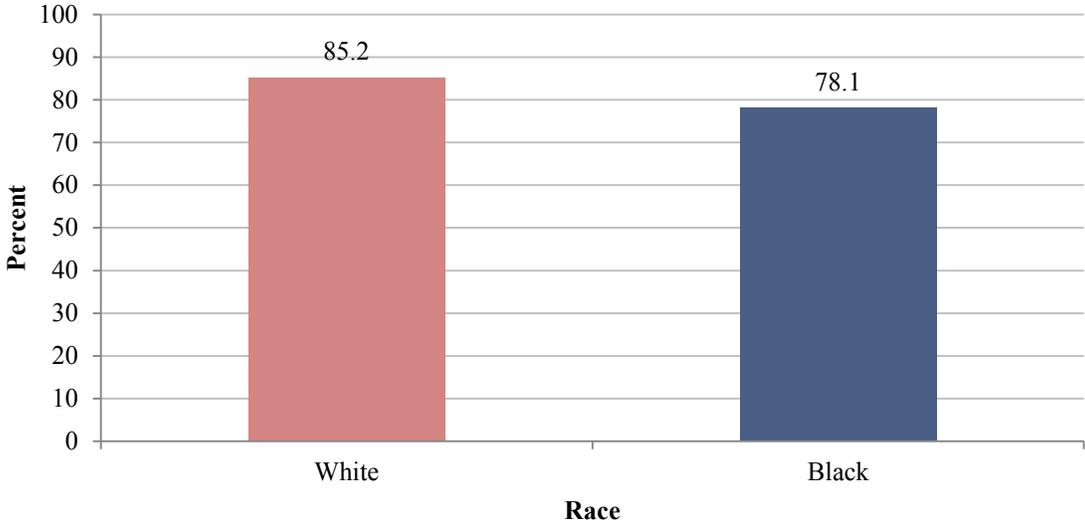
**Figure 3.9. Percent of adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months when compared by sex.

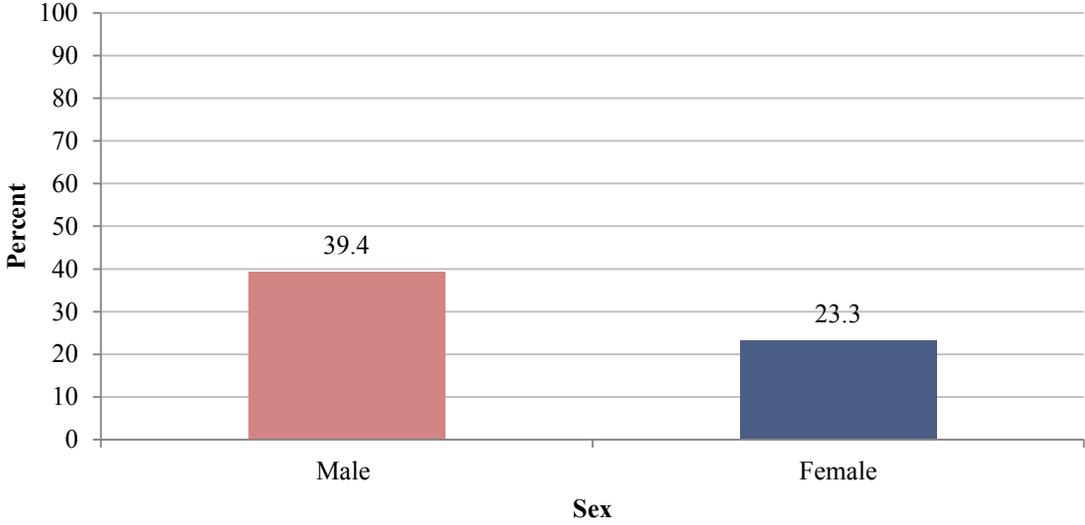
**Figure 3.10. Percent of adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months when compared by race.

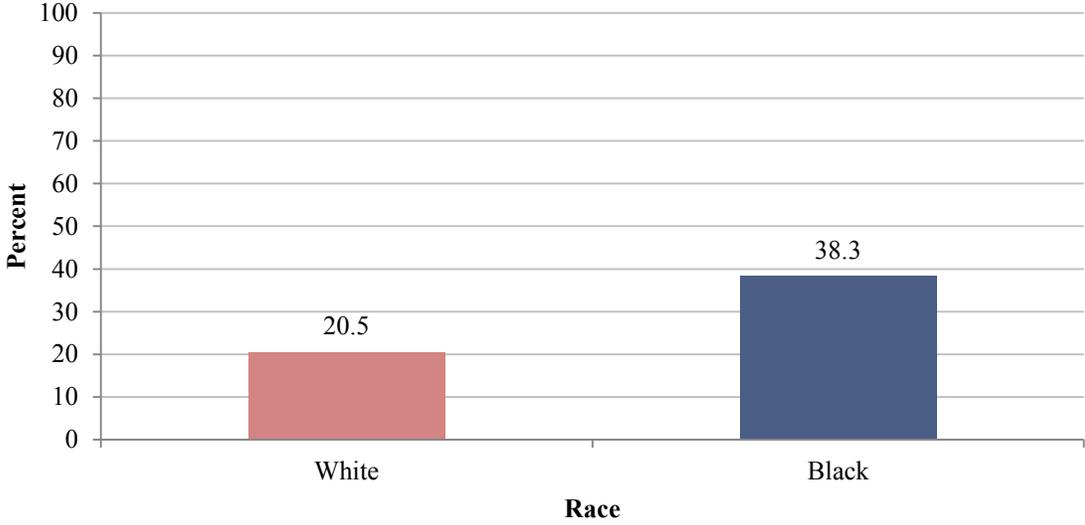
**Figure 3.11. Percent of adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months when compared by sex.

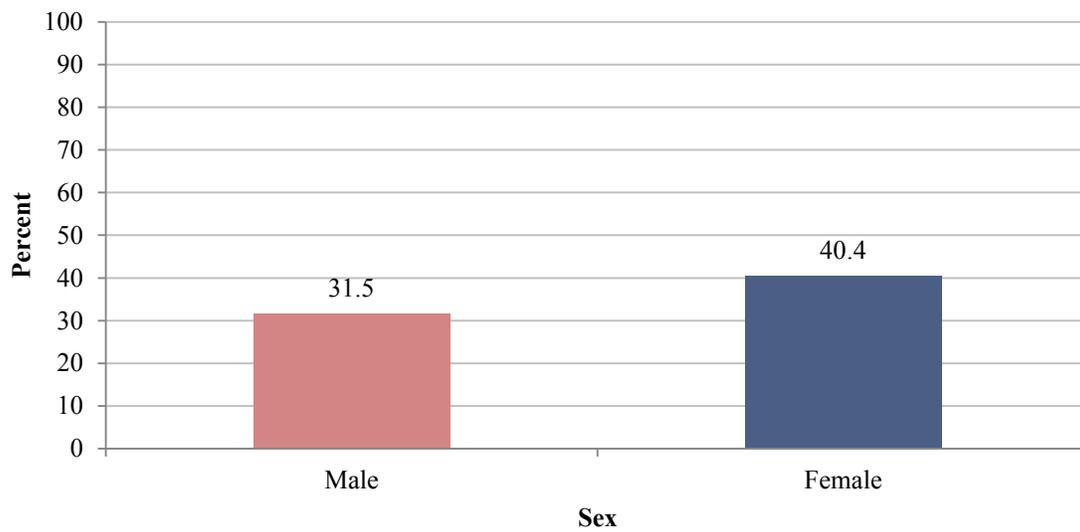
**Figure 3.12. Percent of adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months when compared by race.

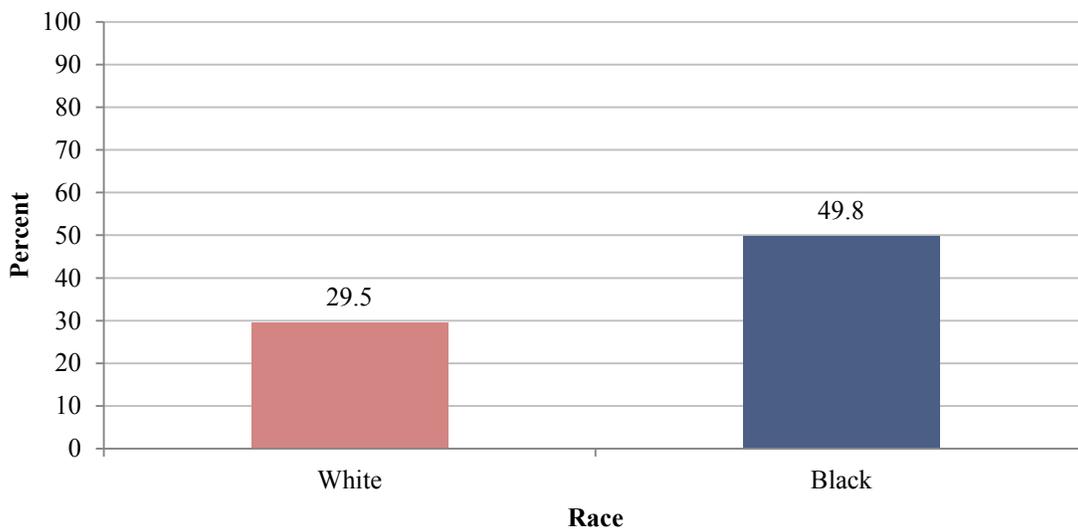
**Figure 3.13. Percent of adults who were unable to work or carry out usual activities because of their asthma during the past 12 months by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were unable to work or carry out usual activities because of their asthma during the past 12 months when compared by sex.

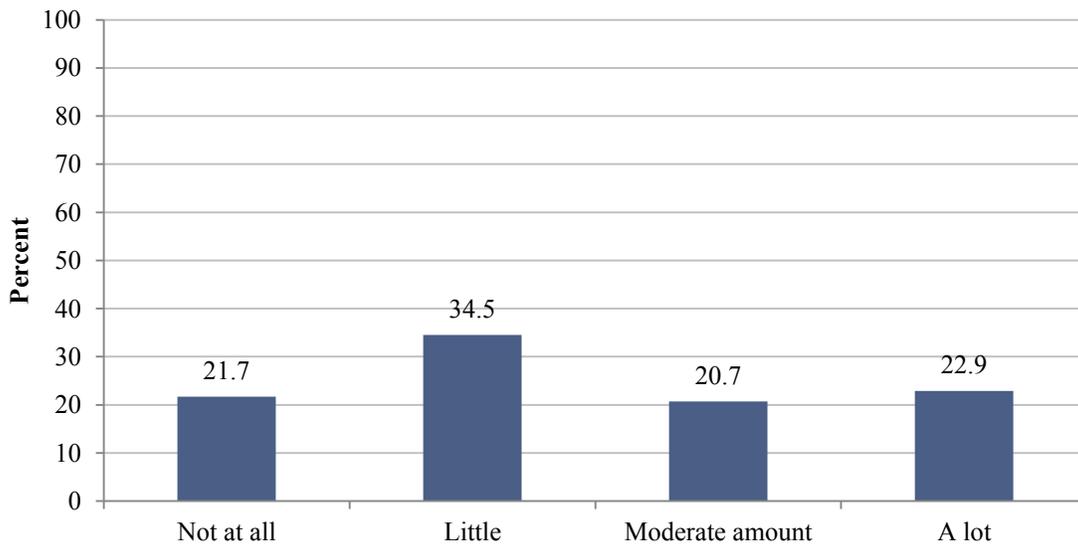
**Figure 3.14. Percent of adults who were unable to work or carry out usual activities because of their asthma during the past 12 months by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were unable to work or carry out usual activities because of their asthma during the past 12 months when compared by race.

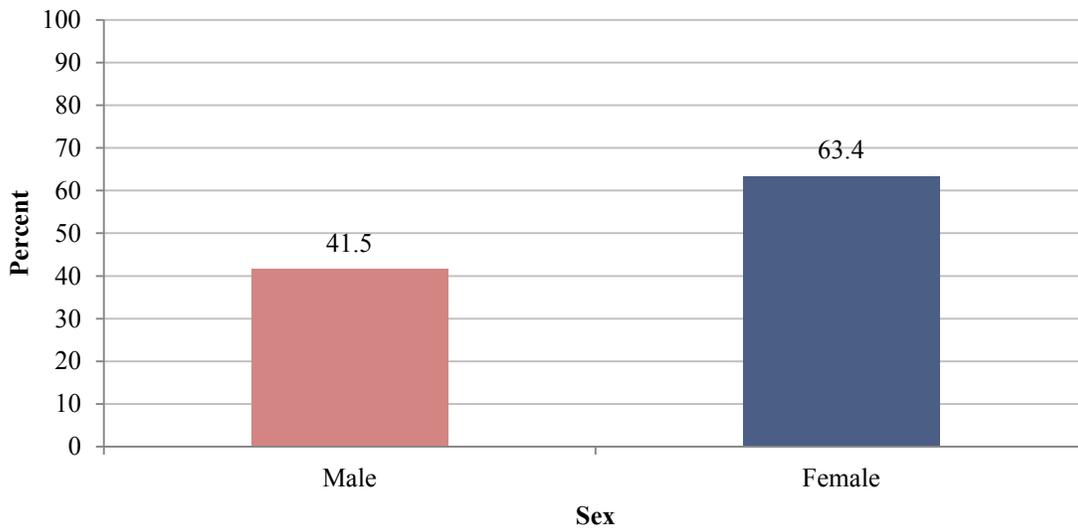
**Figure 3.15. Percent of adults who limited their usual activities due to asthma in the past 12 months not at all, a little, a moderate amount, or a lot, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who limited their usual activities due to asthma in the past 12 months when compared by severity of activity limitation.

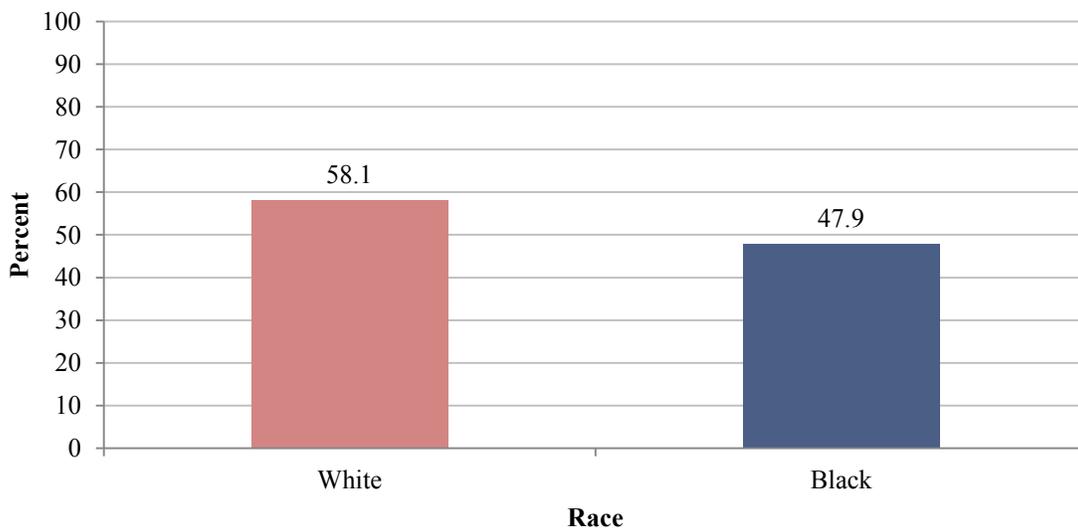
**Figure 3.16. Percent of adults who were ever taught how to recognize early signs or symptoms of an asthma episode by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were ever taught how to recognize early signs or symptoms of an asthma episode when compared by sex.

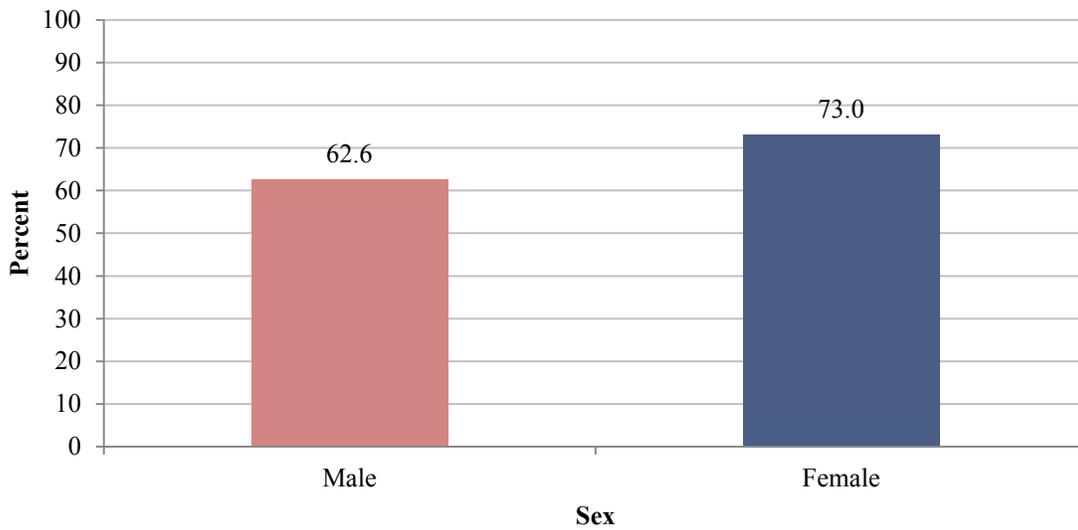
**Figure 3.17. Percent of adults who were ever taught how to recognize early signs or symptoms of an asthma episode by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were ever taught how to recognize early signs or symptoms of an asthma episode when compared by race.

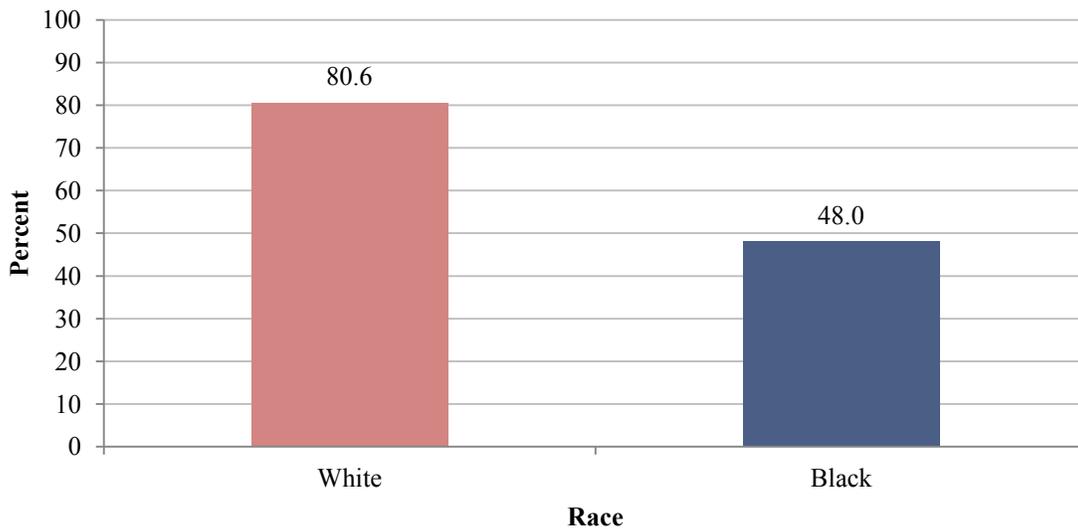
**Figure 3.18. Percent of adults who were ever taught what to do during asthma episode or attack by sex, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: No significant difference was observed in adults with current asthma who were ever taught what to do during asthma episode or attack when compared by sex.

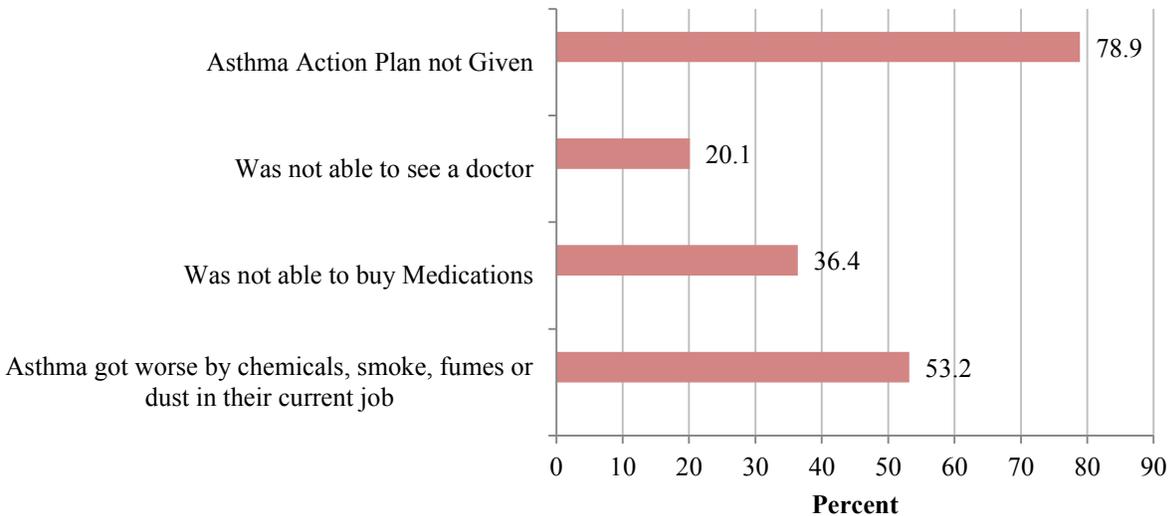
**Figure 3.19. Percent of adults who were ever taught what to do during asthma episode or attack by race, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: Significant difference was observed in adults with current asthma who were ever taught what to do during asthma episode or attack when compared by race.

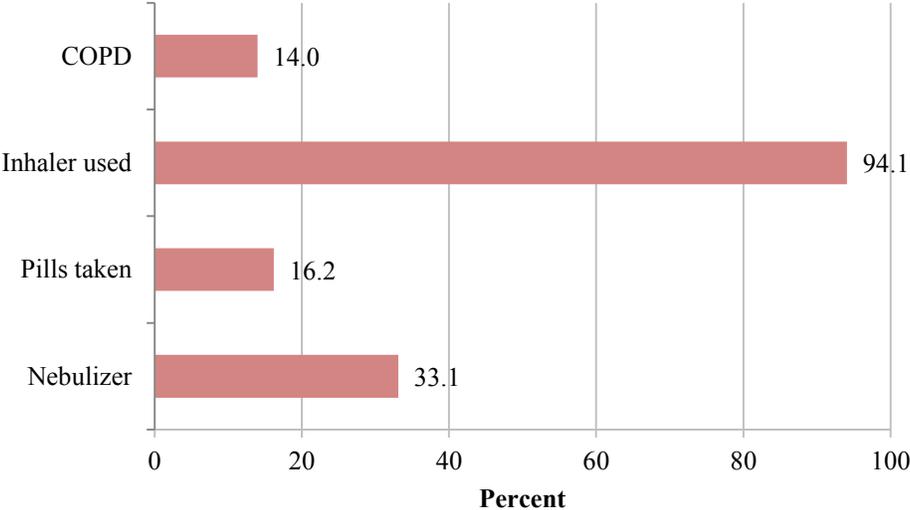
**Figure 3.20. Percent of adults with current asthma who were not given an asthma action plan by a doctor or other health professional, percent of adults with current asthma who needed to see a primary care doctor during the past 12 months for their asthma but could not because of the cost, percent of adults with current asthma who needed to buy medications during the past 12 months for their asthma but could not because of the cost and percent of adults with current asthma whose asthma became worse due to chemicals, smoke, fumes or dust in their current job, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: During the past 12 months, 78.9% of adults with current asthma were not given an asthma action plan by a doctor or other health professional, 20.1% of adults with current asthma needed to see a primary care doctor for their asthma, but could not due to cost. 36.4% of adults with current asthma needed to buy medications for their asthma but could not due to cost and 53.2% of adults with current asthma reported that their asthma was made worse by chemicals, smoke, fumes or dust in their current job.

**Figure 3.21. Percent of adults who were ever been told by a doctor or health professional that they have chronic obstructive pulmonary disease also known as COPD, Percent of adults with current asthma who had taken prescription asthma medicine using an inhaler, who had taken asthma medicine in the pill form and who had taken asthma medicines with a nebulizer during the past three months, Mississippi, 2011**



*Source: Asthma Adult Call-back Survey*

Key Observations: 14.0% of adults with current asthma were ever been told by a doctor or health professional that they have chronic obstructive pulmonary disease (COPD). During the past three months 94.1% of adults with current asthma used prescription asthma medicine using an inhaler, 16.2% took asthma medicine in the pill form and 33.1% took asthma medicines with a nebulizer.

## Section 4: Health Care Access and Utilization

### Health Care Access and Utilization Defined

Health care access is the ability to obtain medical care, and is typically measured by indicators of health care coverage and the presence of a primary care provider. Health care utilization is the use of medical care, including routine preventive visits, emergency department (ED) visits, and hospitalizations. Access to health care and routine check-ups are essential to proper asthma management. In fact, the National Asthma Education and Prevention Program (NAEPP) recommends primary care visits at least every six months, to assess and monitor asthma symptoms and modify management plans as needed.<sup>5</sup> However, asthma-related ED visits and hospitalizations are an indication of poorly controlled asthma. These acute care visits are often preventable through appropriate medication use and avoidance of identified triggers. Analyses of health care access and asthma-related health care visits can help us identify:

- Groups at highest risk for hospital and emergency department visits due to poorly-controlled asthma.
- Disparities in access to health services.
- Medical costs associated with asthma.

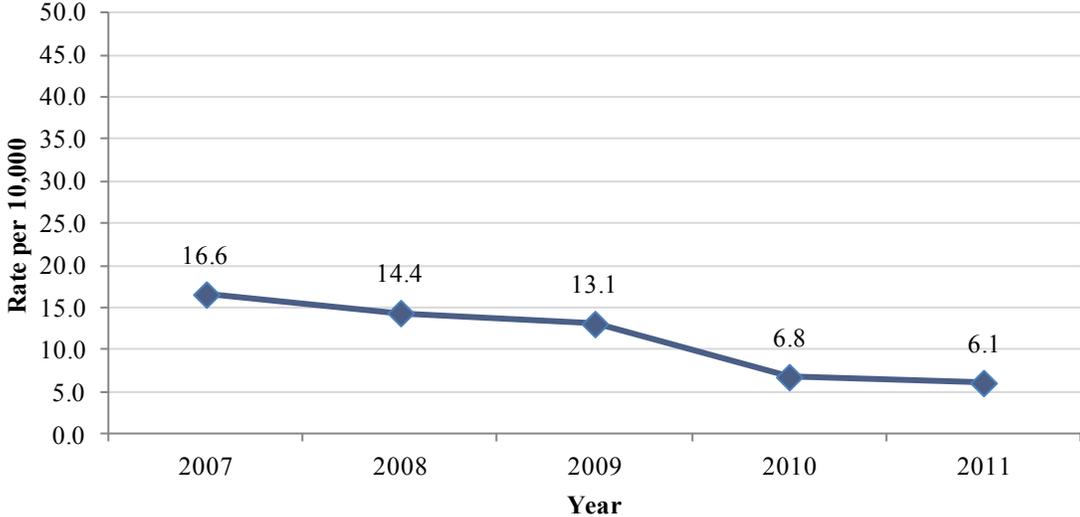
### Health Care Access and Utilization Data

Information on health care access and utilization is obtained through administrative and medical claims data that capture this information for billing purposes. This chapter presents data from the Mississippi Asthma Hospital Discharge Database. Administrative claims data provides comprehensive information on all health care visits among the population represented by the data. The hospital discharge database contains data on diagnosis and patient characteristics (e.g., age, sex, race, and county of residence). Asthma discharges are defined as discharges with a primary diagnosis of asthma (ICD-9-CM 493.xx).

This chapter presents data on health care access and asthma-related health care utilization for Mississippi adults and children. The following figures include asthma hospital and emergency department visit rates calculated from the Mississippi State Department of Health's Asthma Program Hospital Discharge Database. All rates are age-adjusted to the United States 2000 Standard Population. Refer to Appendix B for a discussion of the methodologies used during analysis and interpretation.

# Hospital Discharges with Asthma as the First Listed Diagnosis

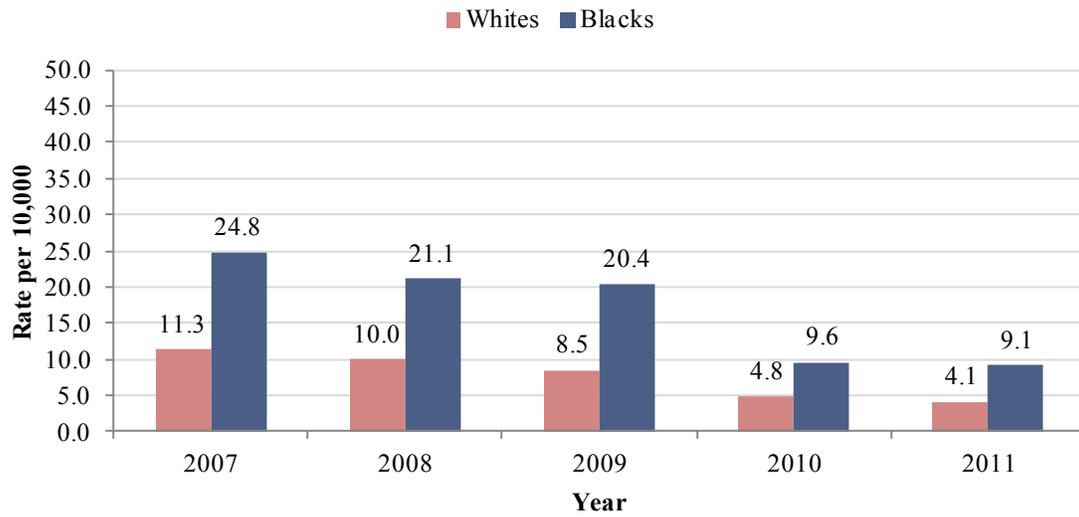
Figure 4.1. Estimated asthma hospital discharge rate per 10,000 population by year, Mississippi, 2007-2011



Source: Mississippi Asthma Hospital Discharge Database

Key Observations: Significant decrease in the age-adjusted current asthma hospital discharge rates were observed from the year 2007-2011.

**Figure 4.2. Estimated asthma hospital discharge rate per 10,000 population by year and race, Mississippi, 2007-2011**



*Source: Mississippi Asthma Hospital Discharge Database*

**Key Observations:** A significant decrease in the age-adjusted current asthma hospital discharge rates were observed among the white and black population from the years 2007-2011. The hospital discharge rates of the black population were significantly higher than those of the white population.

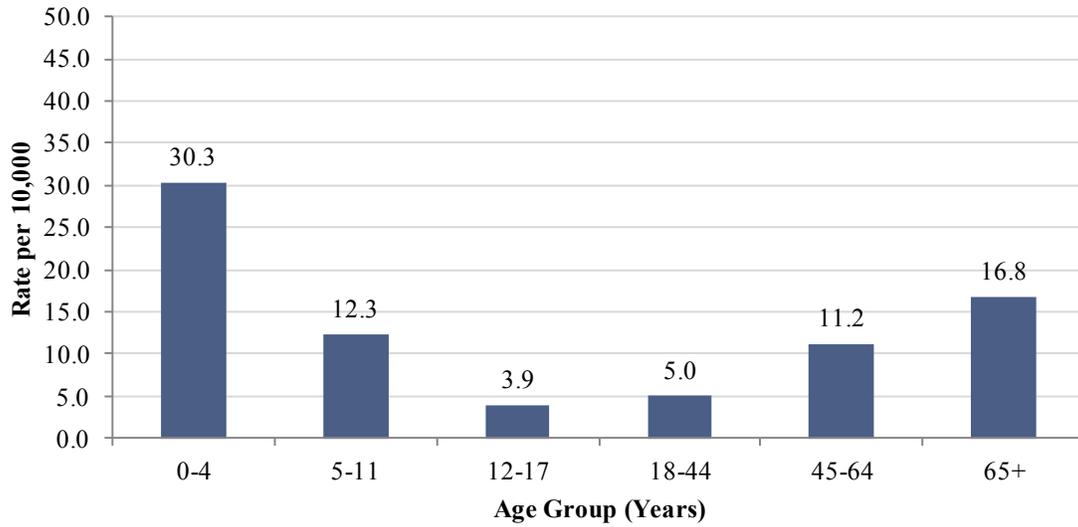
**Figure 4.3. Estimated asthma hospital discharge rate per 10,000 population by year and sex, Mississippi, 2007-2011**



*Source: Mississippi Asthma Hospital Discharge Database*

**Key Observations:** A significant decrease in the age-adjusted current asthma hospital discharge rates were observed among the male and female population from the years 2007-2011. The hospital discharge rates of the female population were significantly higher than those of the male population.

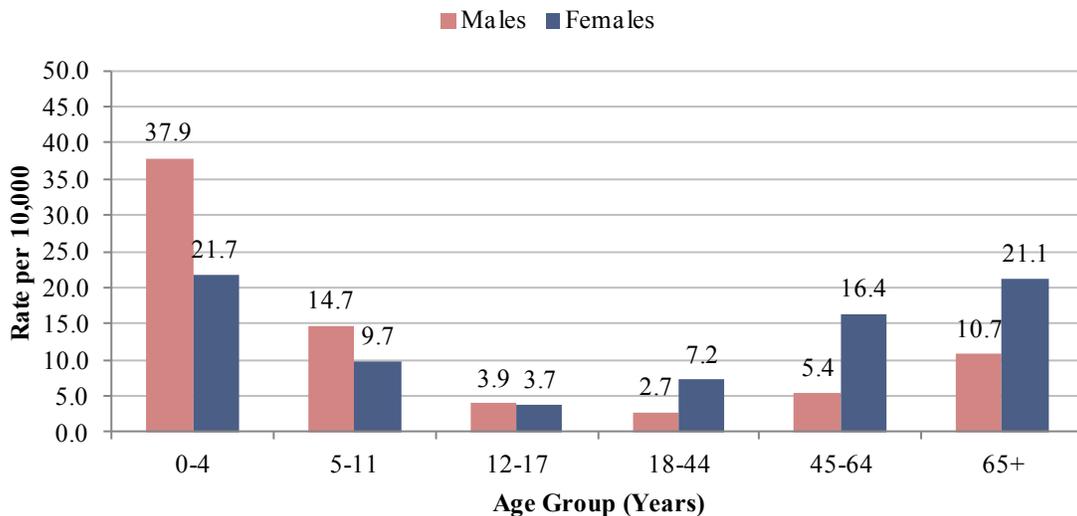
**Figure 4.4. Estimated asthma hospital discharge rate per 10,000 population by age group, Mississippi, 2007-2011\***



*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

Key Observations: Children aged 0-4 years had significantly higher asthma hospital discharge rates compared to any other age group.

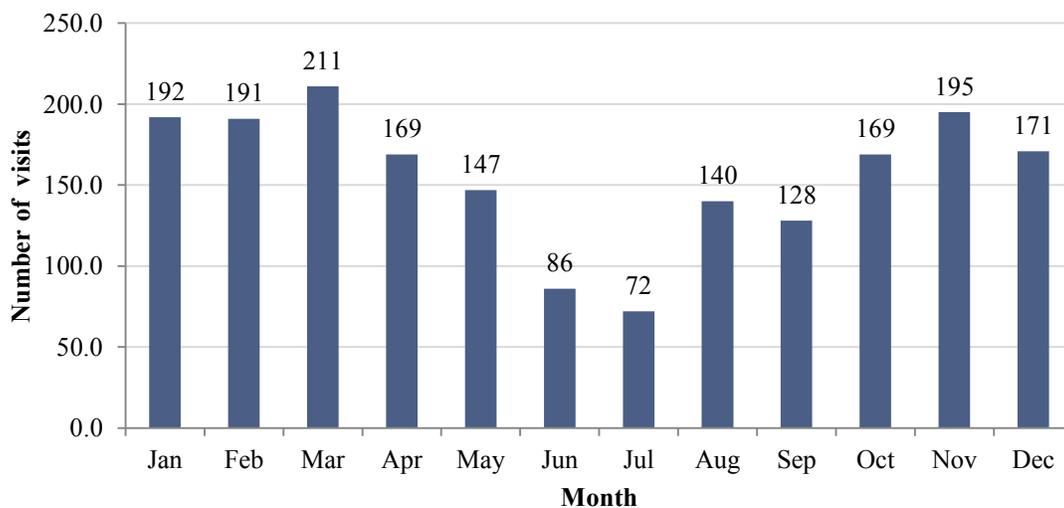
**Figure 4.5. Estimated asthma hospital discharge rate per 10,000 population by age group and sex, Mississippi, 2007-2011\***



*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

**Key Observations:** Asthma hospital discharge rates were significantly higher among male children aged 0-11 years than female children of the same age group. Asthma hospital discharge rates were significantly higher among adult females aged 18 years and above, than adult males of the same age group.

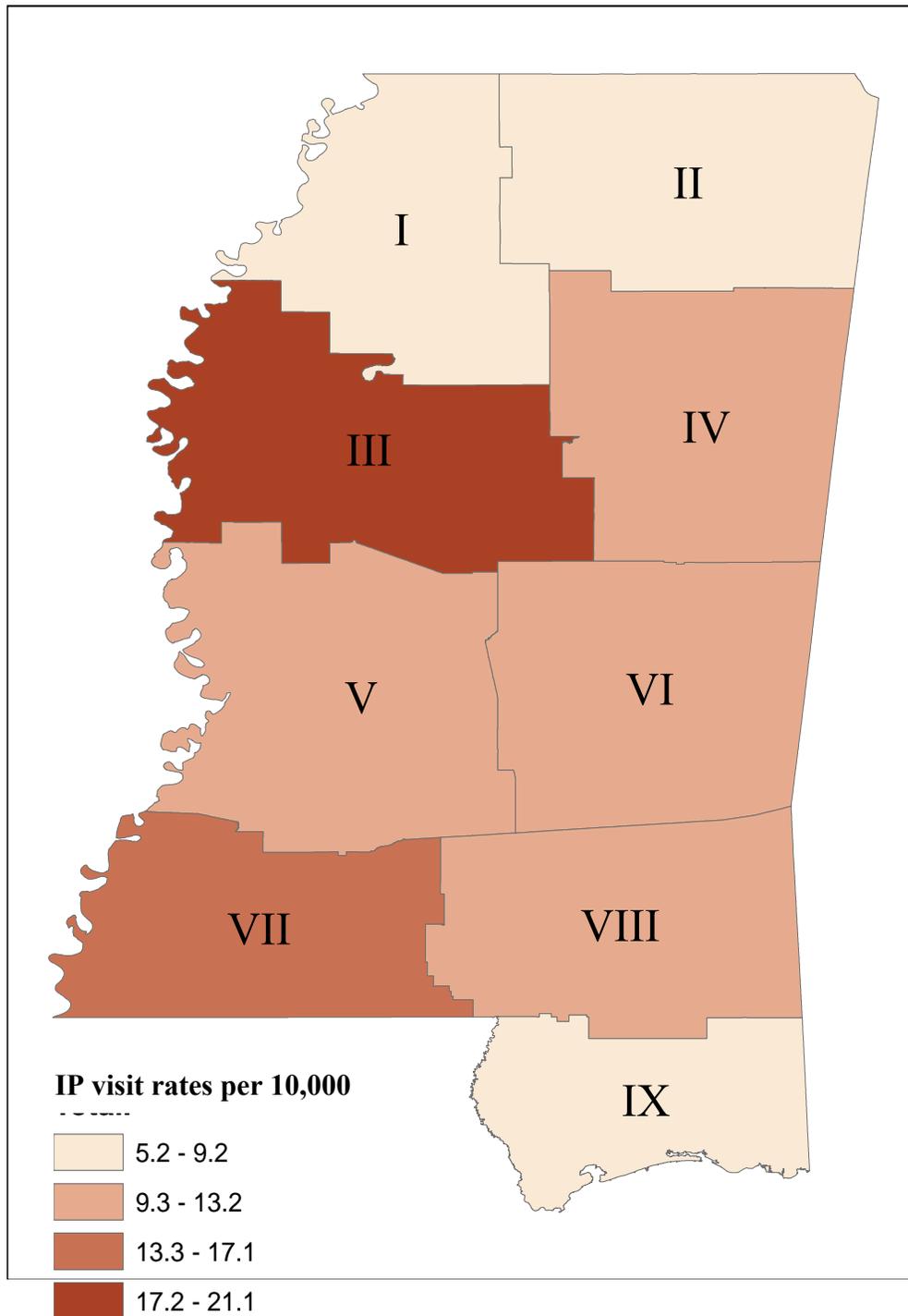
**Figure 4.6. Estimated number of hospital discharges with asthma as the first listed diagnosis by month, Mississippi, 2011**



*Source: Mississippi Asthma Surveillance System*

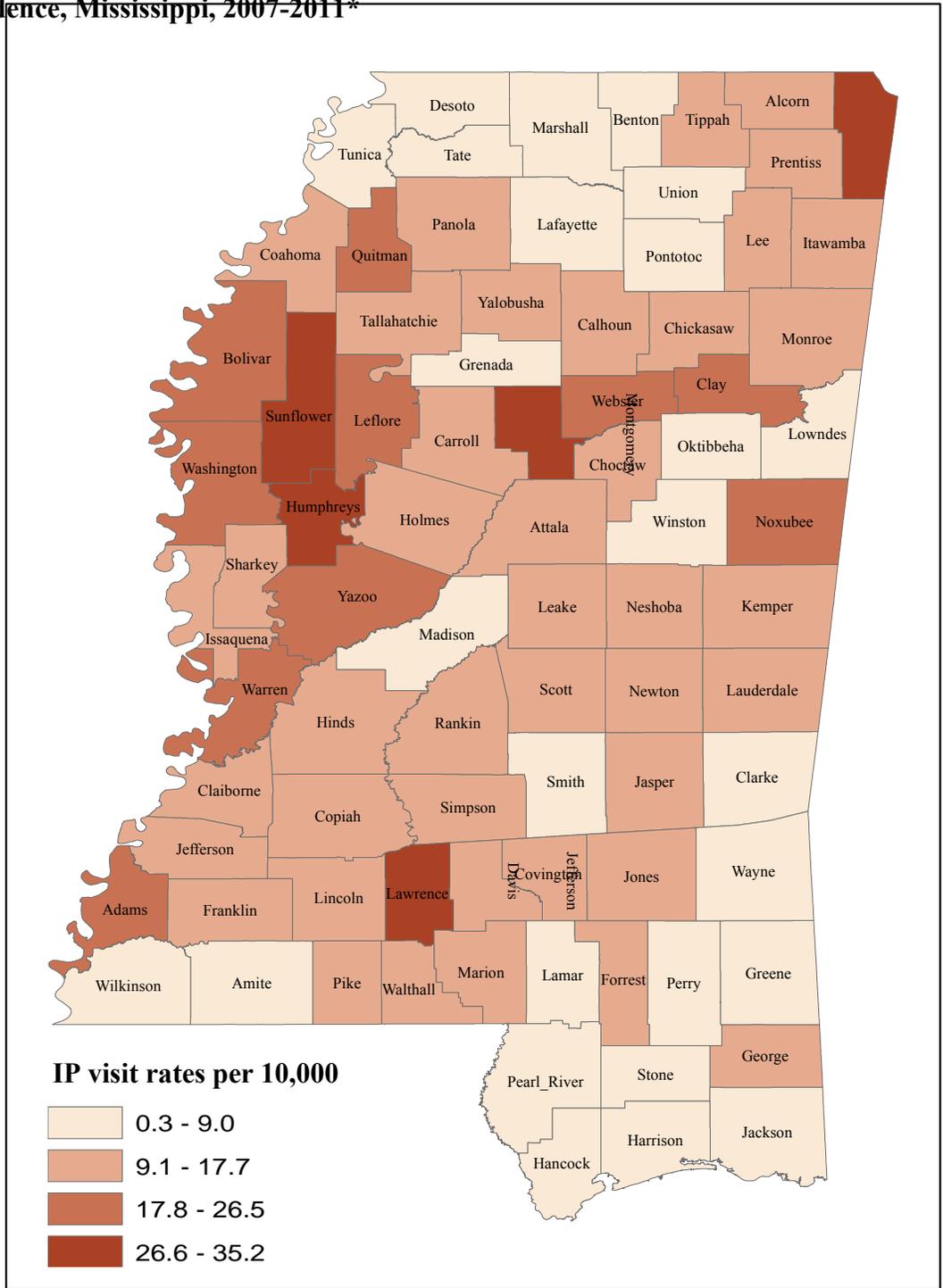
**Key Observations:** Asthma hospital discharges peaked in the month of March.

**Map 4.7. Estimated asthma hospital discharge rate per 10,000 population by public health district of residence, Mississippi, 2007-2011\***



*Data Source: Mississippi Asthma Hospital Discharge Database*  
*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

**Map 4.8. Estimated asthma hospital discharge rate per 10,000 population by county of residence, Mississippi, 2007-2011\***



*Data Source: Mississippi Asthma Hospital Discharge Database*

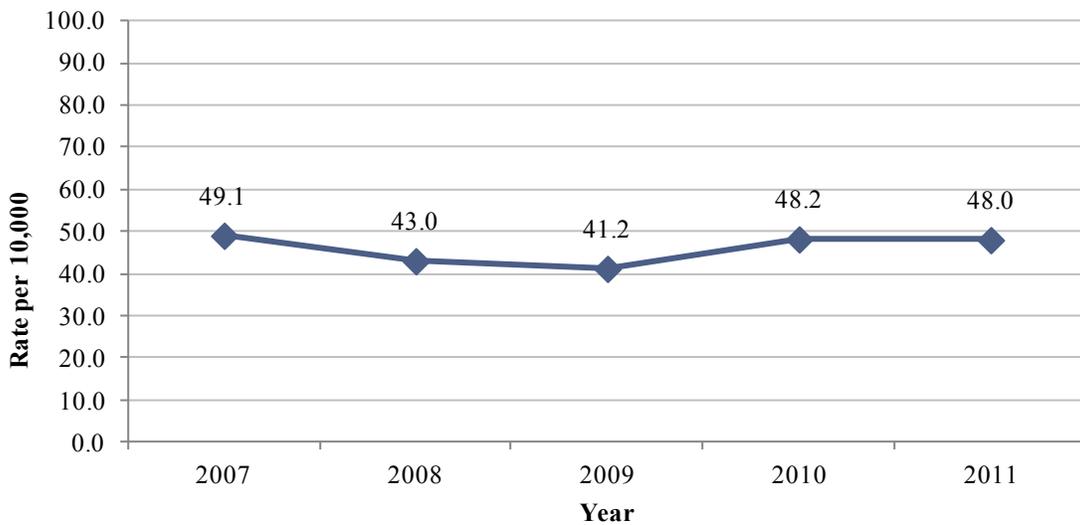
*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

## Emergency Department Visit Rate with Asthma as the First Listed Diagnosis

Like hospital discharges, emergency department visits for asthma provide an important public health surveillance endpoint. Emergency department visits can be used to determine the severity of asthma in specific populations and geographic areas, which can be used to help direct prevention and intervention efforts. Emergency department visits are preventable with routine healthcare visits to primary care providers or asthma specialists, use of proper medication and trigger recognition and reduction.

Asthma is one of the leading causes for emergency department visits nationwide, accounting for approximately 1.75 million visits in the United States in 2007.<sup>6</sup> This section examines asthma emergency department visits in Mississippi from 2007 through 2011.

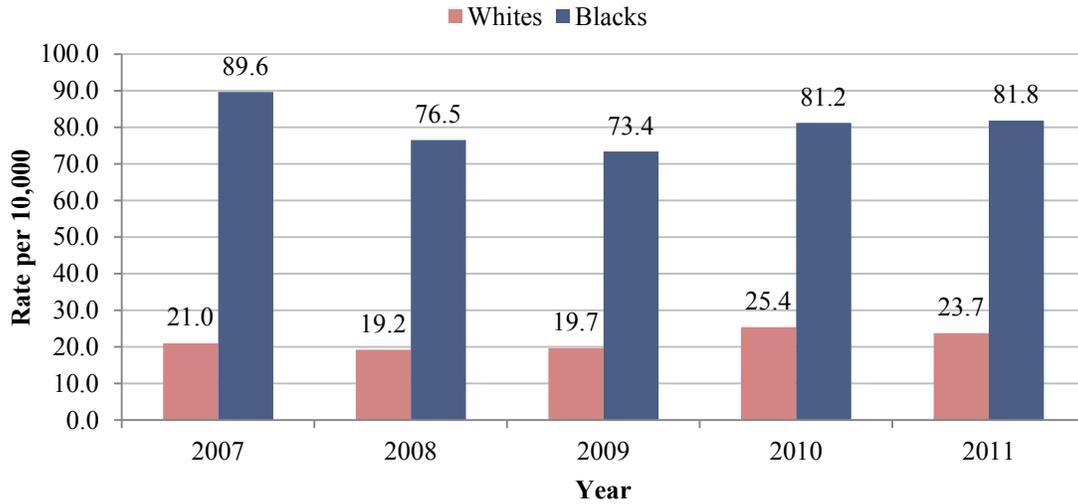
**Figure 4.9. Estimated asthma emergency department visit rate per 10,000 population by year, Mississippi, 2007-2011**



*Source: Mississippi Asthma Hospital Discharge Database*

**Key Observations:** A significant decrease in the age-adjusted current asthma emergency department visit rates were observed from 2007-2009 and a significant increase in the rates were observed from 2009 to 2011.

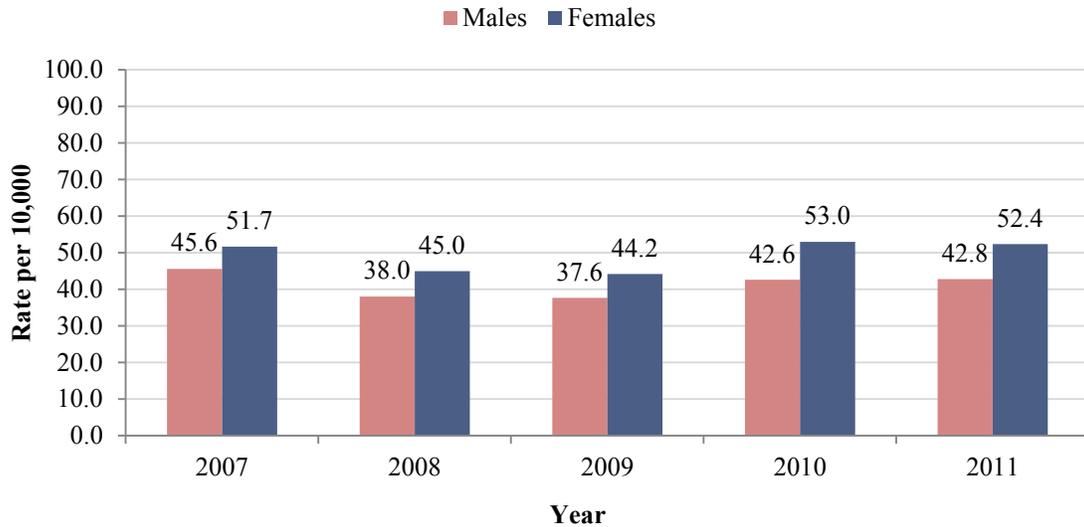
**Figure 4.10. Estimated asthma emergency department visit rate per 10,000 population by year and race, Mississippi, 2007-2011**



*Source: Mississippi Asthma Hospital Discharge Database*

**Key Observations:** A significant difference in the age-adjusted current asthma emergency department visit rates were observed among the white and black populations. The rates of the black population were more than three times as high as the white population. A significant decrease in the rates among the black population was observed when compared between years 2007 and 2011 and a significant increase in the rates was observed among the white population when compared between years 2007 to 2011.

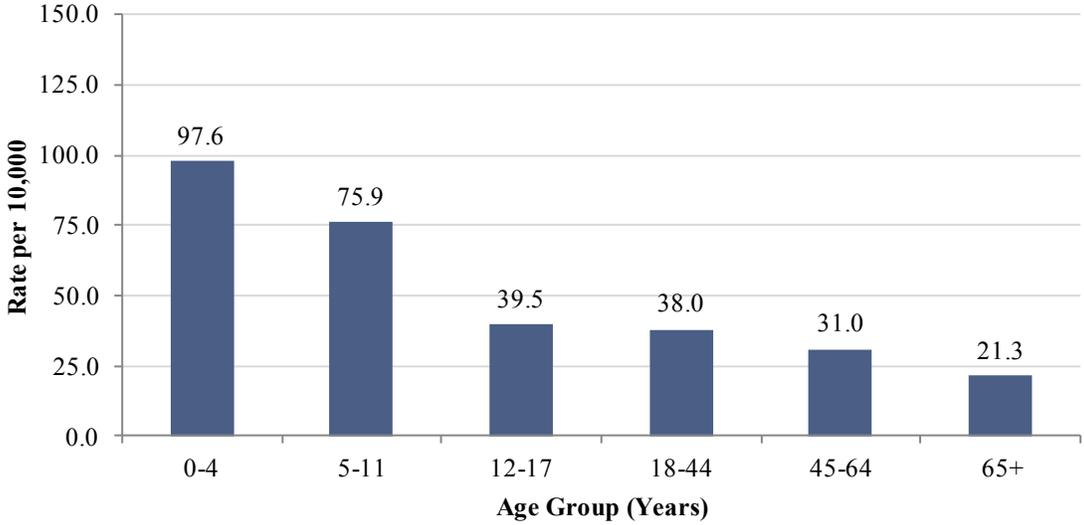
**Figure 4.11. Estimated asthma emergency department visit rate per 10,000 population by year and sex, Mississippi, 2007-2011**



*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: A significant difference in the age-adjusted current asthma emergency department visit rates were observed among the male and female populations. The asthma emergency department visit rates of the female population were significantly higher than that of the male population. Significant decrease in the age-adjusted current asthma rates was observed among male population when compared between years 2007 and 2011.

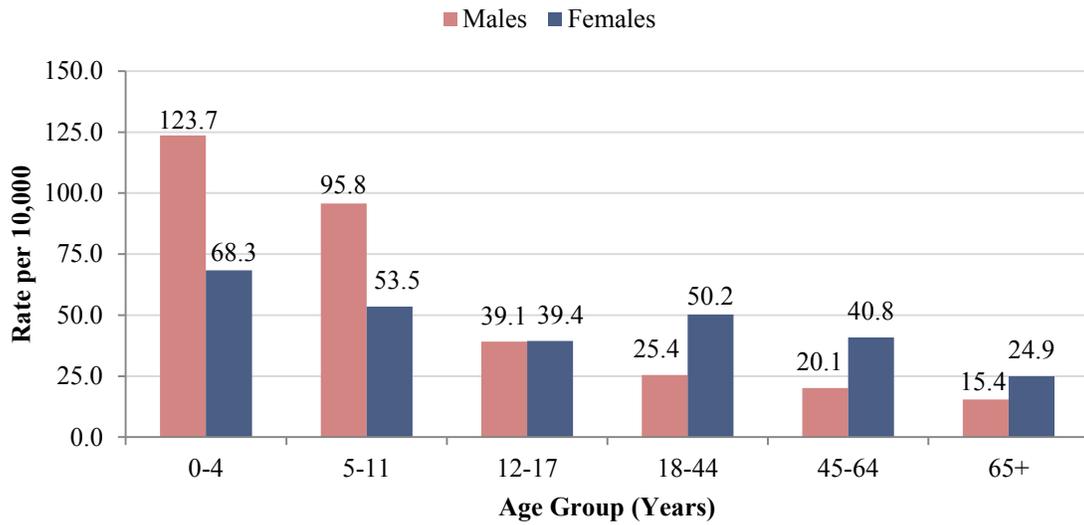
**Figure 4.12. Estimated asthma emergency department visit rate per 10,000 population by age group, Mississippi, 2007-2011\***



*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

Key Observations: Children aged 0-4 years had significantly higher asthma emergency department visit rates compared to any other age groups.

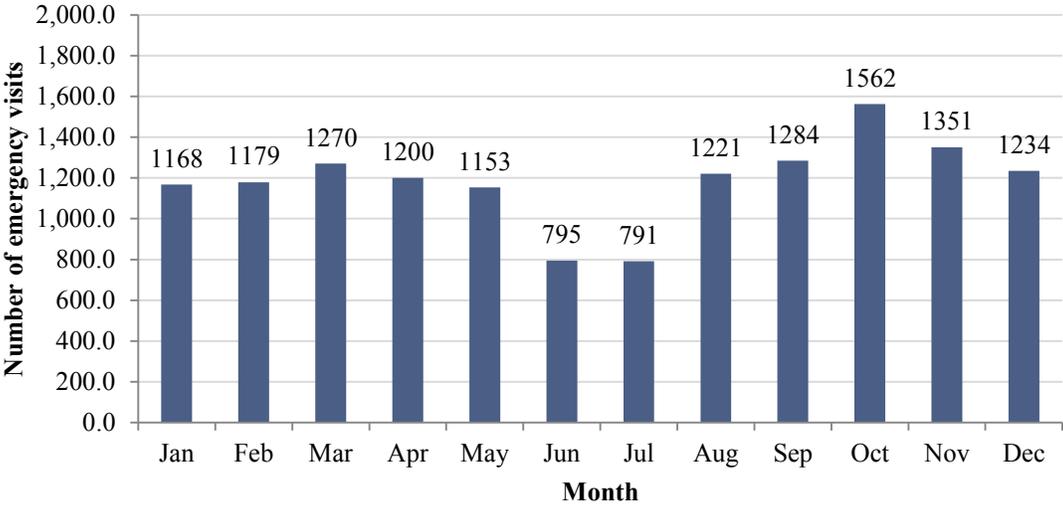
**Figure 4.13. Estimated asthma emergency department visit rate per 10,000 population by age group and sex, Mississippi, 2007-2011\***



*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

**Key Observations:** Boys aged 0-11 years had significantly higher rates of asthma emergency department visits than girls aged 0-11 years. Females aged 18 years and above had significantly higher rates of asthma emergency department visits than males aged 18 years and above.

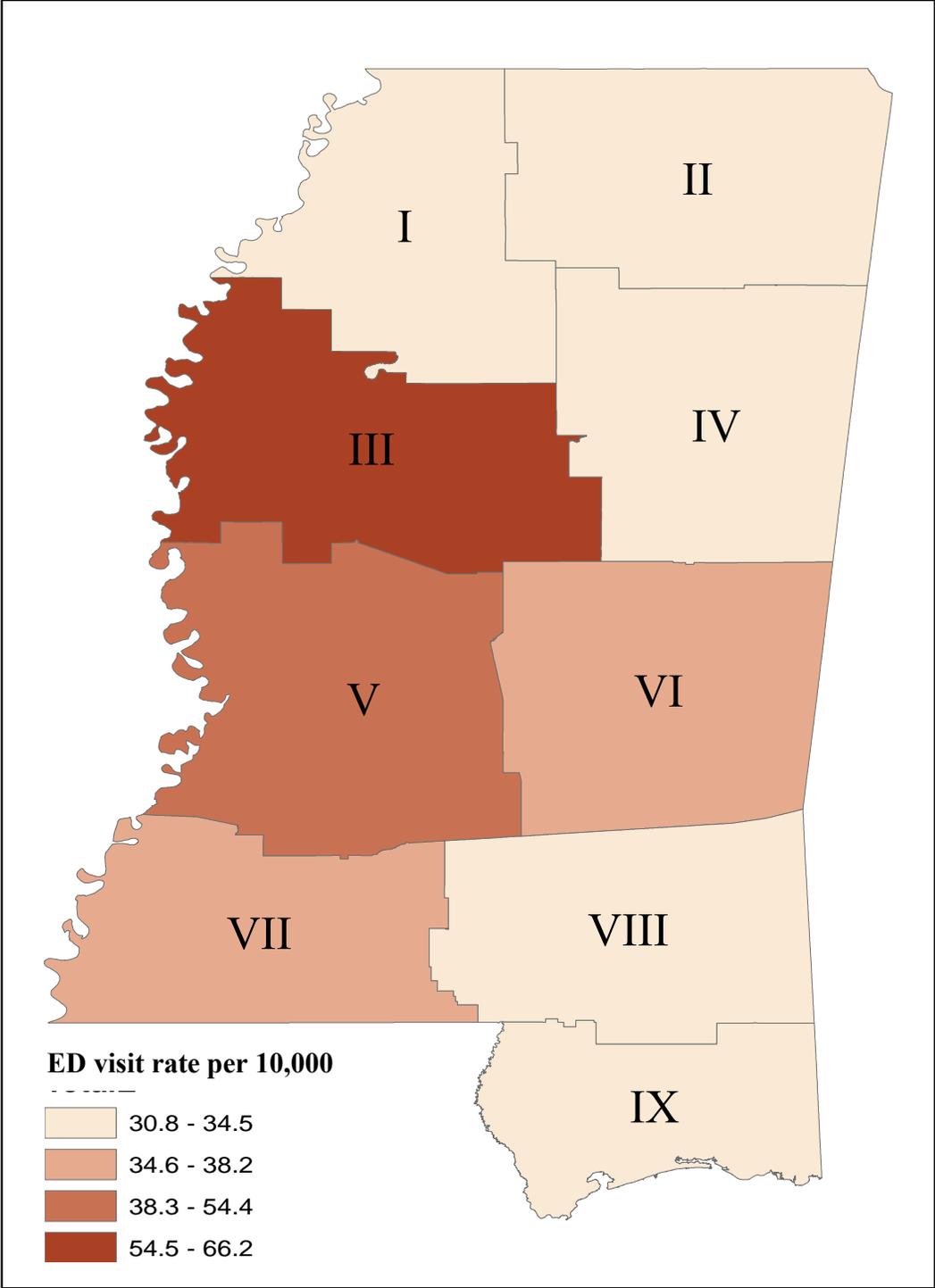
**Figure 4.14. Estimated number of emergency department visits with asthma as the first listed diagnosis by month, Mississippi, 2011**



*Source: Mississippi Asthma Surveillance System*

Key Observations: Asthma emergency department visits peaked in the month of October.

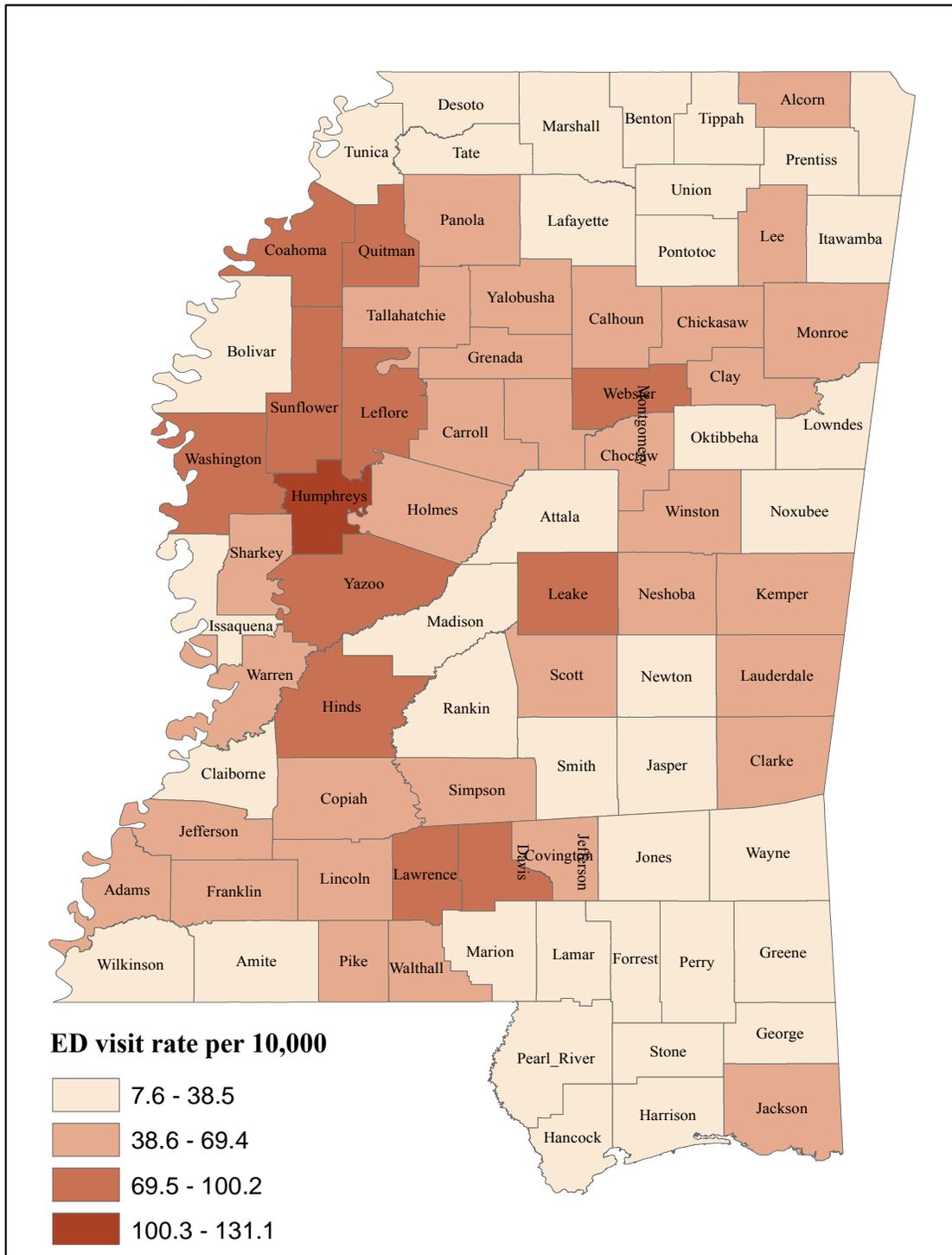
**Map 4.15. Estimated asthma emergency department visit rate per 10,000 population by public health district of residence, Mississippi, 2007-2011\***



*Data Source: Mississippi Asthma Hospital Discharge Database*

*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

**Map 4.16. Estimated asthma emergency department visit per 10,000 population by county of residence, Mississippi, 2007-2011\***



*Data Source: Mississippi Asthma Hospital Discharge Database*

*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

Tishomingo

## At-Risk Based Asthma Discharge Rates

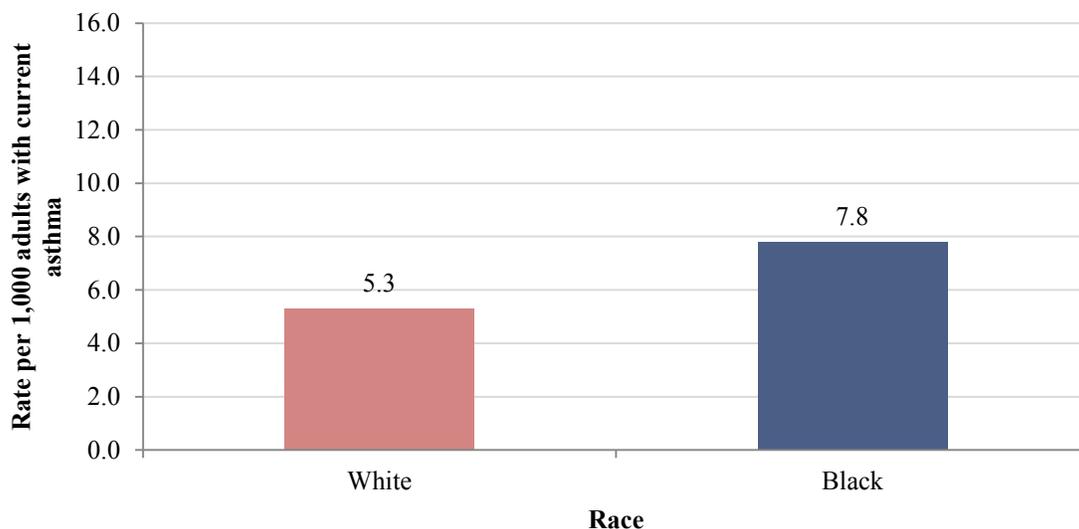
Unlike population-based asthma hospital and emergency department visit rates, which are calculated using state population estimates, at-risk based asthma hospital and emergency department visit rates are calculated using the estimated number of persons with asthma in Mississippi. At-risk based rates therefore take into account differences in asthma prevalence among demographic groups that may drive differences in health care access and utilization.

## At-Risk Based Asthma Hospital Discharge Rates

At-risk based asthma hospital discharge rates show trends similar to population-based rates. Among adults, at-risk based hospital discharge rates are higher among females and blacks. Children aged 0-4 years had the highest at-risk based rates in 2011. The statistical significance of the data is determined by using the confidence limits. This method is more conservative than formal statistical testing.

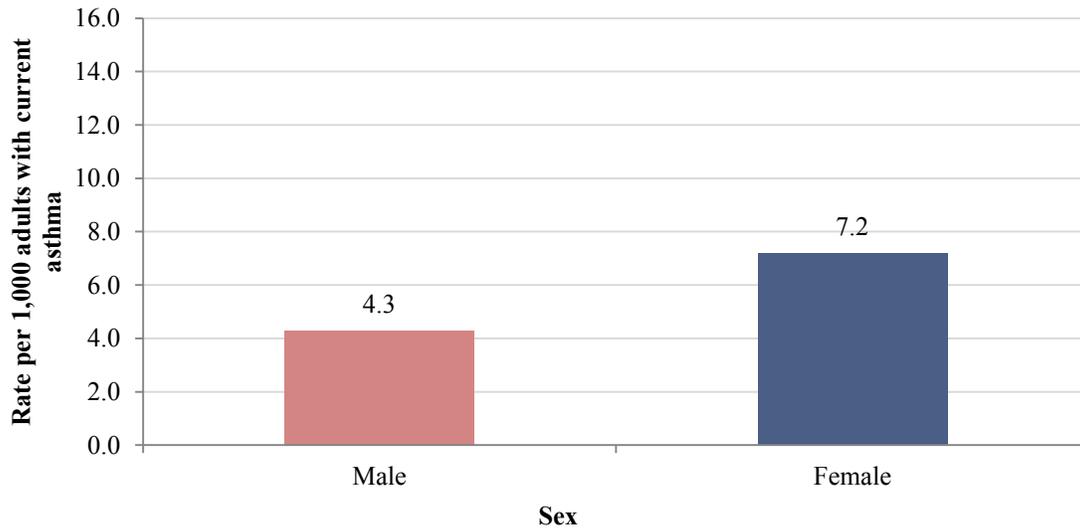
## Adult At-Risk Based Asthma Hospital Discharge Rates

**Figure 4.17. Estimated asthma hospital discharge rate per 1,000 adults with current asthma aged 18 years and above by race, Mississippi, 2011**



**Key Observations:** A significant difference in the adult at-risk based asthma hospital discharge rates were observed among the white and black populations.

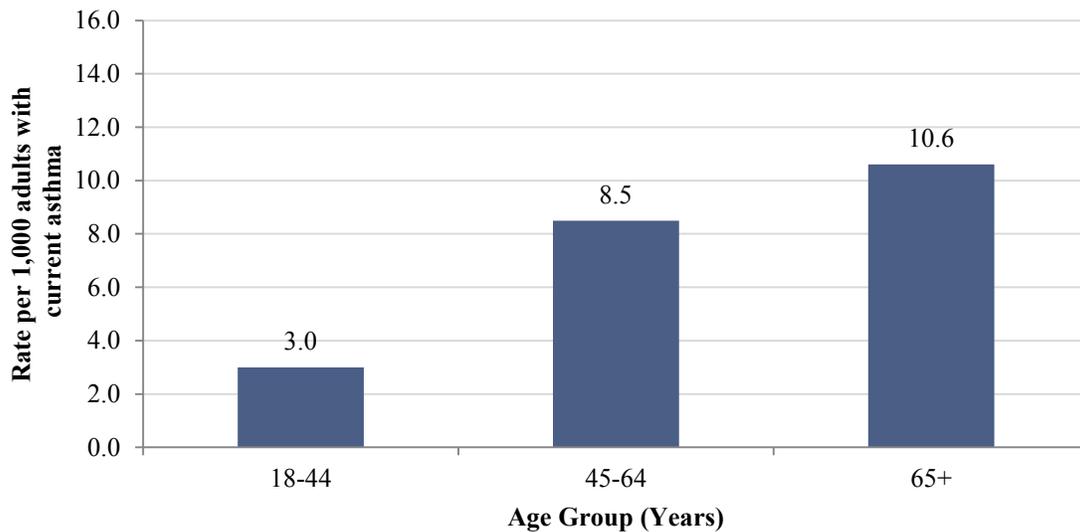
**Figure 4.18. Estimated asthma hospital discharge rate 1,000 adults with current asthma aged 18 years and above by sex, Mississippi, 2011**



*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: A significant difference in the adult at-risk based asthma hospital discharge rates were observed among male population and female population.

**Figure 4.19. Estimated asthma hospital discharge rate per 1,000 adults with current asthma aged 18 years and above by age group, Mississippi, 2011**

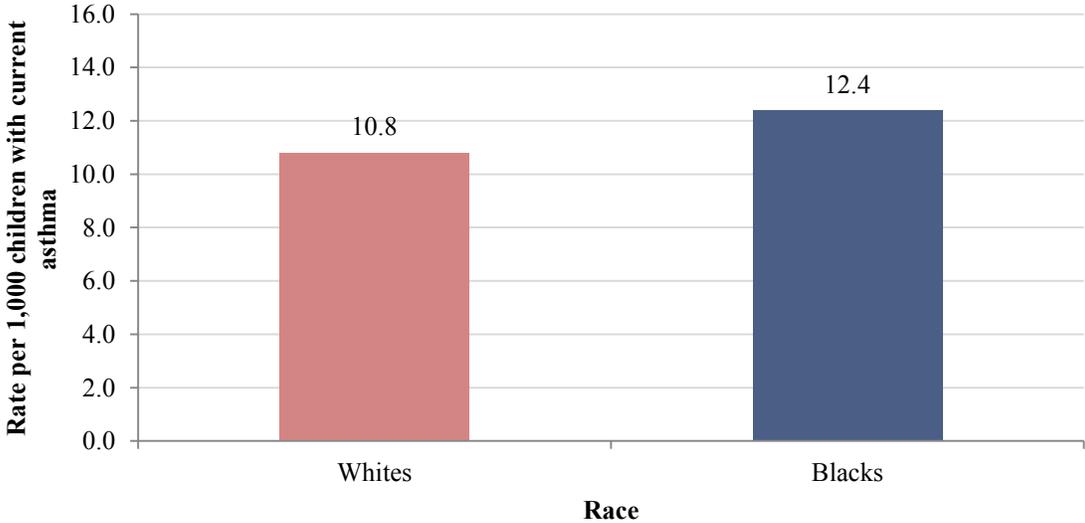


*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: A significant difference in the adult at-risk based asthma hospital discharge rates were observed when compared between age groups (18-44 ,45-64) and (18-44 , 65+) but no significant difference was among age groups (46-64 , 65+).

# Childhood At-Risk Based Asthma Hospital Discharge Rates

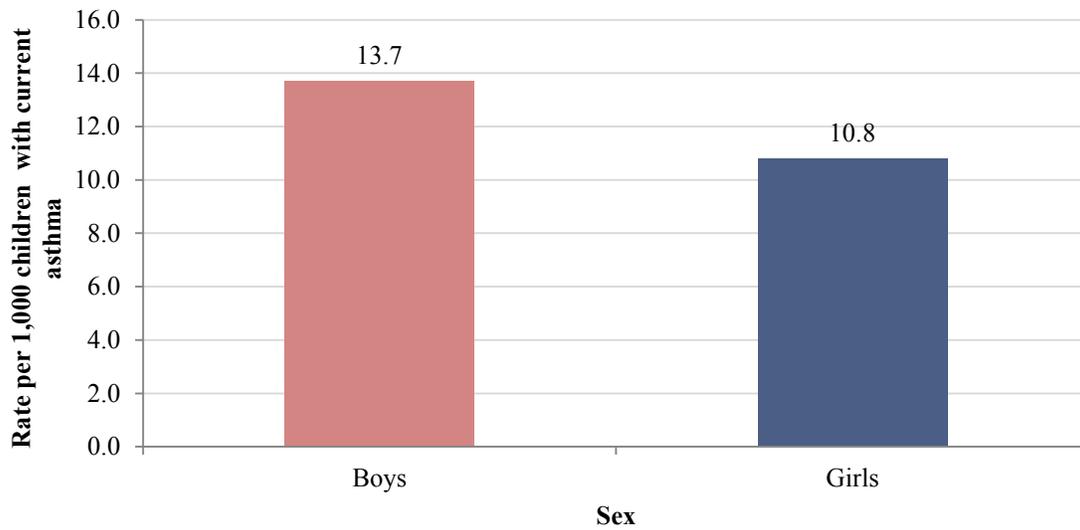
Figure 4.20. Estimated asthma hospital discharge visit rate per 1,000 children with current asthma aged 0-17 years by race, Mississippi, 2011



Source: Mississippi Asthma Hospital Discharge Database

Key Observations: No significant difference in the childhood at-risk based asthma hospital discharge rates were observed among the white and black populations.

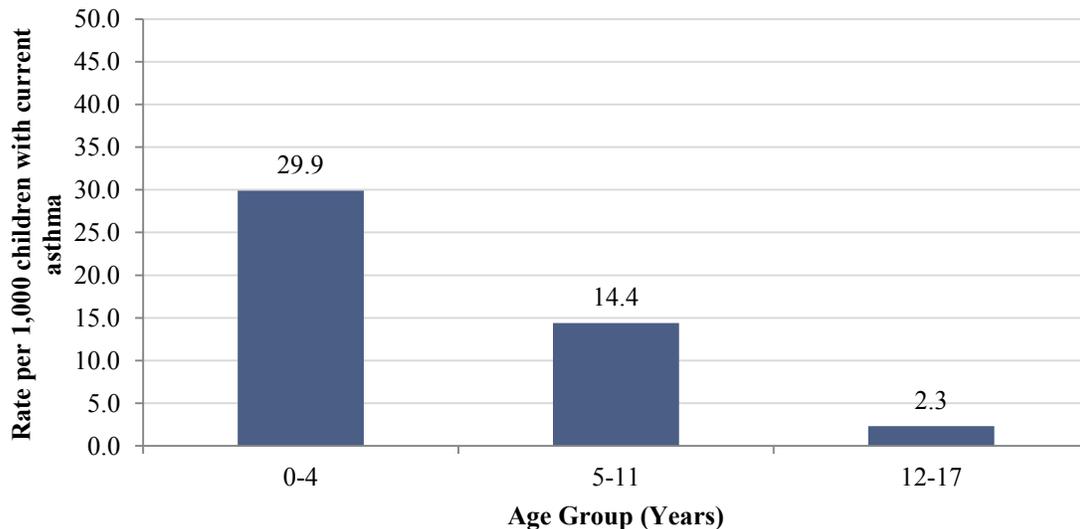
**Figure 4.21. Estimated asthma hospital discharge rate per 1,000 children with current asthma aged 0-17 years by sex, Mississippi, 2011**



*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: No significant difference in the childhood at-risk based asthma hospital discharge rates was observed among boys and girls aged 0-17 years.

**Figure 4.22. Estimated asthma hospital discharge rate per 1,000 children with current asthma aged 0-17 years by age group, Mississippi, 2011**



*Source: Mississippi Asthma Hospital Discharge Database*

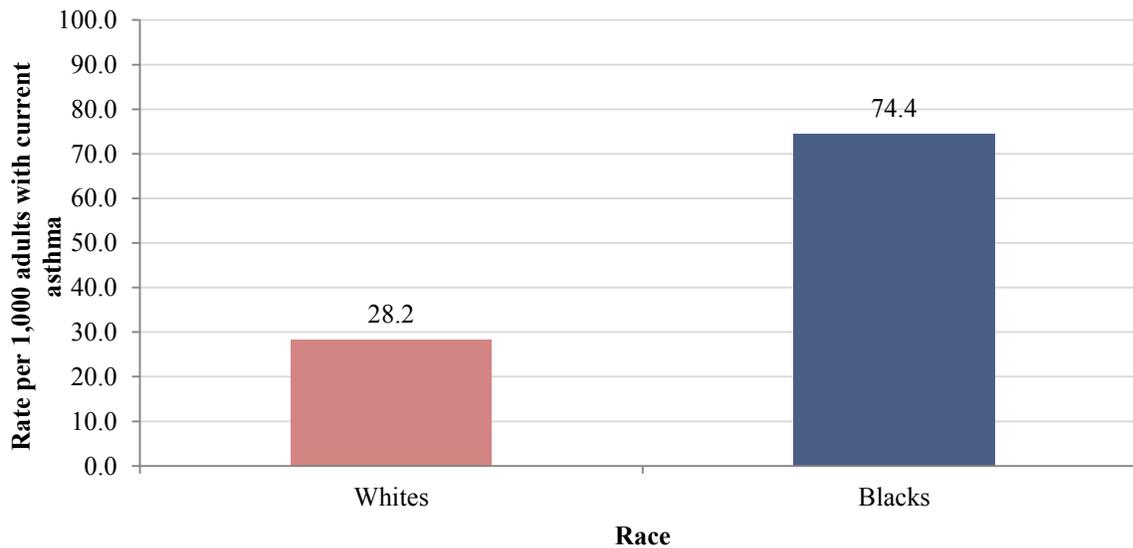
Key Observations: A significant difference in the childhood at-risk based asthma hospital discharge rates were observed when compared between age groups (0-4, 12-17) and (5-11, 12-17) but no significant difference was observed among age groups (0-4, 5-11).

## At-Risk-Based Asthma Emergency Department Visit Rates

At-risk based asthma emergency department visit rates were higher among black adults and children aged 0-4 years. The statistical significance of the data is determined by using the confidence limits. This method is more conservative than formal statistical testing.

## Adult At-Risk Based Asthma Emergency Department Visit Rates

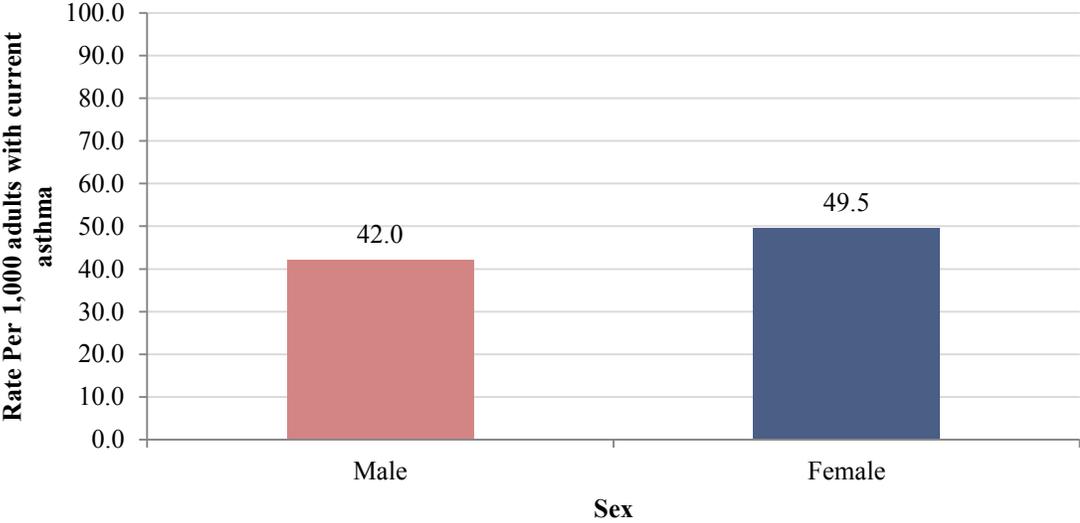
Figure 4.23. Estimated asthma emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by race, Mississippi, 2011



Source: Mississippi Asthma Hospital Discharge Database

Key Observations: A significant difference in the adult at-risk based asthma emergency department visit rates were observed among white population and black population.

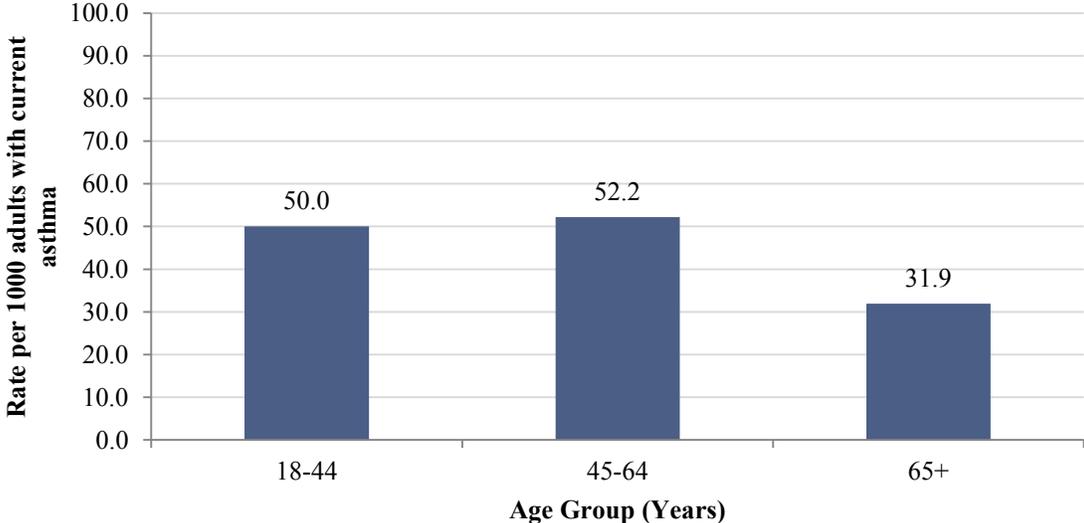
**Figure 4.24. Estimated emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by sex, Mississippi, 2011**



*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: No significant difference in the adult at-risk based asthma emergency department visit rates were observed among male population and female population.

**Figure 4.25. Estimated asthma emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by age group, Mississippi, 2011**

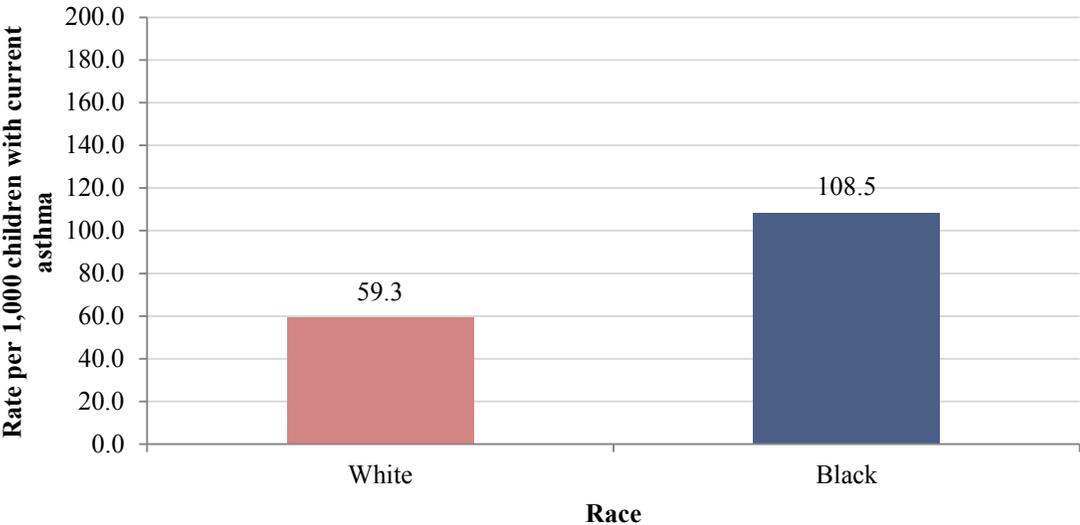


*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: A significant difference in the adult at-risk based asthma emergency department visit rates were observed when compared between age groups (18-44, 65+) and (45-64, 65+) but no significant difference was observed among age groups (18-44, 45-64).

# Childhood At-Risk Based Asthma Emergency Department Visit Rates

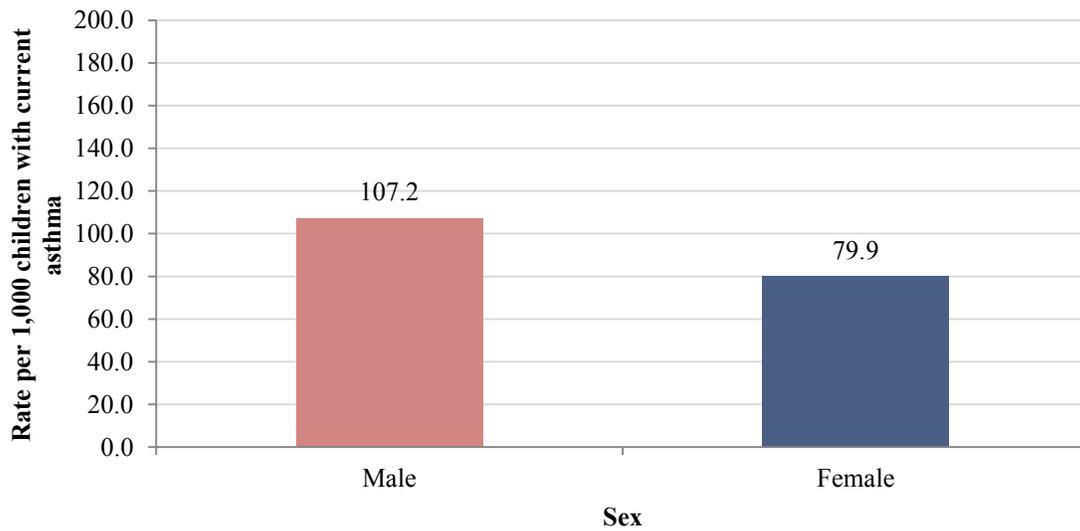
Figure 4.26. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by race, Mississippi, 2011



Source: Mississippi Asthma Hospital Discharge Database

Key Observations: No significant difference in the childhood at-risk based asthma emergency department visit rates were observed among white population and black population.

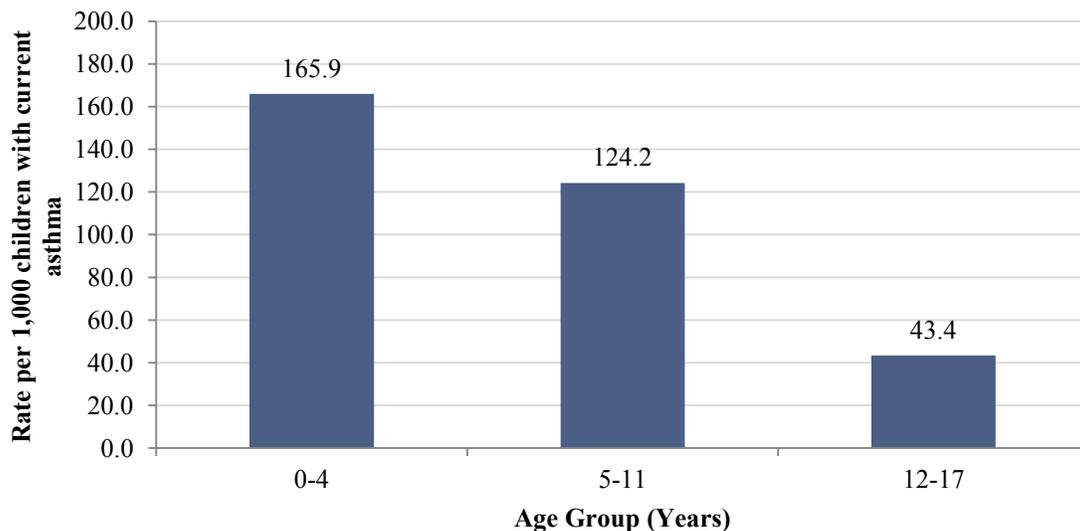
**Figure 4.27. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by sex, Mississippi, 2011**



*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: No significant difference in the childhood at-risk based asthma emergency department visit rates were observed among male population and female population.

**Figure 4.28. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by age group, Mississippi, 2011**



*Source: Mississippi Asthma Hospital Discharge Database*

Key Observations: A significant difference in the childhood at-risk based asthma emergency department visit rates were observed when compared between age groups (0-4, 12-17) and (5-11, 12-17) but no significant difference was observed among age groups (0-4, 5-11).

# Conclusion

The data included in this report indicate that there are five populations experiencing a high burden of asthma in Mississippi. A summary of the data pertaining to each group is outlined below. To decrease the burden of asthma among the groups with the highest prevalence, the diverse group of partners represented by the Asthma Coalition of Mississippi should target evidence-based interventions to groups disproportionately affected by asthma.

## **Populations experiencing a high burden of asthma in Mississippi:**

**Children** – In 2011, approximately 66,253 Mississippi children aged 0-17 years had current asthma. The current asthma prevalence among children aged 0-17 years was 8.5%. The current asthma prevalence among boys and girls aged 0-17 years was 9.4% and 8.1% respectively and was significantly higher among black children (12.3%) than white children (6.3%) aged 0-17 years. Children aged 0-4 years experienced the highest hospital and emergency department discharge rates due to asthma when compared to any other age groups.

**Recommendations:** Evidence-based interventions should target parents and caregivers of children aged 0-4 years, the group with the highest asthma hospital discharge and emergency department rates.

**Blacks**– In 2011, the asthma mortality rate was higher among blacks (2.8 per 100,000) compared to whites (1.2 per 100,000). In 2011, current asthma prevalence was significantly higher among black children aged 0-17 (12.3%) compared to white children of the same age (6.3%). In 2011, the asthma hospital discharge rates (9.1 per 10,000) and emergency department discharge rates (81.8 per 10,000) among black Mississippians of all age groups were significantly higher than white Mississippians of all age groups (4.1 per 10,000) and (23.7 per 10,000) respectively.

**Recommendations:** Evidence-based interventions should target black Mississippians discharged from the emergency department with a primary diagnosis of asthma. Additional surveillance is necessary to determine the reason for the higher rates among the black population when compared to white population, which may be affected by factors such as lack of access to primary care, underinsured, environmental factors, and/or asthma management skills.

**Adult Women** – In 2011, the current asthma prevalence was significantly higher among adult women aged 18 years and above (9.6%) compared to adult men of the same age (5.5%). In 2011, the asthma hospital discharge rates (7.1 per 10,000) and emergency department discharge rates (52.4 per 10,000) among women of all age groups was significantly higher than men of all age groups (5.0 per 10,000) and (42.8 per 10,000) respectively (see figures 4.5 and 4.11).

**Recommendations:** Evidence-based interventions should target adult women discharged from hospitals and emergency departments with a primary diagnosis of asthma.

**Mississippians of Low Socioeconomic Status** – Adults aged 18 years and above of low socioeconomic status had significantly higher current asthma prevalence (13.8%) than adults of high socioeconomic status (4.6%). Low socioeconomic status predicts higher current asthma prevalence among both black and white adults. Additional data sources are needed to explore the effects of socioeconomic status on childhood asthma.

**Recommendations:** Evidence-based interventions should target adults with less than a high school diploma and/or a household income less than \$25,000.

**Residents of Montgomery, Lawrence, Humphreys, Sunflower, Tishomingo, Coahoma, Quitman, and Leflore Counties** – For the year 2011 residents of these eight counties experienced the highest asthma hospital discharge and emergency department discharge rates in the state. The five counties with the highest asthma hospital discharge rates are (1=highest) (1) Montgomery; (2) Lawrence; (3) Humphreys; (4) Sunflower and (5) Tishomingo. The five counties with the highest asthma emergency department discharge rates are (1=highest) (1) Humphreys; (2) Sunflower; (3); Coahoma; (4) Quitman and (5) Leflore.

**Recommendations:** Interventions addressing access to and utilization of primary healthcare services for asthma, designed to prevent hospital and emergency department discharges, should be developed in partnership with healthcare providers located in and targeted to residents of Montgomery, Lawrence, Humphreys, Sunflower, Tishomingo, Coahoma, Quitman, and Leflore Counties.

#### **Future Asthma Surveillance in Mississippi:**

The MSDH has identified priorities for expanding asthma surveillance activities in the state:

**Expanded health services data:** The MSDH began expanding its asthma health services data with asthma hospital and emergency department discharge data in 2003. The Department plans to pursue additional partnerships with Mississippi Division of Medicaid. The Medicaid data provides a better understanding of the burden of asthma in Medicaid population. The data can provide information about the prevalence of current and persistent asthma, hospitalizations, emergency department visits, outpatient visits and the financial cost of asthma on a statewide level, as well as a detailed analysis of prevalence and hospitalizations among children and adults by age group, sex and geographical location. In addition, it will assist public health programs, policymakers, health providers and asthma stakeholders around the state to understand the burden of asthma in the Medicaid population to identify the scope of the problem and to focus on efforts to reduce the burden of asthma, particularly in the Medicaid population.

# Appendix A

## Data Sources

### Mississippi Vital Statistics

The definition of death was adopted by the Mississippi Legislature in 1982, statute number 41-36-3.

**Death:** An individual who has sustained either (a) irreversible cessation of circulatory and respiratory functions or (b) irreversible cessation of all functions of the entire brain, including the brain stem, is dead. A determination of death must be made in accordance with accepted medical standards.

**Strengths:** Death counts from vital records are very accurate since virtually all deaths in Mississippi and the United States are reported. These records have been collected by states using standards outlined by NCHS, allowing for state-to-state comparisons.

**Limitations:** Cause of death is reported on death certificates by medical professionals using codes and rules outlined in the International Classification of Diseases (ICD) developed by the World Health Organization. These codes are periodically revised and these revisions sometimes result in changes to the way in which primary cause of death is determined and recorded. Therefore, trend analysis for certain causes of death are not possible across ICD versions. The new ICD-10 system, implemented in 1999, included new rules for recording respiratory deaths. The conversion from ICD-9 to ICD-10 accounts for an 11% decrease in asthma deaths between 1998 and 1999.

### Asthma Hospital Discharge Database

From 2008, the Asthma Hospital Discharge Database has become a mandatory reporting system for hospital and emergency department visit data. Due to the mandatory nature of the system, from 2007 to 2011 the number of hospital reported had increased tremendously and finally reached 100 % in 2011. State and county population estimates were obtained from the United States Census Bureau. Due to some of the non-reporting hospitals from 2008-2010, state population estimates were adjusted using the proportion of hospital beds accounted for by the hospitals reporting asthma data to the MSDH. Adjustments varied by year due to changes in reporting and hospital bed counts. The proportion of beds accounted for by hospitals reporting asthma data to the MSDH, by year, are as follows: 2007, 82.0%; 2008, 83.4%; 2009, 95.3%; 2010, 98.5%; 2011, 100.0% and 2007-2011 aggregate, 92.2%. Yearly and aggregate population estimates used to calculate asthma hospital and emergency department visit rates were adjusted by the preceding percentages in order to estimate statewide asthma hospitalization rates.

An asthma hospital or emergency department visit was defined as having a principal discharge diagnosis with an International Classification of Diseases, 9<sup>th</sup> Revision, Clinical Modification (ICD-9-CM) code of 493. Asthma discharge rates for a specific year were calculated by dividing the number of asthma emergency department visits by the estimated population of that year and then multiplying by 10,000. Age-specific rates were calculated as crude rates and all other rates were age-adjusted to the 2000 United States Standard Population. Standard errors for the age-adjusted population-based rates were calculated as weighted linear combinations, assuming the population denominator was a constant.<sup>7, 8</sup> Standard errors for the at-risk based rates, which used estimates of the number of persons with asthma in the denominator, were calculated using the formula for ratios and assumed independent observations.<sup>9</sup> Relative standard errors were calculated by dividing the standard errors by the estimates and multiplying by 100. Standard errors were used in significance tests, and relative standard errors were used to indicate unreliable estimates. Estimates were considered unreliable if the relative standard error of the estimate was 30%-50%. Estimates with a relative standard error exceeding 50% were not included in this report. All stated comparisons (e.g. higher, lower, significant, and not significant) are interpreted using confidence intervals, which is a conservative test for statistical significance.

Five-year trends (2007-2011) are presented by state total, race, and sex. Aggregate 2007-2011 (calculated as the total number of asthma discharges over the five year period divided by the summed five-year population) asthma discharge rates are presented by state total, race, sex, age group, and county of residence. Race-specific rates for 2007-2011 were calculated for the categories 'white' and 'black'. Estimates for other races were unreliable and are not reported due to small population and numbers of asthma hospital discharges among these groups.

Strengths: For the year 2011, the hospital discharge database contains information from hospitals representing 100% of acute hospital beds in the state. The information is collected and reported in a standard format.

### **Behavioral Risk Factor Surveillance System (BRFSS)**

#### **Methodologic Changes in the Behavioral Risk Factor Surveillance System in 2011 and Potential Effects on Prevalence Estimates**

Refinements to the Behavioral Risk Factor Surveillance System (BRFSS) to include data received from cell phone users facilitates the inclusion of a broader demographic and ultimately provides a better reflection of the nation's health status.

The BRFSS telephone survey has been traditionally done with people using landlines. However, in recent years, an increasing number of people are only using cell/mobile phones. CDC recognized the need to include cell phone users in our survey in order to obtain data that better represents the diverse populations in our society. Because we have expanded and improved the way we gather and process information, new data cannot be accurately compared to previous

findings line by line (point by point). However, as we move forward, the survey results will better reflect the health status of the people of the United States.

In the past few years, all large population health surveys that depend on telephone interviews, including the Behavioral Risk Factor Surveillance System (BRFSS), have had to respond to the rapid rise in the proportion of U.S. households that contain only cellular telephones and no landline telephones. In order to maintain survey coverage and validity, surveys have had to add cellular telephones to their samples. At the same time, new methods of weighting to adjust survey data for differences between the demographic characteristics of respondents and the target population have been adopted. Since 2004, the BRFSS has been planning and testing the addition of cellular telephones and improvements in its method of statistical weighting. These new methods were implemented during the fielding of the 2011 BRFSS, which is released in 2012. This policy note describes the methodological changes and their potential effects on BRFSS prevalence estimates. Policy makers who use BRFSS estimates for decision making should be aware of the new methods and their potential effects on estimates. Careful planning in communicating the impact of changes in methods on estimates to non-scientific audiences is needed to prevent misinterpretation.<sup>10</sup>

### **New Weighting Methodology: Raking**

Since the 1980s, CDC has used a statistical method called post stratification to weight BRFSS survey data to simultaneously adjust survey respondent data to known proportions of age, race and ethnicity, sex, geographic region, or other known characteristics of a population. This type of weighting is important because it makes the sample more representative of the population and adjusts for no response bias. In 2006, in accordance with the recommendations of the 2004 expert panel, CDC began testing a more sophisticated weighting method called iterative proportional fitting, or raking.

Raking has several advantages over post stratification. First, it allows the introduction of more demographic variables suggested by the BRFSS expert panel such as education level, marital status, and home ownership into the statistical weighting process than would not have been possible with post stratification. This advantage reduces the potential for bias and increases the representativeness of estimates.

Second, raking allows for the incorporation of a now crucial variable telephone source (landline or cell phone) into the BRFSS weighting methodology.

Beginning with the 2011 dataset, raking will succeed post stratification as the sole BRFSS statistical weighting method.<sup>11</sup>

## **BRFSS Asthma Call-back Survey**

The Asthma Call-back Survey is an in-depth asthma survey, conducted with the Behavioral Risk Factor Surveillance System Survey (BRFSS) respondents who report an asthma diagnosis. The 2011 Adult Asthma Call-back Survey is weighted by using the landline weighting variables only.

**Strengths:** Data on multiple topics are collected, allowing for analysis of associations between asthma and other risk behaviors, health conditions, and demographic characteristics.

**Limitations:** BRFSS and ACBS data must be interpreted with caution because they are self-reported. Individuals may have difficulty recalling past behavior or may understate behaviors known to be unhealthy, socially acceptable, or illegal.

The 2011 BRFSS child asthma prevalence module is weighted by using the landline weighting variable only, whereas the BRFSS adult prevalence module is weighted by using both landline and cell phone weighting variables.

# Appendix B

## Methodology

### Rates

A rate is a measure of some event, disease or condition in relation to a unit of population, along with some specification of time. Rates are calculated by dividing the number of events in a given period by the number of people at risk of experiencing the event in that time period. Counts of events or conditions are obtained or estimated from multiple sources such as surveys and vital records. Population counts are obtained from the U. S. Census Bureau. Rates can be affected by changes and/or differences in the number of events and/or the size of the population.

Age adjustment is a common method for standardizing rates to eliminate the effects of population changes or differences. Age-adjusted rates are computed by applying age-specific rates in a population of interest to a standardized age distribution.

### At-risk Based Rates

At-risk based rates were calculated by dividing the number of asthma hospitalizations/emergency department visits among a given population by the estimated number of persons with current asthma in the population. At-risk based rates allow for comparison of asthma hospitalizations and emergency department visits among groups with varied asthma prevalence. Standard errors for at-risk based rates, which use estimates of the number of persons with asthma in the denominator rather than a population constant, were calculated using the formula for ratios and assumed independent observations (covariance = 0).<sup>9</sup> Relative standard errors were calculated by dividing the standard errors by the estimates and multiplying by 100. Standard errors were used in significance tests, and relative standard errors were used to indicate unreliable estimates. Estimates with a relative standard error of 30%-50% were considered unreliable and estimates with a relative standard error of greater than 50% were suppressed.<sup>8</sup>

### Estimates and Confidence Intervals

Rates calculated from surveys are considered estimates since they are based on responses from a sample of the population of interest, rather than the entire population. Confidence intervals account from sampling and non-sampling errors in data collection and are an indication of reliability and precision of an estimate. They represent the range of values among which the true value would be found. This report represents 95% confidence intervals (95% CIs), meaning that the true value would be within the given interval 95% of the time.

## Confidence Intervals for BRFSS Estimates

- Confidence intervals for BRFSS were derived from the survey procedures in SAS, a statistical software package.

## Significance

Significant is a term used to describe rates that have been tested and found to be statistically different. In this report, two rates are said to be significantly different when the 95% confidence limits associated with each of the rates do not overlap.

## Reliability of Rates

Reliability refers to the precision of a rate. If a rate is termed reliable, there is a confidence that the same or a very similar rate would be obtained if the data were collected again within the same time period and under similar conditions. Rates that are determined to be unreliable may not reflect the true prevalence; therefore, they should be reported and interpreted with caution.

The CDC recommends the following criteria for assessing the reliability of rates.

1. The number of responses or events that the rate is based on. Rates calculated from BRFSS should be based on at least 50 survey responses. Mortality rates should be based on at least 20 deaths.
2. The width or range of the 95% CI. Rates in which the width of the corresponding 95% CI is greater than 20 should be interpreted with caution.
3. The magnitude of the relative standard error (RSE). The RSE of the rate should be less than 30.0%. The RSE is obtained by dividing the standard error of the estimate by the estimate itself.

Several analysis techniques can be used to increase the reliability of rates. When doing subgroup analysis, categories can be collapsed. For example age can be collapsed into 3 categories instead of 6. This option is ideal when it is important to report individual year estimates. Another method is to calculate a multi-year estimate by combining two or more years of data. This technique is useful for 1) producing a stable estimate when the yearly estimates are highly variable and 2) obtaining a large enough number of responses to produce an estimate for a small population or uncommon event. Both of these methods have been used throughout this report.

# Appendix C

## ASTHMA MORTALITY DETAILED TABLES

**Table 1.1. Rate of asthma deaths per 100,000 population by year, Mississippi, 2001-2011**

Year	Number of deaths	Rate
2001	50	1.7
2002	52	1.8
2003	34	1.2
2004	46	1.6
2005	49	1.7
2006	46	1.6
2007	35	1.2
2008	44	1.5
2009	44	1.5
2010	49	1.7
2011	52	1.7
Total	501	1.6

*Source: Mississippi Vital Statistics*

**Table 1.2. Rate of asthma deaths per 100,000 population by year and race, Mississippi, 2001-2011**

Year	White		Black		Other		Total	
	Number of deaths	Rate*	Number of deaths r	Rate*	Number of deaths	Rate	Number of deaths	Rate*
2001	20	1.1	30	2.9	0	0.0	50	1.7
2002	25	1.4	25	2.4	2	3.9	52	1.8
2003	12	0.7	22	2.1	0	0.0	34	1.2
2004	13	0.7	33	3.1	0	0.0	46	1.6
2005	18	1.0	31	2.9	0	0.0	49	1.7
2006	16	0.9	30	2.8	0	0.0	46	1.6
2007	12	0.7	23	2.1	0	0.0	35	1.2
2008	14	0.8	30	2.7	0	0.0	44	1.5
2009	19	1.1	25	2.3	0	0.0	44	1.5
2010	17	1.0	30	2.7	2	1.8	49	1.7
2011	21	1.2	31	2.8	0	0.0	52	1.7
Total	187	1.0	310	2.6	4	0.6	501	1.6

Source: Mississippi Vital Statistics

\*Age-adjusted rates expressed as per 100,000 population

\*Rates in the shaded cells shaded are based on less than 20 events and are unstable.

**Table 1.3. Rate of asthma deaths per 100,000 population by year and sex, Mississippi, 2001-2011**

Year	Male		Female		Total	
	Number of deaths	Rate*	Number of deaths	Rate*	Number of deaths	Rate*
2001	22	1.6	28	1.9	50	1.7
2002	19	1.4	33	2.2	52	1.8
2003	9	0.6	25	1.7	34	1.2
2004	20	1.4	26	1.7	46	1.6
2005	21	1.5	28	1.9	49	1.7
2006	14	1.0	32	2.1	46	1.6
2007	16	1.1	19	1.3	35	1.2
2008	21	1.5	23	1.5	44	1.5
2009	14	1.0	30	2.0	44	1.5
2010	22	1.5	27	1.8	49	1.7
2011	20	1.4	32	2.1	52	1.7
Total	198	1.3	303	1.8	501	1.6

Source: Mississippi Vital Statistics

\*Age-adjusted rates expressed as per 100,000 population

\*Rates in the shaded cells shaded are based on less than 20 events and are unstable.

**Table 1.4. Rate of asthma deaths per 100,000 population by age group, Mississippi, 2001-2011**

Age Group (Years)	Rate*
0-4	0.4
5-14	0.5
15-24	0.5
25-34	0.8
35-44	1.3
45-54	2.0
55-64	2.1
65-74	3.1
75-84	5.6
85 +	10.3

*Source: Mississippi Vital Statistics*

*\*Rates in the shaded cells shaded are based on less than 20 events and are unstable.*

**ADULT ASTHMA PREVALENCE  
DETAILED TABLES**

**Table 2.1. Adult lifetime asthma prevalence, Mississippi vs. United States, 2011**

Year	US	95% CI		MS	95% CI	
	%	Lower	Upper	%	Lower	Upper
2011	13.4	13.2	13.6	12.3	11.3	13.3

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.2. Adult current asthma prevalence, Mississippi vs. United States, 2011**

Year	US	95% CI		MS	95% CI	
	%	Lower	Upper	%	Lower	Upper
2011	8.7	8.5	8.9	7.6	6.8	8.4

*Source: Behavioral Risk Factor Surveillance System*

**Note: Weighted frequency indicates estimated number of people with current or lifetime asthma in a given socio-demographic group.**

**Table 2.3. Adult current asthma prevalence by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI	
			Lower	Upper
White	96,280	7.0	6.0	7.9
Black	66,521	8.6	7.0	10.2

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.4. Adult current asthma prevalence by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI	
			Lower	Upper
Male	57,821	5.5	4.3	6.6
Female	111,188	9.6	8.4	10.7

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.5. Adult current asthma prevalence by age group, Mississippi, 2011**

Age Group (Years)	Weighted Frequency	%	95% CI	
			Lower	Upper
18-44	7,285	6.3	2.7	9.9
45-64	3,458	5.4	2.3	8.6
65+	2,222	8.4	3.2	13.5

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.6. Adult current asthma prevalence by educational level, Mississippi, 2011**

Educational Level	Weighted Frequency	%	95% CI	
			Lower	Upper
No H. S. Diploma	54,081	11.9	9.7	14.2
H. S. Graduate	45,082	6.6	5.3	7.9
Some College	49,242	7.1	5.5	8.8
College Graduate	20,603	5.3	3.9	6.7

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.7. Adult current asthma prevalence by educational level and race, Mississippi, 2011**

Educational Level	Whites		95% CI		Black		95% CI	
	Weighted Frequency	%	Lower	Upper	Weighted Frequency	%	Lower	Upper
No H. S. Diploma	24,906	11.2	8.1	14.3	27,426	12.7	9.5	16.0
H. S. Graduate	26,189	6.3	4.8	7.8	18,657	7.4	4.8	10.0
Some College	31,942	7.0	5.1	9.0	13,537	6.4	3.3	9.5
College Graduate	13,242	4.6	3.3	6.0	6,901	7.5	3.5	11.5

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.8. Adult current asthma prevalence by educational level and sex, Mississippi, 2011**

Educational Level	Males		95% CI		Females		95% CI	
	Weighted Frequency	%	Lower	Upper	Weighted Frequency	%	Lower	Upper
No H. S. Diploma	21,354	8.9	6.0	11.8	32,727	15.3	12.0	18.7
H. S. Graduate	12,770	3.7	2.0	5.5	32,313	9.5	7.5	11.5
Some College	15,571	5.2	2.8	7.6	33,671	8.7	6.4	10.9
College Graduate	8,126	4.7	2.2	7.2	12,477	5.8	4.3	7.3

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.9. Adult current asthma prevalence by annual household income, Mississippi, 2011**

Income (US Dollars)	Weighted Frequency	%	95% CI	
			Lower	Upper
<\$25,000	88,029	10.7	9.2	12.3
\$25,000-\$49,999	28,489	5.6	4.2	7.0
\$50,000+	23,392	4.2	3.0	5.5

Source: Behavioral Risk Factor Surveillance System

**Table 2.10. Adult current asthma prevalence by annual household income and race, Mississippi, 2011**

Income (US Dollars)	Whites		95% CI		Blacks		95% CI	
	Weighted Frequency	%	Lower	Upper	Weighted Frequency	%	Lower	Upper
<\$25,000	44,109	11.7	9.4	14.1	41,044	9.9	7.6	12.1
\$25,000-\$49,999	19,920	5.8	4.1	7.5	6,886	4.5*	2.3	6.8
\$50,000+	19,061	4.2	2.8	5.5	2,823	3.4*	0.6	6.2

Source: Behavioral Risk Factor Surveillance System

\*Unweighted sample size is less than 50; results may be unstable

**Table 2.11. Adult current asthma prevalence by socioeconomic status (SES), 2011**

Socioeconomic Status	Weighted Frequency	%	95% CI	
			Lower	Upper
Low	36,957	13.8	10.8	16.8
High	45,090	4.6	3.7	5.6

Source: Behavioral Risk Factor Surveillance System

Low SES= "Fewer than 12 years of education and a household income < \$25,000"

High SES= "12 or more years of education and a household income ≥ \$25,000"

**Table 2.12. Adult current asthma prevalence by socioeconomic status (SES) and race, Mississippi, 2011**

Socioeconomic Status	Whites		95% CI		Blacks		95% CI	
	Weighted Frequency	%	Lower	Upper	Weighted Frequency	%	Lower	Upper
Low	18,356	16.3	11.2	21.3	18,381	12.6	8.8	16.4
High	34,731	4.7	3.6	5.8	8,558	4.0*	2.1	5.8

Source: Behavioral Risk Factor Surveillance System

\*Unweighted sample size is less than 50; results may be unstable.

Low SES= "Fewer than 12 years of education and a household income < \$25,000"

High SES= "12 or more years of education and a household income ≥ \$25,000"

**Table 2.13. Adult current asthma prevalence by public health district, Mississippi, 2011**

District	%	95% CI	
		Lower	Upper
I (Northwest)	8.3	6.4	10.2
II (Northeast)	8.5	6.8	10.2
III (Delta)	8.7	6.7	10.6
IV (Tombigbee)	7.1	5.5	8.8
V (West Central)	6.3	4.9	7.8
VI (East Central)	7.5	5.8	9.2
VII (Southwest)	9.1	7.3	10.8
VIII (Southeast)	7.2	5.7	8.8
IX (Coast)	7.2	5.6	8.8

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.14. Percent of mothers who delivered and were ever been told by a doctor, nurse, or other health care worker that they have asthma by race, Mississippi, 2010**

Lifetime asthma	Weighted Frequency	%	95% CI	
			Lower	Upper
White	2,868	55.0	45.6	64.5
Black	2,238	42.9	33.5	52.3

*Source: Pregnancy Risk Assessment Monitoring System*

**Table 2.15. Percent of adults with current asthma by weight status, Mississippi, 2011**

BMI	Weighted Frequency	%	95% CI
Healthy weight	47,342	29.7	24.4-35.1
Overweight/Obese	103,388	65.0	59.2-70.8

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.16. Percent of adults with current asthma by smoking status, Mississippi, 2011**

Smoking status	Weighted Frequency	%	95% CI
Current smoker	53,626	9.4	7.4-11.3
Current non-smoker	115,351	7.1	6.2-7.9

*Source: Behavioral Risk Factor Surveillance System*

**CHILDHOOD ASTHMA PREVALENCE  
DETAILED TABLES**

**Table 2.17. Lifetime vs. current asthma prevalence among children aged 0-17 years, Mississippi, 2011**

Asthma Classification	Weighted Frequency	%	95% CI
Lifetime	105,960	13.7	11.5-15.9
Current	66,253	8.7	7.0-10.5

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.18. Lifetime vs. current asthma prevalence among high school students, Mississippi, 2011**

Asthma Classification	%	95% CI
Lifetime	20.0	18.2-22.0
Current	11.2	9.7-12.9

*Source: Youth Risk Behavior Survey*

**Table 2.19. Current asthma prevalence among children aged 0-17 years by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	23,711	6.4	4.2-8.5
Black	41,838	12.4	9.1-15.6

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.20. Current asthma prevalence among high school students by race, Mississippi, 2011**

Race	Current		
	Weighted Frequency	%	95% CI
Black	8955	12.8	10.4-15.7
White	5723	9.1	7.2-11.3

*Source: Youth Risk Behavior Survey*

**Table 2.21. Current asthma prevalence among children aged 0-17 years by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Boys	35,990	9.4	6.8-12.1
Girls	30,263	8.1	5.7-10.6

*Source: Behavioral Risk Factor Surveillance System*

**Table 2.22. Current asthma prevalence among high school students by sex, Mississippi, 2011**

Sex	Current		
	Weighted Frequency	%	95% CI
Boys	6145	8.9	7.1-11.1
Girls	9302	13.4	11.3-15.7

*Source: Youth Risk Behavior Survey*

**Table 2.23. Current asthma prevalence among children aged 0-17 years by age group, Mississippi, 2011**

Age Group (Years)	Weighted Frequency	%	95% CI
0-4	15,338	7.0*	3.4-10.6
5-11	20,836	8.1*	5.5-10.8
12-17	26,388	11.2	7.7-14.6

*Source: Behavioral Risk Factor Surveillance System*

*\*Unweighted sample size less than 50; results may be unstable.*

**Table 2.24. Current asthma prevalence among high school students by age group, Mississippi, 2011**

Age Group (Years)	Current		
	Weighted Frequency	%	95% CI
15 or younger	6426	13.8	10.8-17.5
16 or 17	6112	8.9	7.2-10.9
18 or older	2960	12.5	9.7-15.8

*Source: Youth Risk Behavior Survey*

**Table 2.25. Students with known asthma having an asthma action plan on file at their school, Mississippi, 2012**

Asthma action plans on file	Number of Schools	%	95% CI
No students with asthma	6	2.4	0.4-4.5
All students have an AAP	131	56.3	50.3-62.3
Most students have an AAP	40	17.2	12.2-22.2
Some students have an AAP	42	17.9	13.5-22.3
No students have an AAP	13	5.8	3.2-8.5

*Source: School Health Profiles Report, Principal*

**Table 2.26. Services provided by the schools for students with poorly controlled asthma, Mississippi, 2012**

Services provided by schools	Number of Schools	%	95% CI
Providing referrals to primary health care clinicians or child health insurance- I	113	48	42.8-54.7
Ensuring an appropriate written asthma action plan is obtained- II	179	77	72.6-82.5
Ensuring access to and appropriate use of asthma medications, spacers, and peak flow meters at school- III	180	79	73.6-84.6
Offering asthma education for students with asthma- IV	118	51	44.3-57.6
Minimizing asthma triggers in school environment-V	164	70	65.5-76.3

*Source: School Health Profiles Report, Principal*

**Table 2.27. Schools having procedures to inform the following groups about school’s policy permitting students to carry and self-administer asthma medications, Mississippi, 2012**

Groups	Number of Schools	%	95% CI
Students	154	94.4	91.7-97.1
Parents and families	152	93.7	90.4-97.0

*Source: School Health Profiles Report, Principal*

**Table 2.28. During this school year, schools that did not provide parents and families with health information designed to increase parent and family knowledge on asthma, Schools that have not adopted a policy stating that students are permitted to carry and self-administer asthma medications, Schools that do not have a full-time nurse, Mississippi, Mississippi, 2012**

	Number of Schools	%	95% CI
Schools that did not provide parents and families with health information	137	61.9	55.0-68.7
Schools that have not adopted a policy	64	27.3	21.7-32.8
Schools that do not have a full-time nurse	135	57.2	50.2-64.1

*Source: School Health Profiles Report, Principal*

**Table 2.29. Health education teachers who would not like to receive professional development course on asthma, Teachers in schools who have not tried to increase student knowledge on asthma in a required course in any of grades 6 through 12 during this school year, Mississippi, 2012**

	Number of Health Education Teachers	%	95% CI
Health education teachers who would not like to receive professional development course on asthma	73	32.3	26.6-38.0
Teachers who have not tried	57	26.3	20.6-31.9

*Source: School Health Profiles Report, Health Education Teacher*

**ASTHMA SYMPTOMS  
DETAILED TABLES**

**Table 3.1. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	45,921	94.2	86.0-100.0
Female	85,402	89.8	82.3-97.3

*Source: Asthma Adult Call-back Survey*

**Table 3.2. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	81,247	92.4	86.0-98.9
Black	47,001	89.5	80.0-99.0

*Source: Asthma Adult Call-back Survey*

**Table 3.3. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	30,095	64.7	43.6-85.9
Female	57,759	66.3	53.2-79.4

*Source: Asthma Adult Call-back Survey*

**Table 3.4. Percent of adults with current asthma experiencing symptoms of asthma in the past 30 days making them difficult to stay asleep by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	48,177	58.5	42.1-74.9
Black	37,710	78.3	64.9-91.7

*Source: Asthma Adult Call-back Survey*

**Table 3.5. Percent of adults with current asthma who were completely symptom-free in the past two weeks by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	51,055	67.1	46.0-88.2
Female	89,956	73.1	62.1-84.0

*Source: Asthma Adult Call-back Survey*

**Table 3.5. Percent of adults with current asthma who were completely symptom-free in the past two weeks by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	85,804	69.4	54.8-84.0
Black	53,899	74.8	60.9-88.7

*Source: Asthma Adult Call-back Survey*

### ASTHMA SEVERITY AND QUALITY OF LIFE DETAILED TABLES

**Table 3.7. Percent of adults with current asthma who had an episode of asthma or asthma attack in the past 12 months by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	26,139	41.2	16.9-65.5
Female	54,505	48.6	33.8-63.4

*Source: Asthma Adult Call-back Survey*

**Table 3.8. Percent of adults with current asthma who had an episode of asthma or asthma attack in the past 12 months by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	59,290	51.7	34.6-68.9
Black	19,707	34.3	18.9-49.7

*Source: Asthma Adult Call-back Survey*

**Table 3.9. Percent of adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	22,408	71.8	51.3-92.2
Female	76,237	85.2	77.0-93.4

*Source: Asthma Adult Call-back Survey*

**Table 3.10. Percent of adults with current asthma who had seen a doctor or other health professional for a routine checkup for their asthma in the past 12 months by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	58,772	85.2	76.1-94.3
Black	37,932	78.1	63.1-93.1

*Source: Asthma Adult Call-back Survey*

**Table 3.11. Percent of adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	12,301	39.4	13.77-65.0
Female	20,845	23.3	12.9-33.6

*Source: Asthma Adult Call-back Survey*

**Table 3.12. Percent of adults with current asthma who had to visit an emergency room or urgent care because of their asthma during the past 12 months by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	14,190	20.5	9.2-31.9
Black	18,618	38.3	17.7-58.9

*Source: Asthma Adult Call-back Survey*

**Table 3.13. Percent of adults who were unable to work or carry out usual activities because of their asthma during the past 12 months by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	23,869	31.5	9.0-54.0
Female	49,446	40.4	26.7-54.1

*Source: Asthma Adult Call-back Survey*

**Table 3.14. Percent of adults who were unable to work or carry out usual activities because of their asthma during the past 12 months by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	36,119	29.5	16.6-42.3
Black	35,905	49.8	29.0-70.6

*Source: Asthma Adult Call-back Survey*

**Table 3.15. Percent of adults who limited their usual activities due to asthma in the past 12 months not at all, a little, a moderate amount, or a lot, Mississippi, 2011**

Activity Limitation	Weighted Frequency	%	95% CI
Not at all	42,966	21.7	11.8-31.6
A little	68,428	34.5	21.7-47.4
A moderate amount	40,983	20.7	12.2-29.1
A lot	45,329	22.9	12.8-32.9

*Source: Asthma Adult Call-back Survey*

**Table 3.16. Percent of adults who were ever taught how to recognize early signs or symptoms of an asthma episode by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	31,570	41.5	18.5-64.5
Female	78,081	63.4	51.5-75.3

*Source: Asthma Adult Call-back Survey*

**Table 3.17. Percent of adults who were ever taught how to recognize early signs or symptoms of an asthma episode by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	71,855	58.1	42.7-73.5
Black	34,511	47.9	27.1-68.6

*Source: Asthma Adult Call-back Survey*

**Table 3.18. Percent of adults who were ever taught what to do during asthma episode or attack by sex, Mississippi, 2011**

Sex	Weighted Frequency	%	95% CI
Male	47,608	62.6	39.7-85.5
Female	89,916	73.0	60.2-85.9

*Source: Asthma Adult Call-back Survey*

**Table 3.19. Percent of adults who were ever taught what to do during asthma episode or attack by race, Mississippi, 2011**

Race	Weighted Frequency	%	95% CI
White	99,597	80.6	70.0-91.1
Black	34,587	48.0	27.4-68.6

*Source: Asthma Adult Call-back Survey*

**Table 3.20. Percent of adults with current asthma who were not given an asthma action plan by a doctor or other health professional, Percent of adults with current asthma who were needed to see a primary care doctor during the past 12 months for their asthma but could not because of the cost, Percent of adults with current asthma who were needed to buy medications during the past 12 months for their asthma but could not because of the cost and percent of adults with current asthma whose asthma became worse by chemicals, smoke, fumes or dust in their current job, Mississippi, 2011**

	Weighted Frequency	%	95% CI
Asthma action plan not given	157,175	78.9	69.5-88.4
Was not able to see a doctor	39,887	20.1	9.7-30.5
Was not able to buy medications	72,175	36.4	23.9-48.9
Asthma got worse by chemicals, smoke, fumes or dust in their current job	39,220	53.2	28.5-77.9

*Source: Asthma Adult Call-back Survey*

**Table 3.21. Percent of adults who were ever been told by a doctor or health professional that they have chronic obstructive pulmonary disease also known as COPD, Percent of adults with current asthma who had taken prescription asthma medicine using an inhaler, who had taken asthma medicine in the pill form and who had taken asthma medicines with a nebulizer during the past three months, Mississippi, 2011**

	Weighted Frequency	%	95% CI
COPD	28,024	14.0	8.7-19.3
Inhaler used	119,138	94.1	90.4-97.8
Pills taken	20,949	16.2	9.1-23.2
Nebulizer	42,737	33.1	22.4-43.8

*Source: Asthma Adult Call-back Survey*

## ASTHMA HOSPITAL DISCHARGE

### DETAILED TABLES

**Table 4.1. Estimated asthma hospital discharge rate per 10,000 population by year, Mississippi, 2007-2011**

Year	Estimated Frequency	Rate*	95% CI
2007	4,069	16.6	16.0-17.1
2008	3,740	14.4	13.9-14.8
2009	3,770	13.1	12.6-13.4
2010	2,044	6.8	6.5-7.1
2011	1,871	6.1	5.8-6.4

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Age-adjusted rate per 10,000 population*

**Table 4.2. Estimated asthma hospital discharge rate per 10,000 population by year and race, Mississippi, 2007-2011**

Year	White			Black		
	Estimated Frequency	Rate*	95% CI	Estimated Frequency	Rate*	95% CI
2007	1,747	11.3	10.7-11.8	2,234	24.8	23.7-25.8
2008	1,629	10.0	9.5-10.5	2,029	21.1	20.1-22.0
2009	1,548	8.5	8.0-8.9	2,155	20.4	19.4-21.2
2010	913	4.8	4.5-5.1	1,089	9.6	9.0-10.2
2011	762	4.1	3.8-4.4	1,037	9.1	8.6-9.7

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Age-adjusted rate per 10,000 population*

**Table 4.3. Estimated asthma hospital discharge rate per 10,000 population by year and sex, Mississippi, 2007-2011**

Year	Male			Female		
	Estimated Frequency	Rate*	95% CI	Estimated Frequency	Rate*	95% CI
2007	1,558	12.9	12.2-13.5	2,511	19.5	18.8-20.3
2008	1,290	10.3	9.7-10.8	2,382	17.4	16.7-18.1
2009	1,532	10.9	10.3-11.4	2,238	14.8	14.2-15.4
2010	788	5.4	5.0-5.8	1,256	8.0	7.5-8.4
2011	744	5.0	4.7-5.4	1,127	7.1	6.6-7.5

*Source: Mississippi Asthma Hospital Discharge Database  
\*Age-adjusted rate per 10,000 population*

**Table 4.4. Estimated asthma hospital discharge rate per 10,000 population by age group, Mississippi, 2007-2011\***

Age (Years)	Estimated Frequency	Rate*	Lower 95% CI
0-4	3,277	30.3	29.2-31.3
5-11	1,789	12.3	11.8-12.9
12-17	493	3.9	3.5-4.2
18-44	2,661	5.0	4.8-5.2
45-64	4,148	11.2	10.8-11.5
65+	3,126	16.8	16.2-17.4

*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

**Table 4.5. Estimate asthma hospital discharge rate per 10,000 population by age group and sex, Mississippi, 2007-2011\***

Age (Years)	Male			Female		
	Estimated Frequency	Rate	95% CI	Estimated Frequency	Rate	95% CI
0-4	2,100	37.9	36.3-39.5	1,148	21.7	20.4-23.0
5-11	1,086	14.7	13.8-15.5	690	9.7	9.0-10.5
12-17	257	3.9	3.5-4.4	232	3.7	3.2-4.2
18-44	711	2.7	2.5-2.9	1,946	7.2	6.9-7.5
45-64	971	5.4	5.1-5.8	3,166	16.4	15.8-17.0
65+	832	10.7	10.0-11.4	2,332	21.1	20.3-22.0

*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

**Table 4.6. Estimated number of hospital discharges with asthma as the first listed diagnosis, by month, Mississippi, 2011**

Number of emergency department visits by month											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
192	191	211	169	147	86	72	140	128	169	195	171

*Source: Mississippi Asthma Hospital Discharge Database*

**Map 4.7. Estimated asthma hospital discharge rate per 10,000 population by public health district of residence, Mississippi, 2007-2011\***

District	Rate				
	Male	Female	White	Black	Total
I	4.0	6.3	2.8	9.4	5.2
II	6.1	11.7	8.7	10.3	9.0
III	17.7	24.2	12.4	25.6	21.1
IV	7.0	11.6	7.0	12.3	9.4
V	9.8	14.3	8.3	16.2	12.1
VI	10.5	14.8	9.5	17.2	12.7
VII	11.3	18.2	12.3	19.1	15.5
VIII	7.1	12.5	8.1	13.8	9.9
IX	5.3	6.4	4.9	9.8	5.8
Total	8.3	12.5	7.5	15.6	10.5

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

**Map 4.8. Estimated asthma hospital discharge rate per 10,000 population by county of residence, Mississippi, 2007-2011\***

County	Rate				
	Male	Female	White	Black	Total
Adams	16.7	21.9	7.5	28.3	19.4
Alcorn	11.3	23.0	15.1	35.5	17.3
Amite	4.7	10.0	4.6	11.3	7.4
Attala	5.4	14.3	6.8	14.7	10.1
Benton	0.5	4.2	2.3	2.7	2.4
Bolivar	15.9	22.5	14.5	22.1	19.4
Calhoun	8.5	16.5	10.6	17.1	12.7
Carroll	14.3	16.2	10.9	23.4	15.2
Chickasaw	9.8	13.8	7.2	16.7	11.9
Choctaw	5.6	15.3	7.3	17.6	10.7
Claiborne	10.3	12.3	7.9	12.1	11.4
Clarke	8.1	8.1	5.6	12.8	8.1
Clay	14.0	22.4	16.4	20.2	18.4
Coahoma	11.5	14.7	8.2	14.9	13.2
Copiah	10.1	10.0	11.0	10.0	10.4
Covington	7.7	14.5	12.2	9.9	11.2
DeSoto	0.1	0.4	0.3	0.1	0.3

Forrest	7.2	12.4	7.7	14.2	9.9
Franklin	3.5	15.0	8.9	11.4	10.0
George	9.3	10.8	8.1	29.9	10.0
Greene	2.9	5.2	2.6	7.3	3.9
Grenada	4.9	9.7	5.0	11.0	7.5
Hancock	5.1	4.3	4.0	14.3	4.7
Harrison	3.7	6.1	4.6	6.4	4.9
Hinds	11.1	15.0	6.6	16.3	13.2
Holmes	9.8	13.9	5.8	13.3	12.0
Humphreys	14.9	41.1	20.5	31.8	28.8
Issaquena	11.3	6.0	10.1	8.5	9.0
Itawamba	6.5	13.1	8.4	29.5	9.9
Jackson	8.0	7.4	6.3	12.7	7.7
Jasper	11.3	13.3	7.8	15.0	12.4
Jefferson	13.7	13.9	5.2	15.2	13.8
Jefferson Davis	6.4	12.8	10.3	9.3	9.7
Jones	12.3	21.1	12.4	28.1	16.8
Kemper	8.4	10.5	9.8	9.9	9.5
Lafayette	1.7	1.6	1.2	3.3	1.6
Lamar	2.7	6.4	4.9	3.7	4.6
Lauderdale	10.3	14.4	10.9	14.7	12.4
Lawrence	25.4	34.3	31.2	32.6	31.2
Leake	14.2	17.7	9.2	23.8	15.9
Lee	7.9	12.9	8.1	17.0	10.5
Leflore	26.2	23.0	15.8	28.4	24.6
Lincoln	14.1	14.8	14.8	23.1	17.4
Lowndes	1.0	1.7	0.7	2.1	1.4
Madison	7.8	9.1	3.8	15.8	8.5
Marion	9.4	13.0	9.6	13.3	11.3
Marshall	1.1	1.8	0.6	2.3	1.5
Monroe	13.5	18.4	14.2	20.5	16.1
Montgomery	24.7	44.6	13.2	61.7	35.2
Neshoba	10.9	17.7	11.1	24.7	14.5
Newton	8.7	17.2	8.2	21.5	13.1
Noxubee	12.5	30.1	9.7	19.7	21.6
Oktibbeha	3.5	5.8	1.5	9.9	4.7
Panola	7.7	12.7	7.9	13.0	10.3
Pearl River	3.6	4.1	2.9	10.3	3.9
Perry	3.4	8.3	5.1	9.1	5.9
Pike	7.5	20.5	12.0	17.1	14.4
Pontotoc	4.2	9.1	7.0	5.6	6.7
Prentiss	7.4	10.7	9.7	6.7	9.1

Quitman	21.9	22.5	24.8	21.1	22.2
Rankin	7.2	11.7	8.7	12.7	9.5
Scott	14.8	19.9	13.2	23.3	17.4
Sharkey	13.0	11.4	6.5	14.7	12.1
Simpson	11.1	14.2	8.6	18.3	12.7
Smith	3.1	6.8	3.6	8.8	5.0
Stone	1.9	7.6	3.9	8.6	4.8
Sunflower	19.7	38.6	23.0	30.2	28.5
Tallahatchie	8.0	10.7	6.2	11.7	9.3
Tate	4.2	7.8	2.8	13.2	6.0
Tippah	6.4	18.5	13.2	11.2	12.6
Tishomingo	16.8	36.7	27.0	34.4	27.1
Tunica	1.6	8.6	2.9	6.0	5.3
Union	2.9	4.0	3.3	4.4	3.5
Walthall	5.4	16.5	7.2	15.2	11.2
Warren	11.3	25.0	17.0	20.8	18.5
Washington	19.5	20.7	7.8	25.2	20.2
Wayne	3.6	4.6	4.3	4.0	4.1
Webster	12.7	25.2	15.5	33.1	19.2
Wilkinson	3.0	5.9	2.7	4.8	4.4
Winston	4.9	4.8	3.7	6.2	4.9
Yalobusha	10.8	15.6	12.1	15.5	13.3
Yazoo	13.1	26.5	14.7	23.4	19.3
Total	8.3	12.5	7.5	15.6	10.5

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

*+ Total includes 'other' and 'unknown' races.*

## ASTHMA EMERGENCY DEPARTMENT DISCHARGE

### DETAILED TABLES

**Table 4.9. Estimated asthma emergency discharge rate per 10,000 population by year, Mississippi, 2007-2011**

Year	Estimated Frequency	Rate*	95% CI
2007	11,730	49.1	48.2-50.0
2008	10,853	43.0	42.2-43.8
2009	11,549	41.2	40.4-41.9
2010	14,064	48.2	47.4-49.0
2011	14,208	48.0	47.2-48.8

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Age-adjusted rate per 10,000 population*

**Table 4.10. Estimated asthma emergency department discharge rate per 10,000 population by year and race, Mississippi, 2007-2011**

Year	White			Black		
	Estimated Frequency	Rate*	95% CI	Estimated Frequency	Rate*	95% CI
2007	2,910	21.0	20.2-21.7	8,428	89.6	87.7-91.6
2008	2,794	19.2	18.5-19.9	7,856	76.5	74.8-78.3
2009	3,246	19.7	19.0-20.3	8,097	73.4	71.7-75.0
2010	4,401	25.4	24.6-26.1	9,312	81.2	79.5-82.9
2011	4,117	23.7	23.0-24.5	9,484	81.8	80.2-83.5

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Age-adjusted rate per 10,000 population*

**Table 4.11. Estimated asthma emergency department discharge rate per 10,000 population by year and sex, Mississippi, 2007-2011**

Year	Male			Female		
	Estimated Frequency	Rate	95% CI	Estimated Frequency	Rate	95% CI
2007	5,479	45.6	44.4-46.8	6,225	51.7	50.4-53.0
2008	4,802	38.0	37.0-39.1	5,731	45.0	43.8-46.1
2009	5,275	37.6	36.6-38.6	6,274	44.2	43.1-45.3
2010	6,162	42.6	41.5-43.6	7,901	53.0	51.8-54.1
2011	6,288	42.8	41.8-43.9	7,920	52.4	51.2 -53.5

*Source: Mississippi Asthma Hospital Discharge Database  
\*Age-adjusted rate per 10,000 population*

**Table 4.12. Estimated asthma emergency department discharge rate per 10,000 population by age group, Mississippi, 2007-2011\***

Age (Years)	Estimated Frequency	Rate*	95% CI
0-4	10,567	97.6	95.7-99.4
5-11	10,999	75.9	74.5-77.3
12-17	5,035	39.5	38.5-40.6
18-44	20,342	38.0	37.5-38.5
45-64	11,501	31.0	30.4-31.5
65+	3,960	21.3	20.6-21.9

*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

**Table 4.13. Estimated asthma emergency department discharge rate per 10,000 population by age and sex, Mississippi, 2007-2011\***

Age (Years)	Estimated Frequency	Male	95% CI	Estimated Frequency	Female	95% CI
0-4	6,850	123.7	120.8-126.6	3,613	68.3	66.1-70.5
5-11	7,103	95.8	93.6-98.1	3,787	53.5	51.8-55.2
12-17	2,548	39.1	37.6-40.6	2,461	39.4	37.8-40.9
18-44	6,716	25.4	24.8-26.0	13,561	50.2	49.4-51.0
45-64	3,588	20.1	19.5-20.8	7,878	40.8	39.9-41.7
65+	1,201	15.4	14.6-16.3	2,751	24.9	24.0-25.9

*Source: Mississippi Asthma Hospital Discharge Database  
\*Aggregate data used to increase reliability of estimates*

**Table 4.14. Estimated number of emergency department visits with asthma as the first listed diagnosis by month, Mississippi, 2011**

Number of emergency department visits by month											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,168	1,179	1,270	1,200	1,153	795	791	1,221	1,284	1,562	1,351	1,234

*Source: Mississippi Asthma Hospital Discharge Database*

**Map 4.15. Estimated asthma emergency department visit rate per 10,000 population by public health district of residence, Mississippi, 2007-2011\***

District	Rate				
	Male	Female	White	Black	Total
I	31.2	34.6	14.3	65.5	33.0
II	28.3	34.9	20.5	71.5	31.7
III	66.4	66.0	20.6	88.5	66.2
IV	34.0	42.1	17.4	68.0	38.2
V	52.6	54.6	20.3	89.0	54.4
VI	40.4	51.1	21.1	83.5	45.9
VII	39.6	52.5	25.8	71.2	47.4
VIII	27.7	33.8	15.6	61.7	30.8
IX	31.0	37.9	22.4	82.7	34.5
;Total	39.1	44.8	19.7	78.7	42.3

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

**Map 4.16. Estimated asthma emergency department discharge rate per 10,000 population by county of residence, Mississippi, 2007-2011\***

County	Rate				
	Male	Female	White	Black	Total
Adams	38.6	41.4	11.6	61.4	40.1
Alcorn	34.2	46.8	30.7	118.9	40.7
Amite	19.5	27.6	12.4	37.8	23.7
Attala	17.7	23.6	7.3	39.9	20.8
Benton	22.2	17.8	15.7	26.8	20.0
Bolivar	23.8	26.1	11.4	31.9	25.0
Calhoun	40.5	57.2	28.8	91.0	49.2
Carroll	50.9	42.3	22.8	92.3	46.6
Chickasaw	40.9	60.6	18.9	90.0	51.1
Choctaw	36.6	45.1	12.7	102.6	41.0

Claiborne	39.3	26.4	19.6	35.3	32.6
Clarke	47.9	63.9	20.0	118.2	56.3
Clay	66.3	60.4	22.9	93.4	63.2
Coahoma	93.0	85.4	29.0	109.5	88.9
Copiah	44.9	51.0	30.3	66.2	49.4
Covington	38.3	63.7	32.5	83.8	51.5
DeSoto	11.6	13.5	8.9	26.4	12.5
Forrest	33.5	32.6	17.5	60.2	33.0
Franklin	31.3	47.0	24.4	67.9	40.2
George	33.7	30.2	26.0	83.9	32.0
Greene	11.1	17.7	8.6	26.1	13.6
Grenada	46.7	50.8	24.0	83.9	48.9
Hancock	6.6	8.5	5.9	15.6	7.6
Harrison	23.6	32.7	19.6	56.5	28.2
Hinds	73.7	72.4	17.6	100.3	74.5
Holmes	51.3	45.4	16.2	55.7	48.5
Humphreys	109.1	150.6	27.9	167.6	131.1
Issaquena	15.9	39.0	3.4	40.2	25.8
Itawamba	21.9	39.9	24.5	124.6	31.1
Jackson	59.4	67.9	39.7	143.6	63.7
Jasper	30.0	41.1	14.8	52.6	35.8
Jefferson	49.6	39.7	12.2	50.2	44.7
Jefferson Davis	67.7	90.6	34.3	111.0	79.9
Jones	32.1	40.3	14.4	92.4	36.3
Kemper	40.2	50.4	14.6	63.6	45.3
Lafayette	12.9	13.6	6.2	35.0	13.2
Lamar	8.5	8.4	7.1	13.4	8.5
Lauderdale	45.7	49.5	21.8	82.5	47.7
Lawrence	65.0	92.0	55.2	131.2	79.5
Leake	47.1	92.3	31.9	119.7	69.4
Lee	39.9	49.6	22.7	104.3	44.9
Leflore	91.7	74.3	29.8	103.4	82.7
Lincoln	32.1	46.1	28.3	81.0	44.4
Lowndes	24.2	29.6	11.7	47.3	27.0
Madison	30.4	27.6	8.0	62.0	29.5
Marion	32.1	42.8	19.6	47.4	37.7
Marshall	40.4	30.9	9.7	59.4	35.6
Monroe	38.3	48.8	27.2	79.9	43.8
Montgomery	71.9	67.0	24.6	122.5	69.3
Neshoba	37.0	50.3	26.4	101.5	43.9
Newton	29.1	36.5	15.0	62.9	32.9
Noxubee	27.5	20.1	5.5	31.4	23.7

Oktibbeha	12.4	14.7	4.7	28.8	13.6
Panola	46.2	58.4	27.0	79.9	52.6
Pearl River	10.8	14.0	9.3	33.2	12.4
Perry	19.9	25.6	19.8	30.5	22.8
Pike	52.8	69.9	30.0	93.2	61.9
Pontotoc	32.0	44.4	31.4	73.7	38.4
Prentiss	6.8	12.4	9.0	13.9	9.7
Quitman	86.4	87.6	52.1	103.2	87.1
Rankin	30.7	41.2	26.5	72.7	36.2
Scott	44.0	47.5	23.3	80.1	45.8
Sharkey	60.8	49.9	19.6	70.1	55.0
Simpson	48.6	64.3	26.7	106.5	56.7
Smith	22.7	28.5	11.0	70.7	25.7
Stone	11.0	16.4	9.8	30.0	13.7
Sunflower	89.2	101.9	25.3	119.8	95.1
Tallahatchie	42.3	37.5	13.6	58.2	40.1
Tate	30.7	33.8	14.8	71.5	32.3
Tippah	26.1	35.3	23.2	65.2	30.8
Tishomingo	28.0	34.9	29.8	81.2	31.6
Tunica	34.1	37.0	15.3	43.4	35.6
Union	20.6	26.5	17.5	59.5	23.6
Walthall	33.0	48.4	21.5	64.4	41.0
Warren	51.8	45.0	20.0	79.1	48.2
Washington	82.1	81.8	26.8	101.1	81.9
Wayne	18.1	19.6	12.8	28.7	18.9
Webster	68.6	72.2	35.1	208.4	70.5
Wilkinson	20.3	39.6	8.1	38.7	29.5
Winston	47.7	77.4	20.8	113.8	63.0
Yalobusha	37.6	44.9	26.6	64.0	41.5
Yazoo	72.1	78.3	17.7	121.0	75.4
Total	39.1	44.8	19.7	78.7	42.3

*Source: Mississippi Asthma Hospital Discharge Database*

*\*Aggregate data used to increase reliability of estimates, rates are per 10,000 population*

*+ Total includes 'other' and 'unknown' races*

## AT-RISK BASED ASTHMA DISCHARGES

### DETAILED TABLES

**Table 4.17-4.19. Estimated asthma hospital discharge rate per 1,000 adults with current asthma aged 18 years and above by sex, race and age group, Mississippi, 2011**

Characteristic	Estimated Frequency	Rate per 1000 with Asthma	95% CI
<b>Total</b>	1,050	6.2	5.4-7.0
<b>Sex</b>			
Male	250	4.3	3.2-5.4
Female	800	7.2	6.2-8.2
<b>Race</b>			
White	506	5.3	4.4-6.1
Black	520	7.8	6.2-9.4
<b>Age Group (Years)</b>			
18-44	245	3.0	2.3-3.7
45-64	446	8.5	7.0-10.0
65+	359	10.6	8.6-12.7

*Source: Mississippi Asthma Hospital Discharge Database*

**Table 4.20-4.22. Estimated asthma hospital discharge visit rate per 1,000 children with current asthma aged 0-17 years by sex, race, and age group, Mississippi, 2011**

<b>Characteristic</b>	<b>Estimated Frequency</b>	<b>Rate per 1000 with Asthma</b>	<b>95% CI</b>
<b>Total</b>	821	12.4	9.7-15.1
<b>Sex</b>			
Male	494	13.7	9.6-17.9
Female	327	10.8	7.3-14.3
<b>Race</b>			
White	256	10.8	6.9-14.7
Black	517	12.4	8.9-15.8
<b>Age Group (Years)</b>			
0-4	459	29.9	14.0-45.8
5-11	300	14.4	9.4-19.4
12-17	62	2.3	1.4-3.3

*Source: Mississippi Asthma Hospital Discharge Database*

**Table 4.23-4.25. Estimated asthma emergency department visit rate per 1,000 adults with current asthma aged 18 years and above by sex, race and age group, Mississippi, 2011**

<b>Characteristic</b>	<b>Estimated Frequency</b>	<b>Rate per 1000 with Asthma</b>	<b>95% CI</b>
<b>Total</b>	7,932	46.9	41.6-52.2
<b>Sex</b>			
Male	2,431	42.0	32.7-51.4
Female	5,501	49.5	43.1-55.9
<b>Race</b>			
White	2,711	28.2	24.0-32.3
Black	4,946	74.4	60.1-88.6
<b>Age Group (Years)</b>			
18-44	4,108	50.0	40.0-60.0
45-64	2,748	52.2	44.1-60.3
65+	1,076	31.9	26.3-37.5

*Source: Mississippi Asthma Hospital Discharge Database*

**Table 4.26-4.28. Estimated asthma emergency department visit rate per 1,000 children with current asthma aged 0-17 years by sex, race and age group, Mississippi, 2011**

<b>Characteristic</b>	<b>Estimated Frequency</b>	<b>Rate per 1000 with Asthma</b>	<b>95% CI</b>
<b>Total</b>	6,276	94.7	75.1-114.3
<b>Sex</b>			
Male	3,857	107.2	75.9-138.4
Female	2,419	79.9	55.6-104.3
<b>Race</b>			
White	1,406	59.3	38.9-79.7
Black	4,538	108.5	79.3-137.6
<b>Age Group (Years)</b>			
0-4	2,545	165.9	78.7-253.1
5-11	2,587	124.2	83.1-165.2
12-17	1,144	43.4	28.9-57.8

*Source: Mississippi Asthma Hospital Discharge Database*

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