MISSISSIPPI DEPARTMENT OF HEALTH

Asthma Surveillance

Summary Report

August 2006

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Acknowledgments

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Executive Summary

Asthma is an important public health problem in Mississippi that is on the increase, especially in children, African-Americans, and women. Asthma is one of the leading chronic illnesses of both adults and children, and is the number one cause of school absences attributed to chronic conditions.

In 2003, Mississippi's adult population was approximately 2.1 million and an estimated 228,852 persons or 10.9% of the population had a history of asthma sometime during their lifetime. An estimated 144,407 adults or 6.9% of the population had currently existing asthma. Among adults, the prevalence of asthma was higher in nonwhites than in whites, higher in females than in males, higher in persons whose marital status was either separated or divorced, or never married, higher in persons with less education, and higher in those with lower incomes. Prevalence rates increased during 1999-2003 with an additional 47,607 persons having current asthma by 2003.

In the Jackson tri-county metropolitan area (comprised of Hinds, Madison and Rankin counties), 4,316 persons visited a hospital at least once for asthma during 2003. Many patients had multiple hospital visits for asthma and a total of 8,181 visits were recorded for the year; 2,296 of these were emergencies and 1,104 were inpatient stays. There were 4,781 outpatient visits (including outpatient hospital visits and visits to clinics associated with hospitals). 1,902 of the hospital visits were children age 0-4 years and an additional 1,872 were children age 5-12. Other key findings include:

- Of the more than 4,000 persons visiting a tri-county metro area hospital each year for asthma, almost three out of every four are nonwhite (predominately African-American); nonwhite females have the highest number of visits (41% of the total) of the four race/sex groups.
- About 40% of all persons visiting a metro area hospital for asthma are under age 15; four out of five of these children are African-American.
- Despite comprising only 37% of the Mississippi population, nonwhites account for about two and a half to three times more hospital visits for asthma than whites.
- Young children under age 5 have the highest number of asthma hospital visits of all age groups.
- The number of yearly asthma hospital visits has increased between 1999 and 2003.

The age-adjusted mortality rate for asthma in Mississippi is relatively low at 1.7 per 100,000 people. Nevertheless, 237 people died from asthma during the 1999-2003 five-year period. Nonwhites bear a disproportionate burden accounting for 147 deaths. The age adjusted mortality rate for nonwhites was 3.5 per 100,000 people – twice the overall age-adjusted rate. There were 90 asthma deaths in whites, with an age-adjusted mortality rate of 1.0 per 100,000 people. The age-adjusted mortality rate for females was 4.1 per 100,000 (156 deaths) compared to 2.6 per 100,000 or 81 deaths among males. Adults over 65 years of age accounted for 107 asthma deaths while children under age 15 accounted for only 11.

Some of the factors that may play into the increasing and disparate asthma prevalence, morbidity and mortality in the state include:

- the high proportion of predominately African American nonwhites (36%) in Mississippi's population;
- a relatively young population;
- high rates of poverty;
- high proportion of the population that is medically uninsured;
- the lack of adequate health care for children under age six;
- the shortage of primary care providers and specialists in asthma/ immunology/ pulmonology, especially in rural areas; and
- a shortage of certified asthma educators (AE-Cs).

This report is the first in-depth examination of factors associated with asthma in Mississippi. The data in this report will be utilized to plan interventions to reduce the burden of asthma on the citizens of this state. However, this is just the first step; further investigation into the asthma problem will be essential to gaining a true understanding of this disease.

1. Introduction

Asthma is a chronic, inflammatory disease of the airways that causes recurrent episodes of wheezing, breathlessness, chest tightness, and cough. The symptoms are associated with variable airflow limitation that is completely or partially reversible either spontaneously or with treatment. Although the causes of asthma are complex and multi-factorial, important associations and determinants are known, including atopy, exposure to indoor and outdoor allergens, environmental tobacco smoke, and environmental pollutants. Asthma incidence, prevalence, and mortality vary according to race, socioeconomic status, and access to health care. Asthma morbidity and mortality are largely preventable through improved medical management and patient education regarding the factors (triggers) associated with asthma attacks.

The first step in addressing asthma as a public health problem is to establish a surveillance system. Surveillance is important because knowledge of the epidemiologic aspects of asthma (e.g., geographic distribution, identification of groups with higher prevalence, time trends, etc) is crucial to the planning, implementation, and evaluation of programs to control the burden of this chronic condition.

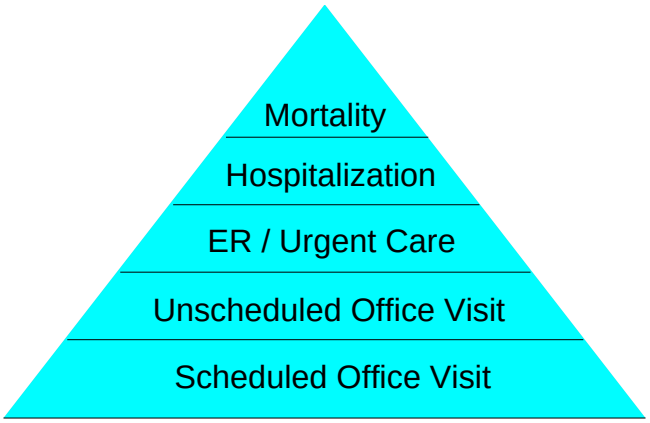
Like many states, Mississippi does not yet have an established statewide asthma surveillance system. Ideally, any asthma surveillance system should, at the very least, count the existing number of persons with the disease - of all grades of severity, from mild to severe - in the population (prevalence), and the number of new cases being added over time to the pool of disease (incidence). For a chronic, remitting/ relapsing disease like asthma, prevalence is a more appropriate measure than incidence; both prevalence and incidence, however, are difficult to measure exactly, for a variety of reasons. Population surveys based on clinical examination and testing require a lot of resources and are costly. Numbers of office visits could be used to estimate prevalence, though this is not exactly equivalent, as some patients will not visit a health care provider. In any case, no system exists in Mississippi for routinely collecting data from primary care providers. Therefore, self-reports are often used, as in the Behavioral Risk Factor Surveillance System (BRFSS) phone survey (described below).

At the other extreme of disease severity, the number of deaths with asthma listed as the underlying cause on death certificates is investigated to assess the impact of asthma. There are also problems with the use of mortality data in asthma. Case-fatality rates in asthma are generally low, which makes mortality a poor proxy for incidence. In addition, the diagnosis of asthma as a cause of death may be unreliable in the middle aged and elderly.

Until 1999, these sources – self-reports from the BRFSS and death certificates - were the only ones available for asthma surveillance in the state. The need for better asthma surveillance data specific to the state became obvious; ultimately, a comprehensive statewide asthma surveillance system would be needed in Mississippi to give a complete picture of the disease burden. A comprehensive asthma surveillance

system should incorporate data from many diverse sources, with each source relating to a different degree of disease severity in the asthma pyramid (Figure 1).

Figure 1. The Asthma Surveillance Pyramid



Measures of emergency room (ER) or hospital visits and hospitalizations reflect intermediate points in the spectrum of disease severity and are an important component in asthma surveillance. From an epidemiologic perspective, the number and rate of ER visits and hospital admissions for asthma reflect the effect of a combination of factors related to disease severity (and triggers of acute episodes) and health care (access, quality). One difficulty in differentiating these various factors is that patients commonly use ERs as a source of primary care, particularly in urban and low-income areas. Nevertheless, ER / hospital data are an important additional component in any asthma surveillance system and will complement prevalence and mortality data, enabling the state to obtain a more complete picture of the epidemiology of asthma. Analysis and tracking of such data will allow identification of groups in the population at risk of more severe morbidity, as well as problems with access to primary /preventive care and quality of care.

It is important to remember that there is no clinical test or measure that is diagnostic for asthma, and clinical diagnosis is not standardized. Even surveillance case definitions (which tend to be broader) are not standardized. It is well recognized that the diagnosis of asthma is most accurate between the ages of 5 and 34 years. Lack of diagnostic accuracy in the very young and the middle aged /elderly will affect the validity of the estimates. In young children, a number of respiratory conditions with wheezing may be mislabeled as asthma, until the true nature of the illness becomes apparent with age. Similarly, in the elderly, a number of cardio-respiratory conditions with wheezing may be mislabeled as asthma. So, the numbers – whether for office visits, hospital visits, or deaths – may be inflated in these age groups. On the other hand, the diagnosis may be missed altogether, leading to an underestimation of the true numbers.

This report is a summary of the 2003 asthma data for Mississippi. Statewide prevalence for adults age 18 and over are presented by race, sex, age, marital status, education, annual household income, and employment status based on the 2003 Mississippi BRFSS. Statewide prevalence for childhood (age less than 18) asthma is based on the 2003 National Survey of Children's Health and the 2002 Mississippi BRFSS Childhood Asthma Module. Due to lack of demographic information, only the overall childhood asthma prevalence is presented. Selected time trends are shown. A brief summary of county-specific data is given. The prevalence of current smoking, overweight status and obesity among adults with and without asthma is summarized. Flu shot and pneumonia vaccination data for adults with and without asthma are summarized. Morbidity data are presented for 2003 in terms of the number of hospital visits reported in the Jackson Mississippi tri-county Metropolitan area (hospital visits include ER visits, inpatient admissions, and outpatient visits). Data on hospital visits are presented in terms of the number of persons with at least one visit and in terms of the total number of visits in all hospitals in the tri-county area. Mortality data for 1999-2003 are summarized by race, sex and age.

The two categories of race used in this report are "white" and "nonwhite." In Mississippi, the population distribution by race is approximately 63% white, 36% African American, and 1% other races (largely Asian/Pacific Islander and American Indian). The number of persons in the "other" race category is too small for a separate analysis. The category "nonwhite" is the combined group of African Americans and "other".

2. Prevalence of Asthma in Mississippi

2.1 What is Prevalence?

Prevalence is the number of people who have a disease, such as asthma or a characteristic such as the habit of cigarette smoking, in a well-defined population, such as the population of people living in Mississippi, at a specified point in time. Prevalence estimates are often expressed as rates so that prevalence in populations of different sizes can be readily compared. The prevalence rates in this report are expressed as percentages. Thus, a prevalence rate for asthma history in a population or subpopulation is the number of people in that population or subpopulation who ever had asthma in their lifetime divided by the total number of people in that population at a specified point in time, such as the time of the 2003 data collection. The reported rate is expressed as a percent by multiplying the result by 100.

In this report, prevalence results are reported for two definitions of asthma:

- *Asthma history*: a response of ever having asthma during a person's lifetime.
- *Current asthma*: a response of currently having asthma at time of survey.

2.2 Behavioral Risk Factor Surveillance System

The asthma prevalence data summarized in this report were collected as part of the BRFSS. The BRFSS is a random-digit dialed telephone survey on health and health care behaviors coordinated by the Centers for Disease Control (CDC). The BRFSS is conducted in all 50 states. Interviews of randomly selected, non-institutionalized adults ages 18 and older are conducted on a monthly basis and combined by calendar year. Data are adjusted to be representative of the population in each state.

Mississippi has participated in the BRFSS since 1990. The BRFSS is the only instrument for state-level surveillance of chronic diseases, health risk behaviors, and health care practices among adult Mississippians. Adult asthma prevalence data (based on the core questions) have been collected since 1999. The BRFSS sample size is now over 4,000 (4,422 in 2003); in 2003, 480 respondents reported a history of asthma, including 310 with current asthma. The adult asthma module was first used in 2001, and the childhood module was first used in 2002.

The BRFSS questionnaire is designed by a working group of state coordinators and CDC staff. Currently, the questionnaire has three parts: 1) the core component, consisting of questions that all states must ask, 2) optional modules, which allow states to add CDC-developed questions about specific topics, and 3) state-added questions, which allow states to develop their own questions for addition to the survey. There are two asthma questions included in the core component, "Have you ever been told by a doctor, nurse, or other health professional that you had asthma?," and "Do you still have asthma?"

Optional modules may be utilized to expand asthma data collection, including:

- Adult Asthma History module: asks questions about age of onset, asthma attacks and ER visits during past 12 months, urgent treatment and routine checkups with healthcare provider during past 12 months, activity limitations, sleep disturbances, asthma symptoms and medication usage.

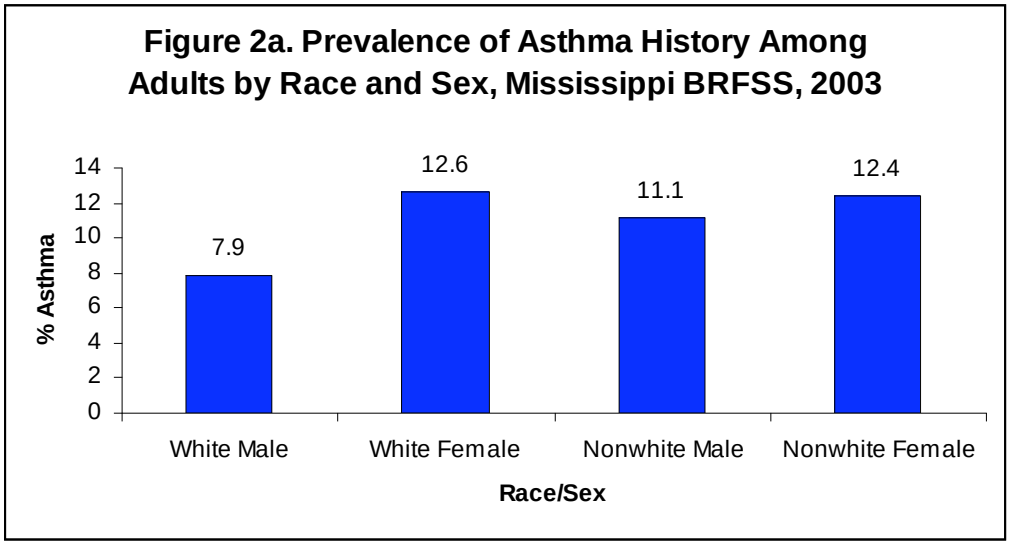
- Childhood Asthma module: asks questions to determine if any children in the household have ever been diagnosed with asthma and if they still have asthma.

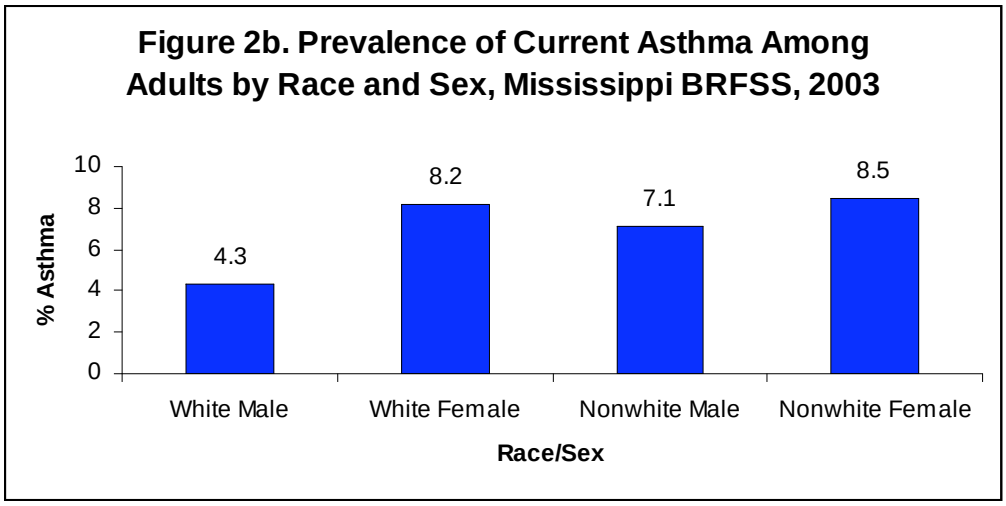
Although data collected in the Mississippi BRFSS are reasonably representative of the adult population in the state, there are limitations. The main limitation is that the data is self-reported. Gaps in coverage are well recognized; persons without telephones and those who refuse to participate are not represented. For example, persons living in rural areas, especially the Delta, are under-sampled due to lack of phones. In addition, errors may result from omissions and inaccurate reporting. Finally, data are subject to variability because of sampling error. Estimates based on surveys vary from sample to sample and hence results of a given survey may be somewhat misleading, but over many well-executed surveys the estimates are very reliable. Sampling error is less in larger samples, but more in smaller ones. Sample sizes may be inadequate to provide reliable estimates in some subpopulations such as county specific estimates in small counties.

2.3 Asthma in Adults

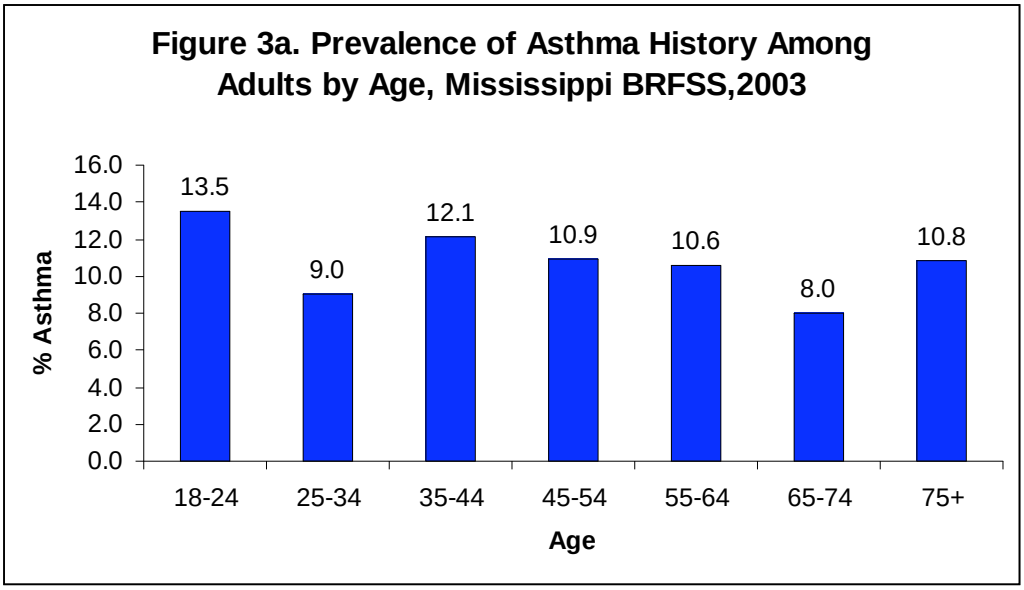
Data from the Mississippi BRFSS show that 10.9% of adults in the state, or an estimated 228,852 persons, had a history of asthma ("ever asthma") in 2003. The estimated prevalence was higher for nonwhites (11.8%) than for whites (10.3%) and higher for females (12.5%) than for males (9.1%). An estimated 144,407 (6.9%) adults reported that they currently have asthma in the 2003 survey. The prevalence was higher for nonwhites (7.8%) than for whites (6.3%) and higher for females (8.3%) than for males (5.3%). These results and additional details related to asthma prevalence estimates in Mississippi are shown in Tables 1 and 2 of Appendix A.

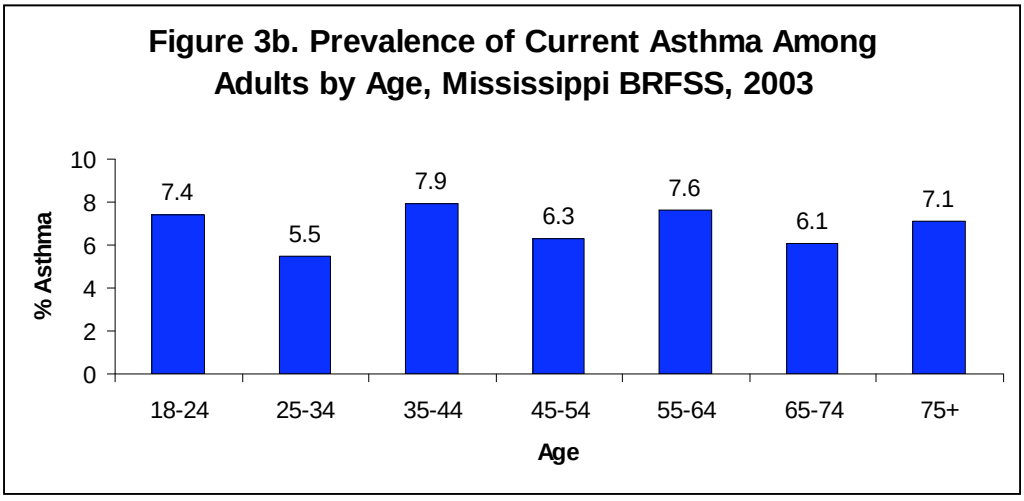
2.3.1 Adult Asthma by Race and Sex. As shown in Figure 2a, female adults of both races had high prevalence of a history of asthma, but there was little difference between white and nonwhite females (12.6% vs 12.4%). White male adults had a lower prevalence compared to nonwhite males (7.9% vs 11.1%). Among whites, the prevalence was much higher for females than for males; but, among nonwhites, prevalence varied only slightly between males and females. Figure 2b shows that, among whites, the prevalence of current asthma was much higher for females than for males (8.2% vs 4.3%). Among nonwhites, the gender difference was not as great (7.1% for males versus 8.5% for females). However, a large difference was observed between white and nonwhite males; but only a slight difference was seen between white and nonwhite females.



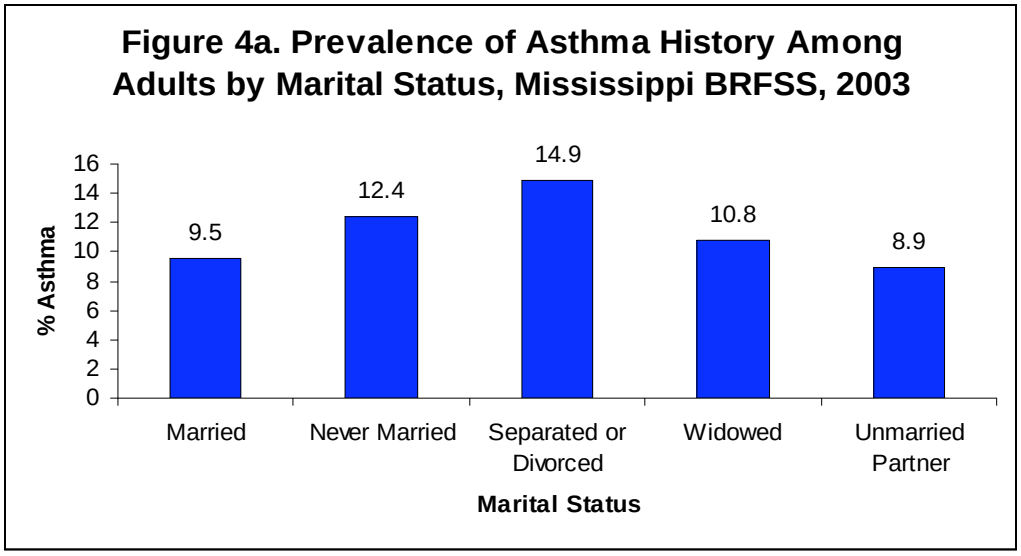


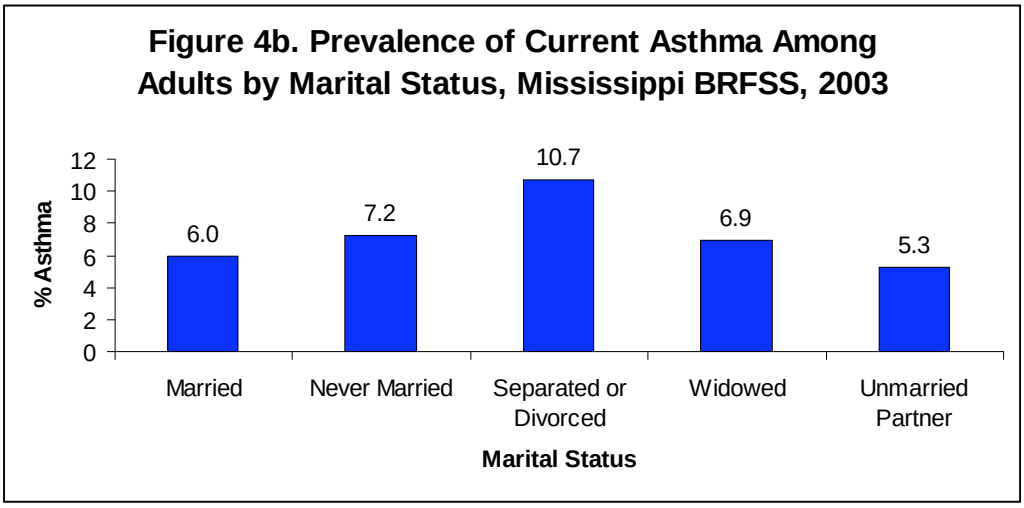
2.3.2 Adult Asthma by Age. The prevalence of asthma history varied with age but was highest in adults of age 18-24 years (13.5%). This may be attributed to the especially high prevalence among nonwhites in this age group (Figure 3a). The prevalence of current asthma also varied with age with no clear pattern, but was highest in adults of age 35 – 44 years (7.9%) (Figure 3b). There are many factors that may influence higher prevalence rates in these age groups in nonwhites; further study of contributing factors, including possible environmental exposures in the workplace, is necessary. These findings may predict further future increases in the overall prevalence.



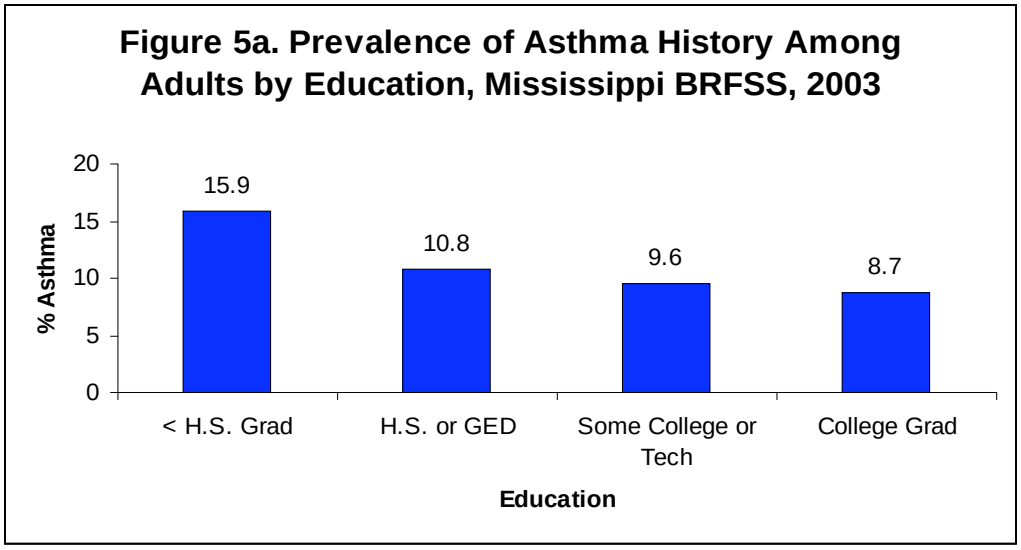


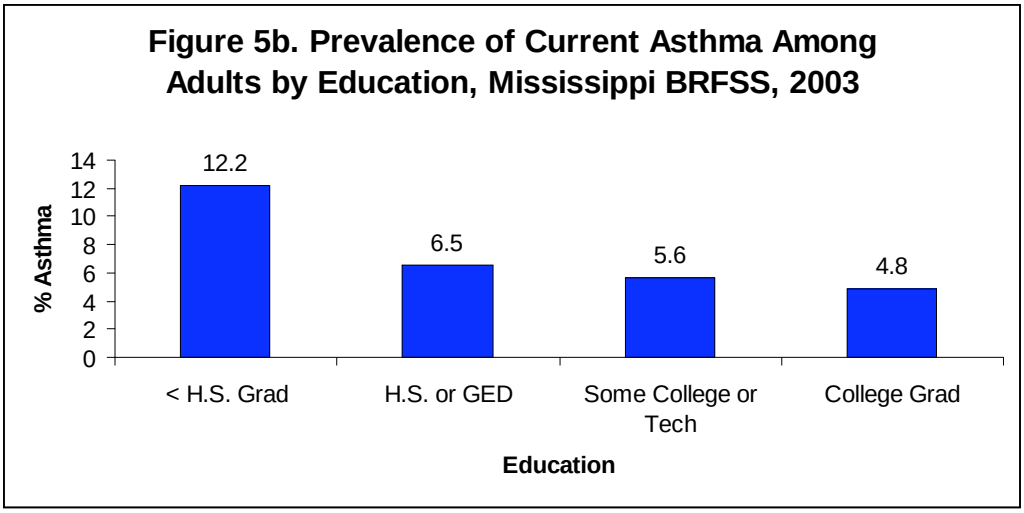
2.3.3 Adult Asthma by Marital Status. As depicted in Figure 4a, the prevalence of asthma history was elevated among adults who were never married (12.4%) and those who were separated or divorced (14.9%). Prevalence was relatively low among adults with an unmarried partner (8.9%) and married adults (9.5%). As depicted in Figure 4b, the prevalence of current asthma was elevated among adults who were never married (7.2%) and those who were separated or divorced (10.7%).





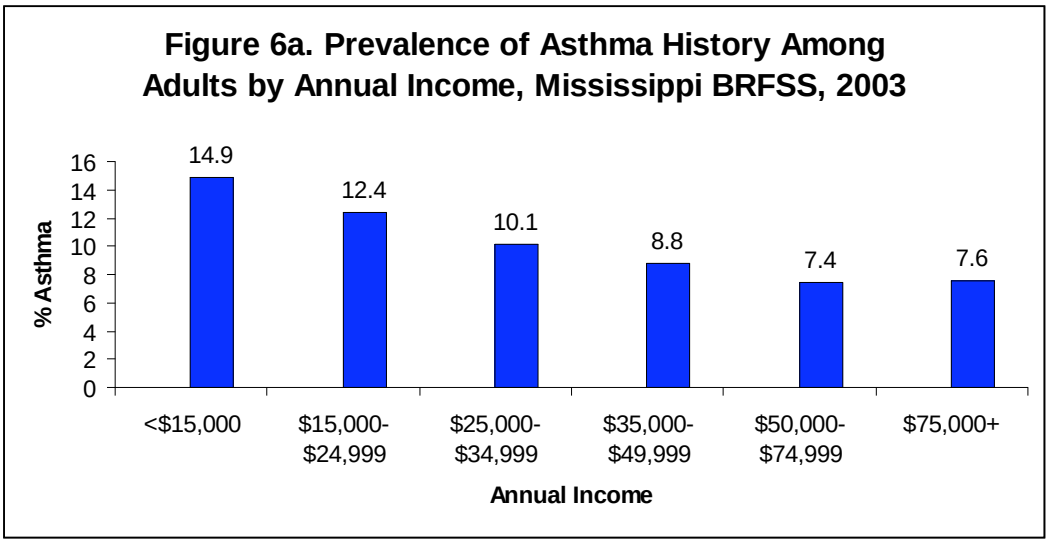
2.3.4 Adult Asthma by Education. There was an inverse relationship between educational attainment and asthma history, with a decreasing trend ranging from 15.9% for adults who did not graduate high school to 8.7% among college graduates (Figure 5a). There was a similar relationship between educational attainment and current asthma, with a decreasing trend ranging from 12.2% for those who did not graduate high school to 4.8% among college graduates (Figure 5b).

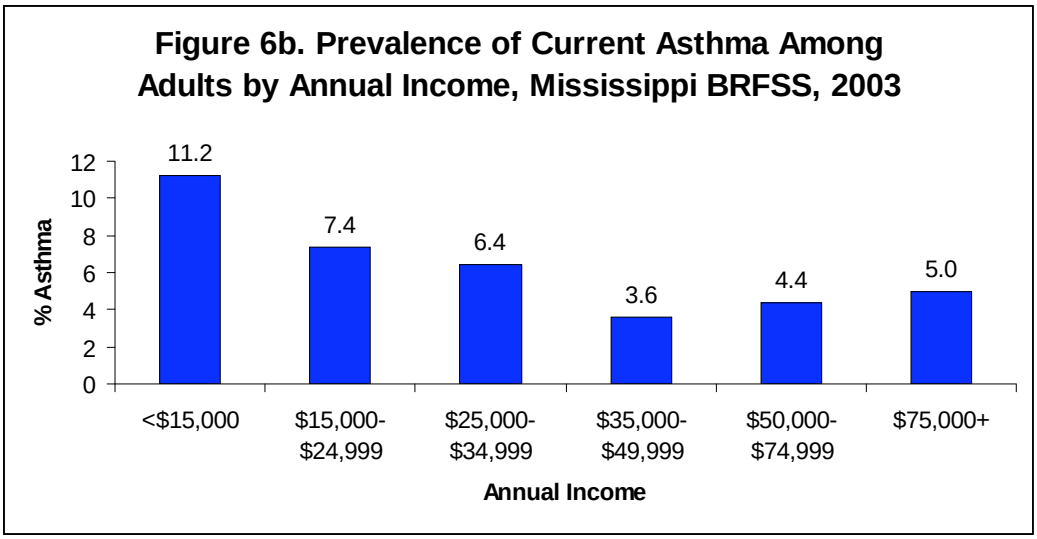




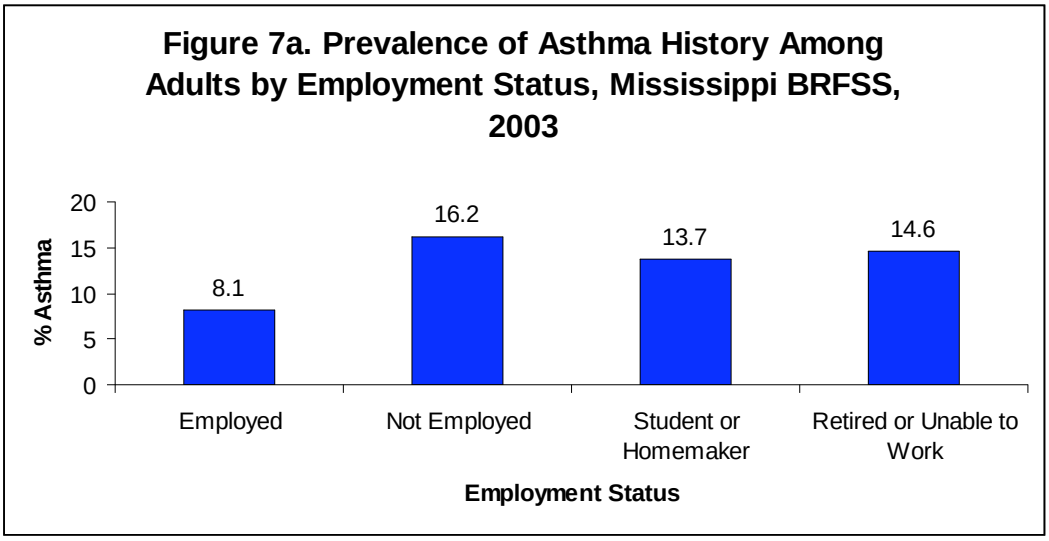
Definitions of Categories for Figure 5a and 5b are:
H. S. Grad – High School Graduate
H. S. or GED – High School Graduate or equivalent
Some College or Tech – Some college or technical school
College Grad – College Graduate

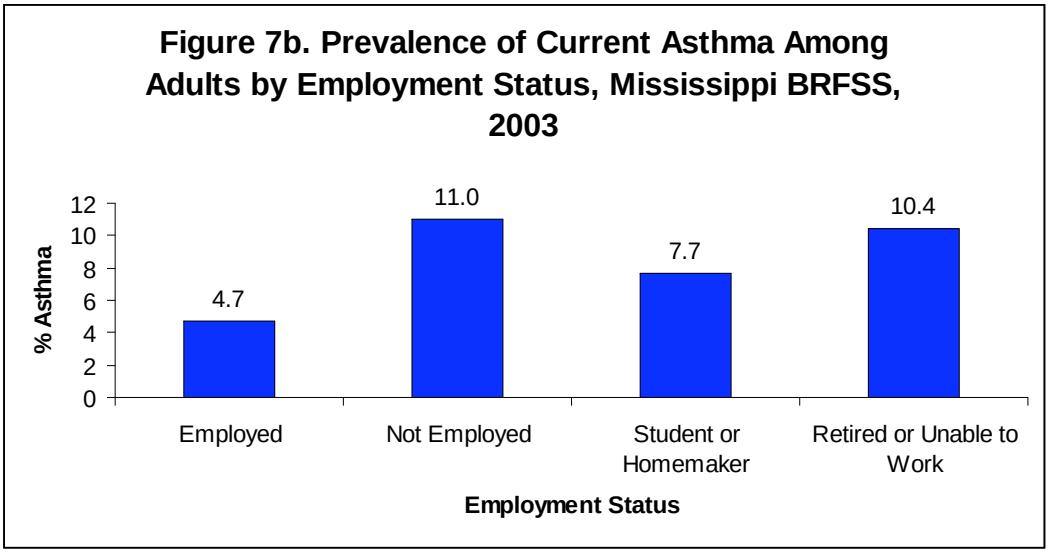
2.3.5 Adult Asthma by Annual Income. An inverse relationship was also found between annual income and prevalence of asthma history, ranging from 14.9% among adults with annual incomes less than $15,000 to 7.4% and 7.6% among those with annual incomes from $50,000 to $74,999 and $75,000 or more, respectively (Figure 6a). The prevalence of current asthma ranged from 11.2% among adults with annual incomes less than $15,000 to a low of 3.6% among adults with annual incomes from $35,000 to $44,999 (Figure 6b).



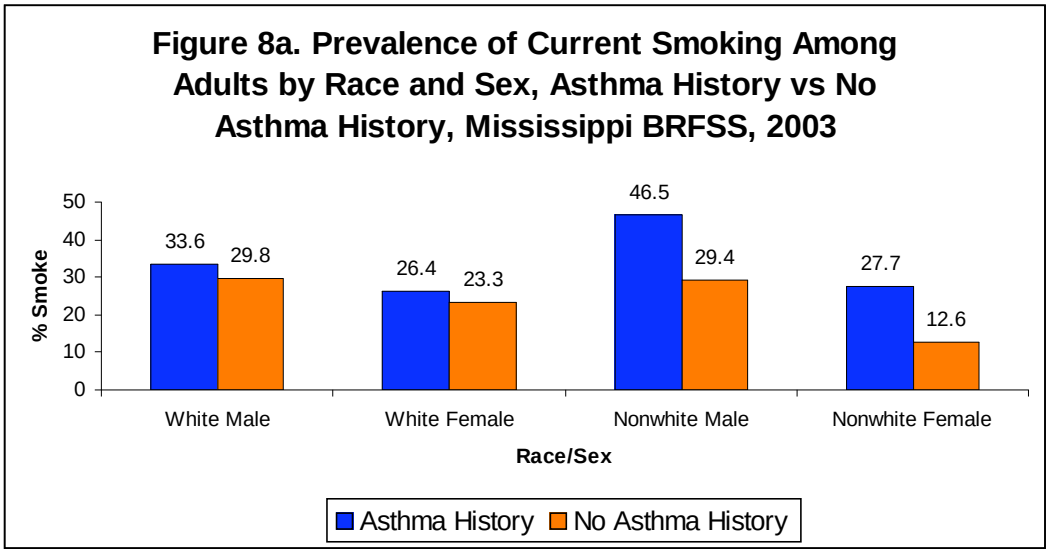


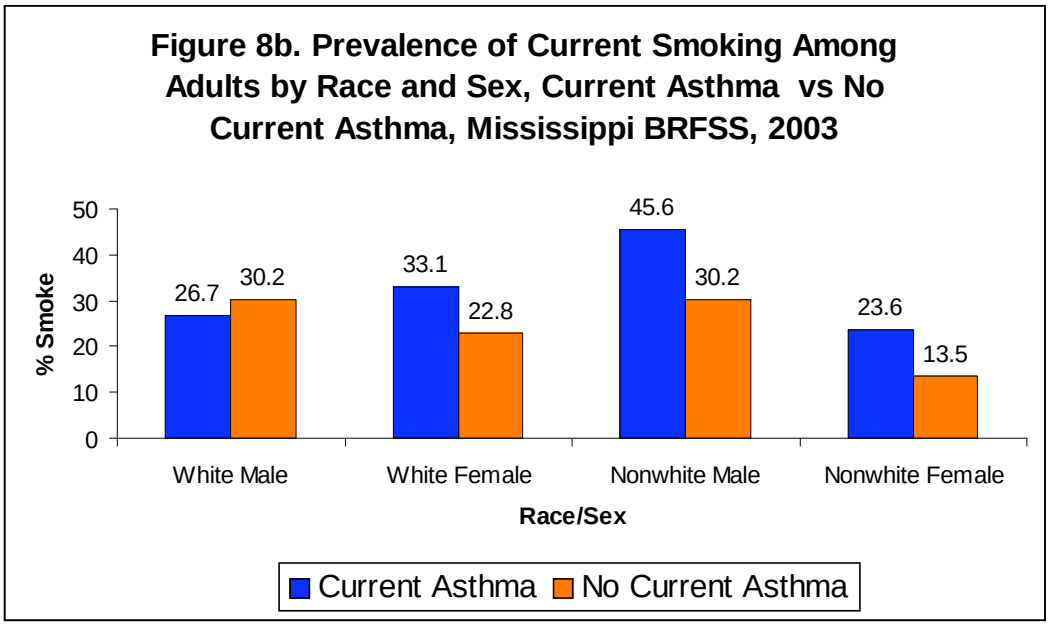
2.3.6 Adult Asthma by Employment Status. As displayed in Figure 7a, prevalence of asthma history was highest among unemployed (16.2%) adults and lowest among employed adults (8.1%). As displayed in Figure 7b, prevalence of current asthma was highest among unemployed (11.0%) or retired (10.4%) adults and lowest among those employed (4.7%).





2.3.7 Smoking Adults and Asthma. As shown in Table 3 of Appendix A, an estimated 76,821 (33.6%) of 228,852 adults who ever had asthma were current smokers; the percentage of current smokers was higher among nonwhite than among white adults who ever had asthma (40.2% versus 29.1%). The difference between persons with and without a history of asthma with respect to prevalence of current smokers is depicted in Figure 8a. It is clear that the prevalence of smokers is higher among those with a history of asthma in all race/sex groups but the discrepancy is especially large for nonwhites of both sexes (46.5% vs 29.4% for males, 27.7% vs 12.6% for females). Since cigarette smoking can trigger or worsen asthma and asthma symptoms, smoking cessation programs targeted to nonwhites could help to reduce the burden of asthma in these groups.





As shown in Table 4 of Appendix A, an estimated 48,653 (33.7%) of 144,407 adults who currently had asthma were current smokers; the percentage of smokers was higher among nonwhite than white adults (37.3% versus 31.0%). The prevalence of current smokers among adults who currently have asthma and adults who do not currently have asthma, is shown in Figure 8b by race and gender. It is clear that smoking is more prevalent among those who currently have asthma compared to those who do not for white females (33.1% vs 22.8%), nonwhite males (45.6% vs 30.2%) and nonwhite females (23.6% vs 13.5%). This pattern was reversed in white males (26.7% smokers among those with current asthma vs 30.2% smokers among those without current asthma).

2.3.8 Obesity and Adult Asthma. As indicated in Table 3 of Appendix A, over 60% of adults with asthma history were overweight (30.8% overweight but not obese, 32.3% obese). The prevalence of obesity was higher among nonwhite (36.8%) than among white (29.2%) adults who had a history of asthma. As depicted in Figure 9a, the prevalence of obesity was higher among those with a history of asthma than among those who never had asthma for white males (31.4% vs 25.4%), white females (27.9% vs 19.7%) and nonwhite males (32.0% vs 27.2%), but the difference was small for nonwhite females (39.5% vs 40.1%).

Over 96,000 (66%) adults with current asthma were overweight; 45,349 (31.4%) were overweight but not obese and 50,770 were (35.2%) obese (Table 4 of Appendix A). The prevalence of obesity was higher among nonwhite (42.0%) than among white (30.2%) adults but the prevalence of being overweight but not obese was higher among whites (37.6% vs 22.9%). The prevalence of obesity among adults who currently have asthma, and among adults who do not currently have asthma, is shown in Figure 9b by race and gender. The prevalence of obesity was higher among those with current asthma in every race/gender group. The prevalence of obesity was highest among nonwhite females.

2.3.9 Flu Shot and Adult Asthma. As shown in Table 3 of Appendix A, 34.1% of adults with asthma history had a flu shot within the last year. A higher percentage of white than nonwhite adults had a flu shot within the last year (37.5% versus 29.1%). As displayed in Figure 10a, among white male adults 65 years of age or older, a smaller percentage of those with a history of asthma had a flu shot in the most recent one year period compared to those without a history of asthma (42.9% vs 65.9%). The differences were small in the other race/gender groups.

As indicated in Table 4 of Appendix A, a slightly higher percentage of white than nonwhite adults with current asthma had a flu shot within the last year (36.1% versus 35.1%, overall 35.7%). The prevalence of flu shot in the past year is shown in Figure 10b by race and gender for adults over 65 years of age to compare those with versus those without current asthma. The prevalence of flu shot is about the same among those with and those without current asthma for white females, nonwhite males and nonwhite females. Among white males, the prevalence was less among those with current asthma (42.9% vs 65.9%).

Figure 9a. Prevalence of Obesity Among Adults by Race and Sex, Asthma History vs No Asthma History, Mississippi BRFSS, 2003

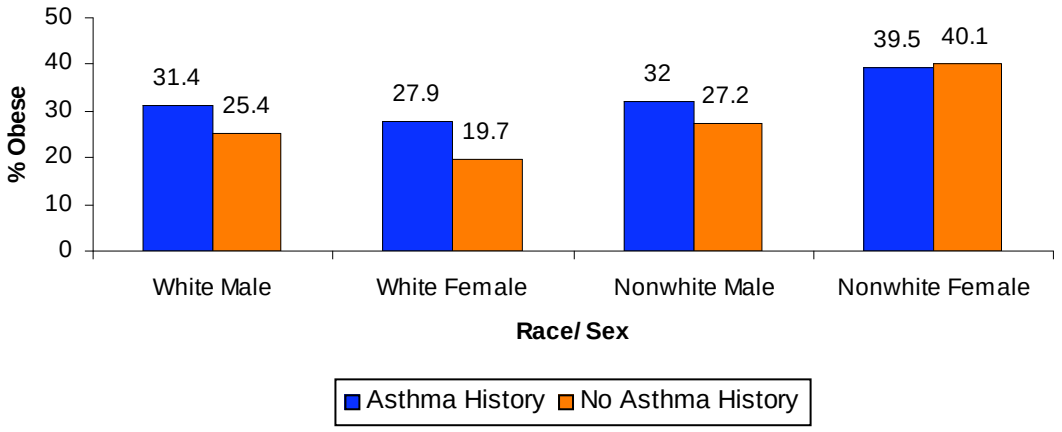
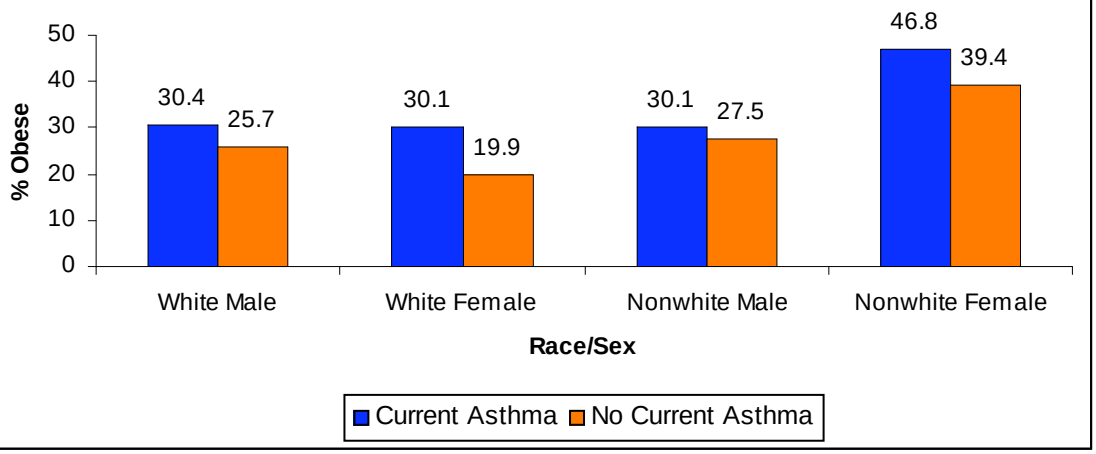
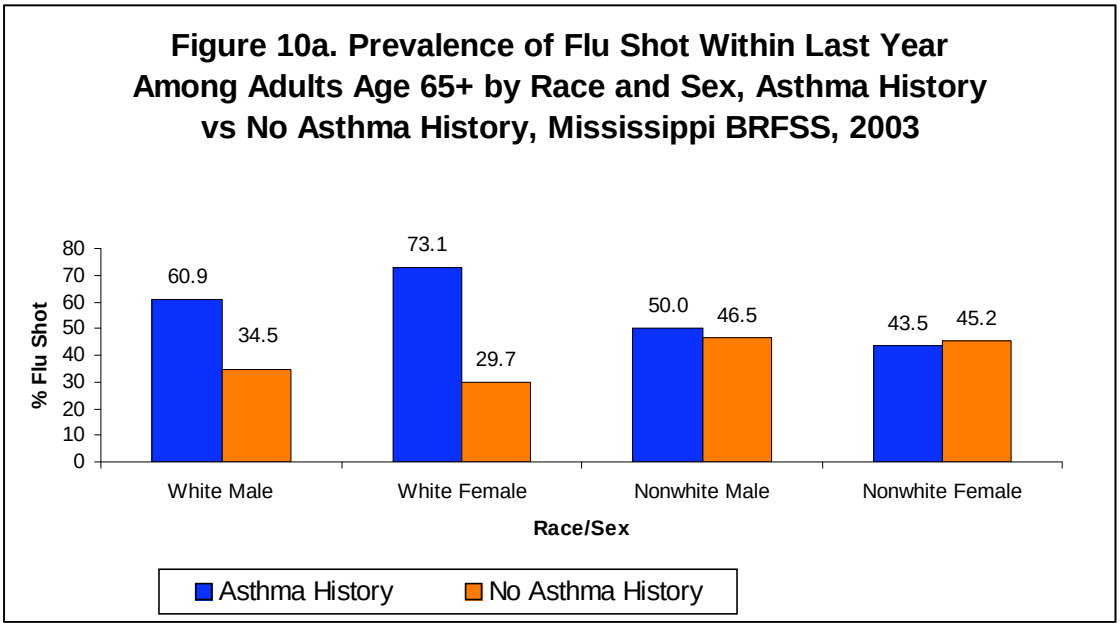
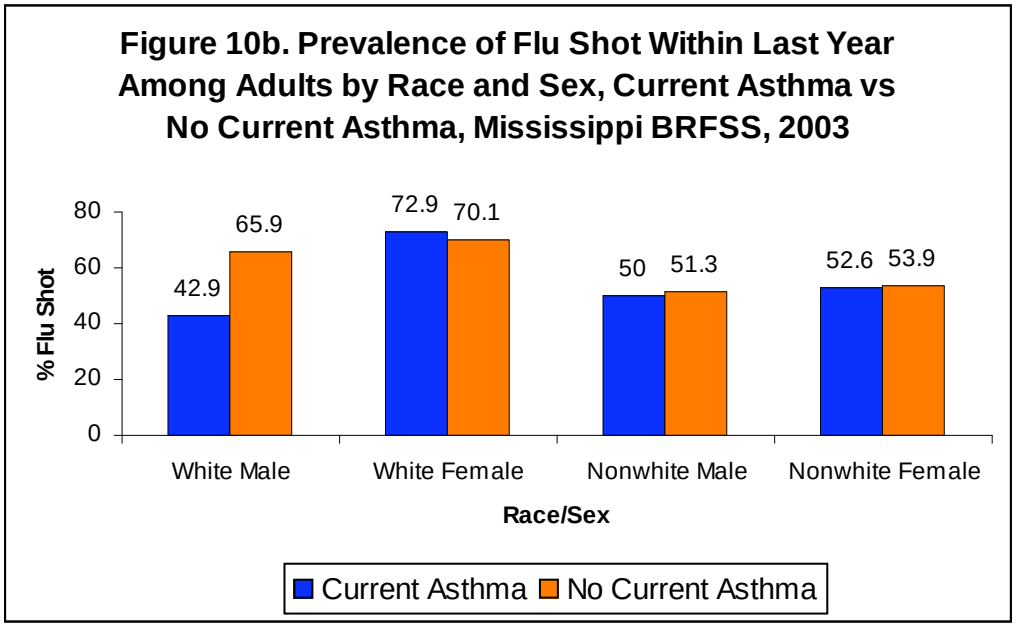


Figure 9b. Prevalence of Obesity Among Adults by Race and Sex, Current Asthma vs No Current Asthma, Mississippi BRFSS, 2003







2.3.10 Pneumonia Vaccination and Adult Asthma. As shown in Table 3 of Appendix A, 34.7% of adults with asthma history ever had a pneumonia vaccination. A smaller percentage of white than nonwhite adults ever had a pneumonia shot (33.7% versus 36.2%). As indicated in Figure 11a, among adults 65 years of age or older, a larger percentage of those with a history of asthma had ever had a pneumonia vaccination compared to those without a history of asthma for white males (87.0% vs 58.0%),

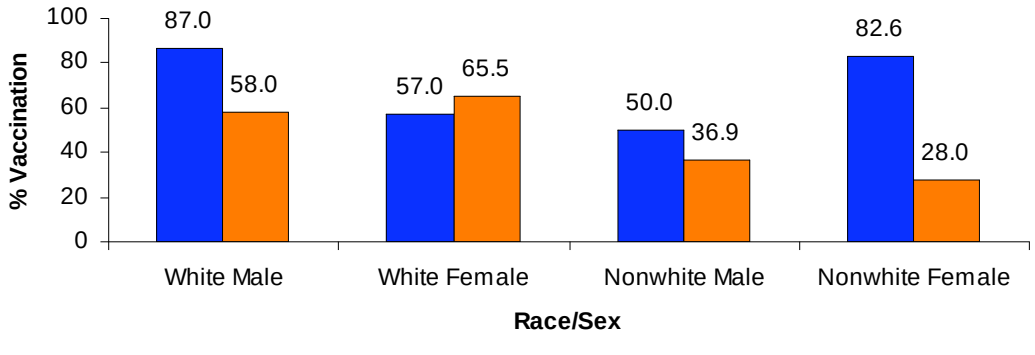
nonwhite males (50.0% vs 36.9%) and nonwhite females (82.6% vs 28.0%). The difference was of smaller magnitude and in the opposite direction for white females (57.0% vs 65.5%).

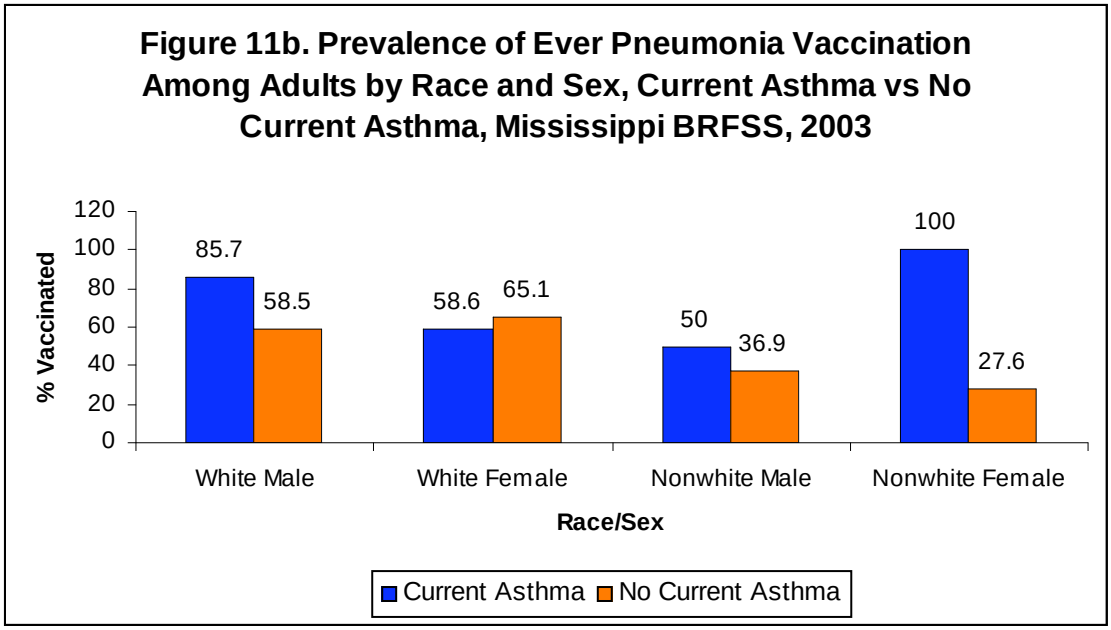
As shown in Table 4 of Appendix A, the percentage of white adults with current asthma who had ever had a pneumonia vaccination was slightly less than that of nonwhites (35.3% versus 37.1%, overall 36.0%). The prevalence of ever having pneumonia vaccination is shown in Figure 11b by race and gender for adults over 65 years of age to compare those with versus those without current asthma. The prevalence was higher among adults with current asthma relative to those without current asthma for white males, nonwhite males and nonwhite females. Conversely, the prevalence was lower among white females with current asthma relative to white females without current asthma (58.6% vs 65.1%).

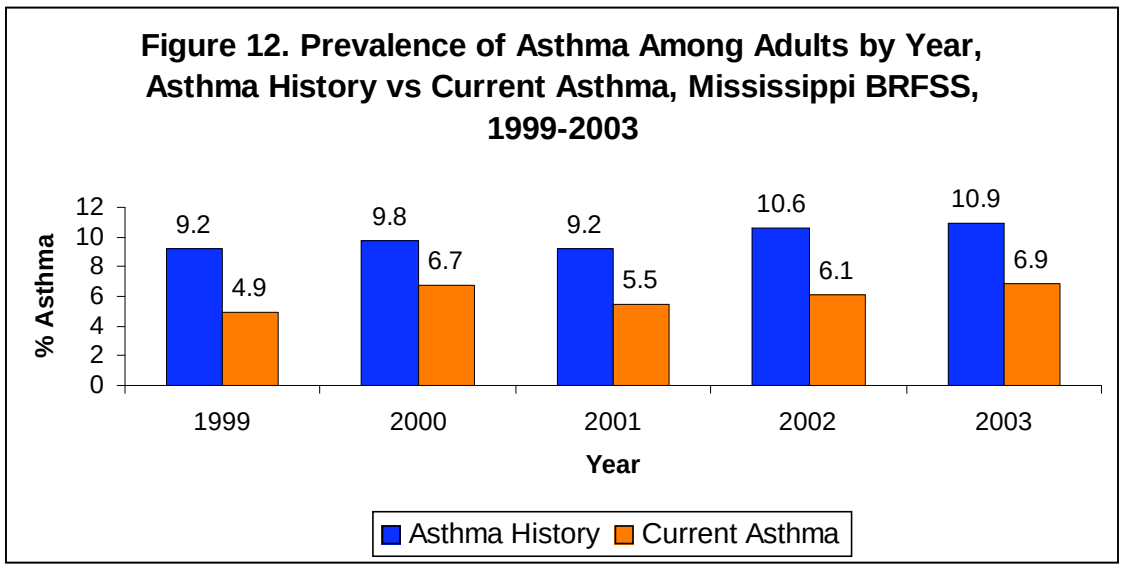
2.3.11 Time Trends in Adult Asthma Prevalence

A visual display of the overall 5-year trend is displayed in Figure 12. Over the 5-year period 1999-2003, there appears to be a variable slight upward trend in the number and percentage of adults with asthma history and current asthma. This appears to be due to an increase in prevalence among females in both racial groups (Tables 5 and 6 of Appendix A). The prevalence did not increase in males for either race.

Figure 11a. Prevalence of Ever Pneumonia Vaccination Among Adults Age 65+ by Race and Sex, Asthma History vs No Asthma History, Mississippi BRFSS, 2003







2.3.12 Adult Asthma Prevalence by County. Averaged over the three years 2001-2003, prevalence data for asthma history among adults show a wide variation from county to county, ranging from 22.4% in Wayne county to 0% in Sharkey county (Table 7 of Appendix A). The top ten counties with the highest asthma prevalence rates are, in descending order, Wayne (22.4%), Sunflower (20.2%), Noxubee (19.0%), Tate (18.4%), Lawrence (17.4%), Kemper (15.7%), Choctaw (15.5%), Leflore (15.2%), Wilkinson (15.2%) and Marshall (15.0%). The rates in Wayne and Sunflower counties were about double the overall three-year average prevalence for Mississippi (10.2%).

Averaged over the three years 2001-2003, prevalence data for current asthma among adults also show a wide variation from county to county, ranging from 16.7% in Wayne county to less than 1% in Jasper, Sharkey, and Stone counties. The top ten counties with the highest prevalence of current asthma are, in descending order, Wayne (16.7%), Issaquena (14.4%), Choctaw (13.5%), Tate (12.8%), Walthall (12.4%), Marshall (12.2%), Sunflower (11.8%), Noxubee (11.5%), Copiah (10.8%) and Pike (10.5%). The prevalence in Wayne County was 2.7 times the overall three year average prevalence for Mississippi (6.2%).

2.4 Asthma in Children. Asthma is well-recognized as a leading cause of illness among children in the U.S. Based on the 2003 National Youth Risk Behavior Survey (YRBS), 18.9% of U.S. high school students had asthma and 16.1% had current asthma. Of those with current asthma, 37.9% had an episode of asthma or an asthma attack during the preceding year (CDC MMWR, August 2005).

2.4.1 National Survey of Children's Health (NSCH). Based on the 2003 National Survey of Children's Health,(NSCH) more than 9 million children (12.4%) less than 18 years of age in the U.S. have ever been told by a doctor or health care professional they have asthma.
More than 6.4 million (8.8%) currently have asthma and more than 4.1 million (5.8%) had an episode of asthma or an asthma attack during the 12 months preceding the survey.

The childhood prevalence of asthma is slightly higher in Mississippi relative to the entire U.S. as shown in Figure 13. An estimated 96, 835 (12.8%) children less than 18 years of age who live in Mississippi have ever been told by a doctor or health professional they had asthma and 68,855 (9.1%) currently have asthma. During the 12 months preceding the survey, an estimated 46,497 (6.1%) had an episode of asthma or an asthma attack.

In Mississippi, the childhood prevalence of current asthma is higher for males (10.4%) compared to females (7.8%) and higher among blacks (10.7%) compared to whites (7.3%). Although there are only about 7,632 children of other races in Mississippi, the prevalence of asthma is very high (22.5%) among these other races as shown in Figure 14.

In Mississippi, the childhood prevalence of current asthma increases as weight increases ranging from 4.8% for underweight children to 11.4% for overweight children as shown in Figure 15. It is not clear whether having asthma contributes to overweight, or if children who are overweight have asthma more often.

2.4.2 Mississippi BRFSS Data on Asthma in Children. Based on the 2002 BRFSS results published by Centers for Disease Control and Prevention, an estimated 55,228 (7.5%) children under 18 years of age who live in Mississippi currently have asthma. As shown in Figures 16 and 17, childhood prevalence of asthma in Mississippi is similar to that in Alabama and Louisiana, but slightly higher than that of Arkansas with respect to both ever and current asthma.

Figure 13. Childhood Asthma Prevalence in Mississippi Versus the Entire United States, NSCH, 2003

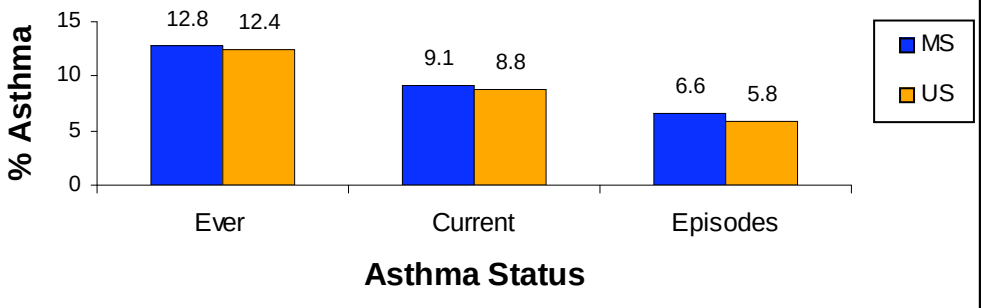


Figure 14. Current Childhood Asthma Prevalence by Race, Mississippi, NSCH, 2003

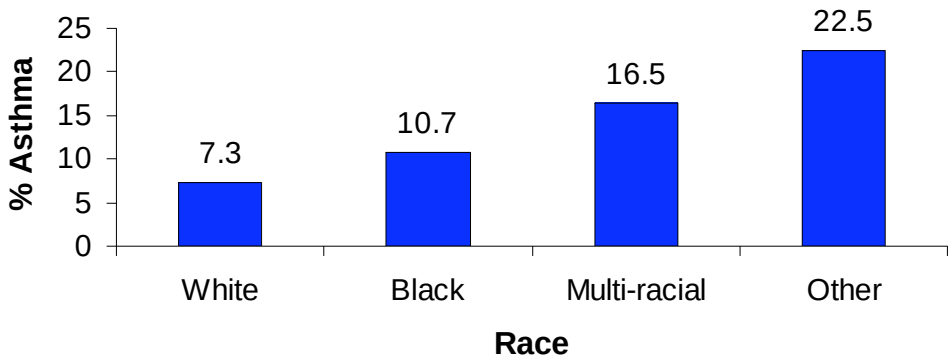


Figure 15. Current Childhood Asthma Prevalence by Weight Status, Mississippi, NSCH, 2003

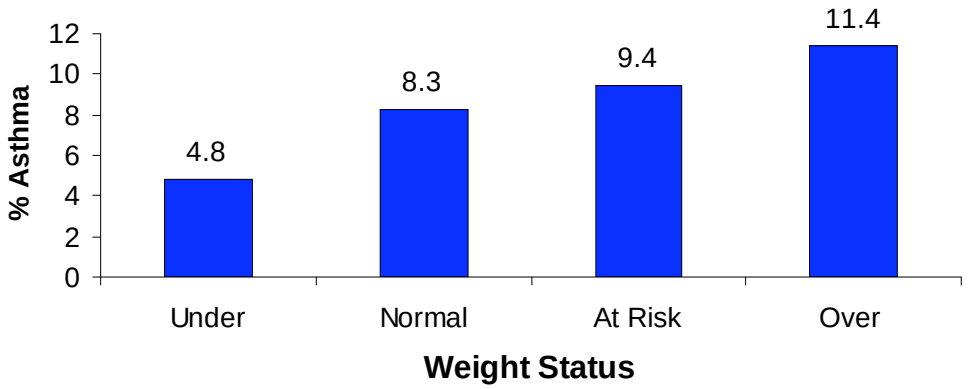
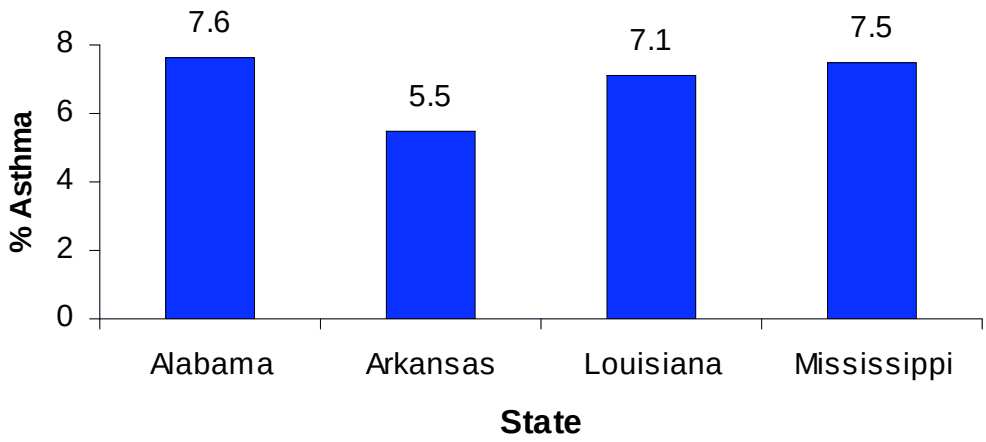


Figure 16. Childhood Prevalence of Current Asthma, BRFSS, 2002



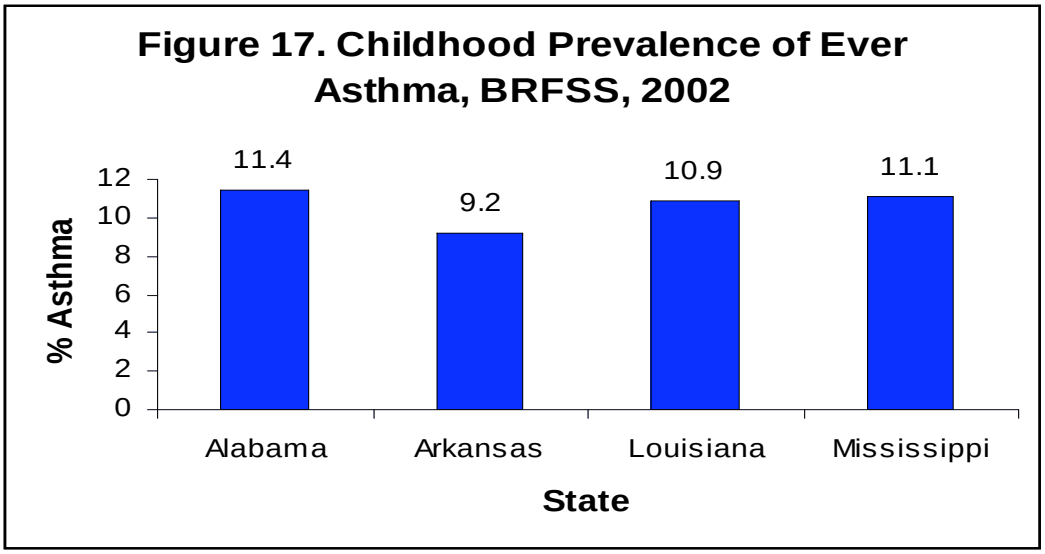


Figure 17. Childhood Prevalence of Ever Asthma, BRFSS, 2002
% Asthma
12
10
8
6
4
2
0
11.4
9.2
10.9
11.1
Alabama
Arkansas
Louisiana
Mississippi
State

3. Asthma Hospital Visits in Jackson Tri-County Area

Since 1999, data on asthma hospital visits made by Mississippi residents in the central Mississippi (Jackson) tri-county area (Hinds, Rankin, and Madison counties) have been collected by the Mississippi Department of Health. This area is the state's largest metropolitan center and its hospitals draw patients from throughout the state.

All acute care hospitals in the Jackson metro tri-county area have submitted visit data from 1999 to 2003, and have continued to do so for 2004-2005. Data collection has been expanded into all nine Public Health (PH) Districts, beginning with the year 2003 data. Of the state's 95 acute care hospitals, 28 (29.5%) have either not reported their 2003 asthma visits or the data reported was incompatible with the MDH's database. Future reports will include data from the remaining PH Districts to determine whether or not differences in hospitalization rates exist across geographic regions..

As stated previously, Mississippi has 95 acute care hospitals, which include seven in the Jackson, Mississippi Tri-county Metropolitan area (University of Mississippi Medical Center, Central Mississippi Medical Center, Mississippi Baptist Medical Center, St. Dominic – Jackson Memorial Hospital, Rankin Medical Center, Madison Regional Medical Center, and River Oaks Hospital). Statewide, there are 11,725 licensed acute care beds, including the 2,589 in the Jackson Metropolitan area. The seven hospitals listed above provided data to the MDH for all hospital visits (outpatient visits, emergency room (ER) visits, and admissions) with a primary discharge diagnosis of ICD-9-CM code 493 for Mississippi residents. Outpatient visits include admissions that are for 23-hours or less, observation holds, and visits to hospital-affiliated outpatient/rural health clinics.

Data gathered by this system and summarized in Table 9 and Figure 10 show:

- Of the more than 4,000 persons visiting a tri-county metro area hospital each year for asthma, almost three out of every four are African-American; African-American females have the highest number of visits (41% of the total) of the four race/sex groups.
- About 40% of all persons visiting a metro area hospital for asthma are under age 15; four out of five of these children are African-American.
- African-Americans have asthma hospital visit rates that are two and a half to three times as high as those for whites.
- Young children under age 5 have the highest number of asthma hospital visits of all age groups.
- The number of yearly asthma hospital visits has increased between 1999 and 2003.

Detailed breakdowns of the hospital visits for 2003 are given below. The data highlight the marked white/nonwhite disparities at all ages in number of hospital visits for asthma. The reasons for this are not obvious from these data. The most important

initial use of these data will probably be to draw attention to the increasing numbers over time and age, race, and gender disparities.

3.1 Number of Persons Visiting Hospitals due to Asthma. In 2003, 4,316 persons were admitted at least once to a hospital in the Jackson, Mississippi, Metropolitan Tri-county Area, with a total 8,181 hospital visits where asthma was the primary diagnosis. The number of admissions per person varied from 1 to 46, with 2,635 (61%) of the persons having exactly one visit, 837 (19.4%) having two, 385 (8.9%) having three, 183 (4.2%) having four, 240 (5.6%) having 5-9, and 36 (0.8%) having 10 or more admissions (Table 9). Of the 4,316 persons who visited a hospital for asthma, 1,854 (43%) were males and 2,462 (57%) were females, and females exceeded males in every category of single and multiple visits. The number of blacks with at least one visit exceeded that of whites by nearly three to one, and blacks also exceeded whites in multiple visits. Children in the 0-4 age group accounted for 1,037 (24%) of the persons with at least one visit, followed by those in the 5-12 age group with 966 (22%) persons. Persons in the 65 and over age group accounted for the smallest number of visits of all age categories; only 254 (5.9%) in this group had at least one visit for asthma in 2003. Because a person may make repeat hospital visits, the number of persons visiting hospitals due to asthma will not equal the total number of hospital visits.

3.2 Total Number of Hospital Visits. Monthly variation in the number of hospital visits for asthma in the Jackson tri-county area is Table 10. Of the 8,181 total hospital visits, 4,756 (58.1%) were visits by females and 3,425 (41.9%) were visits by males; 6,355 (77.7%) were by blacks, 1,756 (21.5%) were by whites and 70 (0.9%) were by other race. Children in the 0-4 age group accounted for 1,902 (23.2%) of the visits whereas the 5-12 age group accounted for 1,872 (22.9%). The number of visits in other age categories ranged from 373 (4.6%) in the over 65 group to 805 (9.8%) in the 45-54 group. Further details of the monthly numbers are given in Table 10.

As shown in Figure 18, the monthly frequency of total hospital visits for asthma varied by season, ranging from 581 in August to 926 in October with an average of 682 per month. The peak was in October (926), followed by the second highest number in December (776). March and September through December were all high months ranging from 722 to 926 visits per month.

Of the 8,181 visits, 2,296 (28.1%) were emergency, 1,104 (13.5%) were inpatient and 4,781 (58.4%). A detailed breakdown of the type of visits by gender, race, race/gender and age is given in Table 11. A breakdown of the monthly number of emergency visits is shown in Table 12 and Figure 19. The seasonal variation in emergency visits follows a pattern similar to that for total visits. The monthly number of inpatient visits is shown in Table 13 and Figure 20. The peak month for inpatient visits was November followed by December. The monthly number of outpatient visits is shown in Table 14 and Figure 21. The seasonal variation in outpatient visits follows a pattern similar to that for total visits.

Figure 18. Number of Hospital Visits for Asthma, Jackson Mississippi Tri-county Area, 2003

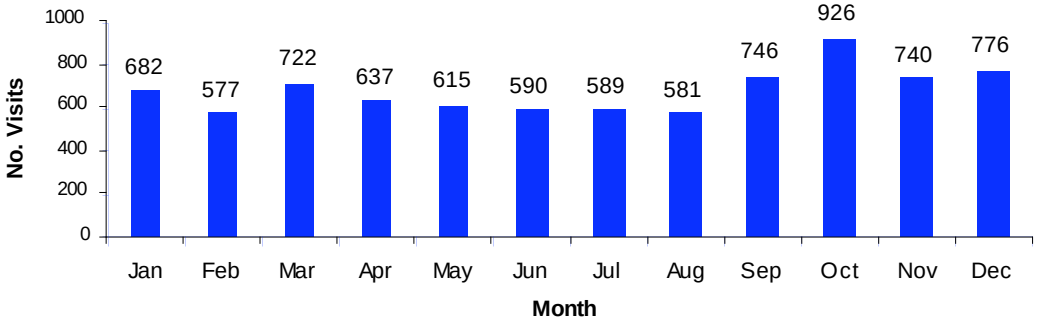


Figure 19. Number of Emergency Hospital Visits for Asthma, Jackson Mississippi Tri-County Area, 2003

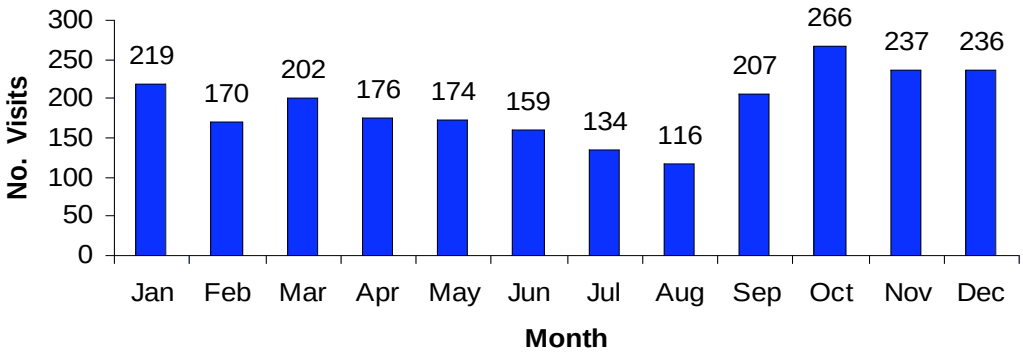
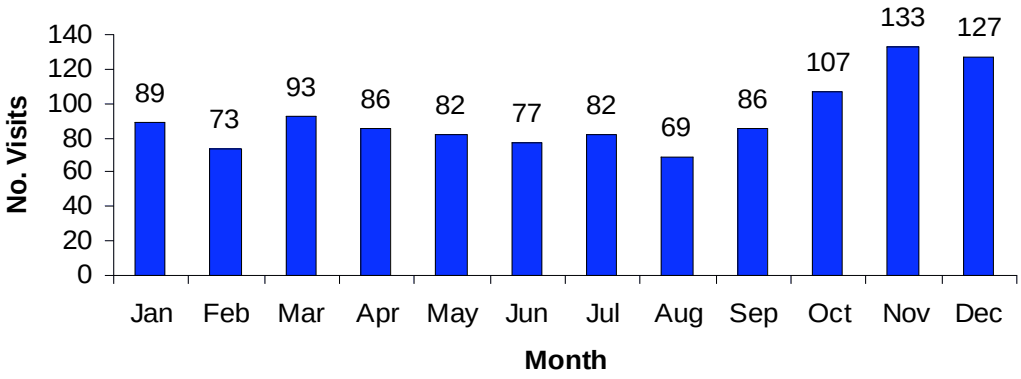
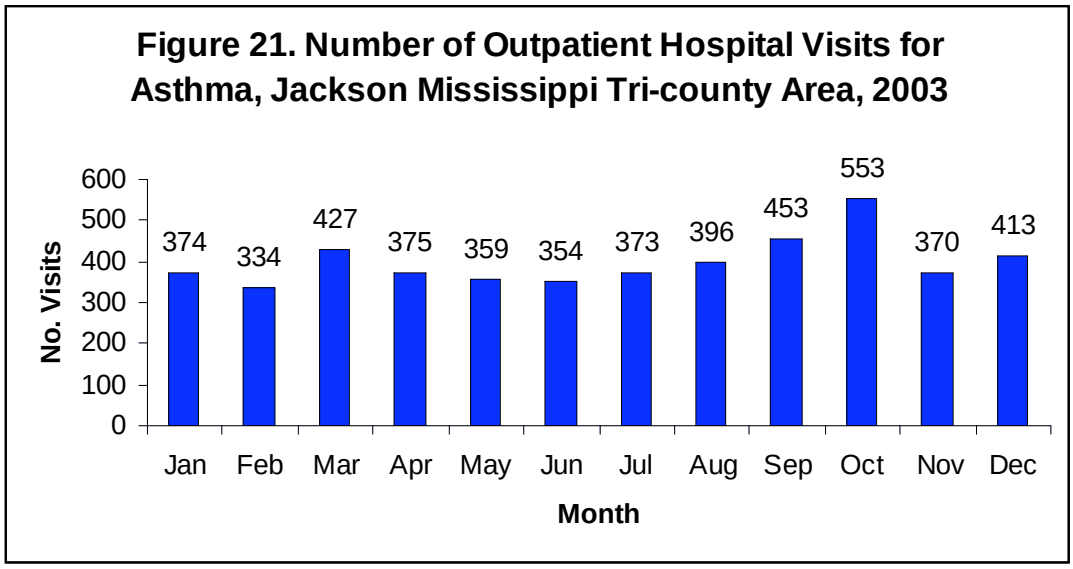


Figure 20. Number of Inpatient Hospital Visits for Asthma, Jackson Mississippi Tri-county Area, 2003





3.3 Work-related Asthma. Occupational asthma is the most prevalent occupational lung disease in the United States. Approximately 15 percent of asthma cases in the United States are due to occupational exposures. Using Mississippi's 2003 statewide prevalence estimate of 228,852 adults with asthma, we can estimate that 34,328 of these cases are due to occupational exposure.

According to a recent study, men working in forestry and with metals and women in the service industries (waitresses, cleaners, and dental workers) have the highest risk for occupational asthma. The National Institute of Occupational Safety and Health (NIOSH) at the Centers for Disease Control and Prevention (CDC) has identified certain industries in which workers may be more at risk for occupational asthma. Utilizing this list and data from the US Census Bureau's 2002 Economic Survey, Mississippi's population at risk for work-related asthma may be identified.

As shown in Figure 22, Mississippi has large at-risk populations of workers in three main industries: the meat product manufacturing industry, in-patient nursing facilities, and the wood product industry. Some workers at risk of developing asthma as a result of occupational exposure, others are at risk of aggravating their preexisting asthma due to occupational exposure. For a list of other high risk industries in Mississippi related to developing or aggravating asthma, see Table 15.

Limited data is being collected through the MDH asthma hospital visit surveillance related to occupational asthma. MDH requests that the state's hospitals submit information about hospital visits using ICD-9-CM code 506.XX – respiratory conditions due to exposure to chemical fumes and vapors. To date, too few visits have been reported as coded to 506.XX to perform any meaningful data analysis. See Figure 23 for aggregate numbers of visits coded 506.XX, grouped by public health district for 2003.

Figure 22. Mississippi's Top 5 Industries Identified as High Risk for Asthma and Number of Workers, 2002

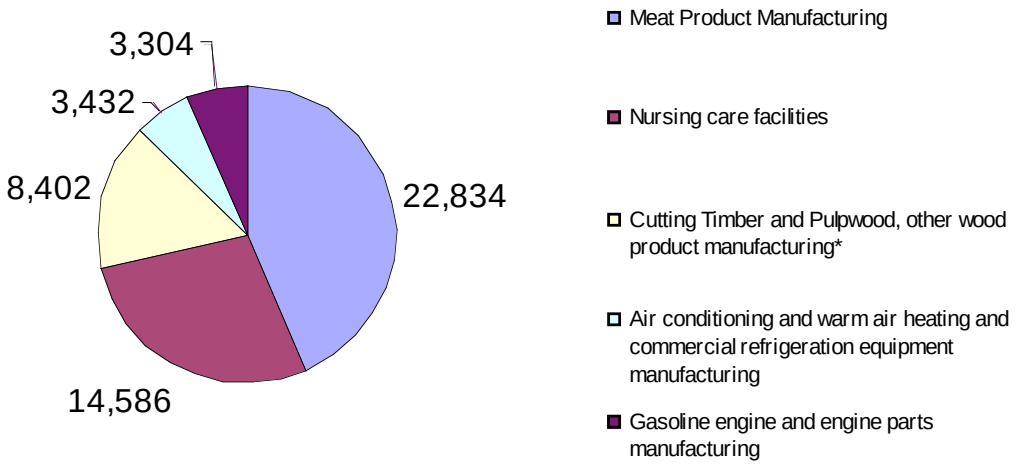


Figure 23. Hospital Visits potentially due to Work-Related Asthma based on ICD9 code 506.xx, by Public Health District and Sex, Mississippi, 2003

	Public Health Districts									
	I	II	III	IV	V	VI	VII	VIII	IX	State
Male	1	3	2	1	2	1	0	5	2	17
Female	2	7	2	3	0	1	5	7	7	34
Total	3	10	4	4	2	2	5	12	9	51

Note: Five visits were excluded from potential work-related asthma visits because the patient was less than 16 years old (working age).

4. Asthma Mortality

Asthma mortality refers to deaths where asthma is listed on the death certificate as the primary cause of death. Asthma mortality data reported here include data for all deaths with an underlying cause of death coded as ICD10 J45-J46. Mortality data are routinely available for 1979 to 2003 from the Office of Health Informatics (Vital Records and Statistics). Mortality data are also available for 1979 to 2003 at the NCHS/CDC WONDER site (http://wonder.cdc.gov/).

Mortality reflects the influence of a number of factors, including disease severity, access to health care, and the quality of care. In Mississippi, access to health care, especially primary and preventive care, and quality of care may not be optimal for all groups in the population. Physicians and other health care providers may not always follow the guidelines established by the National Asthma Education Program for asthma care. The situation in Jackson and other urban areas (and also in medically underserved rural areas) in Mississippi could well be leading to disparities in asthma mortality among different segments of the population.

4.1 Time Trends in Asthma Mortality. As indicated in Table 16 of Appendix A, asthma was the cause of 237 deaths in Mississippi during the five-year period 1999-2003; an average of 47.4 persons died each year from asthma, at an age-adjusted annual rate of 1.7 per 100,000. As shown in Figure 24, asthma mortality rates in Mississippi are low and ranged from 1.2 to 2.2 per 100,000 over the period 1999 to 2002 but the rate was down to 1.2 per 100,000 in 2003. The time trend is similar for whites and nonwhites with whites having higher age-adjusted rates but the gap appears to be closing somewhat.

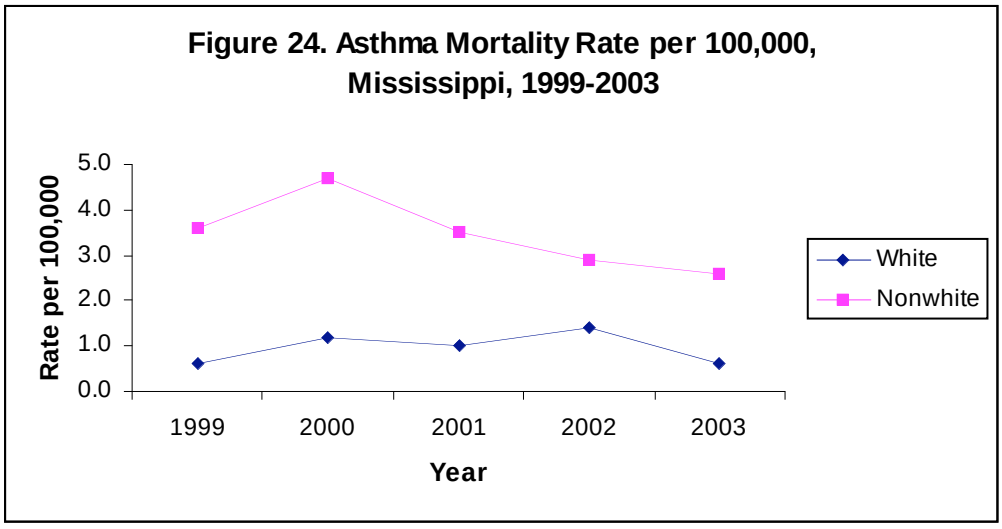
4.2 Asthma Mortality by Race. An average of 39.4 nonwhites died each year from 1999-2003 because of asthma, at an age-adjusted annual rate of 3.5 per 100,000 compared an average of 18 deaths at an age-adjusted annual rate of 1 per 100,000 for whites (Tables 17 and 18 of Appendix A).

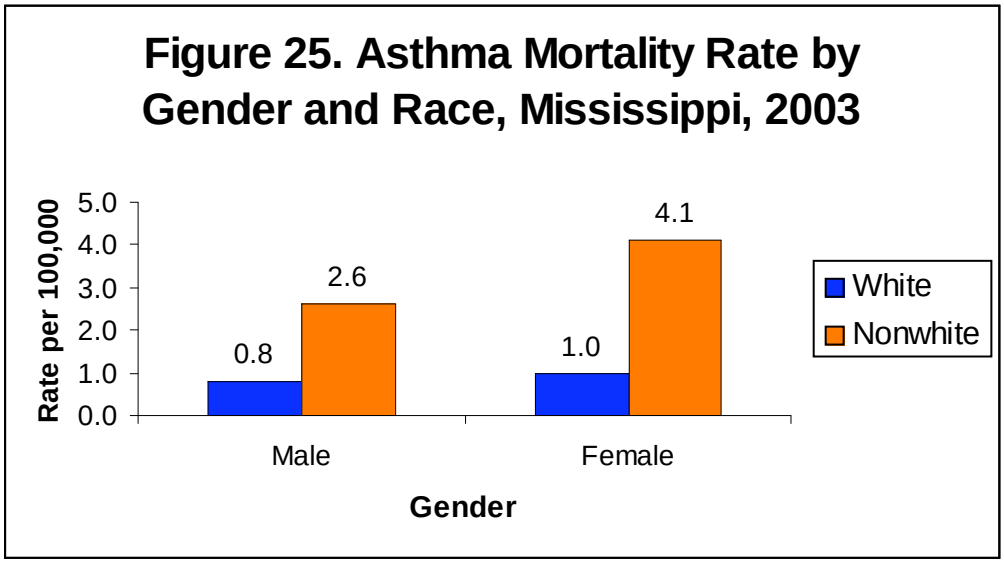
4.3 Asthma Mortality by Sex. An average of 31.2 females died each year from 1999-2003 because of asthma, at an age-adjusted annual rate of 2.0 per 100,000 compared an average of 16.3 deaths at an age-adjusted annual rate of 1.3 per 100,000 for males (Table 16 of Appendix A).

4.4 Asthma Mortality by Race and Sex. From 1999-2003, nonwhite females died because of asthma at an age-adjusted annual rate of 4.1 per 100,000, followed by nonwhite males (2.6 per 100,000), white females (1 per 100,000) and white males (0.8 per 100,000) (Table 17 of Appendix A). The 2003 mortality rate was higher for females than males and higher for nonwhites than for whites (Figure 25).

4.5 Asthma Mortality by Age. Of the 237 asthma deaths during 1999-2003, only 11 were children under 15 years of age; 56 were persons age 15-44, 63 were persons age 45-64 and 107 were persons age 65 and over (Table 18 of Appendix A).

4.6 Asthma Mortality by Race, Sex and Age. A breakdown of the number of asthma deaths during 1999-2003 attributed to asthma is shown in Table 21 of Appendix A. Relatively few deaths (11) occurred among those under 15 year of age; 6 were nonwhite females, 4 nonwhite males, 1 was white male and none was white female. The number of deaths was similar among white males and females in the 15-44 and 45-64 age groups, but among nonwhites there were more female than male deaths in both age groups. Of the 107 deaths among persons age 65 and over, 44 were nonwhite females, 33 white females, 18 nonwhite males and 12 white males. The sample size was too small to provide reliable estimates of race-sex-age specific rates, but the racial differences are even more striking in view of the smaller number of nonwhites in the Mississippi population.





5. Summary of Findings

Asthma Prevalence

- The overall statewide prevalence of asthma history among adults was 10.9%; prevalence of current asthma among adults was 6.9% in 2003.
- Based on the 2003 NSCH, an estimated 96, 835 (12.8%) children less than 18 years of age have a history of asthma and 68,855 (9.1%) currently have asthma.
- During the 12 months preceding the 2003 NSCH, an estimated 46,497 (6.1%) Mississippi children had an episode of asthma or an asthma attack.

Asthma Prevalence in Specific Population Groups

- Asthma history and current asthma were more prevalent among nonwhite than white adults, nonwhite versus white adult males, and adult females than adult males of both races.
- Adult asthma prevalence was higher in:
    - Persons with less than high school education.
    - Persons with annual household income less than $15,000.
    - Unemployed persons.
    - Separated or divorced persons.

Asthma Prevalence in Relation to Other Health Behaviors/ Risks

- Current smokers had asthma more often than those who were not current smokers.
- Obese adults had asthma more often than those who were not obese.
- Among adults age 65+, prevalence of having a flu shot within the last year was lower in white males with asthma.
- Among adults age 65+, prevalence of ever having the pneumonia vaccination was lower in white females with asthma.

Hospital Visits due to Asthma

- During 2003, 4,316 persons visited a hospital in the Jackson tri-county metro area.
- More females than males visited a hospital in the Jackson tri-county metro area.

- More nonwhites than whites visited a hospital in the Jackson tri-county metro area.
- More children in the age groups under 4 and 5-12 years visited a hospital in the Jackson tri-county metro area compared to persons in other age groups.
- During 2003, October was the peak month for asthma hospital visits in the tri-county metro area of Jackson.
- During 2003, there were 2,296 emergency room visits and 1,104 inpatient hospital visits for asthma in the Jackson tri-county metro area.
- During 2003, there were 4,781 outpatient visits (admissions for 23-hours or less, observation holds, and visits to hospital affiliated clinics) for asthma in the Jackson tri-county metro area.

Work-related Asthma

- During 2003, there were a total of 51 hospital visits that could potentially be due to work-related asthma.
- Of hospital visits that may have been due to work-related asthma, the highest number of visits occurred in Public Health District VIII (12), followed by Public Health Districts II and IX, with 10 and 9 visits, respectively.
- Based on data from the 2002 US Economic Census, Mississippi had 62,057 workers at risk for work-related asthma.

Asthma Mortality, 1999-2003

- The age-adjusted mortality rate for asthma in Mississippi is relatively low at 1.7 per 100,000 people.
- Nonwhites accounted for 147 deaths while the remaining 90 were white, with age-adjusted rates of 3.5 per 100,000 for nonwhites versus 1.0 per 100,000 for whites.
- The age-adjusted mortality rate for females was 4.1 per 100,000 (156 deaths) compared to 2.6 per 100,000 or 81 deaths among males.
- Adults over 65 years of age accounted for 107 asthma deaths while children under age 15 accounted for only 11.

6. Useful Web Sites for Further Information

Mississippi State Department of Health: http://www.msdh.state.ms.us

Mortality data: http://wonder.cdc.gov

Behavioral Risk Factor Surveillance System (BRFSS): http://www.cdc.gov/brfss

American Lung Association (national): http://www.lungusa.org

American Lung Association of Mississippi: www.alams.org

American Academy of Asthma, Allergy, and Immunology: http://www.aaaai.org

Asthma and Allergy Foundation of America: http://www.aafa.org

Allergy & Asthma Network Mothers of Asthmatics: http://www.aanma.org

Allergy, Asthma and Immunology Online: http://www.acaai.org

Appendix A: Detailed Tables on Asthma Prevalence, Hospital Visits and Mortality

Table 1
Adults With Asthma History, Year 2003
Mississippi Adult Population = 2,101,708

Group	White		Nonwhite		Total	
	Number	%	Number	%	Number	%
Total	136,885	10.3	91,967	11.8	228,852	10.9
Gender						
Male	51,012	7.9	39,424	11.1	90,435	9.1
Female	85,873	12.6	52,543	12.4	138,417	12.5
Age						
18-24	15,929	9.5	27,508	17.7	43,438	13.5
25-34	19,149	8.9	14,128	9.0	33,276	9.0
35-44	27,784	11.1	20,747	13.7	48,532	12.1
45-54	26,313	10.9	15,070	11.0	41,383	10.9
55-64	22,178	11.5	6,246	8.3	28,424	10.6
65-74	10,832	8.1	3988	7.7	14,821	8.0
75+	14,699	11.6	4279	8.7	18,978	10.8
Marital Status						
Never Married	17,159	10.5	34,318	13.6	51,476	12.4
Married	81,353	9.2	33,231	10.4	114,585	9.5
Separated or Divorced	25,884	17.3	14,822	12.1	40,706	14.9
Widowed	11,010	10.3	6,962	11.6	17,972	10.8
Unmarried Partner	1,479	7.0	2,378	10.7	3,857	8.9
Education						
< High School Graduate	30,035	16.5	29,680	15.3	59,716	15.9
H. S. Graduate or GED	43,398	10.6	29,199	11.0	72,597	10.8
Some College or Tech S.	30,928	8.4	22,721	12.1	53,650	9.6
College Graduate	32,524	8.9	10,366	8.1	42,890	8.7
Annual Income						
< $15,000	16,615	13.9	24,909	15.1	41,524	14.6
$15,000-$24,999	27,596	13.8	21,629	11.0	49,225	12.4
$25,000-$34,999	17,211	9.6	12,691	10.8	29,902	10.1
$35,000-$49,999	21,195	9.3	6,976	7.5	28,172	8.8
$50,000-$74,999	14,681	7.1	4,454	8.7	19,134	7.4
$75,000+	14,542	7.3	3,039	9.8	17,581	7.6
Employment Status						
Employed	60,228	7.8	36,425	8.7	96,653	8.1
Not Employed	9,388	14.2	14,646	17.8	24,034	16.2
Student/Homemaker	20,407	13.6	12,063	13.8	32,471	13.7
Retired/Unable to Work	46,862	14.2	28,833	15.2	75,695	14.6

Table 2
Adults With Current Asthma, Year 2003
Mississippi Adult Population = 2,101,708

Group	White		Nonwhite		Total	
	Number	%	Number	%	Number	%
Total	83,459	6.3	60,948	7.8	144,407	6.9
Gender						
Male	27,531	4.3	25,128	7.1	52,659	5.3
Female	55,928	8.2	35,820	8.5	91,748	8.3
Age						
18-24	8,606	5.2	15,350	9.9	23,957	7.4
25-34	12,649	5.9	7,936	5.0	20,585	5.5
35-44	15,649	6.2	16,284	10.8	31,933	7.9
45-54	14,941	6.2	8,939	6.5	23,880	6.3
55-64	15,114	7.9	5,208	6.9	20,321	7.6
65-74	7,795	5.9	3,460	6.7	11,256	6.1
75+	8705	6.9	3770	7.7	12475	7.1
Marital Status						
Never Married	11,756	7.2	18,075	7.1	29,831	7.2
Married	47,074	5.3	24,415	7.7	71,488	6.0
Separated or Divorced	17,670	11.8	11,529	9.4	29,199	10.7
Widowed	6,170	5.8	5,416	9.0	11,587	6.9
Unmarried Partner	789	3.7	1,512	6.8	2,301	5.3
Education						
< High School Graduate	21,778	12.0	24,072	12.4	45,850	12.2
H. S. Graduate or GED	26,950	6.6	17,102	6.4	44,051	6.5
Some College or Tech S.	16,994	4.6	14,015	7.5	31,009	5.6
College Graduate	17,737	4.9	5,759	4.5	23,496	4.8
Annual Income						
< $15,000	13,366	11.2	18,600	11.3	31,965	11.2
$15,000-$24,999	18,210	9.1	11,111	5.6	29,320	7.4
$25,000-$34,999	9,313	5.2	9,714	8.3	19,026	6.4
$35,000-$49,999	9,347	4.1	2,198	2.4	11,545	3.6
$50,000-$74,999	8,042	3.9	3,381	6.6	11,423	4.4
$75,000+	8,489	4.2	3,039	9.8	11,528	5.0
Employment Status						
Employed	31,966	4.1	23,746	5.7	55,712	4.7
Not Employed	7,393	11.2	8,954	10.9	16,347	11.0
Student/Homemaker	12,456	8.3	5,919	6.8	18,374	7.7
Retired/Unable to Work	31,645	9.6	22,330	11.8	53,974	10.4

Table 3
Adults With Asthma History, Year 2003
Mississippi Adult Asthma History Population = 228,852

Group	White		Nonwhite		Total	
	Number	%	Number	%	Number	%
Smoker	39,803	29.1	37,019	40.2	76,821	33.6
Overweight but not Obese	47,840	34.9	22,662	24.6	70,502	30.8
Obese	39,997	29.2	33,885	36.8	73,881	32.3
Flu Shot Within Last Year	51,305	37.5	26,725	29.1	78,030	34.1
Pneumonia Shot Ever	46,195	33.7	33,303	36.2	79,498	34.7

Table 4
Adults With Current Asthma, Year 2003
Mississippi Adult Current Asthma Population = 144,407

Group	White		Nonwhite		Total	
	Number	%	Number	%	Number	%
Smoker	25,887	31.0	22,765	37.3	48,653	33.7
Overweight but not Obese	31,398	37.6	13,950	22.9	45,349	31.4
Obese	25,188	30.2	25,582	42.0	50,770	35.2
Flu Shot Within Last Year	30,103	36.1	21,390	35.1	51,493	35.7
Pneumonia Shot Ever	29,463	35.3	22,586	37.1	52,048	36.0

Table 5
Adults With Asthma History, Mississippi, 1999-2003

Group	Prevalence	Year				
		1999	2000	2001	2002	2003
Total	No.	183,100	195,400	188,800	222,800	228,852
Total	%	9.2	9.8	9.2	10.6	10.9
White Males	%	9.5	9.0	8.1	9.7	7.9
White Females	%	8.3	9.4	8.3	11.0	12.6
Nonwhite Males	%	12.3	11.1	10.1	12.5	10.1
Nonwhite Females	%	8.0	10.7	11.8	10.2	12.2

Table 6
Adults With Current Asthma, Mississippi, 1999-2003

Group	Prevalence	Year				
		1999	2000	2001	2002	2003
Total	No.	96,800	134,100	113,900	127,900	144,407
Total	%	4.9	6.7	5.5	6.1	6.9
White Males	%	3.0	5.9	3.8	4.5	4.3
White Females	%	5.8	6.6	5.0	7.6	8.2
Nonwhite Males	%	6.6	5.9	7.3	5.9	6.4
Nonwhite Females	%	4.9	9.0	7.9	6.6	9.0

Table 7
Prevalence of Asthma by County, 2001-2003
Mississippi Population = 2,101,708

County	Ever Had Asthma		Currently Have Asthma	
	Number	%	Number	%
Adams	5,497	8.7	3,907	6.2
Alcorn	4,211	4.7	3,535	3.9
Amite	2,515	6.1	731	1.8
Attala	2,644	6.3	745	1.8
Benton	1,837	7.0	1,260	4.8
Bolivar	8,158	9.1	6,317	7.1
Calhoun	3,889	12.0	1,799	5.5
Carroll	3,181	10.9	2,756	9.4
Chickasaw	4,955	11.0	2,906	6.4
Choctaw	3,420	15.5	2,969	13.5
Claiborne	2,655	9.2	1,529	5.3
Clarke	2,838	6.8	2,454	5.9
Clay	2,832	6.4	2,170	4.9
Coahoma	7,840	12.9	3,973	6.5
Copiah	9,560	13.7	7,524	10.8
Covington	5,021	12.2	2,987	7.3
Desoto	22,971	9.8	17,011	7.3
Forrest	14,166	9.0	9,969	6.3
Franklin	2,866	11.3	1,321	5.2
George	2,694	5.7	2,038	4.3
Greene	2,272	8.5	889	3.3
Grenada	7,775	12.3	2,327	3.7
Hancock	7,355	7.4	4,573	4.6
Harrison	44,757	11.7	25,756	6.7
Hinds	51,127	9.0	25,854	4.6
Holmes	1,057	4.2	1,057	4.2
Humphreys	2,509	12.9	1,427	7.4
Issaquena	384	14.4	384	14.4
Itawamba	5,044	9.9	2,278	4.5
Jackson	21,700	8.8	12,500	5.1
Jasper	2,113	6.2	179	0.5

Table 7
Prevalence of Asthma by County, 2001-2003
Mississippi Population = 2,101,708

County	Ever Had Asthma		Currently Have Asthma	
	Number	%	Number	%
Jefferson	2,331	11.7	1,399	7.0
Jeff Davis	2,575	8.2	2,394	7.7
Jones	15,670	11.7	11,567	8.7
Kemper	5,625	15.7	1,091	3.0
Lafayette	5,811	7.6	4,830	6.3
Lamar	11,505	12.1	6,334	6.7
Lauderdale	14,668	8.4	6,370	3.7
Lawrence	5,831	17.4	2,557	7.6
Leake	4,982	11.4	3,023	6.9
Lee	10,976	6.4	6,898	4.0
Leflore	12,694	15.2	7,245	8.9
Lincoln	7,175	9.7	3,128	4.2
Lowndes	12,018	9.4	7,316	5.7
Madison	10,304	7.0	2,401	1.6
Marion	3,552	5.8	1,995	3.3
Marshall	10,980	15.0	8,950	12.2
Monroe	7,453	7.9	5,460	5.8
Montgomery	2,362	9.0	2,362	9.0
Neshoba	4,315	7.8	1,467	2.6
Newton	5,945	12.5	3,813	8.0
Noxubee	4,963	19.0	3,016	11.5
Oktibbeha	14,527	12.4	7,598	6.5
Panola	9,217	13.0	6,693	9.5
Pearl River	9,537	9.7	4,999	5.1
Perry	2,783	10.9	1,315	5.1
Pike	13,596	14.5	9,832	10.5
Pontotoc	5,259	8.0	2,472	3.8
Prentiss	6,391	13.6	4,292	9.1
Quitman	2,155	9.4	2,155	9.4
Rankin	18,541	7.5	10,987	4.5
Scott	5,014	7.2	4,469	6.4
Sharkey	0	0.0	0	0.0
Simpson	7,274	13.4	4,260	7.8
Smith	2,508	7.1	1,605	4.6
Stone	1,273	4.3	61	0.2
Sunflower	16,036	20.2	9,390	11.8
Tallahatchie	2,045	7.4	1,361	5.0
Tate	11,353	18.4	7,878	12.8
Tippah	5,002	9.8	3,657	7.2
Tishomingo	8,310	14.7	6,063	10.8
Tunica	1,496	7.3	1,112	5.5
Union	2,646	5.3	1,985	4.0
Walthall	5,029	13.6	4,589	12.4

Table 7
Prevalence of Asthma by County, 2001-2003
Mississippi Population = 2,101,708

County	Ever Had Asthma		Currently Have Asthma	
	Number	%	Number	%
Warren	14,808	13.1	7,310	6.5
Washington	14,418	12.6	10,060	8.8
Wayne	10,989	22.4	8,185	16.7
Webster	2,360	9.9	1,557	6.5
Wilkinson	4,587	15.2	2,392	7.9
Winston	2,513	5.5	1,574	3.5
Yalobusha	2,125	6.0	1,292	3.6
Yazoo	1,747	5.6	1,747	5.6

Table 8
Number of Persons with at Least One Hospital Visit for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group	Number of Visits per Person						Total
	1	2	3	4	5-9	10+	
Total	2,635	837	385	183	240	36	4,316
Sex: Male	1,122	372	173	90	88	9	1,854
Female	1,513	465	212	93	152	27	2,462
Race: White	824	173	70	26	39	4	1,136
Black	1,780	649	313	156	201	32	3,131
Other	31	15	2	1	0	0	49
Age: 0-4	636	209	100	38	51	3	1,037
5-12	515	230	112	59	47	3	966
13-17	173	67	33	16	13	2	304
18-24	200	48	27	12	21	10	318
25-34	242	76	22	9	25	5	379
35-44	239	65	34	12	30	6	386
45-54	260	66	32	21	32	5	416
55-64	179	39	13	8	15	2	256
65+	191	37	12	8	6	0	254

Table 9
Total Number of Hospital Visits per Month for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total		682	577	722	637	615	590	589	581	746	926	740	776	8,181
Sex:	Male	297	245	307	257	237	232	253	248	306	397	334	312	3,425
	Female	385	332	415	380	378	358	336	333	440	529	406	464	4,756
Race:	White	163	137	176	132	112	151	114	112	140	186	146	187	1,756
	Black	512	434	538	493	499	437	470	465	600	730	588	589	6,355
	Other	7	6	8	12	4	2	5	4	6	10	6	0	70
Age:	0-4	114	117	167	133	124	132	119	135	187	244	208	192	1,902
	5-12	150	158	170	155	128	129	130	138	177	217	164	156	1,872
	13-17	60	37	44	43	39	39	35	38	47	71	51	59	563
	18-24	50	49	63	55	64	50	74	52	66	67	62	74	726
	25-34	67	39	50	54	74	49	57	53	54	78	65	71	711
	35-44	77	55	72	81	59	62	58	43	74	93	52	69	795
	45-54	61	61	78	63	62	60	60	64	71	74	75	76	805
	55-64	35	36	46	28	38	41	32	31	40	40	33	34	434
	65+	38	25	32	25	27	28	24	27	30	42	30	45	373

Table 10
Number of Hospital Visits by Type for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group		Type of Visit			
		Emergency	**Inpatient**	**Outpatient**	**Total**
Total		2,296	1,104	4,781	8,181
Sex:	Male	1,013	394	2,018	3,425
	Female	1,283	710	2,763	4,756
Race:	White	383	338	1,035	1,756
	Black	1,896	760	3,699	6,355
	Other	17	6	47	70
Sex/Race:	Male/White	135	101	419	655
	Male /Black	872	289	1,574	2,735
	Male/Other	6	4	25	35
	Female/White	248	237	616	1,101
	Female/Black	1,024	471	2,125	3,620
	Female/Other	11	2	22	35
Age:	0-4	493	186	1,223	1,902
	5-12	450	144	1,278	1,872
	13-17	163	42	358	563
	18-24	271	122	333	726
	25-34	292	107	312	711
	35-44	280	144	371	795
	45-54	195	141	469	805
	55-64	101	82	251	434
	65+	51	136	186	373

Table 11
Number of Emergency Hospital Visits per Month for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total		219	170	202	176	174	159	134	116	207	266	237	236	2,296
Sex:	Male	102	72	91	76	64	74	73	57	104	112	98	90	1,013
	Female	117	98	111	100	110	85	61	59	103	154	139	146	1,283
Race:	White	39	24	40	35	22	33	21	14	26	45	41	43	383
	Black	179	146	160	137	151	125	111	102	179	219	194	193	1,896
	Other	1	0	2	4	1	1	2	0	2	2	2	0	17
Age:	0-4	32	42	38	34	32	27	24	36	53	67	65	43	493
	5-12	41	39	47	56	24	27	22	24	35	52	46	37	450
	13-17	22	3	10	11	13	7	5	10	18	23	16	25	163
	18-24	25	18	19	22	17	21	26	14	28	20	30	31	271
	25-34	38	17	23	9	32	21	21	14	18	37	29	33	292
	35-44	32	20	25	22	24	24	13	3	28	42	16	31	280
	45-54	18	14	23	17	13	16	14	9	13	16	19	23	195
	55-64	2	9	16	2	12	14	8	5	10	6	9	8	101
	65+	9	8	1	3	7	2	1	1	4	3	7	5	51

Table 12
Number of Inpatient Hospital Visits per Month for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total		89	73	93	86	82	77	82	69	86	107	133	127	1,104
Sex:	Male	23	22	40	37	24	26	27	28	30	39	56	42	394
	Female	66	51	53	49	58	51	55	41	56	68	77	85	710
Race:	White	29	34	31	16	21	27	18	21	23	32	37	49	338
	Black	57	39	62	69	61	50	64	48	62	74	96	78	760
	Other	3	0	0	1	0	0	0	0	1	1	0	0	6
Age:	0-4	7	13	16	16	12	9	9	10	15	26	33	20	186
	5-12	14	11	18	10	11	9	8	10	12	15	15	11	144
	13-17	5	2	3	7	4	1	3	2	3	1	2	9	42
	18-24	8	5	11	10	17	5	14	10	10	8	10	14	122
	25-34	10	6	7	8	9	11	10	9	10	7	12	8	107
	35-44	11	7	14	13	9	14	9	12	13	12	18	12	144
	45-54	14	14	8	11	11	9	10	7	5	13	19	20	141
	55-64	9	10	5	4	4	8	10	3	6	6	9	8	82
	65+	11	5	11	7	5	11	9	6	12	19	15	25	136

Table 13
Number of Outpatient Hospital Visits per Month for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total		374	334	427	375	359	354	373	396	453	553	370	413	4,781
Sex:	Male	172	151	176	144	149	132	153	163	172	246	180	180	2,018
	Female	202	183	251	231	210	222	220	233	281	307	190	233	2,763
Race:	White	95	79	105	81	69	91	75	77	91	109	68	95	1,035
	Black	276	249	316	287	287	262	295	315	359	437	298	318	3,699
	Other	3	6	6	**7**	3	1	3	4	3	7	4	0	47
Age:	0-4	105	62	113	83	80	96	86	89	119	151	110	129	1,223
	5-12	95	108	105	89	93	93	100	104	130	150	103	108	1,278
	13-17	33	32	31	25	22	31	27	26	26	47	33	25	358
	18-24	17	26	33	23	30	24	34	28	28	39	22	29	333
	25-34	19	16	20	37	33	17	26	30	26	34	24	30	312
	35-44	34	28	33	46	26	24	36	28	33	39	18	26	371
	45-54	29	33	47	35	38	35	36	48	53	45	37	33	469
	55-64	24	17	25	22	22	19	14	23	24	28	15	18	251
	65+	18	12	20	15	15	15	14	20	14	20	8	15	186

Table 14
Number of Persons With at Least One Hospital Visit by Type for Asthma, Jackson Mississippi Metropolitan Tri-county Area, 2003

Group		Type of Visit			
		Emergency	Inpatient	Outpatient	Total
Total		1,508	694	2,114	4,316
Sex:	Male	678	258	916	1,852
	Female	830	436	1,198	2,464
Race:	White	305	242	588	1,135
	Black	1,189	447	1,497	3,133
	Other	14	5	29	48
Sex/Race:	Male/White	113	76	247	436
	Male /Black	560	178	652	1,390
	Male/Other	5	4	17	26
	Female/White	192	166	341	699
	Female/Black	629	269	845	1,743
	Female/Other	9	1	12	22
Age:	0-4	330	125	620	1,075
	5-12	289	101	556	946
	13-17	126	21	146	293
	18-24	180	54	79	313
	25-34	190	65	122	377
	35-44	161	78	156	395
	45-54	125	81	206	412
	55-64	68	61	122	251
	65+	39	108	107	254

Table 15
Mississippi Industries with Employees at Risk
for Work-Related Asthma, 2002

Type of Industry	Number of Employees
Meat Product Manufacturing	22,834
Saw Mills	4,205
Cut stock, resawing lumber, and planing	987
Other millwork including flooring	485
Wood container and pallet manufacturing	1,099
All other miscellaneous wood product manufacturing	1,626
Cement and concrete product manufacturing	1,779
Metal stamping	346
Plate work and fabricated structural product manufacturing	2,168
Ornamental and architectural metal product manufacturing	298
Other commercial and service industry machinery manufacturing	841
Air conditioning and warm air heating and commercial refrigeration equipment manufacturing	3,432
Material and Handling equipment manufacturing	1,058
Motor vehicle body and trailer manufacturing	321
Gasoline engine and engine parts manufacturing	3,304
Other motor vehicle electrical and electronic equipment manufacturing	1,202
Nursing care facilities	14,586
Continuing care retirement communities	1,486
	62,057

Table 16

Number and Rate of Asthma Deaths by Race and Year of Death
Vital Records and Statistics, Mississippi 1999-2003

Year	White		Nonwhite		Total	
	Number	Rate[a]	Number	Rate[a]	Number	Rate[a]
1999	11	0.6	30	3.6	41	1.5
2000	22	1.2	38	4.7	60	2.2
2001	20	1.0	30	3.5	50	1.8
2002	25	1.4	27	2.9	52	1.9
2003	12	0.6	22	2.6	34	1.2
Total	90	1.0	147	3.5	237	1.7

[a]Rate = Deaths per 100,000

Table 17
Number and Rate of Asthma Deaths by Race and Sex
Vital Records and Statistics, Mississippi 1999-2003

Sex	White		Nonwhite		Total	
	Number	Rate[a]	Number	Rate[a]	Number	Rate[a]
Male	34	0.8	47	2.6	81	1.3
Female	56	1.0	100	4.1	156	2.0
Total	90	1.0	147	3.5	237	1.7

[a]Rate = Deaths per 100,000

Table 18
Number[a] of Asthma Deaths by Age,
Vital Records and Statistics, Mississippi 1999-2003

Age	Number
<15	11
15-44	56
45-64	63
65+	107
Total	237

[a]The count was too small to provide reliable estimates of age specific rates.

Table 19
Number[a] of Asthma Deaths by Race, Sex and Age
Vital Records and Statistics, Mississippi 1999-2003

Sex	Age	White	Nonwhite	Total
Male	<15	1	4	5
	15-44	10	15	25
	45-64	11	10	21
	65+	12	18	30
Female	<15	0	6	6
	15-44	11	20	31
	45-64	12	30	42
	65+	33	44	77
Total		90	147	237

[a]The count was too small to provide reliable estimates of race-sex-age specific rates

Table 20
Average Number of Asthma Deaths per Year by Race and Age
Vital Records and Statistics, Mississippi 1999-2003

Year	White		Nonwhite		Total
	Male	Female	Male	Female	
<15	0.2	0.0	0.8	1.2	2.2
15-44	2.0	2.2	3.0	4.0	11.2
45-64	2.2	2.4	2.0	6.0	12.6
65+	2.4	6.6	3.6	8.8	21.4
Total	6.8	11.2	9.4	20.0	47.4

Appendix B: Abbreviations

BRFSS: Behavioral Risk Factor Surveillance System

ER: Emergency Room

ICD-9: International Classification of Diseases, 9th Revision

ICD-10: International Classification of Diseases, 10th Revision

MDH = Mississippi Department of Health

CDC = Centers for Disease Control and Prevention

NCHS = National Center for Health Statistics

NSCH = National Survey of Children's Health

Appendix C. Schedule for Use of BRFSS Asthma Questions

Schedule for Past Use of BRFSS Asthma Questions

Year	1999	2000	2001	2002	2003
Adult asthma prevalence	! (module)	! (core)	! (core)	! (core)	! (core)
Adult asthma history			! (module)		
Childhood asthma				! (module)	

Schedule for Planned Future Use of BRFSS Asthma Questions.

Year	2004	2005	2006	2007	2008
Adult asthma prevalence	! (core)		! (core)	! (module)	! (core)
Adult asthma history	! (module)			! (module)	
Childhood asthma	! (module)			! (module)	
Asthma Call-Back Survey				! (module)	