Asthma Surveillance Report

OKLAHOMA

2006

Asthma Prevention and Control Program
Chronic Disease Service
Oklahoma State Department of Health

Oklahoma Asthma Initiative

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- Tobacco Use Prevention Service

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DISCLAIMER

Oklahoma Asthma Prevention and Control Program is supported under Cooperative Agreement #U59/CCU620857, Addressing Asthma from a Public Health Perspective from the Centers for Disease Control and Prevention (CDC).

The analyses, interpretations, conclusions, or opinions expressed in this report do not necessarily reflect the views of CDC, OSDH, OAI, American Lung Association of the Central States, or any organization provided data for this report.

EXECUTIVE SUMMARY

This report provides information and data about the mortality and morbidity of asthma in Oklahoma, and compared to the Healthy People 2010 objectives where applicable. This report also provides information about prevalence of asthma related risk behaviors, asthma hospitalizations, and the cost of asthma.

In the United States

- Over 20 million adults and nearly 9 million children under the age of 18 are estimated to have been diagnosed with asthma in their lifetime. Over 14 million adults and about 6 million children under 18 years old currently have asthma.
- Asthma affecting nearly 1 in 13 school-aged children, is the leading cause of school absenteeism due to chronic disease.
- The estimated cost of treating asthma in children less than 18 years of age is $3.2 billion per year.

Asthma in Oklahoma Adults

- 358,400 adults 18 years and older (13.3%) reported that they had ever been diagnosed with asthma by health professionals.
- 229,000 adults 18 years and older (8.5%) reported that they currently have asthma.
- Female adults in Oklahoma have significantly higher prevalence of lifetime and current asthma than males ($P<0.05$).
- Hispanic adults in Oklahoma reported significantly lower prevalence of lifetime and current asthma than Non-Hispanic adults ($P<0.01$).

Asthma in Oklahoma Children

- 114,300 children under age 18 (13.4%) reported that had been told by a health professional that he/she had asthma.
- 78,500 children under age 18 (9.2%) reported that they currently have asthma.
- African American children had the highest prevalence of both lifetime and current asthma.

Asthma Control and Management in Oklahoma

- 41.1% of adults with current asthma took medication for asthma at least once a day, but 25.4% of adults with current asthma did not take any medication.
- About 40.5% of children with current asthma took medication within last 24 hours.
- 55.3% of adults with current asthma reported they had an asthma attack during the past 12 months. Females had a higher percentage of asthma attacks than males ($P<0.05$).

- Among children with current asthma, 71.9% experienced an episode or attack of asthma during the past 12 months.
- 19.2% of adults with current asthma visited an emergency room (ER) or urgent care center because of their asthma during the past 12 months. Females were more likely to have ER visits than males ($P<0.05$).
- 29.1% of adults with current asthma visited a physician or nurse for urgent treatment of worsening asthma symptoms during the past 12 months.
- 50.9% of adults with current asthma went to their physician for a routine asthma checkup during the past 12 months.
- 34.2% of adults with current asthma were unable to work or carry out usual activities at least one day during the past 12 months because of asthma.

Asthma Hospitalizations in Oklahoma

- In 2005, there were 4,883 hospital admissions with asthma as the principle diagnosis.
- The total charges in 2005 were approximately $48.8 million for hospitalizations with asthma as the principle diagnosis. Females accounted for 78% of the total charges and had higher average charges than males.
- In 2005, the average length of stay for hospitalizations with asthma as the principle diagnosis was 3.4 days. Females stayed longer than males.
- Among patients hospitalized with asthma as the principle diagnosis, 57.7% were admitted from the emergency room.

Asthma in Oklahoma Medicaid Beneficiaries

- In 2005, there were 32,525 Medicaid beneficiaries that received paid claims with asthma as the primary diagnosis.
- 51.0% of beneficiaries who had claims with asthma as the primary diagnosis were children younger than 10 years of age.
- The total paid claims with primary diagnosis of asthma was over $11 million in 2005.

Asthma Mortality

- There were 56 people died from asthma in 2005 in Oklahoma, four of them were under the age of 25 years old.
- The age-adjusted mortality rate for asthma was similar to that in the US.
- African Americans have two and a half times higher asthma mortality rates than Whites. Females have about 50% higher asthma mortality rates than males.
- Asthma mortality rates increased significantly in the elderly population.

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INTRODUCTION

Asthma is a chronic respiratory disease, impacting adults and children, characterized by cough, shortness of breath, tightening of the chest, and wheezing. These symptoms can be triggered by a variety of sources including respiratory infections, allergens, air pollutants, allergenic food and chemicals, and psychosocial factors (1). Symptoms of asthma can range from mild to severe and life-threatening (2).

In Oklahoma, there were 229,000 adults and 78,500 children had current asthma in 2005. In the same year, 56 people died with asthma as the underlying cause of death. Although more than half of them were elderly, four were younger than 25 years old. There were 4,883 hospital admissions with asthma as the primary diagnosis for the calendar year 2005 in Oklahoma hospitals. The total charges for these admissions were $48.8 million. The total paid claims with primary diagnosis of asthma from the Oklahoma Medicaid program were over $11 million in 2005.

The Healthy People 2010 objectives included the following goals to improve the lives of people with asthma (detailed goals and targets in Appendix 4).

- Reduce asthma deaths.
- Reduce hospitalizations for asthma.
- Reduce hospital emergency department visits for asthma.
- Reduce activity limitations among persons with asthma.
- Reduce the number of school or workdays missed by persons with asthma due to asthma.
- Increase the proportion of persons with asthma who receive formal patient education, including information about community and self-help resources, as an essential part of the management of their condition.
- Increase the proportion of persons with asthma who receive appropriate asthma care according to the NAEPP Guidelines.
- Increase the number of States with an asthma surveillance system for tracking asthma cases, illness, and disability.

The Oklahoma Asthma Initiative (OAI) is a statewide coalition of health and social care organizations and professionals, advocates, and individuals who have asthma or caregivers of people with asthma. The mission of OAI is ***to improve the health status of Oklahomans affected by asthma***, thus, the OAI members are working in an effort to implement and sustain changes in medical professional education, patient and caregiver education, community education, public policy, data and surveillance, and public relations.

The purpose of this surveillance report is to present a variety of the latest statewide, county level when appropriate, asthma-related statistics, to assist policy makers, health professionals, public health programs, media, and the public in identifying problems, program planning, and evaluation.

METHODS AND DATA SOURCES

The Oklahoma Asthma Prevention and Control Program facilitates the Data and Surveillance Committee of the Oklahoma Asthma Initiative. The committee is responsible for maintaining and updating the Oklahoma Asthma Surveillance System. Committee members include staff within the Oklahoma State Department of Health (OSDH, including Chronic Disease Service, Center for Health Statistics, Health Care Information, Vital Records, Tobacco Use Prevention Service, and Maternal and Child Health Service) and staff from external organizations (including American Lung Association of the Central States, Oklahoma Department of Environmental Quality, Oklahoma Health Care Authority, College of Public Health and College of Medicine in University of Oklahoma Health Science Center). The committee members provide technical assistance to the asthma program epidemiologist in gathering data and reviewing data for appropriateness.

BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS)

The Behavioral Risk Factor Surveillance System (BRFSS), which is administered and supported by the Centers for Disease Control and Prevention (CDC), is a state-based, ongoing, random-digit-dialed (RDD) telephone survey of the non-institutionalized civilian population 18 years of age and older. It is designed to monitor the prevalence of the major behavioral risks among adults associated with premature morbidity and mortality.

Two asthma prevalence measures were constructed in BRFSS core questions. In addition, nine questions on adult asthma history and two questions on child prevalence are available as optional modules. Lifetime asthma is defined as an affirmative response to the question “Have you ever been told by a doctor {nurse or other health professional} that you have asthma?”. Current asthma is defined as an affirmative response to that question followed by an affirmative response to the subsequent question “Do you still have asthma?”

The latest asthma data from Oklahoma BRFSS includes two asthma prevalence questions in the core of the 2005 survey, the adult asthma history module and the childhood asthma module from the 2002, 2003, and 2004 survey.

There are limitations to the BRFSS. First, the Oklahoma BRFSS is a telephone survey of Oklahoma residences. While it is estimated that only 5% of Oklahomans do not have residential phone service, these individuals could have higher rates of asthma than the general population. Although statistical weights were used to minimize this effect, it can never be completely eliminated. Second, the BRFSS data is self-reported and cannot be verified.

HOSPITALIZATION DATA

Asthma related hospital discharge data is currently available through 2005. The Oklahoma Health Care Information Act mandates the collection of inpatient hospitalization data from licensed facilities within the state. The Oklahoma Health Care Information Center, housed at the Oklahoma State Department of Health, is responsible for the collection, processing, and dissemination of this data. In 2005, all 138 hospitals reported their data to OSDH.

There are limitations for hospital discharge data. One limitation is that it reflects encounters rather than individuals. Thus, one individual could be in the dataset more than once. Another limitation is that discharges from Indian Health Service hospitals, military and veteran hospitals are not collected. Also, out of state hospital discharges of the Oklahoma residents were not included.

MEDICAID

Medicaid is the federal and state entitlement program that provides funding for medical benefits to low-income individuals who have inadequate or no health insurance coverage. Medicaid guarantees coverage for basic health and long-term care services based upon income and/or resources. The Oklahoma Health Care Authority (OHCA) is the primary entity in the State of Oklahoma charged with controlling costs of State-purchased health care. The mission of OHCA is to purchase state and federally funded health care in the most efficient and comprehensive manner possible and to study and recommend strategies for optimizing the accessibility and quality of health care.

In Oklahoma, a prearranged fee (capitated payment) is paid to the SoonerCare Primary Care Provider/Case Manager (PCP/CM) monthly for primary and preventive care. Other services not included in the capitated benefit package are paid as fee-for-service. Under fee-for-service, payments are made directly to the providers once an allowable service has been provided and billed.

The statistical results of Medicaid claim data were obtained through an inter-agency data sharing agreement between OSDH and OHCA. The data is currently available through 2005.

MINORITY BEHAVIORAL RISK FACTOR SURVEY

The Oklahoma Minority Behavioral Risk Factor Survey (OMBRFS) was a survey focused specifically on minority populations in Oklahoma. Information was collected using the questionnaire and survey methods similar to the one used in the Oklahoma Behavioral Risk Factor Surveillance System (BRFSS).

The OMBRFS is conducted over the telephone and includes several initial questions to identify whether or not there is anyone in the household who may be any racial group other than non-Hispanic White. While all Hispanic and non-White members of a given household were eligible, only one member was selected at random to be interviewed.

In addition to the routine questions regarding health status, access to care, and various health behaviors, other important questions were also asked to determine if minority populations acted or were treated differently from white populations. The added questions asked about discrimination, trust, language and ethnicity, and alternative medicine. Other questions addressed sexual assault, osteoporosis and deterrents to obtaining mammograms.

The OMBRFS was conducted from April 2003 through December 2004. The limitations for OMBRFS were similar to those of BRFSS.

MORTALITY DATA

Asthma mortality data for the US were from CDC WONDER (Wide-ranging OnLine Data for Epidemiologic Research, http://wonder.cdc.gov/), which contains mortality and population counts for the years through 2004. Data for Oklahoma asthma mortality were form Oklahoma Vital Records, the official registration point and repository for certificates for all birth and death events that occur in the state of Oklahoma. The latest available data was through 2005. Oklahoma data was made available from the interactive web-based inquiries through OK2SHARE, the Oklahoma State Department of Health (OSDH) internet databases at http://www.health.state.ok.us/ok2share/ .

Underling causes of deaths with ICD-9 code 493-493.9 before 1999 and ICD-10 code J45-J46 on 1999 and after were considered as asthma mortality cases. The comparability ratio from ICD-10 to ICD-9 for asthma deaths was 0.89, indicates that 11% fewer deaths are coded as caused by asthma in the ICD-10 revision due to the change (see http://wonder.cdc.gov/ for details). Age-adjusted mortality rates (based on US 2000 standard population) were either obtained from the CDC WONDER or OK2SHARE.

There were some limitations with asthma mortality data. Asthma mortality rates might be underreported since persons with asthma may die of other diseases. Furthermore, decedents with asthma recorded as a cause of death are not representative of decedents known to have asthma.

An additional limitation is the misclassification of American Indians on death certificates, particularly in Oklahoma where the American Indian population represents 8.5% of the state Non-Hispanic population. According to a report by the National Center for Health Statistics, all cause death rates for Native Americans are 21% lower than they should be due to misclassification on death certificates and underreporting in the census. To eliminate the misclassification, Oklahoma Vital Records has been making continuing efforts to have a linkage between Oklahoma death data and Indian Health Services (IHS) administrative records in Albuquerque, New Mexico. These administrative records include all patients seen at any Indian Health Services or reporting Tribal Health Service Facility throughout the United States – including all areas offices. The IHS linked mortality data were through 2003.

NATIONAL SURVEY OF CHILDREN'S HEALTH

The National Survey of Children's Health is the 3rd State and Local Area Integrated Telephone Survey (SLAITS) to produce national estimates concerning the health of children, conducted by the Centers for Disease Control and Prevention's (CDC) National Center of Health Statistics (NCHS). A random digit dial (RDD) sample of households with children under 18 years of age was selected from each of the 50 states and the District of Columbia. One child was randomly selected from all children in each identified household to be the subject of the survey. The respondent was the parent or guardian who knew the most about the child's health care. Estimates based on the sampling weights generalize to the noninstitutionalized population in each state and nationwide.

YOUTH RISK BEHAVIOR SURVEY

The Youth Risk Behavior Survey (YRBS) was developed in 1990 to monitor priority health risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States. These behaviors, often established during childhood and early adolescence, include: tobacco use, unhealthy dietary behaviors, inadequate physical activity, alcohol and other drug use, sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, including HIV infection, and behaviors that contribute to unintentional injuries and violence. Oklahoma YRBS collected asthma information in 2005 based on the following questions, "Has a doctor or nurse ever told you that you have asthma?" and "During the past 12 months, have you had an episode of asthma or an asthma attack?"

CDC randomly selected a certain number of schools and a certain number of classrooms from the list of all public schools in Oklahoma. The YRBS program contacted the schools and asked for their participation and a list of all second hour classrooms. The classrooms, which would conduct the survey, were randomly selected from that list. After the classrooms are selected and the school has agreed to participate, each county health department that has a school in the sample was asked to pick a person to help. Those people were trained on how to administer the survey and the state YRBS program also provide staff to assist. The county health department staff worked with the school to arrange a date for the survey, and on that date, they administered the survey in the selected classrooms and collected the survey booklets. After every school had finished, the survey booklets were sent back to the CDC for data entry. The finalized dataset was then provided to YRBS staff in OSDH.

In 2005, 50 schools were randomly selected and 49 chose to participate. The overall response rate was 80%. There were 2,084 students selected and 1,715 students participated.

OKLAHOMA YOUTH TOBACCO SURVEY

The Oklahoma Youth Tobacco Survey is a school-based survey administered to a random sample of 6th-8th, and 9th-12th graders statewide. Sample selection and survey administration procedures are the same

as for the Youth Risk Behavior Survey. In the year 2005, 1,421 students of 9th to 12th grade in 41 schools and 1,765 students of 6th to 8th grade in 43 schools completed the statewide survey. Two asthma questions similar to the BRFSS questions were asked in the YTS back from 2002: "Have you ever been told by a doctor or other health care provider that you had asthma?" and "Do you still have asthma?" The latest available asthma information obtained from YTS data is from the 2005 survey.

ASTHMA IN ADULTS

Prevalence data of asthma in adults (18 years and older) was obtained from the Behavioral Risk Factor Surveillance System (BRFSS). Oklahoma 2005 BRFSS data includes two asthma prevalence questions in the core. The data from nine questions on the adult asthma history module is available through 2004. See Data Sources and Methods for details.

PREVALENCE OF LIFETIME AND CURRENT ASTHMA

In 2005, 13.3% of adults in Oklahoma (358,400 people) had ever been told by a health professional that they have asthma (lifetime asthma) and 8.5% of adults in Oklahoma (229,000 people) currently have asthma.

The prevalence of lifetime asthma in Oklahoma and US adults increased slightly during the past six years (Figure 1). The prevalence of current asthma in Oklahoma adults increased slightly during the past six years, while the prevalence in US adults remained unchanged (Figure 2).

Figure 1. Prevalence of Lifetime Asthma: Oklahoma and US, BRFSS 2000-2005

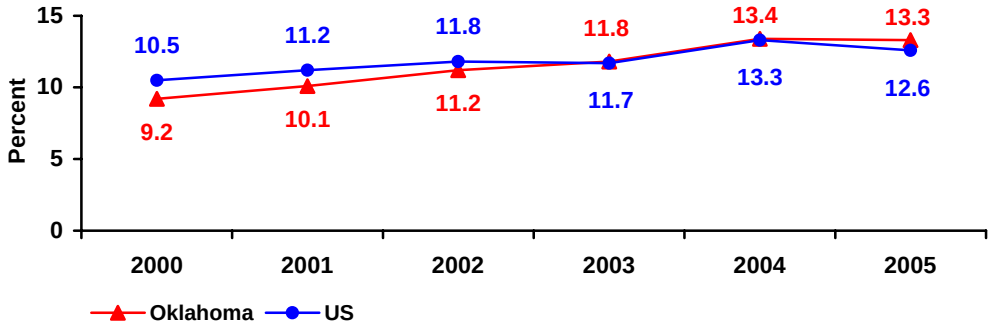
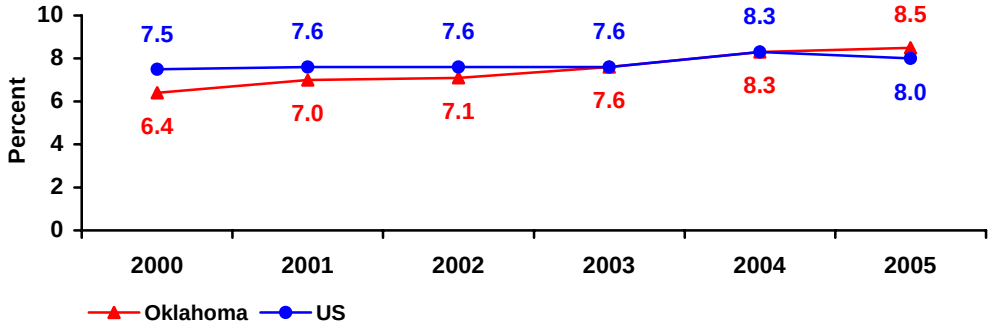
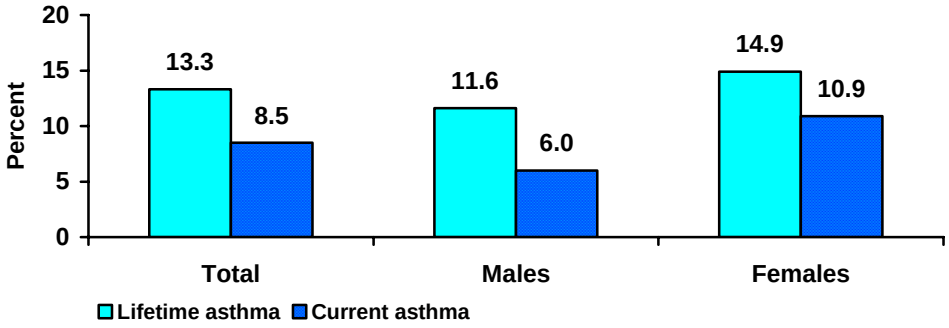


Figure 2. Prevalence of Current Asthma: Oklahoma and US, BRFSS 2000-2005



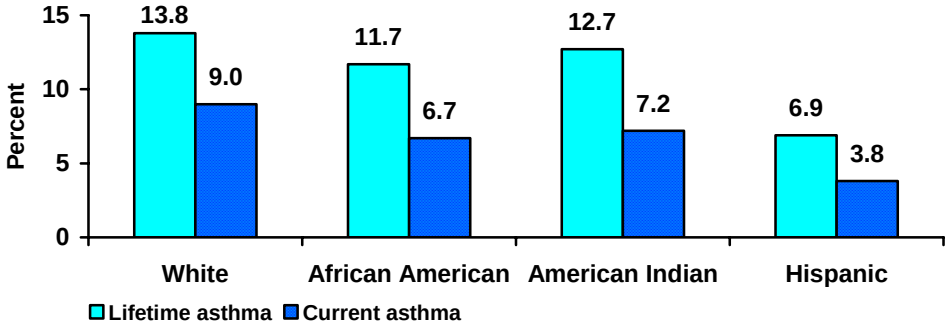
Female adults in Oklahoma have significantly higher prevalence of lifetime and current asthma than males (P<0.05, Figure 3).

Figure 3. Prevalence of Lifetime and Current Asthma by Gender: Oklahoma BRFSS 2005



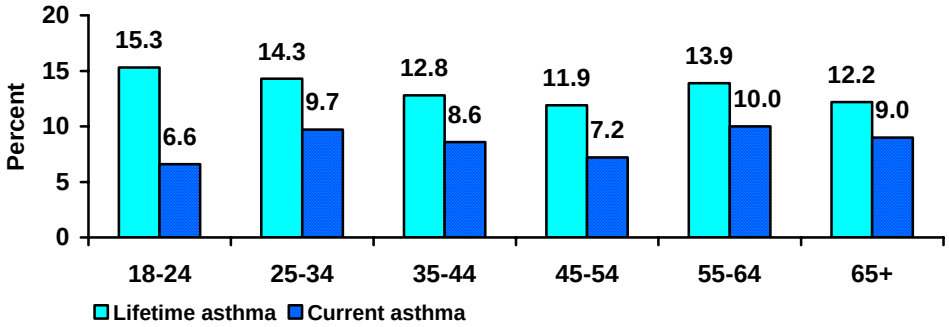
Hispanic adults in Oklahoma reported significantly lower prevalence of lifetime and current asthma than Non-Hispanic adults (P<0.01). Among Non-Hispanic adults, although not significantly different from other racial groups, Whites reported higher prevalence of lifetime and current asthma (Figure 4).

Figure 4. Prevalence of Lifetime and Current Asthma by Race/ethnicity: Oklahoma BRFSS 2005



There is no statistically significant difference in prevalence of lifetime or current asthma by age groups, although those in the 18-24, 25-34, and 55-64 years old age groups reported higher prevalence of lifetime asthma. For current asthma, those 25-34 years old and over 55 years old reported slightly higher prevalence than people in other age groups (Figure 5).

Figure 5. Prevalence of Lifetime and Current Asthma by Age Group: Oklahoma BRFSS 2005



There is no significant difference in prevalence of lifetime or current asthma by level of education (Table 1,2). People with annual household incomes lower than $15,000 reported higher prevalence of both lifetime and current asthma (15.7% and 11.5%, respectfully) than those with annual incomes $50,000 and over (11.5% and 7.3%, respectfully, p>0.05, Table 1,2).

Among those adults that have ever been diagnosed with asthma in their lifetime, 44.7% of them were diagnosed prior to the age of 11 years old (Figure 6). More males were diagnosed with asthma before 11 years old than females (61.5% vs. 31.8%, p<0.05).

Figure 6. Age Diagnosed of Asthma Among Adults Ever Diagnosed with Asthma: Oklahoma BRFSS 2003-2004

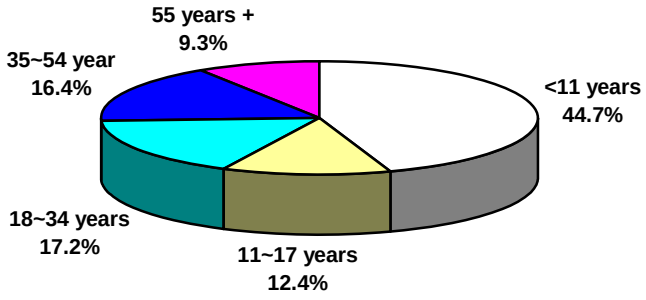


Table 1. Prevalence of Asthma Among Adult Oklahoman: Oklahoma BRFSS 2005

	Lifetime Asthma		Current Asthma	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	13.3	12.3-14.3	8.5	7.7-9.3
Gender				
Males	11.6	10.0-13.2	6.0	4.9-7.1
Females	14.9	13.7-16.1	10.8	9.8-11.9
Race/Ethnicity*				
NH-White	13.8	12.6-15.0	9.0	8.0-9.9
NH-Black	11.3	7.4-15.2	6.4	3.6-9.2
NH-American Indian	12.4	9.1-15.7	7.1	5.3-8.8
Hispanic	7.1	3.8-10.4	3.7	1.4-6.1
Age (years)				
18-24	15.2	10.9-19.5	6.6	3.8-9.3
25-34	14.4	11.9-16.8	9.7	7.6-11.8
35-44	12.7	10.4-15.0	8.5	6.5-10.5
45-54	11.8	9.9-13.8	7.1	5.9-8.4
55-64	13.9	11.9-15.9	10.0	8.4-11.7
65+	12.1	10.5-13.6	8.9	7.5-10.3
Education				
< High School	12.8	7.0-18.6	8.2	5.4-11.0
HS Diploma/GED	13.6	12.1-15.2	9.2	8.0-10.5
Some College	14.4	12.4-16.3	8.0	6.8-9.3
College Degree	11.3	9.4-13.2	7.6	6.1-9.2
Income				
<$15,000	15.4	13.0-17.8	11.3	9.2-13.4
$15,000-24,999	15.8	13.0-18.6	9.2	7.6-10.9
$25,000-34,999	11.4	9.2-13.6	7.5	5.7-9.2
$35,000-49,999	11.8	9.5-14.0	7.0	5.2-8.8
$50,000+	11.6	9.6-13.5	7.4	5.7-9.0

*: NH: Non Hispanic.

Prevalence of lifetime asthma among adults in Oklahoma were higher in some planning districts (Figure 7, Table 2). Those planning districts on the belt from northeastern to southwestern Oklahoma along I-44 tend to have higher prevalence and the northwestern panhandle area has the lowest prevalence.

Figure 7. Prevalence of Lifetime Asthma among Adults by Region, Oklahoma BRFSS 2003-2005

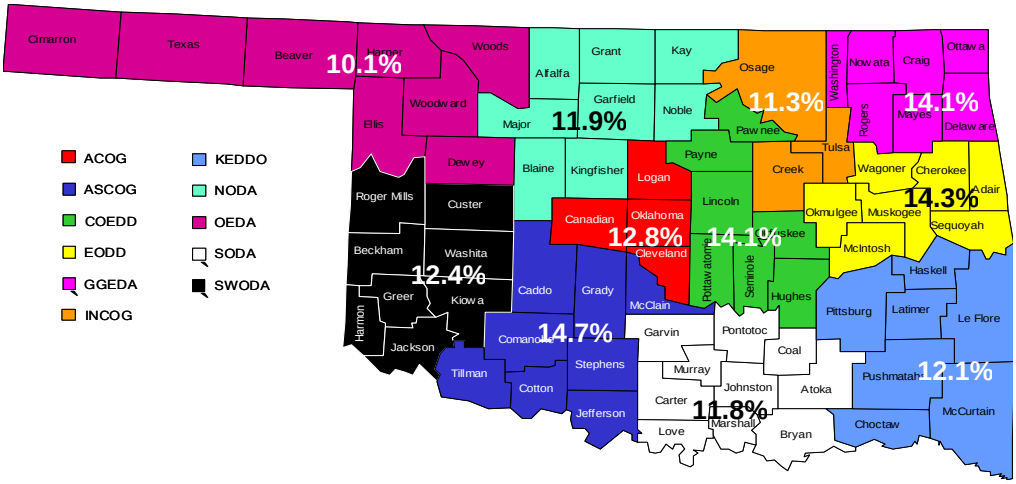


Table 2. Prevalence of Lifetime Asthma among Adults by County, Oklahoma BRFSS 2003-2005*

County	Prevalence (%)	County	Prevalence (%)	County	Prevalence (%)
Adair	17.4	Grant	N/A	Nowata	10.7
Alfalfa	N/A	Greer	N/A	Okfuskee	17.1
Atoka	11.0	Harmon	N/A	Oklahoma	12.8
Beaver	N/A	Harper	N/A	Okmulgee	13.2
Beckham	18.0	Haskell	16.8	Osage	11.1
Blaine	9.7	Hughes	5.9	Ottawa	20.9
Bryan	7.3	Jackson	11.2	Pawnee	12.8
Caddo	15.5	Jefferson	8.2	Payne	16.1
Canadian	10.7	Johnston	9.1	Pittsburg	13.6
Carter	12.3	Kay	11.8	Pontotoc	11.8
Cherokee	18.0	Kingfisher	17.8	Pottawatomie	13.3
Choctaw	8.7	Kiowa	10.9	Pushmataha	N/A
Cimarron	N/A	Latimer	N/A	Roger Mills	N/A
Cleveland	14.4	Le Flore	10.5	Rogers	12.8
Coal	N/A	Lincoln	16.1	Seminole	13.2
Comanche	12.8	Logan	12.8	Sequoyah	16.1
Cotton	N/A	Love	N/A	Stephens	17.7
Craig	19.5	McClain	12.6	Texas	6.9
Creek	14.4	McCurtain	10.6	Tillman	N/A
Custer	9.4	McIntosh	16.1	Tulsa	10.9
Delaware	11.2	Major	9.4	Wagoner	10.3
Dewey	N/A	Marshall	N/A	Washington	13.8
Ellis	N/A	Mayes	12.5	Washita	14.4
Garfield	9.3	Murray	6.6	Woods	N/A
Garvin	13.9	Muskogee	13.0	Woodward	10.1
Grady	14.9	Noble	18.0		

Prevalence is not available if respondents <50 in the county or the half of the 95% Confidence Interval >10 to ensure the stable results.

Prevalence of current asthma among adults in Oklahoma is higher in south central Oklahoma. The northwestern panhandle area has lower prevalence (Figure 8, Table 3).

Figure 8. Prevalence of Current Asthma among Adults by Region, Oklahoma BRFSS 2003-2005

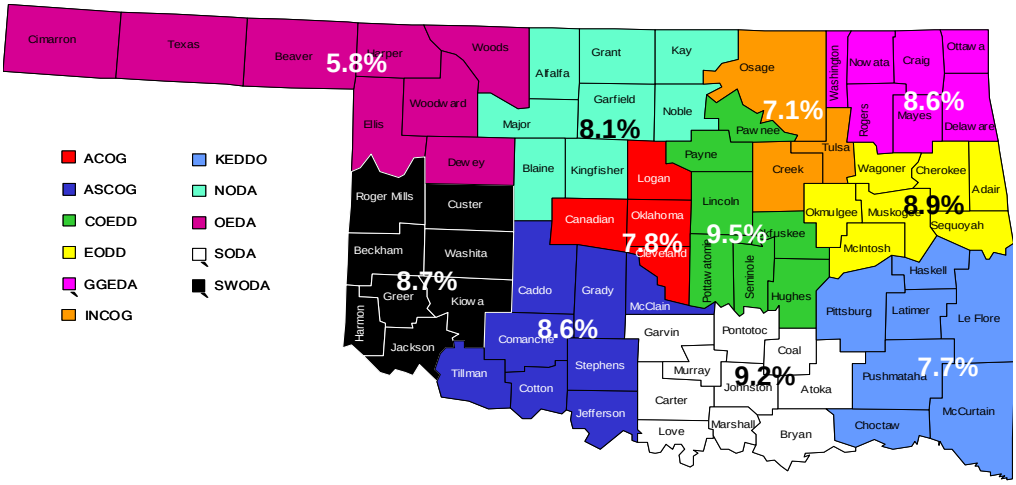


Table 3. Prevalence of Current Asthma among Adults by County, Oklahoma BRFSS 2003-2005*

County	Prevalence (%)	County	Prevalence (%)	County	Prevalence (%)
Adair	10.9	Grant	N/A	Nowata	7.0
Alfalfa	N/A	Greer	N/A	Okfuskee	11.2
Atoka	5.6	Harmon	N/A	Oklahoma	7.9
Beaver	N/A	Harper	N/A	Okmulgee	7.2
Beckham	16.5	Haskell	15.5	Osage	6.3
Blaine	7.5	Hughes	3.3	Ottawa	12.7
Bryan	5.2	Jackson	6.6	Pawnee	8.4
Caddo	10.8	Jefferson	3.7	Payne	8.3
Canadian	6.5	Johnston	9.1	Pittsburg	8.4
Carter	8.7	Kay	9.4	Pontotoc	9.6
Cherokee	8.3	Kingfisher	11.6	Pottawatomie	10.0
Choctaw	6.8	Kiowa	6.2	Pushmataha	5.2
Cimarron	N/A	Latimer	6.7	Roger Mills	N/A
Cleveland	8.0	Le Flore	8.1	Rogers	8.6
Coal	N/A	Lincoln	12.6	Seminole	10.9
Comanche	7.1	Logan	7.7	Sequoyah	11.8
Cotton	N/A	Love	N/A	Stephens	13.3
Craig	10.5	McClain	6.5	Texas	5.0
Creek	10.7	McCurtain	5.5	Tillman	7.1
Custer	6.7	McIntosh	11.2	Tulsa	6.5
Delaware	6.1	Major	2.5	Wagoner	6.5
Dewey	N/A	Marshall	N/A	Washington	8.1
Ellis	N/A	Mayes	8.1	Washita	7.0
Garfield	6.7	Murray	5.2	Woods	9.7
Garvin	11.8	Muskogee	8.9	Woodward	5.5
Grady	9.0	Noble	12.6		

Prevalence is not available if respondents <50 in the county or the half of the 95% Confidence Interval >10 to ensure the stable results.

SEVERITY OF ASTHMA IN ADULTS

Among adults with current asthma, 29.9% reported that they were unable to work or carry out usual activities at least one day during the past 12 months because of asthma. More women reported activity limitations due to asthma than men did (35.9% vs. 19.4%, P<0.01). There was no difference among age groups (data not shown).

According to the guideline from The National Asthma Education and Prevention Program (NAEPP), classification of asthma severity includes severe persistent, moderate persistent, mild persistent, and mild intermittent. An individual should be assigned to the most severe grade in which any feature occurs. The characteristics noted in the guideline are general and may overlap because asthma is highly variable. Furthermore, an individual's classification may change over time.

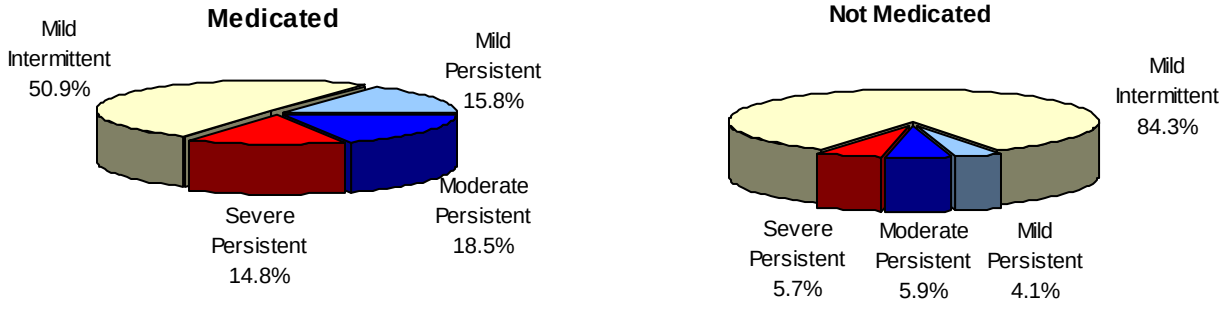
Because the physical examination and pulmonary function testing are not available, using the BRFSS data to assess the severity of asthma could only be based on reported symptoms, sleep disturbances, activity limitations, ER visits, urgent care visits, and medication usages (Table 4).

Table 4. Asthma Severity Classification Based on BRFSS Data

Simple Method	Detailed Method
Symptoms in past 30 days	Symptoms in past 30 days
Sleep disturbance in past 30 days	Sleep disturbance in past 30 days
	ER visits in past year
	Urgent care visits in past year
	Activity limitation days in past year

With the classification by two questions in BRFSS concerning the symptoms in past 30 days and the sleep disturbance in past 30 days (**simple method**), among adults with current asthma and reported taking medications, half of them had mild intermittent asthma, 15.8% had mild persistent asthma, 18.5% had moderate persistent asthma, and 14.8% had severe persistent asthma (Figure 9). While the majority (84.3%) of adults with current asthma but not taking medication for treatment reported mild intermittent asthma, there were more than 10% of them had either moderate or severe persistent asthma (Figure 9).

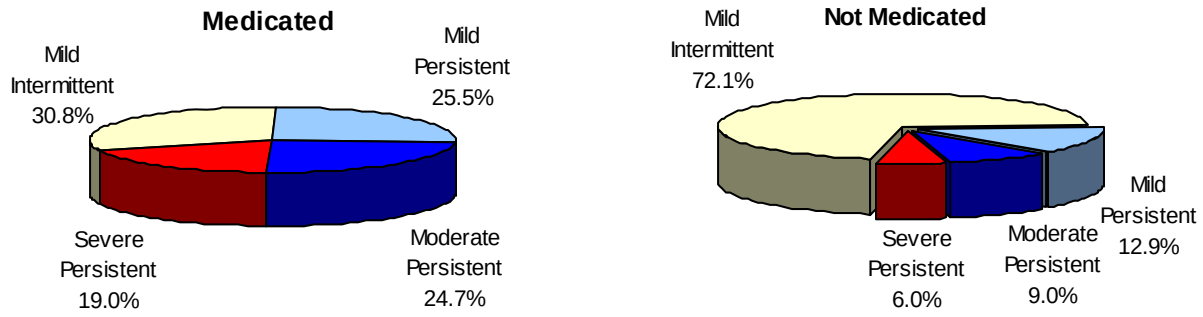
Figure 9. Severity of Adult Current Asthma: Simple Method Oklahoma BRFSS 2003 - 2004



Considering ER and urgent care visits and activity limitations in the asthma severity classification (**detailed method**), proportions of mild intermittent asthma decreased while proportions of those in other classes (higher steps of classifications) increased among adults with current asthma, no matter whether

they were taking medication or not (Figure 10). Among adults with current asthma but not taking medications for treatment, about 15% of them had either moderate or severe persistent asthma.

Figure 10. Severity of Adult Current Asthma: Detailed Method Oklahoma BRFSS 2003-2004



RISK BEHAVIORS FOR ASTHMA

Overweight and Obese

For adults, overweight and obesity ranges are determined by using weight and height to calculate a number called the "body mass index" (BMI, see Glossary of Terms for details). The results from 2005 BRFSS data indicated that adults who were obese (BMI >=30) reported significantly higher prevalence of lifetime asthma and current asthma than those who were normal weight (BMI <25) or overweight (25<= BMI <30). People who were overweight reported slightly higher prevalence of asthma (P<0.05) compared with those with normal weight (Figure 11, Table 5). Due to the cross-sectional survey design of BRFSS, these results could not identify if obesity or asthma came first.

Figure 11. Prevalence of Lifetime and Current Asthma by BMI Category: Oklahoma BRFSS 2005

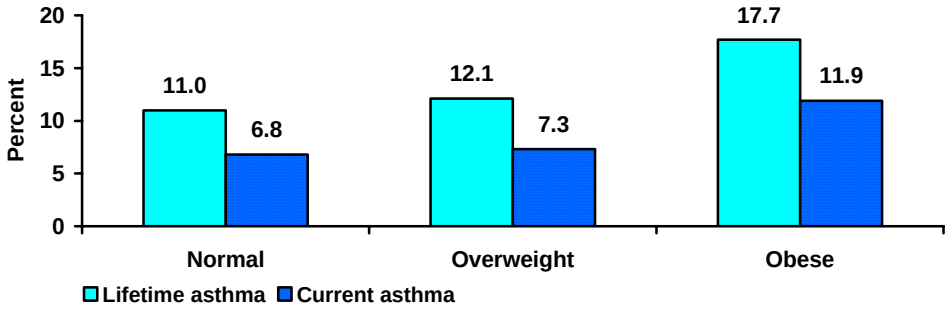


Table 5. Prevalence of Asthma Among Adult Oklahomans by BMI and Smoking Status: Oklahoma BRFSS 2005

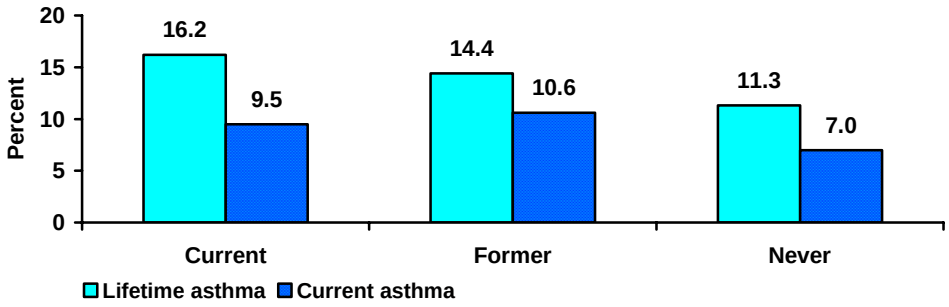
		Lifetime Asthma		Current Asthma	
		Percent	95% CI	Percent	95% CI
Total		13.3	12.3-14.3	8.5	7.7-9.3
BMI					
	<25	11.0	9.4-12.5	6.8	5.8-7.9
	25-29.9	12.1	10.7-13.6	7.3	6.2-8.4
	30+	17.7	15.3-20.1	11.9	9.9-14.0
Smoking Status					
	Current	16.2	13.9-18.6	9.5	8.0-11.1
	Former	14.4	12.4-16.5	10.6	8.7-12.4
	Never	11.3	10.0-12.6	7.0	6.0-7.9

Tobacco Smoking

There is sufficient evidence to conclude that exposure to tobacco smoke increases asthma symptoms and attacks both for smokers and for non-smokers. Tobacco smoke is an exceptionally aggravating trigger that can worsen asthma symptoms. People with asthma have very sensitive airways. Breathing in cigarette smoke, a powerful trigger, is especially difficult for them, and can often bring on an asthma attack. For smokers with asthma, the symptoms are usually difficult to control.

Oklahoma adults who are current or former smokers are more likely to report higher prevalence of lifetime and current asthma, compared to those who have never smoked. Prevalence of current asthma was the highest in former smokers (Figure 12).

Figure 12. Prevalence of Lifetime and Current Asthma by Smoking Status: Oklahoma BRFSS 2005



Oklahoma 2005 BRFSS data indicated prevalence of smoking among adults with current asthma was slightly higher than that among general adult Oklahomans. As many as 28.3% of Oklahoma adults with current asthma reported they were currently smoking, compared with 25.1% in general adult population (P>0.05). Another 30.0% of Oklahoma adults with current asthma said they were former smokers, higher than the 24.2% of former smokers in general adult population (P<0.05) (data not shown).

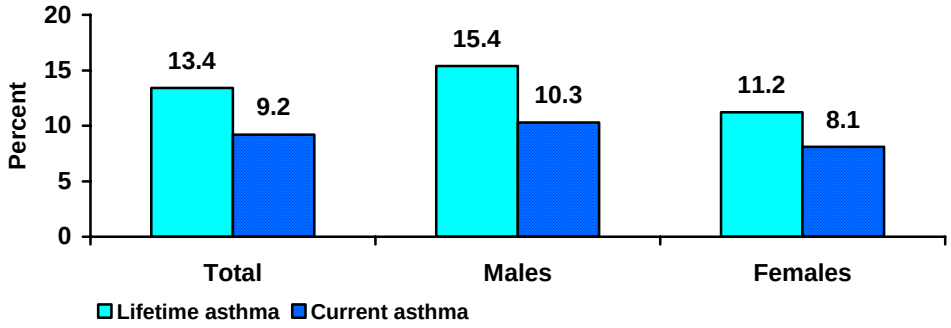
ASTHMA IN CHILDREN

There are several different data sources available to estimate prevalence of childhood asthma. Data from the National Survey of Children's Health (NSCH) provided the opportunity to estimate the indicators of physical and emotional health of children ages 0-17 years of age; the respondents of Youth Risk Behavior Survey (YRBS) are those adolescents in grade 9th –12th; and Youth Tobacco Survey (YTS) is a school-based survey of 6th –12th graders statewide. Because of the survey methods, sample populations are different from each other, therefore, results from one survey should only be considered to represent the correspondent population and may not be used to compare with others. Details about each survey could be found in Data Sources and Methods.

DATA FROM NATIONAL SURVEY OF CHILDREN'S HEALTH

Data from National Survey of Children's Health (2003) provided the prevalence of asthma among children younger than 18 years of age. In Oklahoma, 13.4% of children younger than 18 years of age (116,800 children) have ever been told by a health professional that he/she had asthma (lifetime asthma). And 9.2% of children under age 18 years old (80,200 children) had current asthma (Figure 13).

Figure 13. Prevalence of Lifetime and Current Asthma for Children <18 Years Old in Oklahoma NSCH Data



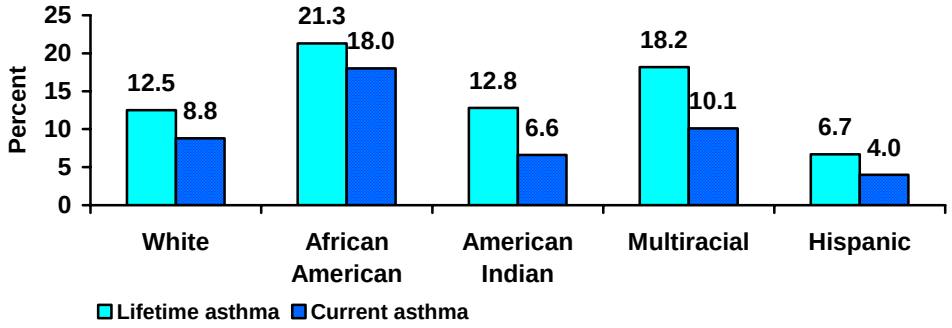
Date source: NCHS, CDC. State and Local Area Integrated Telephone Survey, National Survey of Children's Health, 2003.

The prevalence of lifetime and current asthma in Oklahoma is a slightly higher than the nationwide prevalence (12.5% and 8.9%, respectfully, P>0.05, Table 6). Unlike adults, boys tended to have higher prevalence of lifetime and current asthma than girls did. While there is no statistical significance between boys and girls in Oklahoma, The nationwide data indicated that boys had significantly higher prevalence of lifetime and current asthma than girls (Table 6,7).

In Oklahoma, Hispanic children had significantly lower prevalence for both lifetime and current asthma (P<0.05). African American and Multiracial children tended to have a higher prevalence of lifetime and current asthma than White children (P>0.05, Figure 14).

Nationwide, prevalence for both lifetime and current asthma were lower among Hispanic children, but not significantly different from other racial/ethnic groups. African American and multiracial children reported significantly higher prevalence of lifetime and current asthma than White children (Table 6,7)

Figure 14. Prevalence of Lifetime and Current Asthma for Children <18 Years Old by Race/ethnicity in Oklahoma NSCH Data

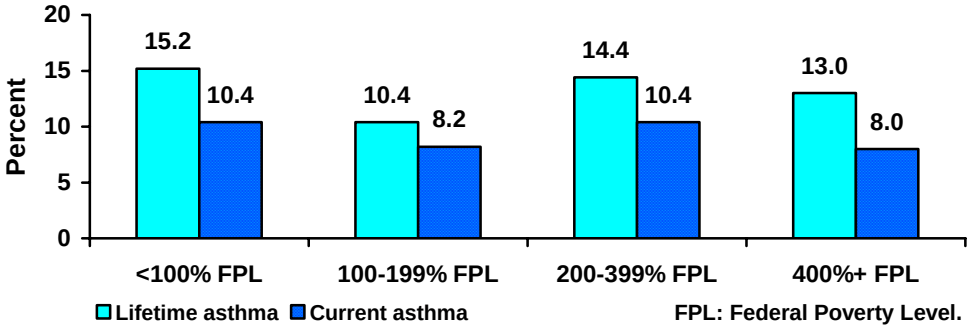


Date source: NCHS, CDC. State and Local Area Integrated Telephone Survey, National Survey of Children's Health, 2003.

In Oklahoma, children 6-11 years old reported slightly higher prevalence of both lifetime and current asthma than children in other age groups (P>0.05). While nationwide, the prevalence increased with age and the 0-5 years old group reported significantly lower prevalence (Table 6,7).

While nationwide data indicated that prevalence of both lifetime and current asthma decreased among children with higher household income (P<0.05, Table 6,7), the relationship between childhood asthma prevalence and household incomes in Oklahoma was not clear (Figure 15). This might because of the small sample size in subgroups.

Figure 15. Prevalence of Lifetime and Current Asthma for Children <18 Years Old by Household Income in Oklahoma NSCH Data



Date source: NCHS, CDC. State and Local Area Integrated Telephone Survey, National Survey of Children's Health, 2003.

Table 6. Prevalence of Childhood Lifetime Asthma in Oklahoma (Data from NSCH 2003)

	Oklahoma		Nationwide	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	13.4	11.6-15.2	12.5	12.1-12.8
Gender				
Males	15.4	12.7-18.2	14.6	14.0-15.1
Females	11.2	8.9-13.5	10.3	9.8-10.7
Race/Ethnicity*				
NH-White	12.5	10.3-14.6	11.5	11.1-11.9
NH-Black	21.3	13.1-29.4	18.0	16.7-19.3
NH-American Indian	12.8	6.7-18.9	15.0 †	11.0-19.0 †
NH-Multiracial	18.2	10.9-25.4	15.1	13.1-17.2
Hispanic	6.7	3.2-10.2	10.7	9.7-11.6
Age (years)				
0-5	10.2	7.1-13.3	8.9	8.3-9.5
6-11	16.2	12.7-19.6	13.6	12.9-14.2
12-17	13.8	10.9-16.7	14.8	14.2-15.4
Income				
<100% FPL**	15.2	10.3-20.1	14.3	13.2-15.4
100-199% FPL**	10.4	7.2-13.5	13.2	12.3-14.1
200-399% FPL**	14.4	11.4-17.4	12.4	11.8-13.0
400%+ FPL**	13.0	8.9-17.1	11.3	10.7-11.9

*: NH: Non Hispanic. ** FPL: Federal Poverty Level. †: Race classification for select states

Table 7. Prevalence of Childhood Current Asthma in Oklahoma (Data from NSCH 2003)

	Oklahoma		Nationwide	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	9.2	7.6-10.8	8.9	8.6-9.2
Gender				
Males	10.3	7.9-12.7	10.3	9.8-10.7
Females	8.1	6.1-10.1	7.4	7.0-7.9
Race/Ethnicity*				
NH-White	8.8	6.9-10.6	8.1	7.8-8.4
NH-Black	18.0	10.3-25.8	13.9	12.8-15.0
NH-American Indian	6.6	1.6-11.5	9.5 †	6.1-12.8 †
NH-Multiracial	10.1	4.2-16.0	12.2	10.2-14.1
Hispanic	4.0	1.4-6.6	7.1	6.3-7.9
Age (years)				
0-5	7.3	4.5-10.0	6.7	6.1-7.2
6-11	12.1	9.0-15.2	9.9	9.3-10.4
12-17	8.3	6.0-10.7	10.1	9.5-10.6
Income				
<100% FPL**	10.4	6.0-14.8	11.2	10.2-12.2
100-199% FPL**	8.2	5.3-11.1	9.5	8.7-10.3
200-399% FPL**	10.4	7.7-13.1	8.8	8.2-9.3
400%+ FPL**	8.0	4.6-11.4	7.6	7.1-8.1

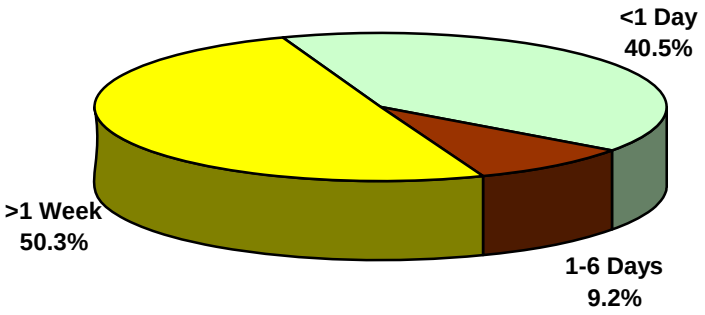
*: NH: Non Hispanic. ** FPL: Federal Poverty Level. . †: Race classification for select states

Among Oklahoma children younger than 18 years old that have ever been told they had asthma, 51.5% experienced an episode of asthma or asthma attack during the past 12 months (57.0% in girls, and 47.8% in boys P>0.05). For Oklahoma children younger than 18 years old with current asthma, 71.9% experienced episode of asthma or asthma attack during the past 12 months, significantly higher than that among adults (58.2%, BRFSS 2003-2004).

For all Oklahoma children <18 years that have old ever been diagnosed with asthma, 3.9% stayed overnight in a hospital because of asthma during the past 12 months. For those children with current asthma, 5.1% reported that they had stayed overnight in a hospital because of asthma during the past 12 months. For children having an asthma episode or attack, 6.4% had to stay overnight in a hospital.

For the question "How long has it been since last took asthma medication", 40.5% of children with current asthma took asthma medication within 24 hours. Another 50.3% of children with current asthma took asthma medication more than a week ago (Figure 16).

Figure 16. Asthma Medication Usage for Children <18 Years Old with Current Asthma in Oklahoma, NSCH Data



Date source: NCHS, CDC. State and Local Area Integrated Telephone Survey, National Survey of Children's Health, 2003.

For families having children with current asthma, 32.8% indicated the health difficulty caused by asthma was moderate; another 2.4% indicated the difficulty is severe. Meanwhile, 16.8% of the families having children with current asthma reported that the asthma put a medium amount or great deal of burden on the family.

DATA FROM OKLAHOMA YOUTH RISK BEHAVIOR SURVEY (YRBS)

The Oklahoma 2005 YRBS randomly selected 50 schools in the state and 49 chose to participate. There were 2,084 students selected and 1,715 students participated. The overall response rate was 80%. The survey respondents were between 14 and 18 years old, and 77.9% of the respondents aged 15-17 years old. The males accounted for 51% of the respondents and Non-Hispanic White accounted for 63.6%. The data has been weighted to provide estimates generalized to the Oklahoma student population.

Oklahoma YRBS collected asthma information based on the following questions, “Has a doctor or nurse ever told you that you have asthma?” and “During the past 12 months, have you had an episode of asthma or an asthma attack?”

Students who had ever been told by a doctor or nurse that they had asthma were considered having lifetime asthma. Students with lifetime asthma and who had an episode of asthma or an asthma attack during the past 12 months or who have asthma but had not had an episode of asthma or an asthma attack during the past 12 months were considered having current asthma.

Overall, 19.6% students reported that they have ever been told by a health professional that they had asthma (lifetime asthma). Males reported a slightly higher prevalence than females (P>0.05, Figure 17, Table 8, 9). Though not significantly, the prevalence of lifetime asthma was higher in Oklahoma than that in the US (for overall, males and females, P>0.05, Table 8). African American students had higher prevalence of lifetime asthma than other racial/ethnic groups (Figure 18, P>0.05). American Indian students reported similar prevalence of lifetime asthma as White students (18.7%, 95%CI: 13.2-24.3, data not shown in table).

Table 8. Prevalence of Lifetime Asthma Among Students, Oklahoma and US (YRBS Data)

	Oklahoma		Nationwide	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	19.6	17.3-21.9	17.1	16.2-18.0
Gender				
Male	20.5	16.9-24.1	17.3	15.9-18.7
Female	18.8	15.9-21.7	17.0	15.7-18.3
Race				
African American	25.3	20.6-30.0	18.8	17.2-20.4
Hispanic	16.1	8.5-23.7	16.9	14.4-19.4
White	19.1	16.0-22.2	16.4	15.2-17.6
Other	19.4	14.6-24.2	19.8	16.0-23.6
Grade				
9^{th}	19.7	15.3-24.1	18.5	16.4-20.6
10^{th}	17.4	14.8-21.0	17.6	15.7-19.5
11^{th}	21.6	17.9-25.3	16.4	14.7-18.1
12^{th}	20.3	15.0-25.6	15.4	13.7-17.1

About 16.3% of all students reported that they currently have asthma (Figure 17, Table 9). Males reported similar prevalence as females. The prevalence of current asthma was higher in Oklahoma than that in the US (P>0.05, Table 9).

Figure 17. Prevalence of Lifetime and Current Asthma by Gender: Oklahoma YRBS 2005

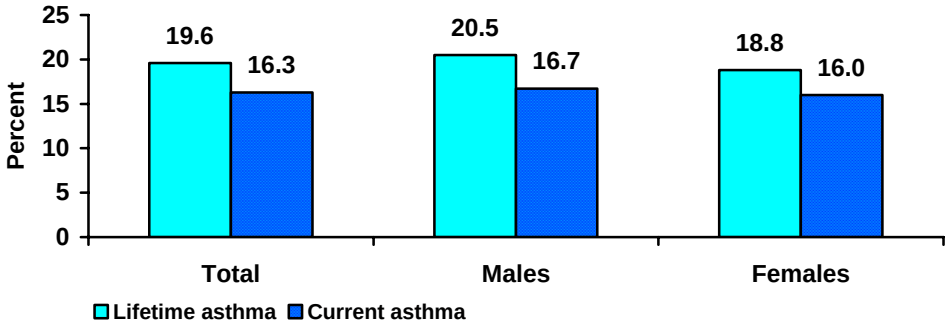
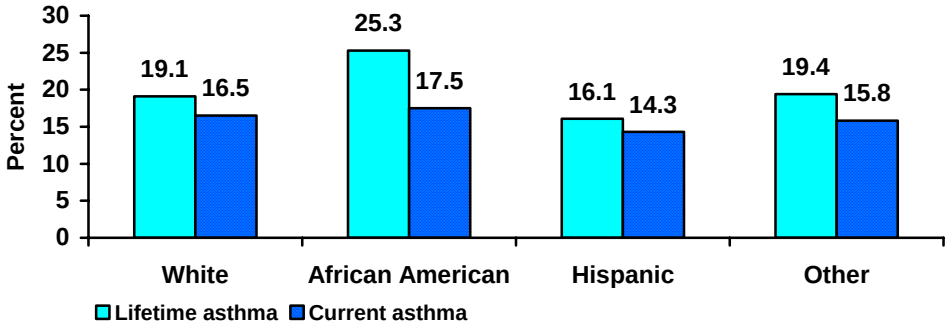


Table 9. Prevalence of Current Asthma Among Students, Oklahoma and US (YRBS Data)

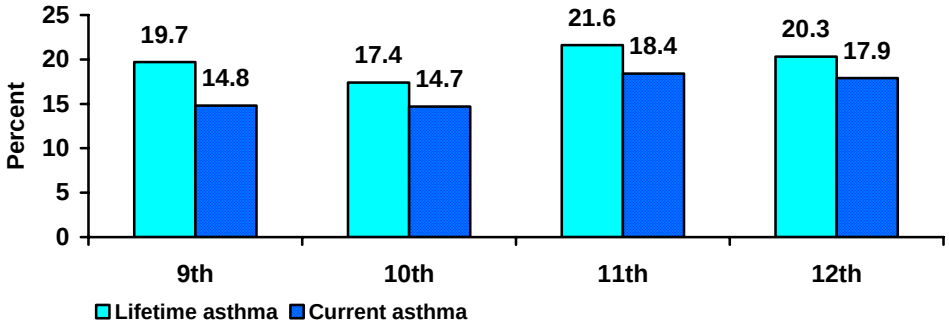
	Oklahoma		Nationwide	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	16.3	14.3-18.3	14.5	13.7-15.3
Gender				
Male	16.7	13.4-20.0	14.3	13.0-15.6
Female	16.0	13.4-18.6	14.7	13.6-15.8
Race				
African American	17.5	12.8-22.2	15.3	13.6-17.0
Hispanic	14.3	7.1-21.5	14.2	12.0-16.4
White	16.5	13.8-19.2	14.2	13.1-15.3
Other	15.8	12.2-19.4	15.8	12.3-19.3
Grade				
9th	14.8	11.8-17.8	15.6	13.7-17.5
10th	14.7	11.5-17.9	14.9	13.2-16.6
11th	18.4	14.9-21.9	14.1	12.6-15.6
12th	17.9	12.4-23.4	12.8	11.4-14.2

Figure 18. Prevalence of Lifetime and Current Asthma by Race/ethnicity: Oklahoma YRBS 2005



Oklahoma students in 11th and 12th grade reported higher prevalence of lifetime asthma, as well as current asthma, than those 9th and 10th graders (P>0.05, Figure 19). While in the US, the prevalence of asthma was higher in the 9th and 10th graders (P>0.05, Table 8,9).

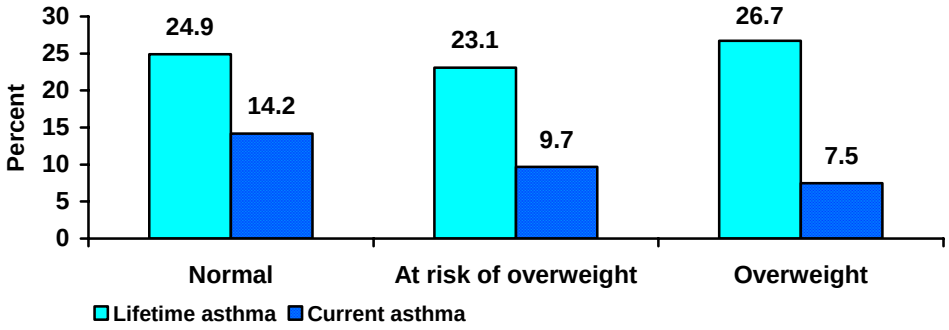
Figure 19. Prevalence of Lifetime and Current Asthma by Grades: Oklahoma YRBS 2005



Among students currently with asthma, 37.2% reported having an episode of asthma or asthma attack during past 12 months. Females experienced more episodes or attacks of asthma than males (46.9% vs. 28.1%, P<0.05). Due to the small number of respondents with current asthma, results by grade and racial/ethnic groups are not available.

Among all the Oklahoma students who participated in YRBS, 15.2% reported as overweight, and another 15.9% reported as at risk of overweight. Students reported similar prevalence of lifetime asthma despite their BMI status, although the overweight students reported slightly higher prevalence, while students with normal weight reported slightly higher prevalence of current asthma than those with at risk of overweight or overweight (Figure 20).

Figure 20. Lifetime and Current Asthma by BMI Status: Oklahoma YRBS 2005



Among students who reported that they have lifetime asthma, 63.7% of them indicated that they had ever smoked, and more than half of them (34.9% of those with lifetime asthma) reported currently smoking.

DATA FROM OKLAHOMA YOUTH TOBACCO SURVEY (YTS)

Oklahoma is one of the states that participate in the Youth Tobacco Survey (YTS), a comprehensive tobacco survey administered to a sample of middle and high school students. The 2005 YTS data was collected from 1,751 students in middle schools and 1,412 students in high schools. The data has been adjusted to the population of Oklahoma middle school and high school students.

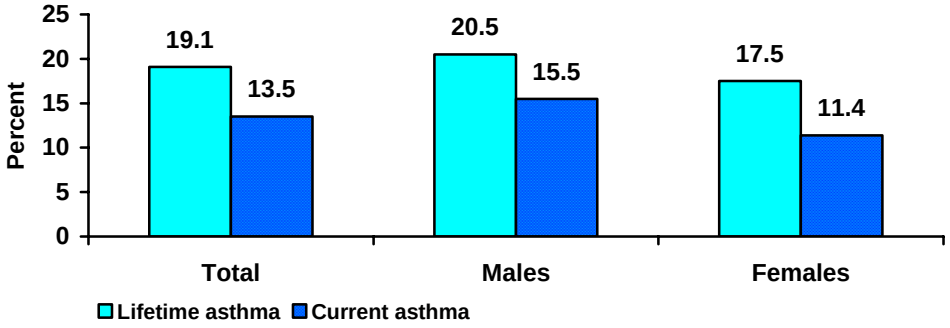
Table 10. Prevalence of Lifetime and Current Asthma Among Oklahoma Middle School Students (Oklahoma Youth Tobacco Survey)

	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
Total	19.1	16.7-21.5	13.5	11.5-15.5
Gender				
Male	20.5	17.8-23.2	15.5	13.3-17.7
Female	17.5	14.4-20.6	11.4	8.5-14.3
Grade				
6th	19.6	14.1-25.1	14.6	10.6-18.6
7th	18.1	15.3-20.9	13.2	10.6-15.8
8th	18.2	15.5-20.9	12.5	9.7-15.3
Race/Ethnicity				
White	19.5	16.8-22.2	13.0	10.3-15.7
African American	16.2	11.2-21.2	10.2	4.4-16.0
Hispanic	18.1	10.6-25.6	10.6	4.2-17.0
Other	19.8	13.4-26.2	17.8	12.8-22.8

Source: 2005 Oklahoma Youth Tobacco Survey

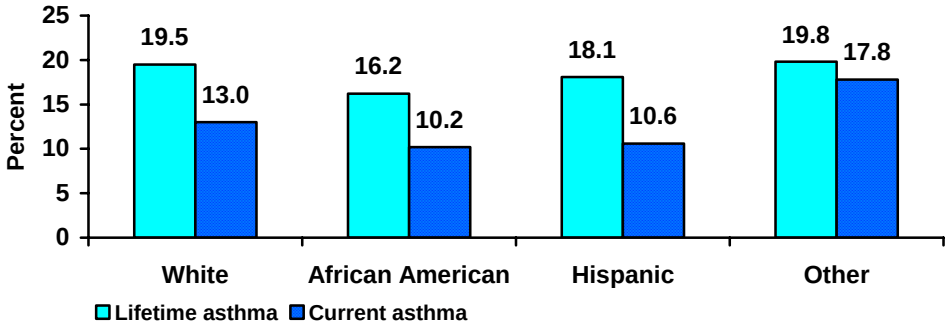
In Oklahoma, 19.1% of middle school students reported they have ever been diagnosed with asthma by health professionals, and 13.5% reported currently having asthma. More males reported ever having and currently having asthma than females without statistical significant difference (Figure 21, Table 10).

Figure 21. Prevalence of Lifetime and Current Asthma in Middle School Students by Gender: Oklahoma YTS 2005



Without statistical significance, African American middle school students reported lower percentages of lifetime asthma and students in the "Other" racial/ethnic group reported higher prevalence of current asthma (Figure 22, Table 10).

Figure 22. Prevalence of Lifetime and Current Asthma in Middle School Students by Race/ethnicity: Oklahoma YTS 2005



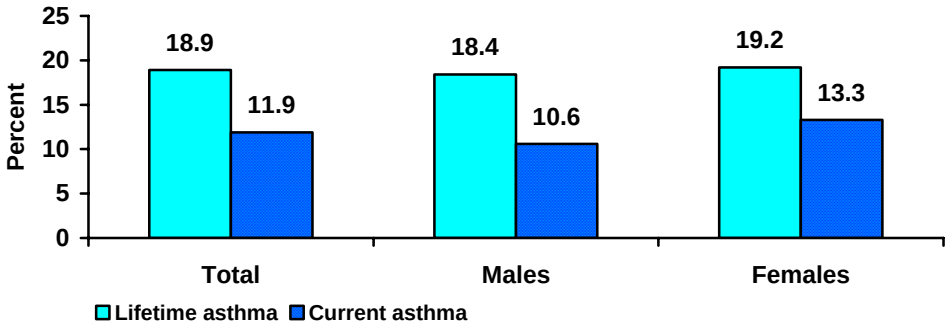
Approximately 19% of high school students reported ever been diagnosed with asthma and nearly 12% reported currently having asthma. Similar to middle school students, there was no statistically significant difference in lifetime and current asthma by gender.

Table 11. Prevalence of Lifetime and Current Asthma Among Oklahoma High School Students (Oklahoma Youth Tobacco Survey)

	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
Total	18.9	16.4-21.4	11.9	9.9-13.9
Gender				
Male	18.4	15.5-21.3	10.6	8.4-12.8
Female	19.2	15.8-22.6	13.3	10.3-16.3
Grade				
9th	22.6	19.3-25.9	14.0	10.4-17.6
10th	16.2	12.3-20.1	10.3	6.4-14.2
11th	21.2	15.2-27.2	12.5	7.3-17.7
12th	14.6	9.6-19.6	10.2	7.0-13.4
Race				
White	17.8	15.4-20.2	9.9	7.9-11.9
African American	27.9	19.1-36.7	21.8	13.9-29.7
Hispanic	12.8	7.1-18.5	7.8	2.8-12.8
Other	19.9	13.4-26.4	14.6	7.7-21.5

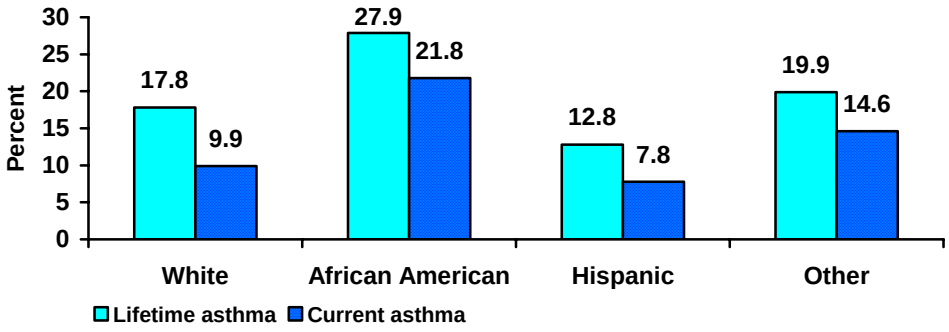
Source: 2005 Oklahoma Youth Tobacco Survey

Figure 23. Prevalence of Lifetime and Current Asthma in High School Students by Gender: Oklahoma YTS 2005



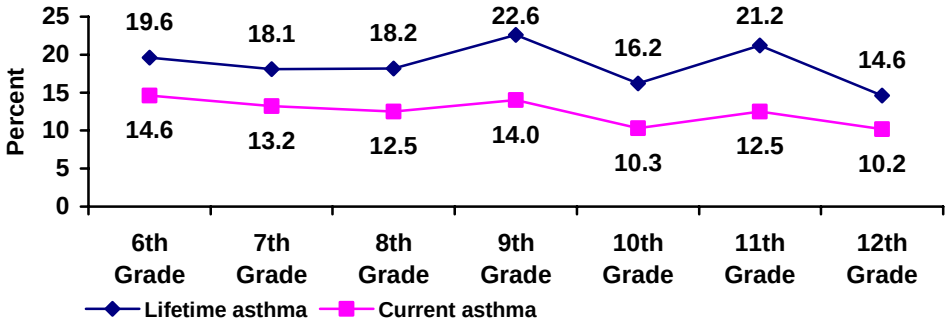
African American high school students in Oklahoma reported significantly higher prevalence of current asthma than White. For lifetime asthma, African American high school students reported a higher (but not significantly) prevalence than White (Figure 24, Table 11).

Figure 24. Prevalence of Lifetime and Current Asthma in High School Students by Race/ethnicity: Oklahoma YTS 2005



Prevalence of lifetime and current asthma by grade indicated that students in 12th grade reported lower prevalence than those in 6th grade (P>0.05, Figure 25, Table 10,11).

Figure 25. Prevalence of Lifetime and Current Asthma in Oklahoma YTS by Grade, 2005



The prevalence of lifetime and current asthma was slightly higher in middle school students. Male middle school students reported significantly higher prevalence of current asthma than their counterpart in high school (P<0.05, Table 10,11). Female middle school students reported lower prevalence of asthma than their counterpart in high school (P>0.05, Table 10,11).

HEALTH CARE UTILIZATIONS FOR ASTHMA

This section will highlight asthma-related healthcare utilization, including hospitalization due to asthma (Oklahoma inpatient hospital discharges data), medication use (BRFSS data and NCHS data), emergency room and/or urgent care visit, routine physician office visits, and preventive interventions, such as influenza vaccinations (BRFSS data).

HOSPITALIZED PATIENTS WITH ASTHMA AS THE PRIMARY DIAGNOSIS

In the calendar year 2005, there were 4,883 hospital admissions in Oklahoma with asthma as the primary diagnosis, accounted for about one percent of all the hospital admissions. Females and males had similar proportions of admitted to hospital with asthma as the primary diagnosis among all hospitalizations. Race-specific results indicated that 2.1% of hospital admissions of African Americans had asthma as the primary diagnosis, much higher than the proportions in other racial groups (0.8-0.9%).

The overall hospitalization rate for asthma was 1.4 per 1,000 people. Females had higher hospitalization rate than males (Figure 26). The hospitalization rates for African Americans were much higher than other racial groups (Figure 27).

Figure 26. Oklahoma Hospitalization Rate with Asthma as the Principal Diagnosis by Gender 2005

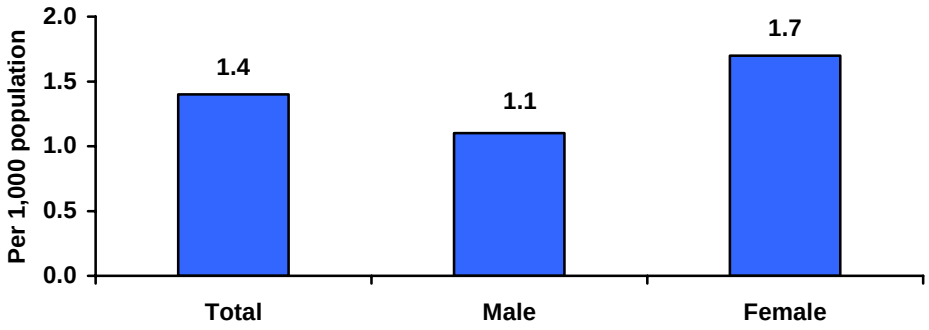
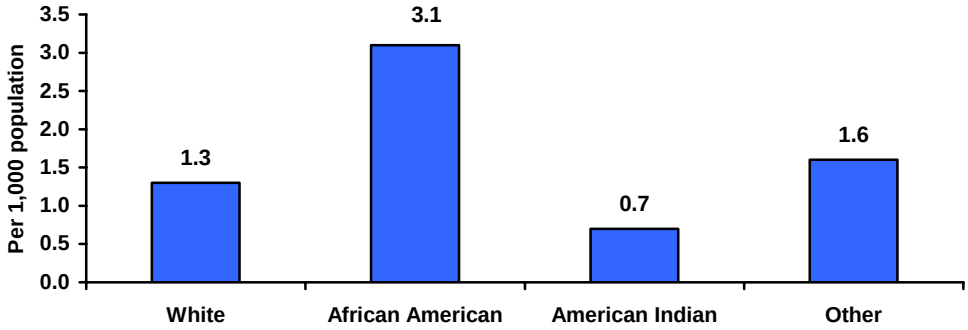
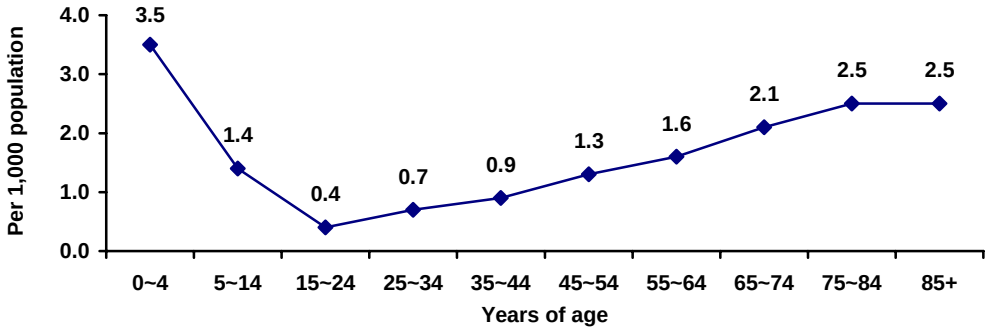


Figure 27. Oklahoma Hospitalization Rate with Asthma as the Principal Diagnosis by Race, 2005



Children and adolescents (<15 years old) accounted for about 30% of admissions due to asthma. Children younger than 5 years accounted for 17.3% of the admissions, and those 5-14 years old accounted for another 13.4%. Seniors are also at higher risk of asthma hospitalization. About 22.1% of admissions with asthma as the primary diagnosis were among persons 65 years and over. The hospitalization rate was the highest among those 0-4 years old, then decreased to the overall lowest at 15-24 years old, and then increased with age (Figure 28).

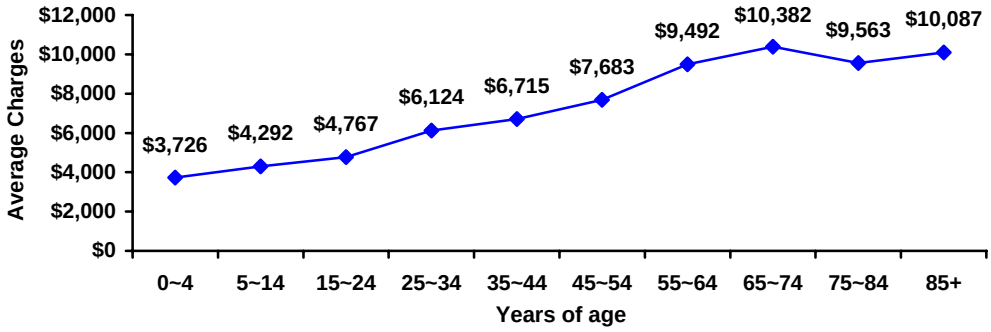
Figure 28. Oklahoma Hospitalization Rate with Asthma as the Principal Diagnosis by Age, 2005



In 2005, the total charges for hospital admissions with asthma as principle diagnosis were approximately $48.8 million, which is an increase from $42.3 million in 2004. Females accounted for 78% of the total charges. There were more charges among senior patients. With one in every five admissions (22.1%) with asthma as principle diagnosis was a person 65 years and over, the total charges accounted for 31.8%.

The average charge of hospital admissions with asthma as principle diagnosis was $6,518. Females had a higher average of charges than males ($7,329 vs. $5,096, respectfully, P<0.05). The average charge was higher among White ($7,121) than that among minority groups ($5,381 in African Americans, $4,993 in American Indians, and $4,098 in other races, P<0.05). The average charge increased with patients' age (Figure 29).

Figure 29. Average Charges of Hospitalization with Asthma as the Principal Diagnosis by Age, Oklahoma 2005



The total length of stay for asthma hospitalizations was 16,372 days in 2005, with an average of 3.4 days. Females stayed in the hospital due to asthma longer than males (P<0.05, Figure 30). African American and American Indians had shorter stay in the hospital compared with white patients (P<0.05, Figure 31). The average of length of stay increased with age (Figure 32).

Figure 30. Oklahoma Hospitalization Average Length of Stay with Asthma as the Principal Diagnosis, by Gender, 2005

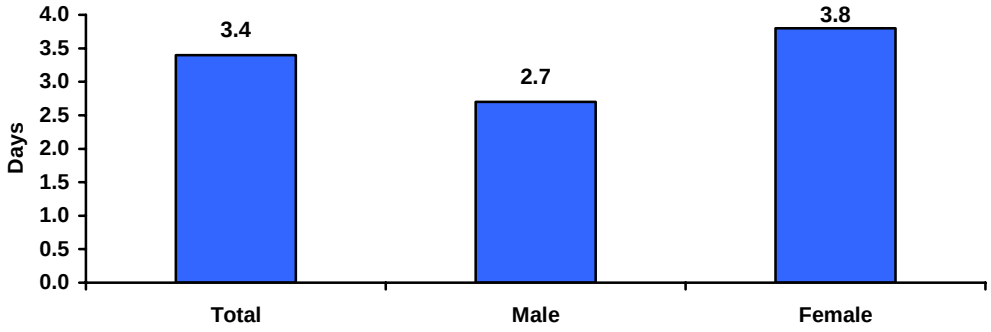


Figure 31. Oklahoma Hospitalization Average Length of Stay with Asthma as the Principal Diagnosis, by Races, 2005

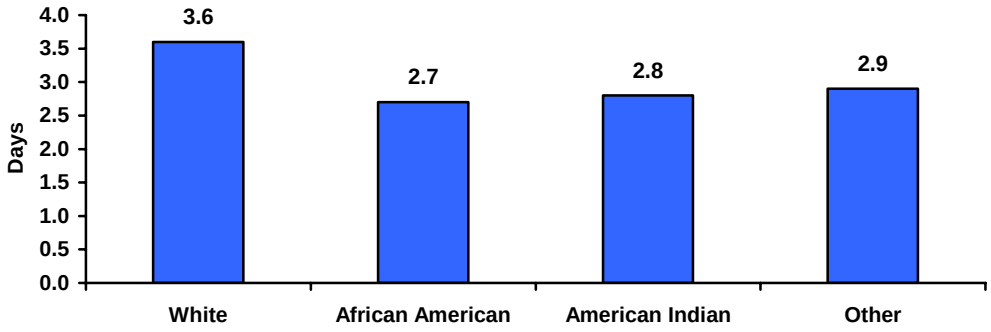
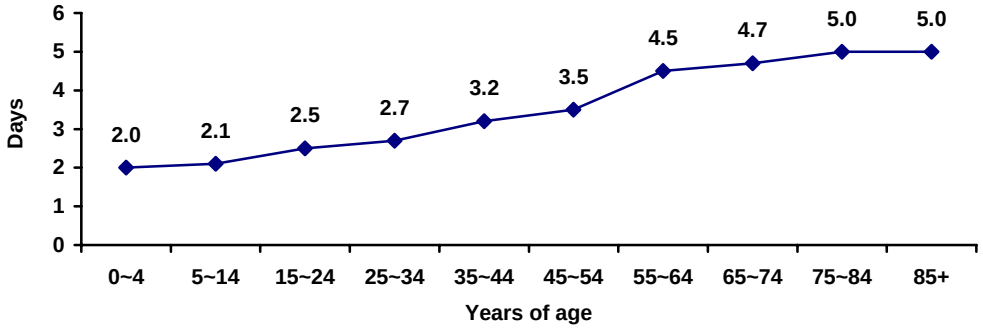
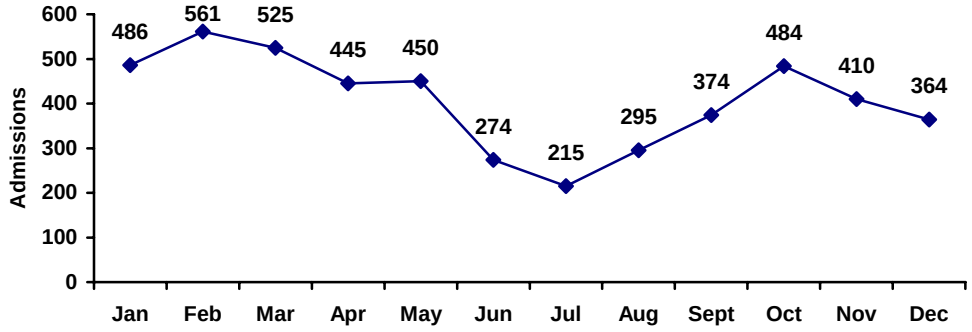


Figure 32. Oklahoma Hospitalization Average Length of Stay with Asthma as the Principal Diagnosis by Age, 2005



There were more patients admitted to the hospitals because of asthma during the spring, compared to the number of patients admitted during summer, There were also elevated number of admissions with asthma in fall (Figure 33).

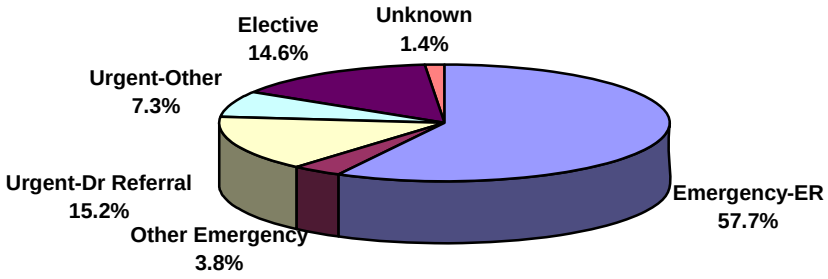
Figure 33. Oklahoma Hospital Admissions with Asthma as the Principal Diagnosis by Month, 2005



Among patients hospitalized with asthma as the principle diagnosis:

- More than half of them were admitted from the emergency room (Figure 34).
- 88.7% were discharged to home or self-care, and another 4.9% were discharged to home under care of organized home health service organization.
- The most common secondary diagnoses were diseases of the respiratory system (21.9%), followed by diseases of the circulatory system (18.0%).

Figure 34. Oklahoma Hospital Admissions with Asthma as the Principal Diagnosis, Source and Type of Admissions, 2005



HOSPITALIZED PATIENTS WITH ASTHMA AS THE SECONDARY DIAGNOSIS

In 2005, there were 6,194 hospital admissions with asthma as secondary diagnosis. Females accounted for 64.4% of the admissions and nearly doubled the hospitalization rate of males (Figure 35). Among hospital admissions with asthma as the secondary diagnosis, 79.6% were White, 10.3% were African Americans, and 4.4% were American Indians. The hospitalization rate of African Americans was higher than that of White (Figure 36).

Figure 35. Oklahoma Hospitalization Rate with Asthma as the Secondary Diagnosis by Gender, 2005

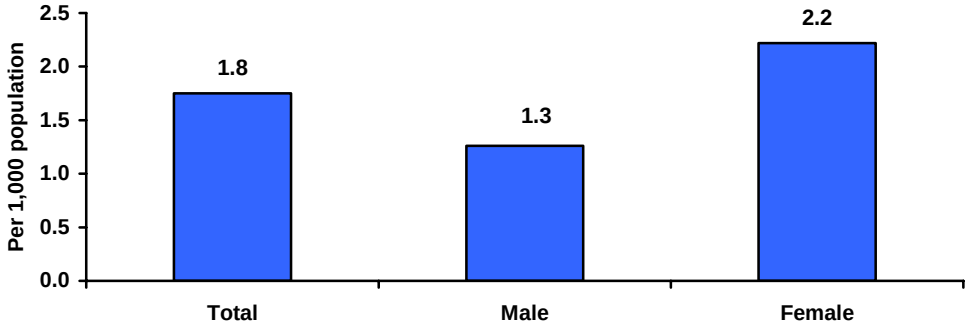
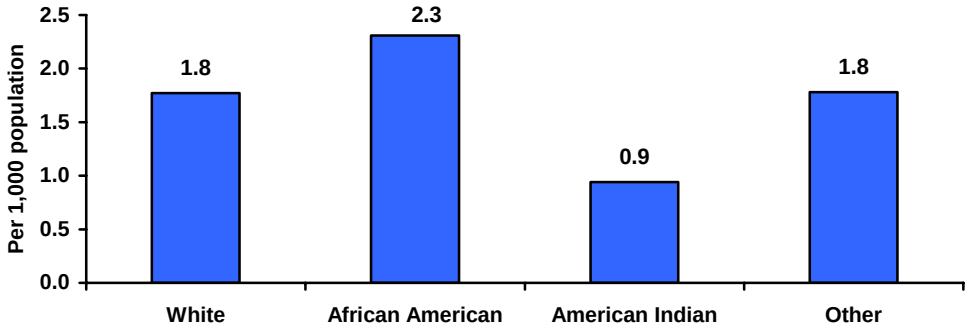
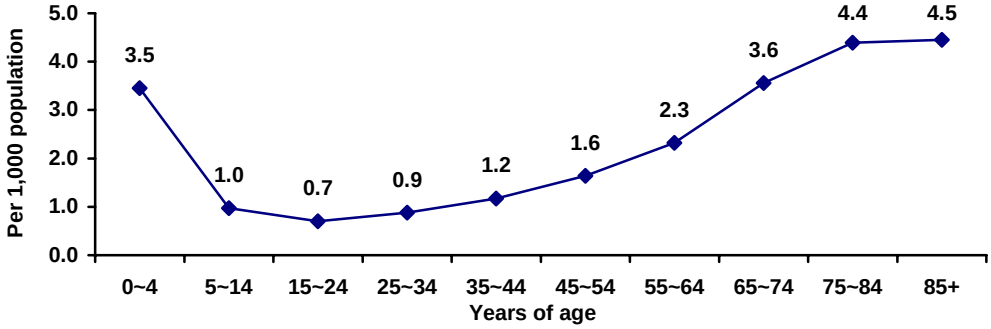


Figure 36. Oklahoma Hospitalization Rate with Asthma as the Secondary Diagnosis by Races, 2005



Hospitalizations with asthma as the secondary diagnosis tend to be more frequent among adults. Patients younger than 15 years accounted for 20.8% of the admissions, while those 65 years and over accounted for 29.9%. The age-specific hospitalization rate was higher in the 0-4 years old group than that in the 5-14 years old group, and then getting higher with age (Figure 35).

Figure 37. Oklahoma Hospitalization Rate with Asthma as the Secondary Diagnosis by Age, 2005



The average charge for admissions with asthma as the secondary diagnosis was about $9,757. The average charge was higher in females than in males ($10,425 vs. $8,498, respectful, P<0.05), and also higher among White ($10,412) than minority groups ($8,268 for African Americans, $6,749 for American Indians, and $6,421 for Other races, P<0.05). The average charge increased with age.

There were more patients admitted to the hospitals during the winter with asthma as the secondary diagnosis. More than 30% of them admitted during January through March.

Among patients admitted to the hospitals with asthma as the secondary diagnosis, 44.4% were admitted from the emergency room, 28.5% from physician referral with elective date, and 14.1% from urgent care physician referrals. About 80.5% of these hospitalizations with asthma as the secondary diagnosis were discharged to home or self-care, 7.0% were discharged to home under care of organized home health service organization.

The most common primary diagnoses for these hospitalizations were diseases of the respiratory system, and followed by diseases of the circulatory system.

MEDICATIONS FOR ASTHMA

Asthma medication use among adults

About 41.1% of adults with current asthma took asthma medication at least once a day, and another 33.3% took asthma medication but not everyday. There were 25.4% of adults with current asthma did not take any medicine for their asthma during past 30 days (Table 12).

Females have slightly higher percentages of taking asthma medications than males (P>0.05). People with current asthma in order age groups were more likely to take asthma medications >= 1 time/day, compared with people younger than 35 years old (P<0.05). People with health coverage were more likely to take asthma medications everyday than those without coverage (P<0.05, Table 12).

Table 12. Medication Usages Among Adult with Current Asthma: Oklahoma BRFSS 2002-2004

	>=1 times/day		1-6 times/week		<1 time/week		No Medication	
	Percent	**95% CI**	**Percent**	**95% CI**	**Percent**	**95% CI**	**Percent**	**95% CI**
Total	41.1	38.3-43.9	20.3	17.8-22.7	13.3	11.1-15.5	25.4	22.7-28.0
Gender								
Males	39.1	33.9-44.3	19.8	15.3-24.3	11.9	7.7-16.1	29.2	24.2-34.3
Females	42.2	38.9-45.5	20.5	17.7-23.4	14.0	11.5-16.5	23.3	20.3-26.3
Race/Ethnicity*								
White	41.6	38.3-44.8	19.8	17.1-22.6	14.4	11.8-17.1	24.2	21.3-27.1
African Americans	N/A	N/A	24.2	14.5-34.0	8.7	2.4-15.0	N/A	N/A
-American Indians	N/A	N/A	22.4	13.2-31.7	12.0	4.7-19.4	22.9	14.6-31.1
Hispanic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Age (years)								
18-24	18.4	10.5-26.4	26.4	17.0-35.7	20.4	12.2-28.5	34.8	24.9-44.8
25-34	32.7	25.9-39.5	20.6	14.8-26.3	18.2	11.7-24.7	28.5	21.8-35.3
35-44	40.1	33.5-46.6	22.1	16.7-27.6	14.9	9.7-20.1	22.9	17.2-28.6
45-54	42.8	36.5-49.2	20.3	14.9-25.7	11.7	7.5-15.9	25.1	19.6-30.7
55-64	50.6	44.0-57.1	15.9	11.1-20.8	7.1	3.7-10.4	26.4	20.7-32.1
65+	61.4	56.0-66.7	15.9	11.7-20.2	6.7	3.9-9.5	16.0	12.1-19.8
Education								
<High School	N/A	N/A	16.7	7.3-26.0	2.4	0.0-5.8	N/A	N/A
High School	38.1	34.0-42.2	21.6	17.8-25.4	14.1	10.8-17.4	26.2	22.1-30.2
Some College	40.3	34.8-45.8	21.4	16.8-25.9	14.9	10.2-19.6	23.4	18.6-28.3
College Degree	46.1	40.3-52.0	16.4	11.9-20.8	11.2	7.5-15.0	26.3	21.0-31.5
Income								
<$15,000	46.1	39.7-52.5	22.9	17.4-28.3	6.1	3.0-9.2	25.0	19.0-30.9
$15,000-24,999	41.5	35.4-47.7	21.1	15.9-26.4	16.3	10.7-21.8	21.1	16.0-26.1
$ 25,000-34,999	41.2	33.7-48.8	21.2	14.2-28.2	13.5	8.2-18.7	24.1	17.4-30.8
$35,000-49,999	36.8	29.5-44.1	22.2	15.4-29.1	14.3	8.6-20.1	26.7	19.4-34.0
$50,000+	39.9	33.7-46.1	15.0	10.5-19.5	13.9	9.2-18.6	31.2	34.9-37.4
Health plan								
Covered	44.3	41.1-47.5	20.5	17.8-23.2	11.7	9.4-14.1	23.4	20.7-26.2
No coverage	29.2	23.2-35.2	19.6	14.0-25.2	18.5	12.8-24.2	32.7	25.8-39.6

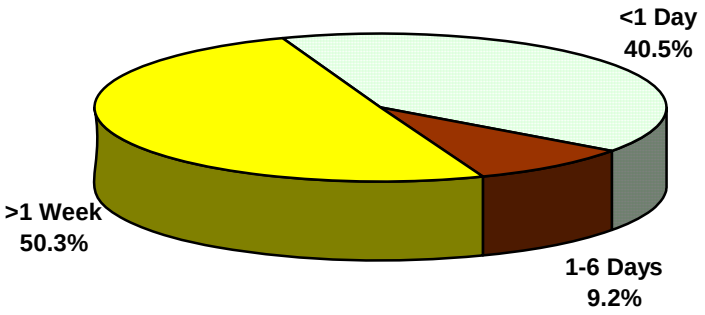
Prevalence is not available if respondents <50 in the county or the half of the Confidence Interval >10 to ensure the stable results.

Adults who were taking asthma medications during the past 30 days reported significantly higher percentages of asthma attacks than those who were not taking medications (66.9% vs. 33.5%, P<0.01).

Asthma medication use among children

The National Survey of Children's Health (NSCH) data provided the information of medication usages among children younger than 18 years of age with asthma. The question in the NSCH about asthma medication was "How long has it been since [he/she] last took asthma medication?" The results from NSCH indicated that 40.5% of children with current asthma took asthma medication within 24 hours. However, for about half of children with current asthma, the last time they took asthma medication was more than a week ago (Figure 38).

Figure 38. Asthma Medication Usage for Children <18 Years Old with Current Asthma in Oklahoma, NSCH Data



Date source: NCHS, CDC. State and Local Area Integrated Telephone Survey, National Survey of Children's Health, 2003.

ASTHMA ATTACK

Asthma attack among adults

Among adults currently with asthma, 55.3% reported that they had an asthma attack during the past 12 months (Table 13). Females had a higher percentage of asthma attacks than males ($P<0.05$). Among adults who had an asthma attack during the past 12 months, 84.0% were taking medications during the past 30 days. There is no information collected by BRFSS to indicate whether those persons had an asthma attack during the past 12 months because of having hard-to-control asthma or the inappropriate treatment/medications.

Table 13. Percent of Having Asthma Attacks in Past 12 Months Among Adult with Current Asthma: Oklahoma BRFSS 2002-2004

	Percent	95% CI
Total	55.3	52.4-58.3
Gender		
Males	45.7	40.3-51.1
Females	59.5	56.2-62.8
Race/Ethnicity*		
NH-White	54.2	50.9-57.4
NH-African Americans	N/A	N/A
NH-American Indians	63.7	53.8-73.6
Hispanic	N/A	N/A
Age (years)		
18-24	N/A	N/A
25-34	59.5	52.1-66.8
35-44	60.5	53.8-67.1
45-54	55.5	49.2-61.9
55-64	60.2	53.8-66.7
65+	38.9	33.7-44.1
Education		
<High School	N/A	N/A
High School Diploma/GED	55.2	50.9-59.6
Some College	54.6	48.9-60.4
College Degree	55.3	49.5-61.1
Income		
<$15,000	58.3	51.9-64.7
$15,000-24,999	58.5	52.4-64.7
$ 25,000-34,999	50.7	42.9-58.5
$35,000-49,999	53.7	45.8-61.6
$50,000+	52.8	46.3-59.2
Health plan		
Covered	53.6	50.4-56.8
No coverage	58.1	51.2-65.1

Percentage not available if respondents <50 in subgroup or the half of the 95% CI >10 to ensure the stable results.

Episode of asthma or asthma attack among children

Among Oklahoma children and youth <18 years old with lifetime asthma, 51.5% experienced an episode of asthma or asthma attack during the past 12 months (NSCH 2003). Females had a slightly higher percentage of episode of or asthma or asthma attack than males (57.0% vs. 47.8%, respectful, P>0.05). Due to the small sample size, results by age, race/ethnicity, and incomes are not available.

Among children and youth with current asthma, 71.9% experienced an episode of asthma or asthma attack during the past 12 months (NSCH 2003). And 6.4% of those children had an episode or attack of asthma had to stay overnight in a hospital.

YRBS data indicated that 37.2% of students with current asthma had an episode of asthma or asthma attack during past 12 months. Females reported higher percentages of having asthma attacks than males (46.9% vs. 28.1%, P<0.05).

EMERGENCY ROOM AND URGENT CARE FOR ASTHMA

2002-2004 Oklahoma BRFSS data showed 19.2% of adults with current asthma visited the emergency room (ER) or urgent care center because of their asthma during the past 12 months. Females were more like to use the emergency and urgent care than males (P<0.05, Table 14). Without significant difference, younger adults used ER visits or urgent care slightly more often than older adults (P>0.05). People with lower household incomes were more likely to use ER visits (P<0.05).

Table 14. Percent of Having Emergency Room or Urgent Care Visits in Past 12 Months Among Adults with Current Asthma: Oklahoma BRFSS 2002-2004

	Percent	95% CI
Total	19.2	16.8-21.6
Gender		
Males	14.0	10.1-17.8
Females	22.1	19.1-25.1
Race/Ethnicity*		
NH-White	18.2	15.6-20.8
NH-African Americans	22.8	13.1-32.4
NH-American Indians	28.0	18.2-37.7
Hispanic	6.5	0.0-13.5
Age (years)		
18-24	24.0	14.9-33.0
25-34	25.0	18.5-31.5
35-44	19.1	13.9-24.3
45-54	16.0	11.4-20.6
55-64	14.9	10.0-19.8
65+	15.7	11.8-19.6
Education		
<High School	21.3	11.5-31.1
High School Diploma/GED	21.7	18.0-25.5
Some College	18.6	14.0-23.2
College Degree	13.9	10.0-17.8
Income		
<$15,000	26.6	20.8-32.4
$15,000-24,999	25.1	19.3-30.8
$ 25,000-34,999	17.0	11.0-23.0
$35,000-49,999	13.5	7.9-19.1
$50,000+	9.6	6.0-13.2
Health plan		
Covered	17.9	15.4-20.4
No coverage	24.1	18.1-30.2

Prevalence is not available if respondents <50 in subgroup or the half of the 95% CI >10 to ensure the stable results.

Among those adults who had ER or urgent care visit in past 12 months, 54.5% were still taking medications at least daily, and another 27.8% took medications less than once a day during past 30 days.

PHYSICIAN OFFICE VISIT FOR URGENT TREATMENT OF ASTHMA

Other than the ER visits, 29.1% of adults with current asthma visited a physician or nurse for urgent treatment of worsening asthma symptoms during the past 12 months. Females reported higher percentage of using physician office or nurse for urgent treatment than males (P<0.05, Table 15). Each age group reported similar percentages of urgent physician visits.

Table 15. Percent of Having Physician Visits for Urgent Treatment in Past 12 Months Among Adults with Current Asthma: Oklahoma BRFSS 2003-2004

	Percent	95% CI
Total	29.1	26.5-31.7
Gender		
Males	23.2	18.7-27.7
Females	32.4	29.2-35.5
Race/Ethnicity*		
NH-White	29.7	26.7-32.7
NH-African Americans	N/A	N/A
NH-American Indians	30.8	21.3-40.2
Hispanic	10.2	2.5-18.0
Age (years)		
18-24	28.1	18.8-37.5
25-34	28.2	21.9-34.6
35-44	34.4	28.1-40.7
45-54	28.6	22.8-34.3
55-64	30.3	24.3-36.4
65+	24.8	20.1-29.5
Education		
<High School	N/A	N/A
High School Diploma/GED	28.3	24.4-32.1
Some College	29.7	24.6-34.8
College Degree	30.5	25.0-35.9
Income		
<$15,000	31.1	25.2-37.1
$15,000-24,999	34.7	28.8-40.5
$ 25,000-34,999	23.2	17.3-29.2
$35,000-49,999	33.2	25.7-40.7
$50,000+	23.4	17.9-29.0
Health plan		
Covered	29.0	26.1-31.9
No coverage	29.6	23.3-35.9

Prevalence is not available if respondents <50 in the county or the half of the Confidence Interval >10 to ensure the stable results.

For those adults who had urgent care physician visits in the past 12 months, 56.7% were still taking medications at least daily, and another 29.1% took medications less than once a day during past 30 days.

ROUTINE PHYSICIAN OFFICE VISIT WITH ASTHMA

Among Oklahoma adults with current asthma, 50.9% of them went to see their physician for a routine checkup of asthma during the past 12 months (Table 16). Females are more likely to have routine checkups than males (P<0.05). While older persons tend to see their doctors more regularly, they did not have significant difference from the younger age groups. People who have health care coverage reported much higher proportions of checkups than those without health care coverage (Table 16, P<0.05).

Table 16. Percent of Having Routine Physician Visits in Past 12 Months Among Adult with Current Asthma: Oklahoma BRFSS 2002-2004

	Percent	95% CI
Total	50.9	47.9-53.8
Gender		
Males	44.9	39.6-50.3
Females	54.1	50.7-57.5
Race/Ethnicity*		
NH-White	51.1	47.8-54.4
NH-African Americans	N/A	N/A
NH-American Indians	N/A	N/A
Hispanic	N/A	N/A
Age (years)		
18-24	N/A	N/A
25-34	47.6	40.2-54.9
35-44	50.1	43.4-56.7
45-54	49.0	42.6-55.4
55-64	54.7	48.2-61.1
65+	57.1	51.8-62.3
Education		
<High School	N/A	N/A
High School Diploma/GED	46.0	41.6-50.3
Some College	53.7	48.0-59.4
College Degree	59.3	53.6-65.0
Income		
<$15,000	47.1	40.7-53.5
$15,000-24,999	51.4	45.1-57.7
$ 25,000-34,999	52.8	45.0-60.6
$35,000-49,999	55.7	47.8-63.5
$50,000+	52.8	46.3-59.3
Health plan		
Covered	55.1	51.9-58.3
No coverage	35.5	29.0-41.9

Percentage is not available if respondents <50 in subgroup or the half of the 95% CI >10 to ensure the stable results.

People who were taking medications everyday visited their physicians for checkup more frequently than those who did not take any medications (66.8% vs. 23.9%, respectful, P<0.01).

ACTIVITY LIMITATIONS DUE TO ASTHMA

Among Oklahoma adults with current asthma, 34.2% reported activity limitations, including unable to work or carry out their usual activities due to asthma (Table 17). More females experienced activity limitations than males (P<0.05). People with lower household incomes experienced more activity limitations compared with those with household incomes $50,000 and over (P<0.05). People without health coverage reported higher percentages of having activity limitation due to asthma (P<0.05, Table 17).

Table 17. Prevalence of Activity Limitation in Past 12 Months Among Adults with Current Asthma: Oklahoma BRFSS 2002-2004

	Percent	95% CI
Total	34.2	31.4-36.9
Gender		
Males	25.0	20.5-29.6
Females	39.2	35.8-42.5
Race/Ethnicity*		
NH-White	33.2	30.1-36.3
NH-African Americans	N/A	N/A
NH-American Indians	N/A	N/A
Hispanic	N/A	N/A
Age (years)		
18-24	35.3	25.3-45.2
25-34	32.4	25.5-39.3
35-44	36.3	30.1-42.6
45-54	32.2	26.3-38.0
55-64	38.1	31.7-44.4
65+	32.0	27.0-36.9
Education		
<High School	N/A	N/A
High School Diploma/GED	35.7	31.5-39.9
Some College	35.0	29.7-40.3
College Degree	27.5	22.4-32.6
Income		
<$15,000	47.8	41.4-54.3
$15,000-24,999	41.3	35.1-47.5
$ 25,000-34,999	31.6	24.7-38.4
$35,000-49,999	21.7	15.6-27.7
$50,000+	24.5	18.9-30.1
Health plan		
Covered	31.9	29.0-34.8
No coverage	41.9	35.0-48.8

Percentage is not available if respondents <50 in subgroup or the half of the 95% CI >10 to ensure the stable results.

INFLUENZA VACCINATION AMONG PERSONS WITH ASTHMA

Vaccination of influenza might prevent hospitalization and death among persons at increased risk, and might also reduce influenza-related respiratory illnesses and physician visits among all age groups. CDC recommends annual influenza vaccination to people 65 years and over or people who have chronic disorder of pulmonary systems, including asthma.

2003-2005 BRFSS included the questions, "During the past 12 months, have you had a flu shot?" Another question "During the past 12 months, have you had a flu vaccine that was sprayed in your nose?" were asked in 2004 and 2005 survey. Respondents answered "Yes" to either question were considered received influenza vaccine.

According to 2003-2005 Oklahoma BRFSS, 45.8% of adults with current asthma reported that they received influenza vaccination during the past year. The proportion of receiving influenza vaccination was much higher in seniors than those under the age of 65 years old (80.1% vs. 38.7%, P<0.05). People with health coverage were more likely to receive influenza vaccination than those without coverage (P<0.05).

Table 18. Prevalence of influenza vaccination in the Past 12 Months Among Adults with Current Asthma: Oklahoma BRFSS 2003-2005

	Percent	95% CI
Total	45.8	43.1-48.5
Gender		
Males	44.9	39.7-50.1
Females	46.3	43.1-49.4
Race/Ethnicity*		
NH-White	46.6	43.5-49.7
NH-African Americans	NA	NA
NH-American Indians	43.8	34.3-53.2
Hispanic	NA	NA
Age (years)		
18-24	23.2	14.3-32.1
25-34	28.7	22.7-34.7
35-44	35.2	29.0-41.4
45-54	44.3	38.4-50.2
55-64	61.7	56.1-67.2
65+	80.1	76.1-84.2
Education		
<High School	NA	NA
High School Diploma/GED	40.3	36.3-44.2
Some College	45.6	40.5-50.6
College Degree	56.9	50.9-62.9
Income		
<$15,000	48.0	42.0-54.0
$15,000-24,999	44.3	38.6-49.9
$ 25,000-34,999	47.3	39.8-54.8
$35,000-49,999	41.8	34.4-49.2
$50,000+	43.8	37.6-50.1
Health plan		
Covered	49.5	45.8-53.2
No coverage	34.5	26.7-42.2

Percentage is not available if respondents <50 in subgroup or the half of the 95% CI >10 to ensure the stable results.

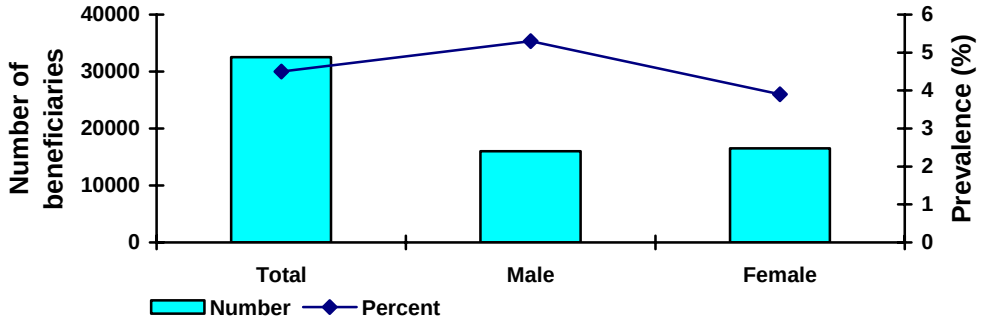
ASTHMA IN MEDICAID BENEFICIARIES

The asthma prevalence data of Oklahoma Medicaid beneficiaries comes from Oklahoma Health Care Authority (OHCA) administrative data, which includes paid claims/encounters only and for recipients eligible at any time during the given year. When calculating the prevalence, the numerators were defined as the number of eligible Medicaid recipients with a defined diagnosis code. The denominators were defined as the total number of people that were Medicaid eligible at any point during the given year and within the defined category (e.g. age, race, gender).

MEDICAID BENEFICIARIES WITH ASTHMA AS PRIMARY DIAGNOSIS

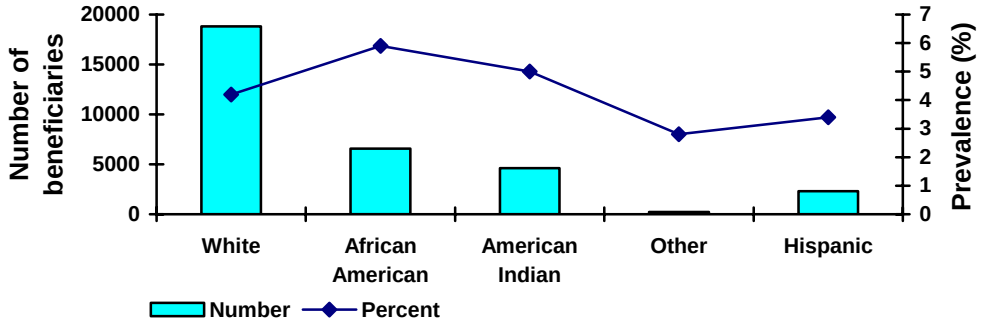
During the calendar year (CY) 2005, there were 32,525 Medicaid beneficiaries that received paid claims with asthma as the primary diagnosis. With the definition of numerator and denominator in the above paragraph, the overall prevalence was 4.5%. The prevalence was higher in males, although the numbers of beneficiaries were close between males and females (Figure 39).

Figure 39. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as the Primary Diagnosis by Gender, CY2005



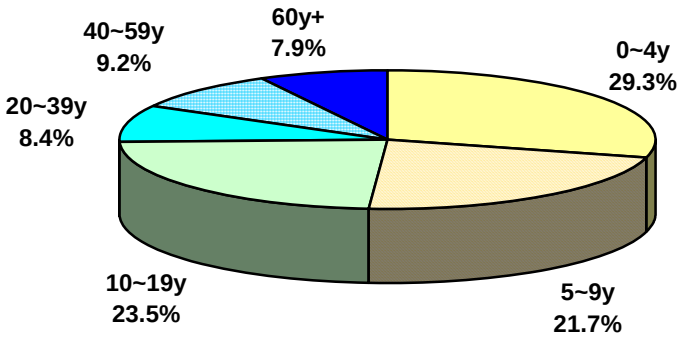
Among beneficiaries with asthma as the primary diagnosis, 57.8% of were Non-Hispanic White, followed by African American (20.2%) and American Indians (14.2%). However, the prevalence was higher in these two minority groups (Figure 40).

Figure 40. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as the Primary Diagnosis by Race/ethnicity, CY2005



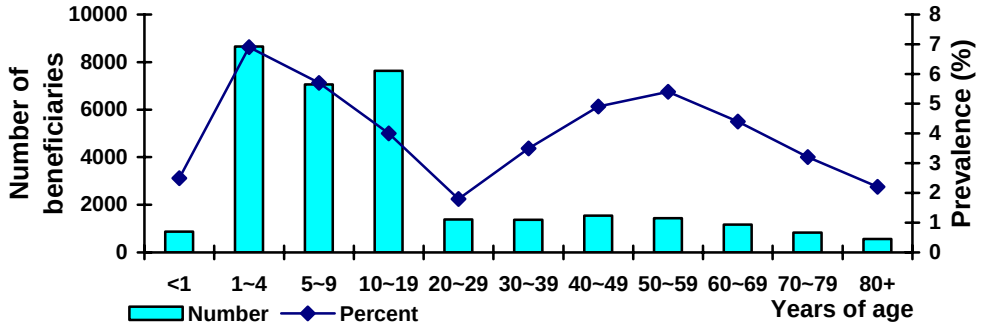
Among Oklahoma Medicaid beneficiaries with asthma as the primary diagnosis, about half (51.0%) of them were kids younger than 10 years of age, in which, more than half were in 1-4 years old. Children and young adults between 10-19 years old accounted for another 23.5% (Figure 41).

Figure 41. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as the Primary Diagnosis by Age, CY2005



The prevalence of asthma for children 1-4 years old was the highest among all age groups. The prevalence decreased from 6.9% in the 1-4 years old age group to 1.8% in the 20-29 years old age group, then increased to 5.4% in the 50-59 years old age group, then started decreasing as beneficiaries' age increased (Figure 42).

Figure 42. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as the Primary Diagnosis by Age, CY2005



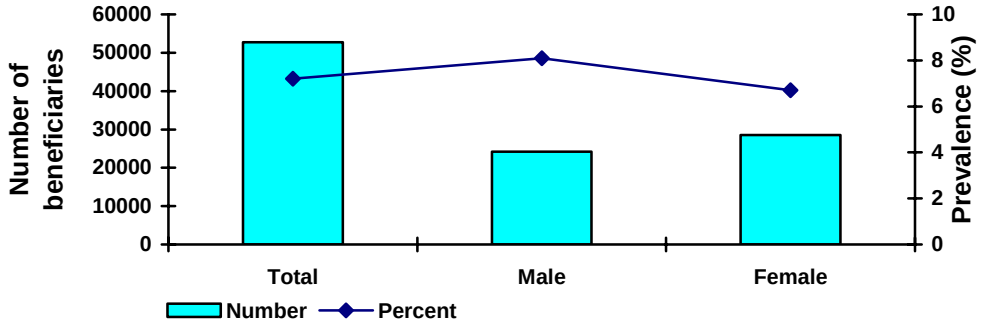
There is no area that has significant higher or lower prevalence for Medicaid beneficiaries that received paid claims with asthma as the primary diagnosis, although more than one third of those beneficiaries were located in the Oklahoma City and Tulsa areas.

The total amount paid by OHCA for claims with a primary diagnosis of asthma was increased from $9.9 million in CY 2004 to over $11 million in CY 2005. These amounts did not include pharmacy claims because of no diagnoses information in pharmacy data.

MEDICAID BENEFICIARIES WITH ASTHMA AS ANY DIAGNOSIS

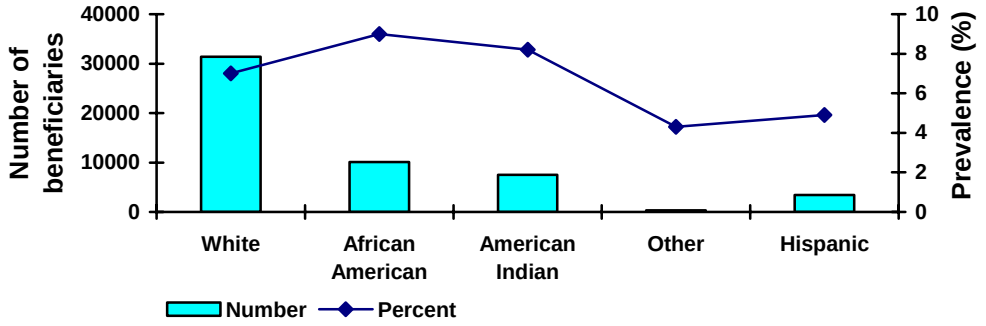
During calendar year 2005, there were 52,740 Medicaid beneficiaries that received paid claims with asthma as any diagnosis from OHCA. The overall prevalence was 7.2%. While slightly more female beneficiaries received the paid claims than males, the prevalence was slightly higher in males (Figure 43).

Figure 43. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as Any Diagnosis by Gender, CY2005



Non-Hispanic White accounted for 60% of the number of beneficiaries with asthma as any diagnosis, African Americans and American Indians accounted for 19.2% and 14.2%, respectfully. These two minority groups had higher prevalence than White (Figure 44).

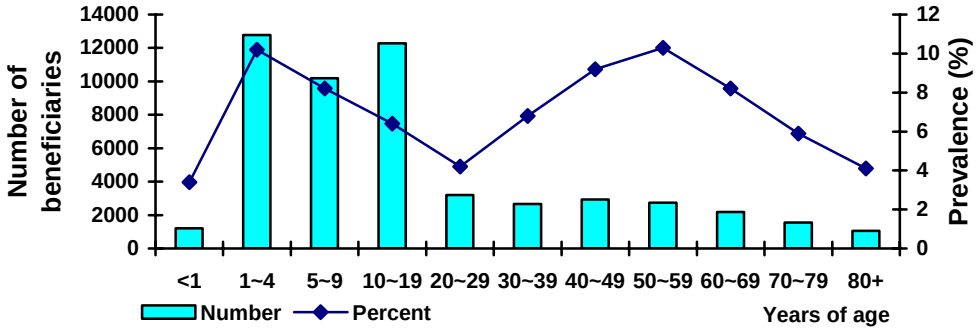
Figure 44. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as Any Diagnosis by Race/ethnicity, CY2005



Beneficiaries younger than 10 years of age accounted for 45.8% of those with asthma as any diagnosis, in which, more than half (52.9%) were in 1-4 years old age group.

The prevalence decreased from 10.2% in the 1-4 years old age group to 4.2% in the 20-29 years old age group, then increased to 10.3% in the 50-59 years old age group, then decrease again (Figure 45).

Figure 45. Oklahoma Medicaid Beneficiaries Received Paid Claims with Asthma as Any Diagnosis by Age, CY2005



Medicaid beneficiaries in east central Oklahoma had higher prevalence of receiving paid claims with asthma as any diagnosis (data not shown). Nearly half (43.8%) of Medicaid beneficiaries received paid claims with asthma as any diagnosis were located in the Oklahoma City and Tulsa areas.

ASTHMA MORTALITY

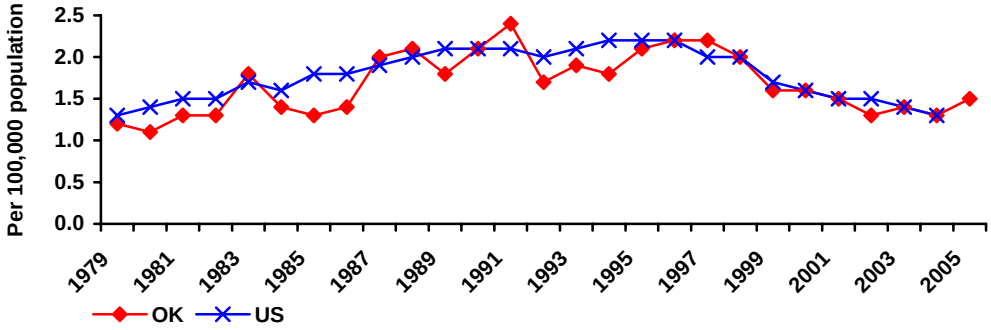
The mortality data from Oklahoma Vital Records are currently available through 2005. Nationwide 2003 mortality data are available from CDC WONDER. Deaths occurred before 1999 with ICD-9 code 493 as the underlying cause of death and deaths occurred from 1999 with ICD-10 code J45-J46 as the underlying cause of death were selected as asthma mortality cases.

To eliminate race misclassifications for American Indians, race-specific mortality rates in Oklahoma were calculated with the revised IHS (Indian Health Service) Racial Categories, which is an ongoing effort where Oklahoma Vital Records data are matched with IHS records. Those individuals that were in the IHS database are considered Native Americans, and those not matched are unchanged. The revised data is available for 1999-2003.

In 2005, 56 people died in Oklahoma with asthma as the underlying cause of death. Although the majority of the death cases were over 65 years old (32 cases, 57.1%), there were four cases (7.1%) that died before the age of 25 years old.

The age-adjusted asthma mortality rates in Oklahoma are close to the national average, and had similar trends as the US, which increased from the 1980's to the 1990's, then decreased in recent years (Figure 46).

Figure 46. Age-Adjusted Mortality Rate for Asthma: Oklahoma and US 1979-2005

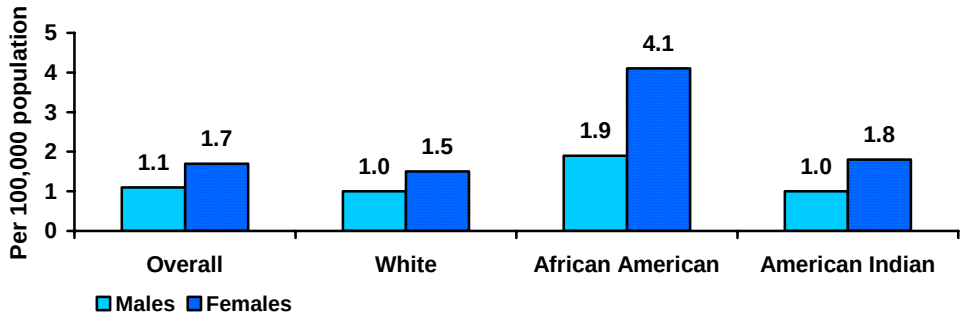


Source: CDC WONDER 1979-2004; Oklahoma Vital Statistics 1979-2005; Age-adjusted to the US 2000 standard population.

Females had higher asthma mortality than males. The age-adjusted mortality rates were higher among females in the overall population of Oklahoma, as well as in each racial subgroup. In African Americans, the asthma mortality rate among females doubled that among males (Figure 47).

Age-adjusted mortality rates of asthma were more than doubled among African Americans (3.2/100,000 population) than that among Whites (1.3/100,000 population), especially among women (Figure 47); American Indians have similar level of mortality rates of asthma compared to Whites (1.4/100,000 population).

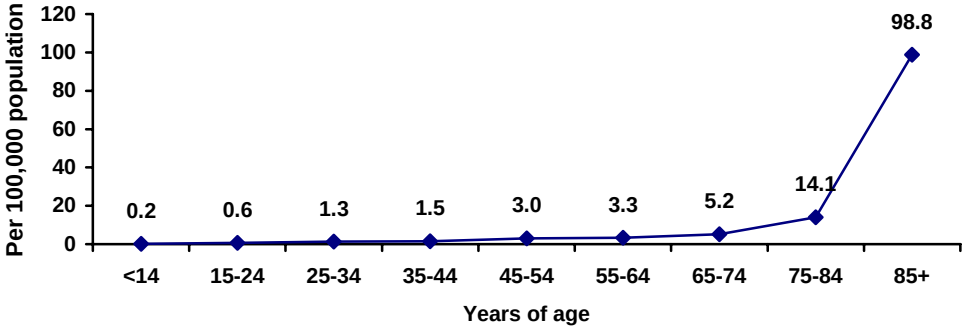
Figure 47. Oklahoma Asthma Age-adjusted Mortality Rates by Gender and Race*: 1999-2003



Source: Oklahoma Vital Statistics. Age-adjusted to the US 2000 standard population. *Races: IHS-linked races

Age-specific asthma mortality rates increased significantly in the elderly population, especially for those aged 75 years and over (Figure 48).

Figure 48. Oklahoma Asthma Age-specific Mortality Rates: 1999-2004



Source: Oklahoma Vital Statistics.

ASTHMA AMONG MINORITY POPULATION

The prevalence of asthma among minority populations in Oklahoma has been difficult to obtain due to the historically small sample size in survey. Reliable estimations usually come from combining datasets for multiple years. The Oklahoma Minority Behavioral Risk Factor Survey (OMBRFS) focused specifically on minority populations in Oklahoma, provided a similar sample size of minority respondents to the combined 2002-2004 standard BRFSS.

Race/ethnicity	OMBRFS	BRFSS 2002-2004
Non-Hispanic African American	1,582	1,275
Non-Hispanic American Indians	1,378	1,407
Non-Hispanic Asian/Pacific Islanders	335	232
Non-Hispanic Others	356	726
Hispanics	1,476	866

Compared to the results from 2002-2004 standard BRFSS, prevalence of lifetime and current asthma among the adult minority population were similar to the results from BRFSS 2002-2004 (Figure 49, 50). Detailed tables are presented in Appendix 3.

Figure 49. Prevalence of Lifetime Asthma by Race/ethnicity: OMBRFS vs. BRFSS 2002-2004

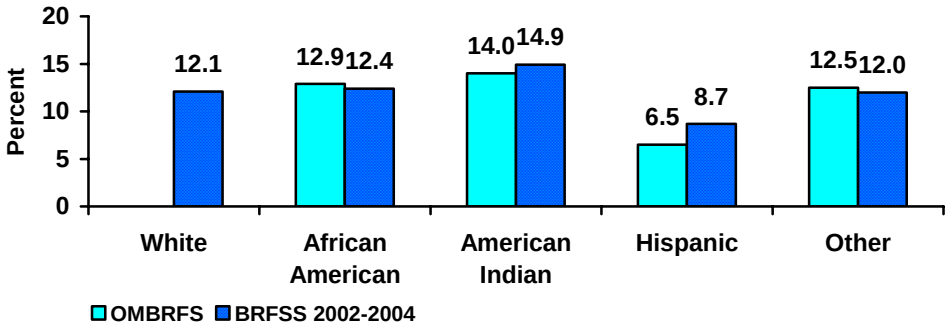
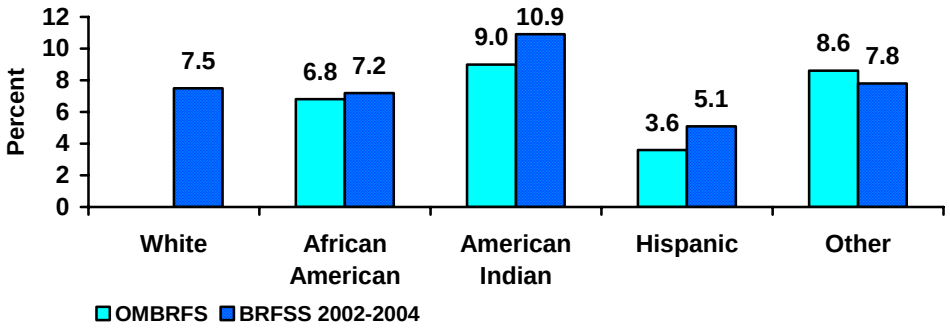
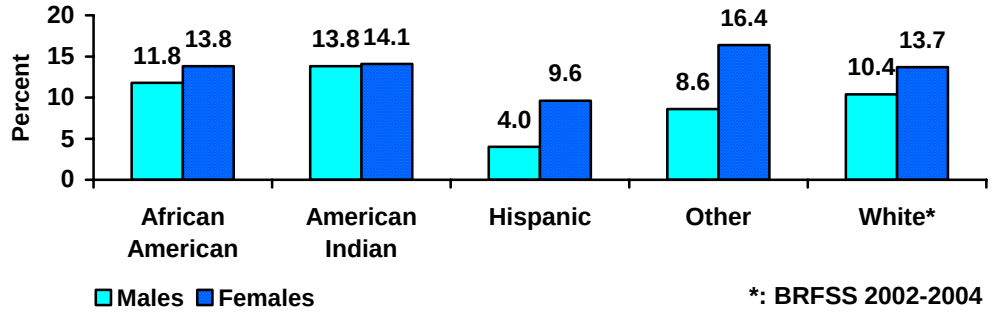


Figure 50. Prevalence of Current Asthma by Race/ethnicity: OMBRFS vs. BRFSS 2002-2004



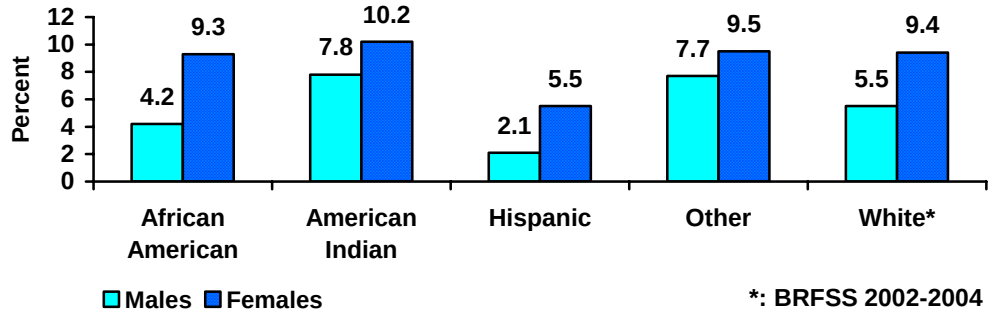
Data from OMBRFS indicated that American Indians females and males had similar prevalence of lifetime asthma, while Hispanic females and females in “Other” race group had much higher prevalence of lifetime asthma than their counterparts. African American females had a slightly higher prevalence of lifetime asthma than African American males (Figure 51). Compare with Non-Hispanic Whites (Oklahoma BRFSS 2002-2004 data), Hispanics had lower prevalence of lifetime asthma (Figure 51).

Figure 51. Prevalence of Lifetime Asthma by Race/ethnicity, Gender: OMBRFS



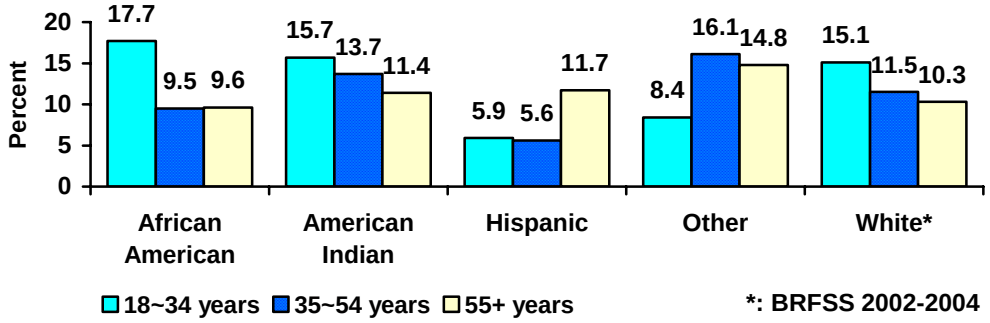
Females in each racial/ethnic group had a higher prevalence of current asthma than males (Figure 52). The differences in prevalence of current asthma between females and males were larger among African Americans and Hispanics. American Indian males and males in “Other” race group had higher prevalence of current asthma than Non-Hispanic White males (Oklahoma BRFSS 2002-2004 data), while African American and Hispanic males had lower prevalence of current asthma than Non-Hispanic White males (Figure 52). Hispanic females had lower prevalence of current asthma than their counterparts in any other racial/ethic groups.

Figure 52. Prevalence of Current Asthma by Race/ethnicity, Gender: OMBRFS



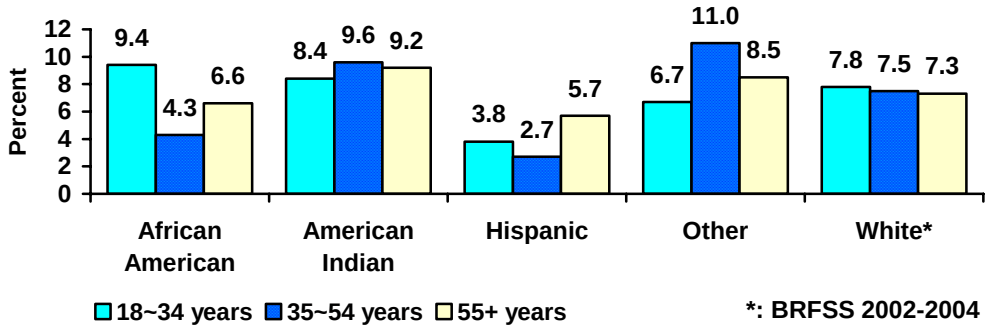
The relationships between age and prevalence of asthma were not same in each racial/ethnic group. The prevalence of lifetime asthma in African Americans and American Indians aged 18-34 years old were higher than those of over 35 years. Hispanic and people in “Other” race group aged 18-34 years old had lower prevalence of lifetime asthma than those of over 55 years (Figure 53).

Figure 53. Prevalence of Lifetime Asthma by Race/ethnicity and Age: OMBRFS



African American and Hispanics aged 35-54 years old had lower prevalence of current asthma than their counterparts in other age groups, while persons in "Other" race group aged 35-54 years old had higher prevalence of current asthma than their counterparts (Figure 54).

Figure 54. Prevalence of Current Asthma by Race/ethnicity and Age: OMBRFS



Adults with lower annual household incomes were more likely to report higher prevalence of lifetime and current asthma among all the racial/ethnic groups (Figure 55, 56). American Indians with household incomes <$20,000 had much higher prevalence of asthma, both lifetime and current, than those with higher incomes (Figure 55, 56).

Figure 55. Prevalence of Lifetime Asthma by Race/ethnicity and Incomes: OMBRFS

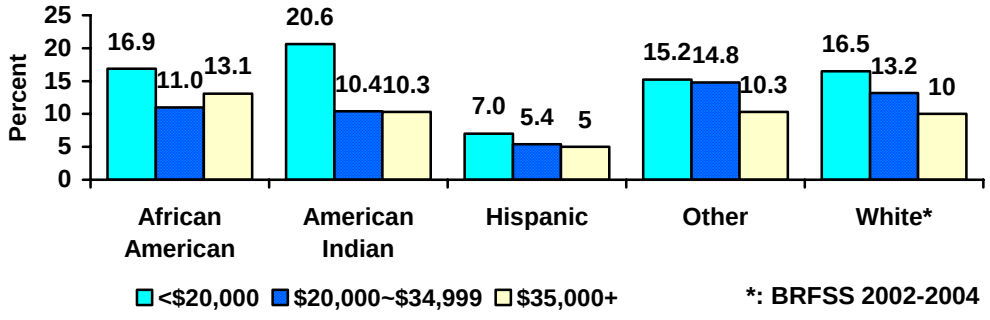
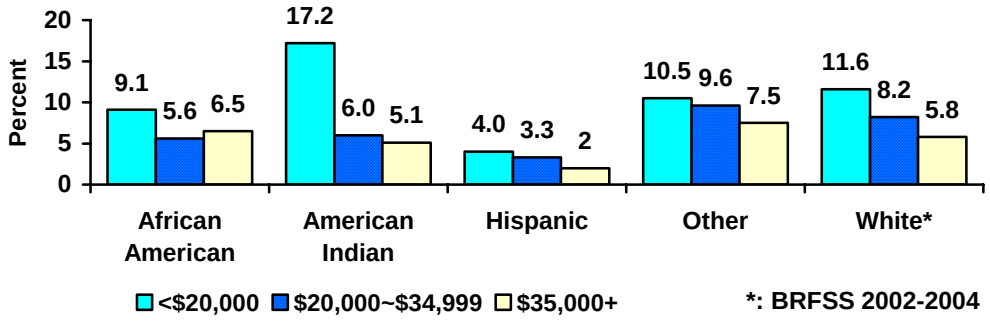


Figure 56. Prevalence of Current Asthma by Race/ethnicity and Incomes: OMBRFS



The relationships between education level and prevalence of asthma were not same in each racial/ethnic group. For those in "Other" race group, people who were college graduate had much lower prevalence of lifetime and current asthma than those who were high school graduate (Figure 57, 58). African Americans with college graduate degree had higher prevalence of lifetime and current asthma than those with high school degree (Figure 57, 58).

Figure 57. Prevalence of Lifetime Asthma by Race/ethnicity and Education: OMBRFS

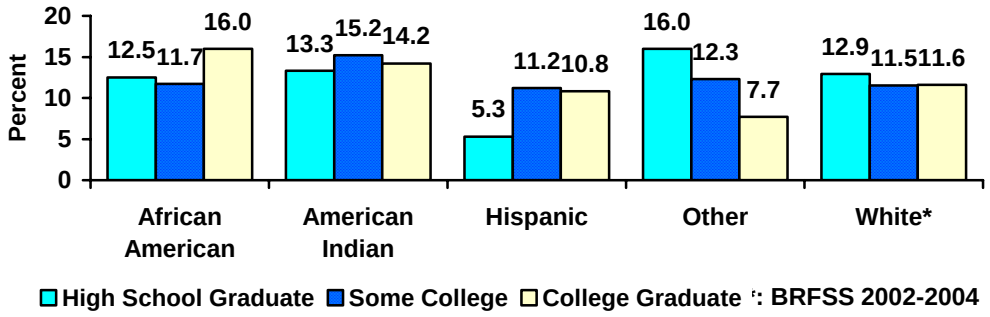
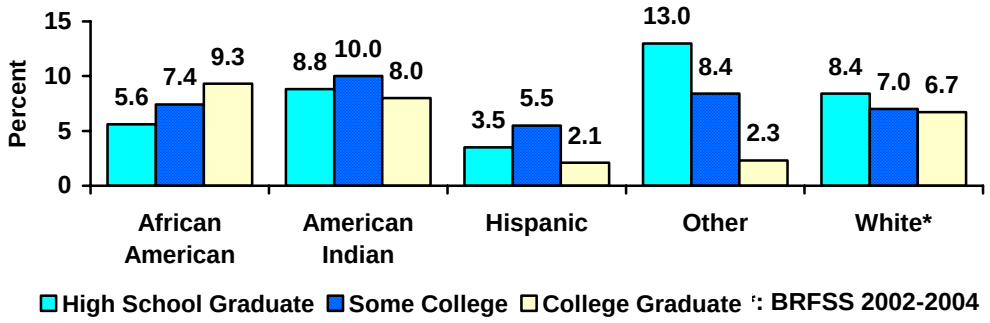


Figure 58. Prevalence of Current Asthma by Race/ethnicity and Education: OMBRFS



ASTHMA AND ENVIRONMENTAL FACTORS

Environmental exposures such as allergens (animal and plant proteins), pollutants released into the environment, and workplace exposures have been linked to exacerbations of asthma. An environmental pollutant may affect asthma severity in the following ways:

- The pollutant might act as an inciter or trigger, leading to an asthma attack in an individual with hyperresponsive airways.
- The pollutant can exacerbate preexisting airway inflammation, leading to increased airway hyperresponsiveness, which may persist after cessation of exposure.
- The pollutant might augment or modify immune responses to inhaled antigens or intensify the impact of other pollutants in the respiratory tract.

OUTDOOR AIR POLLUTION

For the last several decades, high levels of outdoor air pollution have been associated with short-term increases in asthma morbidity and mortality. The National Ambient Air Quality Standards (NAAQS), required by the Clean Air Act (CAA), has been set for six criteria pollutants (O3, SO2, NO2, CO, lead, and PM10 and PM2.5). The standards are designed to protect the health of all susceptible groups. For people with asthma, SO2, sulfuric acid aerosols, and NO2 can exacerbate respiratory symptoms in the short term.

INDOOR AIR POLLUTION

In industrialized countries, adults and children might spend up to 75%-90% of their time indoors. The primary indoor air pollutants associated with asthma exacerbation include the following:

- Biologic allergens, such as those derived from dust mites, cockroaches, and animal dander. The allergen-containing secretions dry on fur, bedding, and clothes and become airborne
- Environmental tobacco smoke (ETS)
- Heating sources

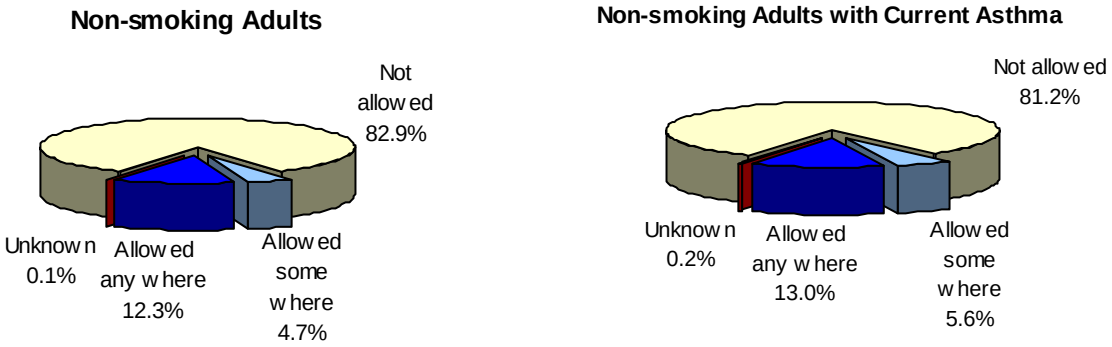
Secondhand smoke

Secondhand smoke is a known cause of cancer in humans and also causes heart disease and stroke. Passive smoking is estimated to cause more than 700 deaths in Oklahoma among nonsmokers each year. Persons with asthma could suffer symptoms ranging from discomfort to acute distress by expose to second hand smoke. Major studies have concluded that parental smoking is associated with increased prevalence of asthma in children. Among those kids with established asthma, parental smoking is associated with more severe disease. Furthermore, there is substantial data confirming that infants

whose mothers smoke during pregnancy have a higher risk of developing asthma and other respiratory illnesses including wheezing and coughing.

Oklahoma 2005 BRFSS data indicated that for people who are non-smokers, 82.9% would not allow smoking anywhere in their house, while 4.7% would allow smoking somewhere in the house (Figure 59). Unfortunately, non-smoking adults with current asthma did not do any better to avoid the secondhand smoking in the household compared to those without current asthma. For persons with current asthma and not currently smoking, most of them would not allow smoking inside their homes, but 13.0% reported smoking is allowed anywhere in their homes (Figure 59).

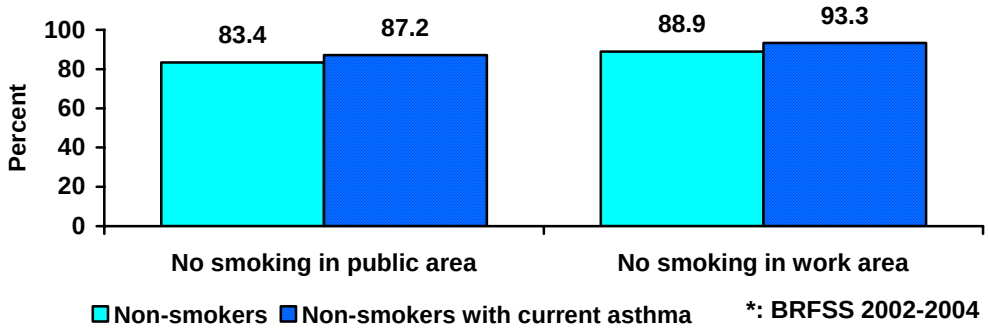
Figure 59. Second Hand Smoking of Indoor Work Place Among Adults in Oklahoma, BRFSS 2005



Nonsmokers exposed to secondhand smoke at work are at increased risk for adverse health effects. Oklahoma BRFSS indicated that among non-smoking persons who are employed and working indoors, 83.4% reported that their place of work's official policy does not allow smoking in public or common areas, such as lobbies, rest rooms, and lunchrooms; and 88.9% reported that smoking is not allowed in the working areas (Figure 60).

Non-smokers with current asthma and who work indoors reported similar situation (Figure 60). However, 6.5% of the adults with current asthma may be exposed to second hand smoke in their working areas and 12.7% of them may be exposed to second hand smoke in the public areas of workplaces due to either there is no official smoking policy or the policy allows smoking in those areas.

Figure 60. Second Hand Smoking of Indoor Work Place Among Adults in Oklahoma, BRFSS 2005



APPENDIX

APPENDIX 1: BRFSS SUPPLEMENTAL TABLES

Table 19. Prevalence of Asthma Among Adult Females in Oklahoma: BRFSS 2005

	Lifetime Asthma		Current Asthma	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	14.9	13.7-16.1	10.8	9.8-11.9
Race/Ethnicity*				
NH-White	13.8	12.6-15.0	9.0	8.0-9.9
NH-Black	11.3	7.4-15.2	6.4	3.6-9.2
NH-American Indian	12.4	9.1-15.7	7.1	5.3-8.8
Hispanic	7.1	3.8-10.4	3.7	1.4-6.1
Age (years)				
18-24	15.2	10.9-19.5	6.6	3.8-9.3
25-34	14.4	11.9-16.8	9.7	7.6-11.8
35-44	12.7	10.4-15.0	8.5	6.5-10.5
45-54	11.8	9.9-13.8	7.1	5.9-8.4
55-64	13.9	11.9-15.9	10.0	8.4-11.7
65+	12.1	10.5-13.6	8.9	7.5-10.3
Education				
< High School	12.8	7.0-18.6	8.2	5.4-11.0
HS Diploma/GED	13.6	12.1-15.2	9.2	8.0-10.5
Some College	14.4	12.4-16.3	8.0	6.8-9.3
College Degree	11.3	9.4-13.2	7.6	6.1-9.2
Income				
<$15,000	15.4	13.0-17.8	11.3	9.2-13.4
$15,000-24,999	15.8	13.0-18.6	9.2	7.6-10.9
$ 25,000-34,999	11.4	9.2-13.6	7.5	5.7-9.2
$35,000-49,999	11.8	9.5-14.0	7.0	5.2-8.8
$50,000+	11.6	9.6-13.5	7.4	5.7-9.0
BMI				
<25	11.0	9.4-12.5	6.8	5.8-7.9
25-29.9	12.1	10.7-13.6	7.3	6.2-8.4
30+	17.7	15.3-20.1	11.9	9.9-14.0
Smoking Status				
Current	16.2	13.9-18.6	9.5	8.0-11.1
Former	14.4	12.4-16.5	10.6	8.7-12.4
Never	11.3	10.0-12.6	7.0	6.0-7.9

*: NH: Non Hispanic.

Table 20. Prevalence of Asthma Among Adult Males in Oklahoma: 2005 BRFSS

	Lifetime Asthma		Current Asthma	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	11.6	10.0-13.2	6.0	4.9-7.1
Race/Ethnicity*				
NH-White	13.8	12.6-15.0	9.0	8.0-9.9
NH-Black	11.3	7.4-15.2	6.4	3.6-9.2
NH-American Indian	12.4	9.1-15.7	7.1	5.3-8.8
Hispanic	7.1	3.8-10.4	3.7	1.4-6.1
Age (years)				
18-24	15.2	10.9-19.5	6.6	3.8-9.3
25-34	14.4	11.9-16.8	9.7	7.6-11.8
35-44	12.7	10.4-15.0	8.5	6.5-10.5
45-54	11.8	9.9-13.8	7.1	5.9-8.4
55-64	13.9	11.9-15.9	10.0	8.4-11.7
65+	12.1	10.5-13.6	8.9	7.5-10.3
Education				
< High School	12.8	7.0-18.6	8.2	5.4-11.0
HS Diploma/GED	13.6	12.1-15.2	9.2	8.0-10.5
Some College	14.4	12.4-16.3	8.0	6.8-9.3
College Degree	11.3	9.4-13.2	7.6	6.1-9.2
Income				
<$15,000	15.4	13.0-17.8	11.3	9.2-13.4
$15,000-24,999	15.8	13.0-18.6	9.2	7.6-10.9
$ 25,000-34,999	11.4	9.2-13.6	7.5	5.7-9.2
$35,000-49,999	11.8	9.5-14.0	7.0	5.2-8.8
$50,000+	11.6	9.6-13.5	7.4	5.7-9.0
BMI				
<25	11.0	9.4-12.5	6.8	5.8-7.9
25-29.9	12.1	10.7-13.6	7.3	6.2-8.4
30+	17.7	15.3-20.1	11.9	9.9-14.0
Smoking Status				
Current	16.2	13.9-18.6	9.5	8.0-11.1
Former	14.4	12.4-16.5	10.6	8.7-12.4
Never	11.3	10.0-12.6	7.0	6.0-7.9

*: NH: Non Hispanic.

APPENDIX 2: OKLAHOMA MEDICAID SUPPLEMENTAL TABLES

Table 21. Oklahoma Medicaid Paid Claim with Asthma as the Primary Diagnosis, CY 2005

		Number	Rate (per 100 Eligibles)
Total		32,525	4.47
Gender			
	Male	16,029	5.34
	Female	16,496	3.85
Race/Ethnicity*			
	White NH	18,817	4.20
	Black NH	6,560	5.85
	Am Indian NH	4,612	5.04
	Other NH	218	2.82
	Hispanic	2,318	3.36
Age (years)**			
	<10	16,590	5.82
	10-19	7,641	4.01
	20-29	1,378	1.79
	30-39	1,367	3.49
	40-49	1,551	4.86
	50-59	1,437	5.40
	60-69	1,171	4.39
	70-79	832	3.18
	80+	558	2.20
	< 1	871	2.49
	1-4	8,656	6.91
	5-9	7,063	5.66
	65+	1,917	2.91
Planning Districts			
	ACOG	8,775	4.66
	ASCOG	2,323	4.09
	COEDD	2,654	5.02
	EODD	3,863	5.13
	GGEDA	2,195	4.00
	INCOG	5,243	4.31
	KEDDO	2,351	4.55
	NODA	1,168	3.59
	OEDA	351	3.11
	SODA	2,273	4.19
	SWODA	1,127	4.78
	Unknown	202	3.98

*: NH: Non-Hispanic; Hispanic may be of any race. **Age as of the end of the calendar year.

Table 22. Oklahoma Medicaid Paid Claim with Asthma as Any Diagnosis, CY 2005

		Number	Rate (per 100 Eligibles)
Total		52,740	7.24
Gender			
	Male	24,212	8.06
	Female	28,528	6.67
Race/Ethnicity*			
	White NH	31,393	7.01
	Black NH	10,116	9.03
	Am Indian NH	7,489	8.19
	Other NH	333	4.31
	Hispanic	3,409	4.95
Age (years)**			
	<10	24,164	8.48
	10-19	12,273	6.44
	20-29	3,200	4.16
	30-39	2,656	6.78
	40-49	2,922	9.15
	50-59	2,744	10.31
	60-69	2,190	8.21
	70-79	1,544	5.90
	80+	1,047	4.14
	< 1	1,197	3.42
	1-4	12,775	10.20
	5-9	10,192	8.17
	65+	3,554	5.40
Planning Districts			
	ACOG	14,841	7.88
	ASCOG	3,968	6.99
	COEDD	4,299	8.13
	EODD	5,990	7.95
	GGEDA	3,528	6.42
	INCOG	8,238	6.76
	KEDDO	3,528	6.83
	NODA	2,004	6.16
	OEDA	606	5.38
	SODA	3,592	6.63
	SWODA	1,819	7.71
	Unknown	327	6.44

*: NH: Non-Hispanic; Hispanic may be of any race. **Age as of the end of the calendar year.

APPENDIX 3: OKLAHOMA MINORITY BRFS SUPPLEMENTAL TABLES

Table 23. Prevalence of Adult Lifetime Asthma by Selected Characteristics: Oklahoma Minority BRFS 2003 vs. BRFSS 2002-2004

	OMBRFS		BRFSS 2002-2004	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	11.8	10.3-13.4	12.1	11.6-12.7
Gender				
Males	10.0	7.7-12.2	10.7	9.9-11.5
Females	13.7	11.7-15.7	13.5	12.7-14.2
Race/Ethnicity*				
NH-White (BRFSS 2003-04)	N/A	N/A	12.1	11.5-12.7
NH-African Americans	12.9	10.0-15.8	12.4	10.0-14.9
NH-American Indians	14.0	11.4-16.5	15.0	12.5-17.4
NH-Asian/Pacific Islander	6.6	1.7-11.4	5.1	1.6-8.6
Hispanic	6.5	4.3-8.6	8.7	6.5-10.9
Age (years)				
18-29	14.1	10.8-17.3	15.5	13.9-17.1
30-39	9.1	5.9-12.3	11.9	10.7-13.2
40-49	10.7	7.5-13.8	11.2	10.1-12.3
50-64	12.5	9.6-15.5	11.4	10.5-12.4
65+	11.8	7.8-15.9	9.9	9.0-10.8
Education				
<High School	11.8	5.0-18.6	10.0	7.8-12.2
High School Diploma/GED	11.1	9.1-13.1	12.8	11.9-13.7
Some College	12.9	9.9-15.9	11.9	10.9-13.0
College Degree	12.2	8.4-16.0	11.4	10.4-12.4
Income				
<$15,000	18.9	14.9-22.9	15.9	14.1-17.6
$15,000-24,999	10.3	7.5-13.2	13.5	12.2-14.8
$ 25,000-34,999	10.5	6.2-14.9	13.3	11.7-14.8
$35,000-49,999	8.3	5.6-11.1	10.6	9.4-11.9
$50,000+	12.3	7.4-17.2	9.9	8.9-10.9

*NH: Non-Hispanic.

Table 24. Prevalence of Adult Current Asthma by Selected Characteristics: Oklahoma Minority BRFS 2003 vs. BRFSS 2002-2004

	OMBRFS		BRFSS 2002-2004	
	Percent	**95% CI**	**Percent**	**95% CI**
Total	7.2	6.0-8.4	7.6	7.2-8.1
Gender				
Males	5.5	3.7-7.3	5.6	5.0-6.1
Females	8.9	7.4-10.5	9.6	9.0-10.2
Race/Ethnicity*				
NH-White (BRFSS 2003-04)	N/A	N/A	7.5	7.1-8.0
NH-African Americans	6.8	4.8-8.8	7.2	5.6-8.8
NH-American Indians	9.0	7.0-11.0	10.9	8.8-13.1
NH-Asian/Pacific Islander	2.1	0.4-3.9	3.3	0.8-5.9
Hispanic	3.6	2.4-4.9	5.1	3.5-6.8
Age (years)				
18-29	10.5	6.4-14.6	8.2	7.0-9.3
30-39	4.7	3.1-6.3	7.0	6.0-8.0
40-49	6.1	3.1-9.2	7.7	6.8-8.6
50-64	7.9	5.6-10.2	7.7	6.9-8.5
65+	9.0	6.0-11.9	7.4	6.6-8.2
Education				
<High School	9.5	3.0-15.9	7.6	5.8-9.5
High School Diploma/GED	6.6	5.2-8.1	8.3	7.6-9.0
Some College	8.3	5.9-10.8	7.5	6.6-8.3
College Degree	5.8	3.4-8.3	6.5	5.8-7.3
Income				
<$15,000	13.5	10.2-16.8	12.0	10.5-13.5
$15,000-24,999	6.2	4.2-8.2	8.8	7.7-9.8
$ 25,000-34,999	6.1	2.3-9.8	7.9	6.7-9.1
$35,000-49,999	5.3	3.2-7.4	6.1	5.1-7.0
$50,000+	6.0	2.1-9.9	5.8	5.0-6.5

*NH: Non-Hispanic.

APPENDIX 4: HEALTHY PEOPLE 2010 OBJECTIVES

Objective 24. Respiratory Diseases

Goal: Promote respiratory health through better prevention, detection, treatment, and education efforts.

24-1 Reduce asthma deaths

Target and baseline: *(Rate per Million)*	1999 Baseline	2010 Target
24-1a. Children under age 5 years	1.7	0.9
24-1b. Children aged 5 to 14 years	3.1	0.9
24-1c. Adolescents and adults aged 15 to 34 years	5.6	1.9
24-1d. Adults aged 35 to 64 years	15.5	8.0
24-1e. Adults aged 65 years and older	69.5	47.0

24-2 Reduce hospitalizations for asthma

Target and baseline: (*Rate per 10,000)*	1998 Baseline	2010 Target
24-2a. Children under age 5 years	45.6	25.0
24-2b. Children and adults aged 5 to 64 years*	12.5	7.7
24-2c. Adults aged 65 years and older*	17.7	11.0

24-3 Reduce hospital emergency department visits for asthma

Target and baseline: (*Rate per 10,000)*	1995-97 Baseline	2010 Target
24-3a. Children under age 5 years	150.0	80.0
24-3b. Children and adults aged 5 to 64 years	71.1	50.0
24-3c. Adults aged 65 years and older	29.5	15.0

24-4 Reduce activity limitations among persons with asthma.

Target: 6 percent.

Baseline: 10 percent of persons with asthma experienced activity limitations in activity in 1997[2] (age adjusted to the year 2000 standard population).

24-5 Reduce the number of school or work days missed by persons with asthma due to asthma.

Target: 2.0 days.

Baseline: The number of school or work days missed by persons aged 5 to 64 years with asthma due to asthma was 6.1 days in 2002.

24-6 Increase the proportion of persons with asthma who receive formal patient education, including information about community and self-help resources, as an essential part of the management of their condition.

Target: 30.0 percent.

Baseline: 8.4 percent of persons aged 12 to 49 years with asthma received formal patient education in 1998 (age-adjusted to the year 2000 standard population).

24-7 Increase the proportion of persons with asthma who receive appropriate asthma care according to the NAEPP Guidelines.

Target and baseline: *Percent* (unless noted)	2002 Baseline	2010 Target
24-7a. Written asthma management plans from their health care provider	32	38
24-7b. With prescribed inhalers who receive instruction on how to use them properly	96.0 (2003)	98.8
24-7c. Education about recognizing early signs and symptoms of asthma episodes and how to respond appropriately, including instruction on peak flow monitoring for those who use daily therapy	68 (2003)	71
24-7d. Medication regimens that prevent the need for more than one canister of short-acting, inhaled, beta agonists per month for relief of symptoms	80 (2003)	92
24-7e. Followup medical care for long-term management of asthma after any hospitalization due to asthma	76 (2003)	87
24-7f. Assistance with assessing and reducing exposure to environmental risk factors in their home, school, and work environments	42	50

24-8 Increase the number of States with an asthma surveillance system for tracking asthma cases, illness, and disability.

Target: 25 States.

Baseline: 19 States had a surveillance system for tracking asthma cases, illness, and disability in 2003.

GLOSSARY OF TERMS

Body Mass Index (BMI): BMI is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. See http://www.cdc.gov/nccdphp/dnpa/bmi/index.htm for details.

CI: Confidence interval, a statistical range with a specified probability that a given parameter lies within the range.

Current asthma: is defined as those respondents of BRFSS who state that they still have asthma.

Lifetime asthma: is defined as respondents of BRFSS who have ever been told by a health professional that they had asthma.

Hospitalization Rates: The number of hospital discharges/episodes in a given year(s) divided by the population in a given region. This is usually expressed per 1000,

Prevalence: The proportion of the population with a particular condition or characteristic. To calculate prevalence you need to sum the number of individuals with a certain condition/characteristic and divide by the number of people in the population of interest over a specified time.

Significance: Statistical significance is the probability that percentages or mean scores observed in the sample are truly different from each other. One way to determine statistical significance is to check whether the confidence intervals around the percentages or scores overlap.

REFERENCES

1. Hannaway PJ. Asthma and Emerging Epidemic. Massachusetts: Paul J. Hannaway, M.D., 2002.
2. Environmental Protection Agency. Asthma Frequent Questions. Available from: http://www.epa.gov/faq/asthma/introduction
3. Centers for Disease Control and Prevention, National Center for Health Statistics. Asthma Prevalence, Health Care Use, and Mortality, 2000-2001. Available from: http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma
4. Centers for Disease Control and Prevention. Asthma's Impact on Children and Adolescents. Available from: http://www.cdc.gov/nceh/airpollution/asthma/children
5. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System User's Guide. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 1998.
6. Oklahoma State Department of Health. Health Care Information. 2000 Annual Report.
7. Anderson RN, et al. Comparability of cause of death between ICD-0 and ICD-10: preliminary estimates. National Vital Statistics Reports, 2001; 49.
8. Child and Adolescent Health Measurement Initiative (2005). National Survey of Children's Health, Data Resource Center on Child and Adolescent Health website. Retrieved June 2006. Available from http://www.nschdata.org

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