

# Oklahoma

## *Asthma Surveillance Report*

**Asthma Prevention and Control Program**

**Chronic Disease Service  
Oklahoma State Department of Health**

Updated Report from 2003

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## Introduction

Asthma is a respiratory disease 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 the United States:

- 14 million adults are estimated to have asthma (3).
- Asthma, affecting nearly 1 in 13 school-aged children, is the leading cause of school absenteeism due to chronic disease (2).
- The estimated cost of treating asthma in children under 18 years of age is \$3.2 billion per year (4).

The purpose of this report is to provide a means to examine the burden of asthma in Oklahoma by presenting a variety of asthma-related data including prevalence, risk factors, hospitalizations, and mortality.

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## **Data Sources and Methods**

The Oklahoma Asthma Prevention and Control Program have facilitated the Data and Surveillance Committee of the Oklahoma Asthma Initiative, which is responsible for maintaining and updating the Oklahoma Asthma Surveillance System. Committee members have included staffs from divisions within Oklahoma State Department of Health (OSDH), including Chronic Disease Service, Center for Health Statistics, Health care Information, Vital Records, and Tobacco Use Prevention Service, and staffs from external organizations, including Oklahoma Department of Environmental Quality, American Lung Association of Oklahoma, College of Public Health, College of Biometrics, and College of Medicine in Oklahoma University Health Science Center. The committee members have provided technical assistance to the asthma program epidemiologist in gathering data and reviewing data for appropriateness.

Current available data for the Oklahoma Asthma Surveillance System includes data within the OSDH and external data sources.

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

Oklahoma BRFSS data includes ten-question adult asthma history module and two-question childhood asthma module providing asthma morbidity data. The 2004 BRFSS data is currently available. The BRFSS is maintained through a partnership between the Centers for Disease Control and Prevention and states and U.S. territories. Each state administers monthly random digit dialing (RDD) telephone survey of adults 18 years of age and older. The BRFSS consists of core questions, optional modules, and state-added questions. The core questions and optional modules are identical for each state, making comparisons between states and to national estimates possible (5).

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 completely be eliminated. Another limitation with the BRFSS data is that it is self-reported and cannot be verified.

### **Youth Tobacco Survey**

Oklahoma Youth Tobacco Survey: School-based survey administered to a random sample of 6th-12th graders statewide every two years. In 2002 students in 100 schools in 42 counties completed the statewide survey. From 2002, two asthma questions similar to the BRFSS

questions were asked in the YTS: “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 2002 survey.

### **Hospitalization data**

Asthma related hospital discharge data (2002) is currently available. 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. One limitation of this data is that it reflects encounters rather than individuals. Another limitation is that data from Indian Health Service hospitals, military and veteran hospitals are not collected (6).

The number of hospitals that reported their data to the Oklahoma State Department of Health was 93% of hospitals in 2002.

### **Mortality Data**

Asthma mortality from 2003 vital records statistics is currently available. In 1999, the Tenth Revision of the International Classification of Diseases (ICD-10) was implemented on mortality statistics. The comparability ratio for asthma from the ICD-10 to the ICD-9 is 0.89, meaning approximately 11% fewer deaths are coded as caused by asthma in the ICD-10 revision than in the ICD-9 revision (7).

## Asthma in Oklahoma Adults

Adult asthma prevalence data was obtained from the Behavioral Risk Factor Surveillance System (BRFSS). Lifetime asthma prevalence is based on the BRFSS question “Have you ever been told by a doctor, nurse, or other health professional that you had asthma?” Current asthma prevalence is based on the BRFSS question “Do you still have asthma?”

Lifetime and current asthma rates for 2003 and 2004 combined are presented in the following charts. Detailed tables are listed in Appendix 1.

The 2003-2004 prevalence rate in Oklahoma is 12.6% of lifetime asthma and 7.9% of current asthma. Higher than the rates of 11.7% and 7.5%, respectively, in the U.S. (U.S. BRFSS 2003)

Females have significantly higher prevalence of lifetime and current asthma.

Although not significantly different from other racial/ethnic groups, American Indians have the highest rates of lifetime and current asthma.

Those in the 18-34 year age group are significantly more likely to have asthma sometime in their lives than those 65 and older.

Figure 1. Prevalence Rate of Lifetime and Current Asthma by Gender: Oklahoma BRFSS 2003 - 2004

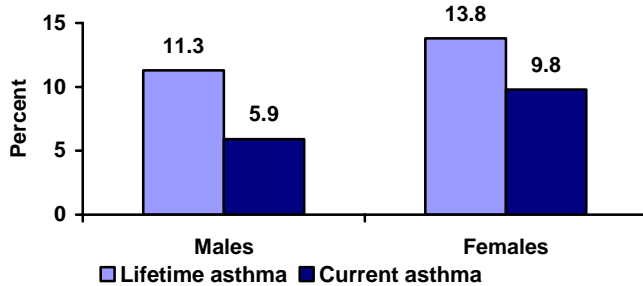


Figure 2. Prevalence Rates of Lifetime and Current Asthma by Race/Ethnicity: Oklahoma BRFSS 2003 - 2004

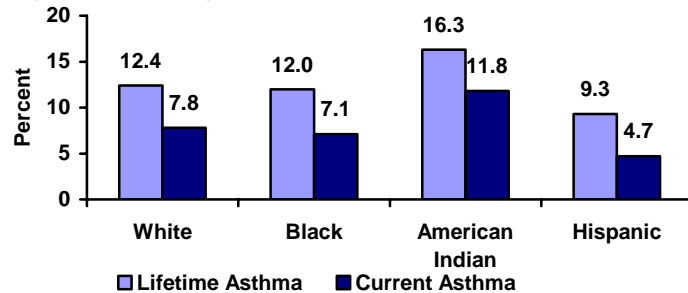
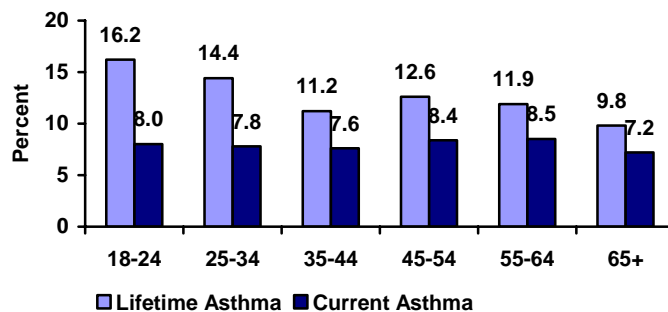
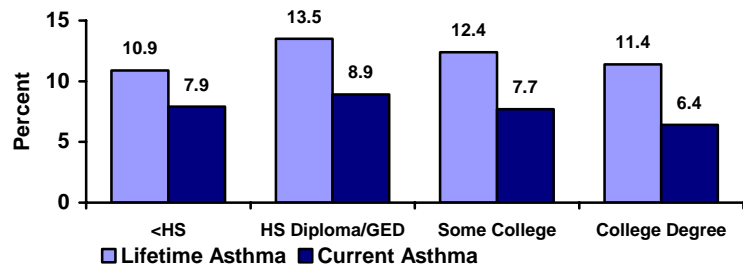


Figure 3. Prevalence Rates of Lifetime and Current Asthma by Age Group: Oklahoma BRFSS 2003 - 2004



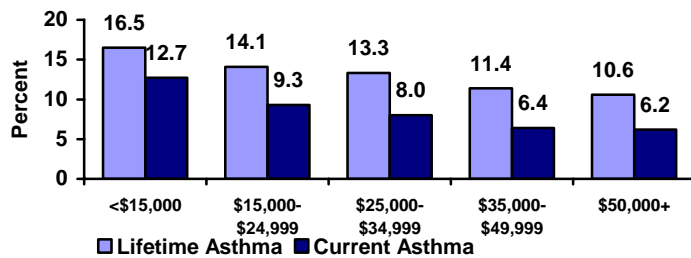
There is no significant difference in lifetime or current asthma by level of education.

Figure 4. Prevalence Rates of Lifetime and Current Asthma by Level of Education: Oklahoma BRFSS 2003 - 2004



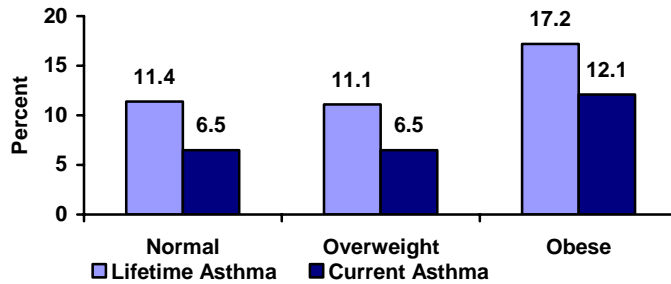
Those making <\$15,000 per year are significantly more likely to have had asthma sometime in their lives than most of the other income groups and more likely to have current asthma than those of other income groups.

Figure 5. Prevalence Rates of Lifetime and Current Asthma by Level of Income: Oklahoma BRFSS 2003 - 2004



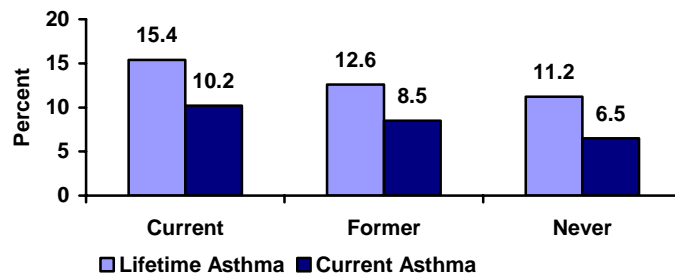
Those who are obese have significantly higher prevalence of lifetime asthma and current asthma than those who are not obese (normal or overweight).

Figure 6. Prevalence Rates of Lifetime and Current Asthma by BMI Category: Oklahoma BRFSS 2003 - 2004



Those who are current or former smokers are more likely to have lifetime asthma than those who have never smoked.

Figure 7. Prevalence Rates of Lifetime and Current Asthma by Smoking Status: Oklahoma BRFSS 2003 - 2004



Over 40% of adults with asthma were diagnosed prior to the age of 11.

Figure 8. Age Diagnosed of Asthma Among Adults Ever Diagnosed with Asthma: Oklahoma BRFSS 2003 - 2004

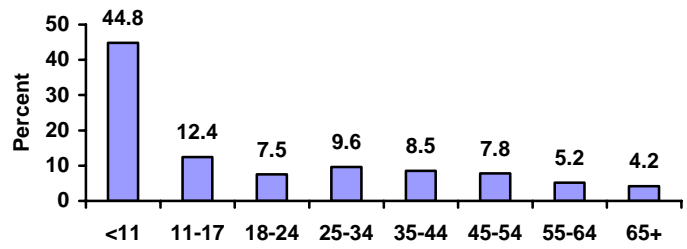
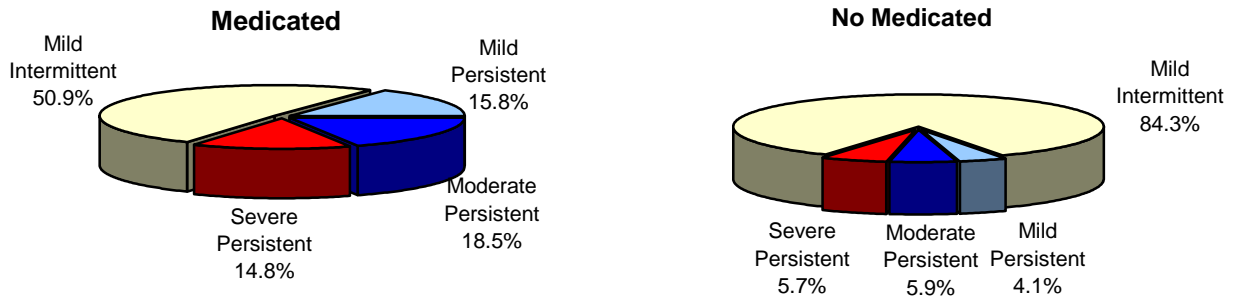


Figure 9. Self-reported Asthma Severity of Adults with Current Asthma: Oklahoma BRFSS 2003 - 2004



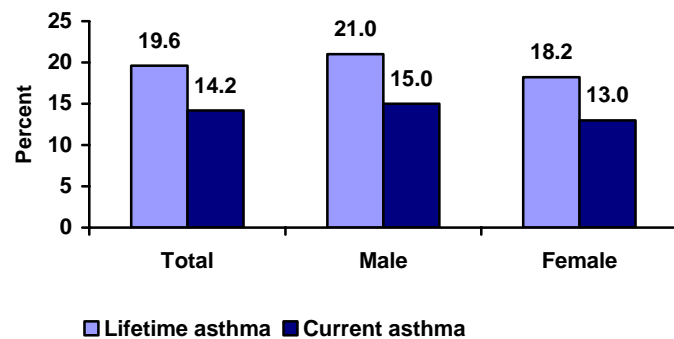
## Asthma in Oklahoma Children

Oklahoma is 1 of 40 states that participate in the Youth Tobacco Survey (YTS). The YTS is a comprehensive tobacco survey administered to a sample of middle and high school students.

Data are from 1,901 students from 49 high schools and 2,043 students from 49 middle schools. The data have been weighted to provide estimates generalizable to the population of Oklahoma middle school and high school students. Detailed tables are presented in Appendix 2.

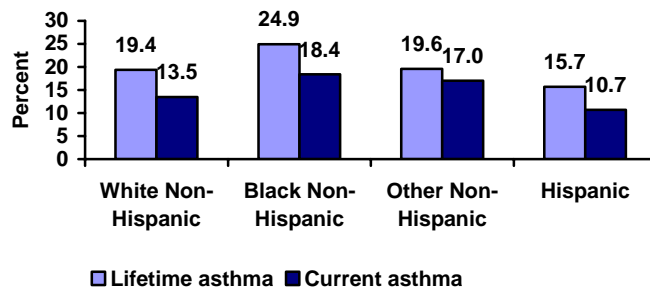
**Approximately 20% of middle school students in Oklahoma report ever having asthma and over 14% report currently having asthma. While more males report ever having and currently having asthma than females, this difference is not statistically significant.**

**Figure 10. Prevalence Rate of Middle School Students with Lifetime and Current Asthma by Gender: Oklahoma YTS 2002**



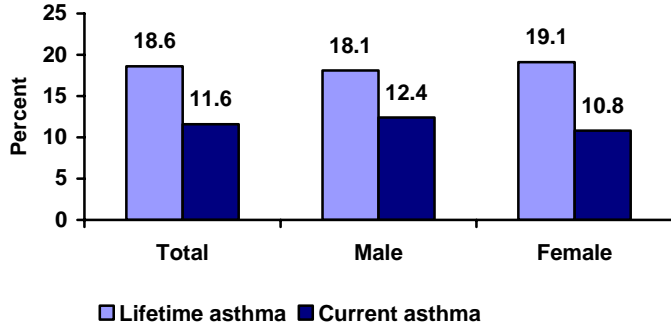
**While more Black middle school students report ever having asthma and currently having asthma than other racial/ethnic groups, this difference is not statistically significant.**

**Figure 11. Prevalence Rate of Middle School Students with Lifetime and Current Asthma by Race: Oklahoma YTS 2002**



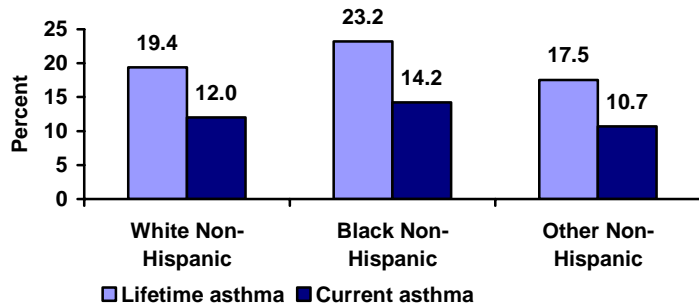
Almost 19% of high school students report ever having asthma and nearly 12% report currently having asthma. As with middle school students, a statistically non-significant difference in lifetime and current asthma by gender is seen.

Figure 12. Lifetime and Current Asthma by Gender Among High School Students: Oklahoma YTS 2002



As with middle school students, a statistically non-significant difference in lifetime and current asthma is seen with more Black students reporting ever having asthma or currently having asthma than White students or students of other races.

Figure 13. Lifetime and Current Asthma by Race Among High School Students: Oklahoma YTS 2002



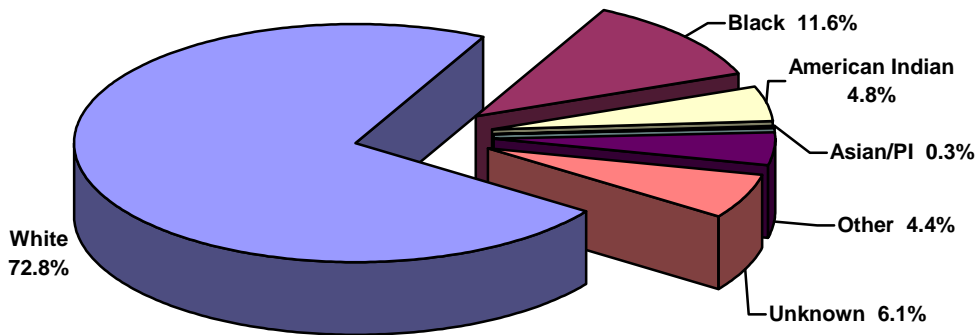
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## Hospitalizations of Asthma

Oklahoma hospital discharges from 2001-2002 with asthma as the primary and secondary diagnosis are presented in Appendix 3. The total number of hospital discharges increased from 2001 to 2002 because of an increase in the number of hospitals that reported their data to the Oklahoma State Department of Health (from 53% to 93% of the licensed hospitals).

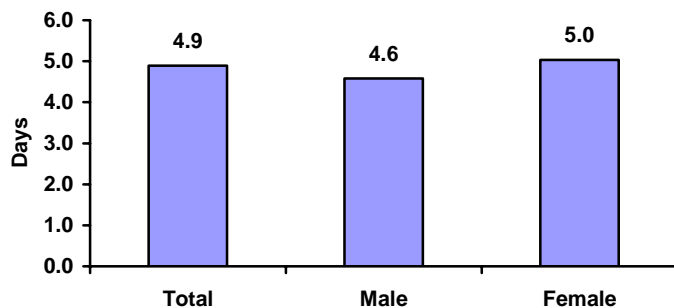
There were 21,202 hospital discharges with asthma as the primary or secondary diagnosis. The total charges for year 2002 accounted for approximately \$282 million. Females accounted for nearly two-thirds of the hospitalizations and 70% of the cost.

Figure 14: Hospital Discharge with Asthma as the Principal or Secondary Diagnosis by Races, 2002



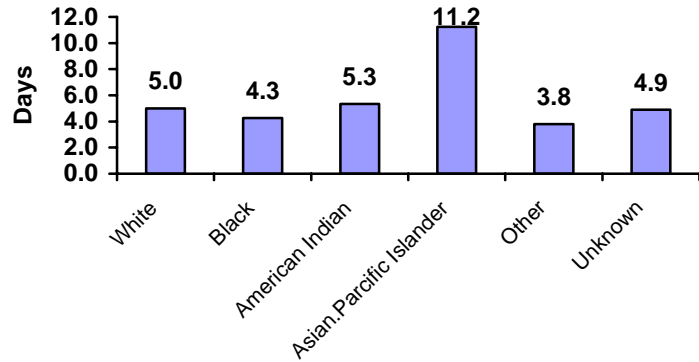
The average length of stay for patients hospitalized with primary or secondary diagnoses of asthma was nearly five days.

Figure 15: Average Length of Stay Among Oklahomans with Asthma as the Principal or Secondary Diagnosis, 2002



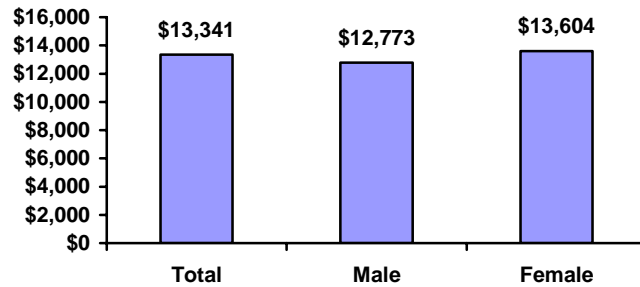
The average length of hospital stay in Asian/Pacific Islander is twice higher than other race groups.

Figure 16: Average Length of Stay Among Oklahomans with Asthma as the Principal or Secondary Diagnosis, by Race 2002



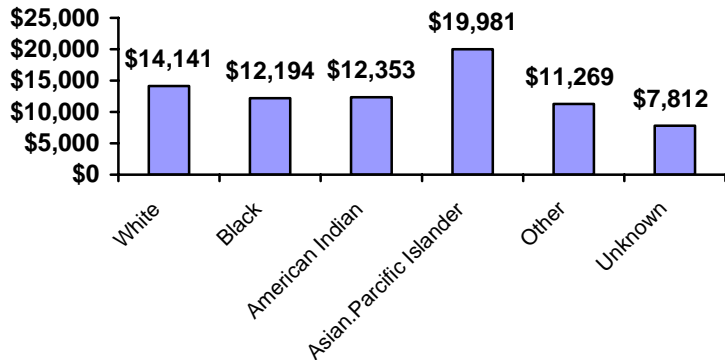
The average hospital charges were over \$13,600 with females accounting for little more charges than males.

Figure 17: Average Hospital Charges with Asthma as the Primary Diagnosis by Gender, 2002



The average hospital charge in Asian/Pacific Islander is much higher than other race groups.

Figure 18: Average Hospital Charges with Asthma as the Primary Diagnosis by Race/Ethnicity: 2002

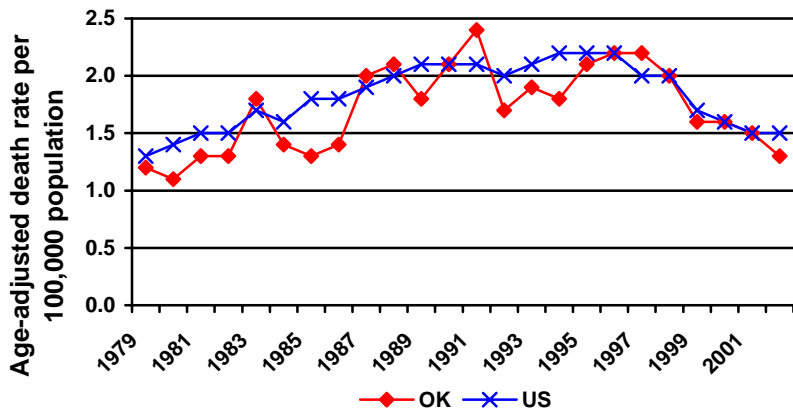


# Asthma Mortality in Oklahoma

The asthma mortality rates in Oklahoma had similar trends in US. The rates presented are only those in which asthma was the underlying cause of death. Indian Health Service-linked race categories were not available in 2002 and 2003 data, but were reflected for 1999-2001 data.

The age-adjusted mortality rate for asthma increased during 1980's and early 1990's, then decreased recently.

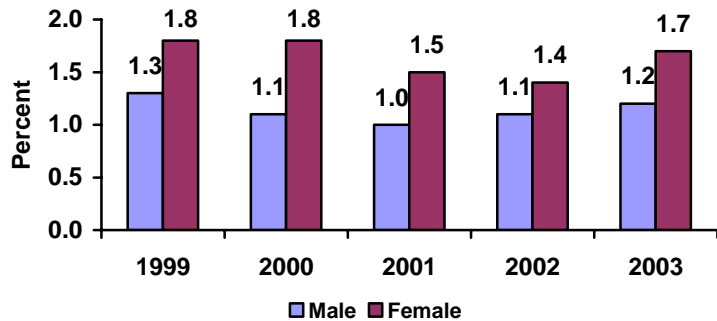
Figure 19. Age-Adjusted Mortality Rate Trend for Asthma as the Underlying Cause of Death: Oklahoma and US 1979-2002



Source: CDC WONDER. Age-adjusted to the US 2000 standard population

Age-adjusted mortality rates were higher among females than males

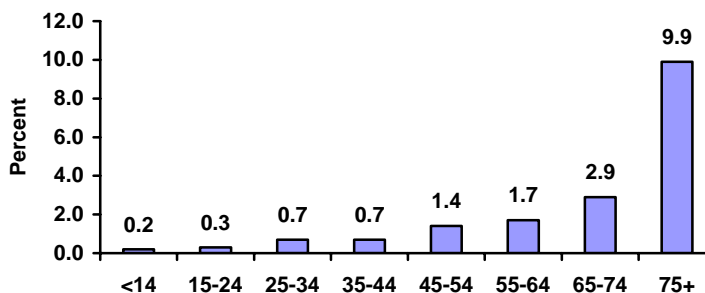
Figure 20. Oklahoma Asthma Age-adjusted Mortality Rates by Gender: 1999-2003



Source: Oklahoma Vital Statistics. Age-adjusted to the US 2000 standard population

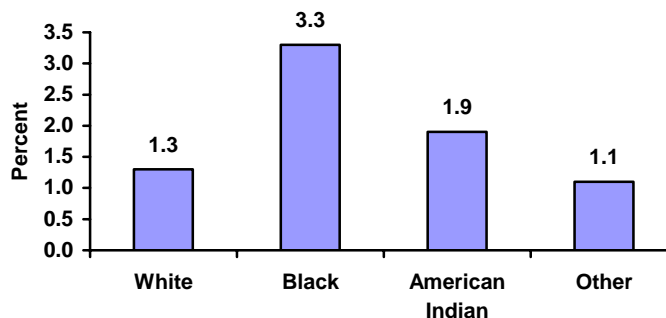
**Asthma mortality rates increased significantly in elderly population**

**Figure 21. Oklahoma Asthma Age-specified Mortality Rates: 1999-2003**



**Figure 22. Oklahoma Age-adjusted Asthma Mortality Rates as the Underlying Cause of Death by Race\*: 1999-2001**

**Age-adjusted mortality rates were 2.5 times higher among Blacks than among Whites, and were 46% higher among American Indians than among Whites.**



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

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## 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.html>
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.htm>
4. Centers for Disease Control and Prevention. Asthma's Impact on Children and Adolescents. Available from: <http://www.cdc.gov/nceh/airpollution/asthma/children.htm>
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.

## Appendix 1: BRFSS Supplemental Tables

Table 1. Prevalence rates of asthma by selected characteristics: Oklahoma BRFSS 2003-2004

	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
<b>Total</b>	12.6	11.9-13.3	7.9	7.4-8.4
<b>Gender</b>				
Males	11.3	10.2-12.3	5.9	5.2-6.6
Females	13.8	13.0-14.7	9.8	9.0-10.5
<b>Race/Ethnicity*</b>				
NH-White	12.4	11.7-13.1	7.8	7.2-8.3
NH-Black	12.0	9.2-14.8	7.1	5.2-9.0
NH-American Indian	16.3	13.2-19.5	11.8	9.2-14.5
NH-Asian/Pacific Islander	7.3	2.1-12.4	4.4	0.7-8.1
Hispanic	9.3	6.5-12.1	4.7	2.7-6.7
<b>Age</b>				
18-24	16.2	13.4-19.0	8.0	6.1-9.9
25-34	14.4	12.6-16.1	7.8	6.5-9.1
35-44	11.2	9.8-12.6	7.7	6.5-8.8
45-54	12.6	11.2-14.1	8.4	7.2-9.6
55-64	11.9	10.5-13.3	8.4	7.2-9.7
65+	9.8	8.8-10.9	7.2	6.3-8.1
<b>Education</b>				
< High School	10.9	8.1-12.6	7.9	5.6-10.1
HS Diploma/GED	13.5	12.4-14.7	8.9	8.0-9.8
Some College	12.4	11.2-13.6	7.7	6.7-8.7
College Degree	11.4	10.2-12.6	6.3	5.5-7.2
<b>Income</b>				
<\$15,000	16.5	14.4-18.6	12.7	10.9-14.6
\$15,000-24,999	14.1	12.4-15.7	9.3	8.0-10.6
\$ 25,000-34,999	13.3	11.4-15.2	8.0	6.6-9.5
\$35,000-49,999	11.4	9.8-12.9	6.3	5.2-7.5
\$50,000+	10.6	9.4-11.9	6.2	5.3-7.1
<b>BMI</b>				
<25	11.4	10.2-12.5	6.5	5.7-7.3
25-29.9	11.1	10.0-12.2	6.5	5.7-7.3
30+	17.2	15.7-18.7	12.1	10.8-13.4
<b>Smoking Status</b>				
Current	15.4	13.8-16.9	10.2	8.9-11.5
Former	12.6	11.3-13.9	8.4	7.4-9.5
Never	11.2	10.3-12.2	6.5	5.9-7.2

\*: NH: Non Hispanic.

## Appendix 2: Youth Tobacco Survey Supplemental Tables

**Table 2. Lifetime and Current Asthma Among Oklahoma Middle School Students**

	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
<b>Total</b>	19.6	17.2-22.0	14.2	12.4-16.0
<b>Gender</b>				
Male	21.0	17.6-24.4	15.0	12.8-17.2
Female	18.2	15.4-21.0	13.0	10.3-15.7
<b>Grade</b>				
6 <sup>th</sup>	17.8	14.3-21.3	13.7	10.6-16.8
7 <sup>th</sup>	20.4	16.9-23.9	15.3	12.3-18.3
8 <sup>th</sup>	20.9	17.0-24.8	13.5	11.1-15.9
<b>Race/Ethnicity</b>				
White	19.4	16.7-22.1	13.5	11.1-15.9
Black	24.9	15.6-34.2	18.4	13.6-23.2
Hispanic	15.7	8.1-23.3	10.7	4.5-16.9
Other	19.6	13.2-26.0	17.0	11.6-22.4

Source: 2002 Oklahoma Youth Tobacco Survey

**Table 3. Lifetime and Current Asthma Among Oklahoma High School Students**

	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
<b>Total</b>	18.6	16.3-20.9	11.6	10.2-14.0
<b>Gender</b>				
Male	18.1	15.7-20.5	12.4	10.6-14.2
Female	19.1	16.0-22.2	10.8	8.5-13.1
<b>Grade</b>				
9 <sup>th</sup>	19.8	17.3-22.3	11.4	9.1-13.7
10 <sup>th</sup>	22.0	17.9-26.1	14.0	10.1-17.9
11 <sup>th</sup>	16.7	13.0-20.4	10.0	6.6-13.4
12 <sup>th</sup>	15.4	11.4-19.4	9.6	6.2-13.0
<b>Race</b>				
White	19.4	16.4-22.4	12.0	10.2-13.8
Black	23.2	18.2-28.2	14.2	8.4-20.0
Other	17.5	12.2-22.8	10.7	6.6-14.8

Source: 2002 Oklahoma Youth Tobacco Survey

## Appendix 3: Hospital Discharges Supplemental Tables

**Table 4. Hospital discharges, length of stay, and charges with asthma as the principal or secondary diagnosis (ICD-9 code 493)**

	Discharges	Avg. Length of Stay (Days)	Total Hospital Charges
<b>2001</b>	11,601	4.89	\$142,875,350
<b>2002</b>	21,202	4.89	\$282,853,685

Source: Oklahoma State Department of Health, Health Care Information Center for Health Statistics

**Table 5. Hospital discharges, total days, and total hospital charges with asthma (ICD-9 code 493) as the primary or secondary diagnosis by gender**

	Discharges	Total Days	Total Hospital Charges
<b>2001</b>			
Male	3,683	16,825	\$44,890,800
Female	7,918	39,925	\$97,984,550
<b>2002</b>			
Male	6,750	30,882	\$86,214,599
Female	14,450	72,750	\$196,582,271
Missing	2	25	\$56,815

Source: Oklahoma State Department of Health, Health Care Information Center for Health Statistics

**Table 6. Hospital discharges, total days, and total charges with asthma (ICD-9 code 493) as primary or secondary diagnosis by races**

	Discharges	Total Days	Total Hospital Charges
<b>2001</b>			
White	8,881	44,587	\$114,116,045
African American	1,616	7,243	\$17,197,996
American Indian	413	2,004	\$5,303,236
Asian/Pacific Islanders	36	142	\$474,708
Other	294	1,138	\$2,362,062
Unknown	361	1,636	\$3,421,303
<b>2002</b>			
White	15,434	77,088	\$218,251,846
African American	2,456	10,467	\$29,949,000
American Indian	1,021	5,438	\$12,612,701
Asian/Pacific Islanders	74	832	\$1,478,624
Other	938	3,566	\$10,570,015
Unknown	1,279	6,266	\$9,991,499

Source: Oklahoma State Department of Health, Health Care Information Center for Health Statistics