



# **The Burden of Asthma in Arkansas**

## **Preparation & Development**

Joyce Biddle, MPA, MPH  
Senior Epidemiologist, Chronic Disease Epidemiology  
Arkansas Department of Health

George (Ed) Fryer, PhD  
Former Associate Director  
Arkansas Center for Health Improvement

Tom Miyoshi, MSW  
Senior Data Analyst  
Arkansas Center for Health Improvement

Angela Sanders, MPH, RRT, AE-C  
President  
Arkansas Asthma Coalition

Lewis Leslie  
Former Associate Bureau Director  
Chronic Disease Branch, Arkansas Department of Health

Linda Cullers  
Senior Director of Health Promotions  
American Lung Association, Plains-Gulf Region

**May 2011**

# Executive Summary

The Arkansas Asthma Coalition has established an asthma surveillance and evaluation committee to better understand and describe the burden of asthma in Arkansas. Tracking different aspects of asthma (the number of people with the disease, visits to the hospital and the emergency room, quality of life, and mortality) are important guides to planning education and intervention programs and to developing policies that are necessary for preventing and controlling asthma in the future.

## Key Findings:

### Asthma in Arkansas Adults

- In 2009, an estimated 11.5% or 248,000 Arkansas adults report having ever been told by a doctor they had asthma, while 7.6% (163,000) currently have asthma.
- Women were more likely than men to report having asthma with 12.6% for lifetime asthma and 9.5% for current asthma in 2009.
- In 2009, prevalence of both lifetime and current asthma was highest among Black adults (16.4%, 11.9%).

### Asthma in Arkansas Children

- In 2007, an estimated 15.0% (104,000) Arkansas children have ever been told by a doctor they had asthma, while approximately 10.2% (71,000) currently have asthma.
- Male children were more likely to have lifetime asthma (17.2%) and current asthma (12.3%) than female children (12.6% and 8.0%) in 2007.
- Prevalence of lifetime asthma (17.9%) and current asthma (14.3%) was highest among Arkansas Black children in 2007.
- In 2009, prevalence of both lifetime and current asthma was highest among Black high school students (26.2%, 13.0%) in Arkansas.

### Risk Factors Associated with Asthma

- In 2009, adults with lifetime asthma were more likely to be a current smoker (15.8%) than those with current asthma (12.1%).
- The prevalence of lifetime asthma (35.1%) and current asthma (30.7%) was significantly higher among children with special health care needs (CSHCN) than non-CSHCN (8.6% and 3.7%) in 2007.
- In 2009, the prevalence of asthma attack or episode was higher among high school students who were current smokers (9.6%) than non-smokers (7.3%).

### Asthma Hospitalizations

- In 2008, there were 3,083 hospital admissions with asthma as principle diagnosis in Arkansas with 53.7% of those classified as an emergency admission.
- In 2008, there were approximately \$35.8 million total charges for hospitalization with asthma as principle diagnosis in 2008.

### Asthma Mortality

- The age-adjusted mortality rate for asthma in Arkansas was similar to that in the U.S. from 1999-2007.
- From 2003-2007, the age-adjusted mortality rate from asthma among Blacks was 3.6 per 100,000, which was two and a half times higher than the asthma mortality rate for Whites (1.3).

# Table of Contents

Executive Summary .....	2
Key Findings: .....	2
What is Asthma?.....	4
Asthma Diagnosis .....	4
Clinical Categories of Asthma .....	4
Surveillance Categories of Asthma.....	5
Asthma Prevalence - Adults.....	6
Lifetime & Current Prevalence .....	6
Health Care Access .....	9
Risk Factors.....	10
Health-Related Quality of Life.....	11
Asthma Prevalence - Children .....	12
Prevalence Among Children .....	12
Prevalence Among High School Students .....	13
Risk Factors.....	15
Asthma Episodes or Attacks .....	18
Hospitalizations.....	20
Hospital Discharges.....	20
Emergency Department Visits .....	22
Economic Impact.....	23
Other Respiratory Conditions .....	24
Mortality .....	25
Geographic Data .....	27
References.....	35
Methods.....	37
Healthy People 2020 Objectives-Respiratory Diseases .....	40
Asthma Control Recommendations .....	41
Arkansas Demographics, 2009 .....	43
Certified Asthma Educators (AE-C) in Arkansas, 2011 .....	44
Glossary .....	45

# What is Asthma?

Asthma is a chronic inflammatory disorder of the airways.<sup>1</sup> Asthma attacks vary from mild to life-threatening and involve shortness of breath, coughing, wheezing, pain or tightness in the chest, or any combination of these symptoms. Asthma symptoms are usually associated with airflow restriction. Airflow restriction or obstruction is caused by inflammation and narrowing of small airways. Inflammation causes an associated increase in airway hyperresponsiveness to a variety of stimuli. The triggering stimuli or factors contributing to an asthma attack include: allergens, infections, exercise, and abrupt changes in weather. Asthmatic episodes are often reversible either spontaneously or with treatment.

## Asthma Diagnosis

Asthma can be a difficult condition to diagnose. People with asthma can have attacks and then have no symptoms for long periods of time.<sup>1</sup> Many other conditions such as bronchitis and pneumonia may present with similar symptoms.

Asthma diagnosis is based on a patient's history and satisfying three criteria:<sup>1</sup>

- Symptoms of asthma occur in response to an allergen trigger or airway irritant (airway hyper-reactivity).
- Repeated episodes of symptoms (recurrence).
- Response to treatment (reversibility) measured objectively by spirometry with a significant increase post-bronchodilator or relief of symptoms.

## Clinical Categories of Asthma

There are four categories of asthma: intermittent, mild persistent, moderate persistent and severe persistent<sup>2</sup>. The category depends on level of asthma control and within that an individual's level of impairment and risk. An impairment deals with how many times asthma affects an individual at night, during normal daily activities, and how often rescue medicine is used. Risk deals with how many times an individual has to take oral systemic corticosteroids due to asthma, and any treatment related adverse reactions.<sup>1</sup>

### Intermittent asthma

Asthma is considered intermittent if without treatment any of the following are true:<sup>2</sup>

- Symptoms (difficulty breathing, wheezing, chest tightness, and coughing):
  - Occur on fewer than 2 days a week
  - Do not interfere with normal activities
- Nighttime symptoms occur on fewer than 2 days a month.
- Lung function tests, spirometry and peak expiratory flow (PEF), are normal when the person is not having an asthma attack. The results of these tests are 80% or more of the expected value and vary little (PEF varies less than 20%) from morning to afternoon.

### Mild persistent asthma

Asthma is considered mild persistent if without treatment any of the following are true:<sup>2</sup>

- Symptoms occur on more than 2 days a week but do not occur every day.
- Attacks interfere with daily activities.

- Nighttime symptoms occur 3 to 4 times a month.
- Lung function tests are normal when the person is not having an asthma attack. The results of these tests are 80% or more of the expected value and may vary a small amount (PEF varies 20% to 30%) from morning to afternoon.

### Moderate persistent asthma

Asthma is considered moderate persistent if without treatment any of the following are true:<sup>2</sup>

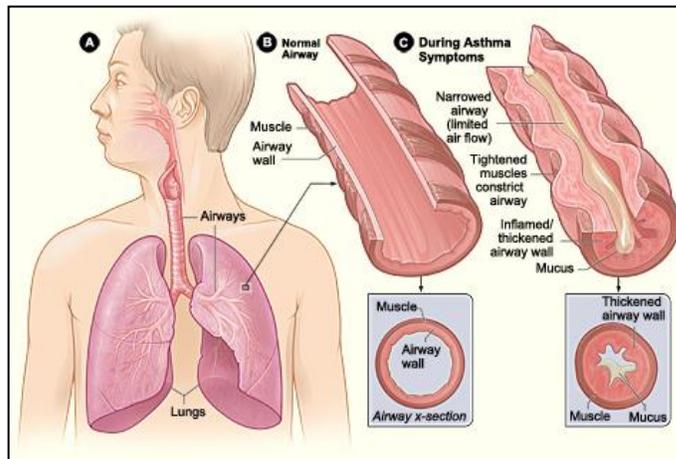
- Symptoms occur daily. Inhaled short-acting asthma medication is used every day.
- Symptoms interfere with daily activities.
- Nighttime symptoms occur more than 1 time a week, but do not happen every night.
- Lung function tests are abnormal (more than 60% to less than 80% of the expected value), and PEF varies more than 30% from morning to afternoon.

### Severe persistent asthma

Asthma is considered severe persistent if without treatment any of the following are true:<sup>2</sup>

- Symptoms:
  - Occur throughout each day.
  - Severely limit daily physical activities.
- Nighttime symptoms occur often, sometimes every night.
- Lung function tests are abnormal (60% or less of expected value), and PEF varies more than 30% from morning to afternoon.

**Diagram 1. Cross-section of Normal Airways & Airways with Asthma Symptoms**



Source: National Heart, Lung, and Blood Institute

## **Surveillance Categories of Asthma**

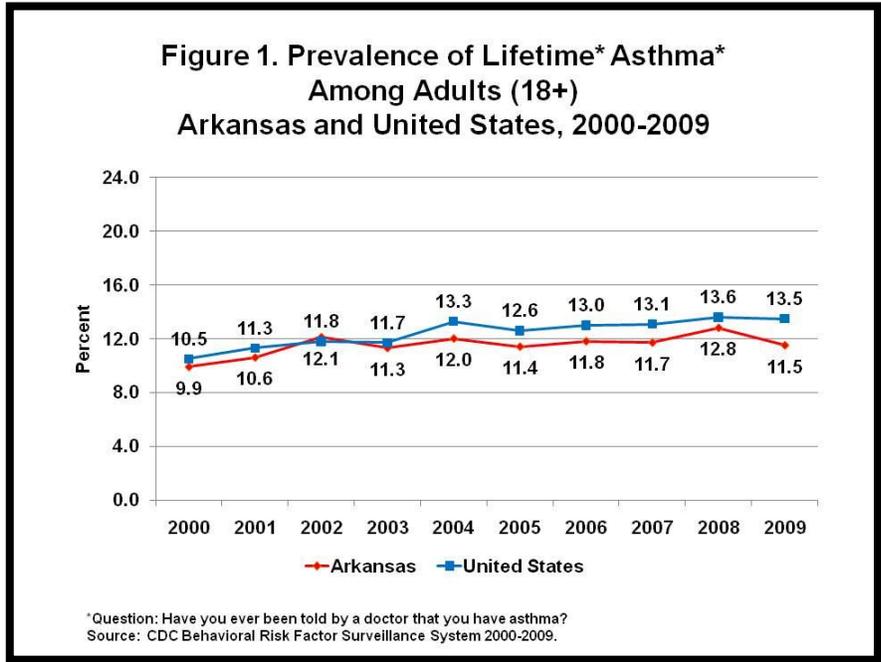
Lifetime Asthma – Persons who report that they have ever been told by a medical professional that they have asthma.

Current Asthma – Persons who report that they have ever been told by a medical professional that they have asthma and still have asthma.

# Asthma Prevalence - Adults

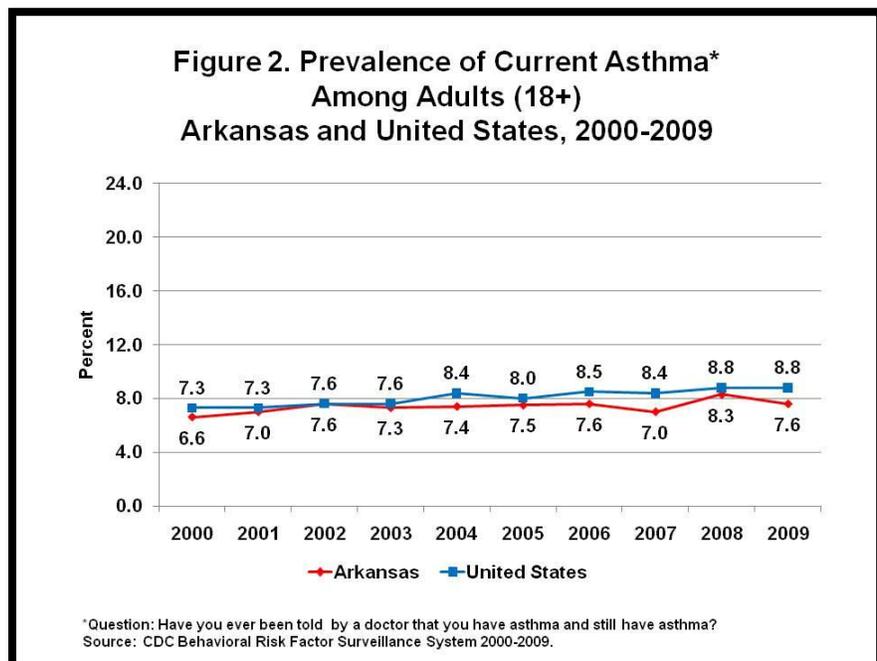
The prevalence of asthma has been increasing across all gender, age, and racial groups since the early 1980s.<sup>3</sup> Asthma is more common among adult women than adult men and slightly more prevalent among Blacks than Whites. Ethnic differences in the prevalence of asthma are highly correlated with poverty, urban air quality, indoor allergens, lack of patient education, and inadequate medical care.

## Lifetime & Current Prevalence



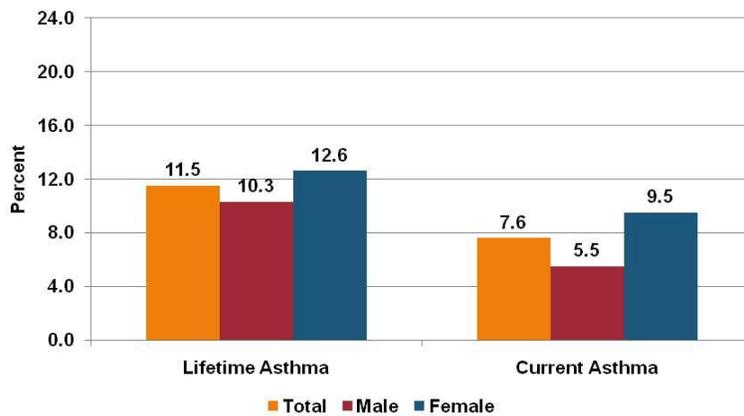
Prevalence of lifetime asthma among adults has increased from 2000 to 2009 for both Arkansas and the United States. For the most part, the prevalence for Arkansas adults has been lower than the median prevalence for the United States during this same time period. Over time, there has not been a statistically significant difference between the prevalence for Arkansas and the United States.

As with lifetime asthma prevalence, current asthma prevalence has increased for both Arkansas and the United States from 2000 to 2009. Current asthma prevalence for Arkansas adults has been either at or below the prevalence for the United States. There has not been a statistically significant difference between the prevalence for Arkansas and the United States over time.



According to the National Center for Health Statistics, there were 24.6 million (8.2%) Americans with current asthma in 2009.<sup>4</sup> Of the 24.6 million people with current asthma, 12.8 million had experienced an asthma attack in the previous year. Of the estimated 24.6 million people with current asthma, 17.5 million were adults. According to the Behavioral Risk Factor Surveillance System, there were an estimated 248,000 Arkansas adults with lifetime asthma in 2009. Of those, 163,000 have current asthma.

**Figure 3. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Gender Arkansas, 2009**

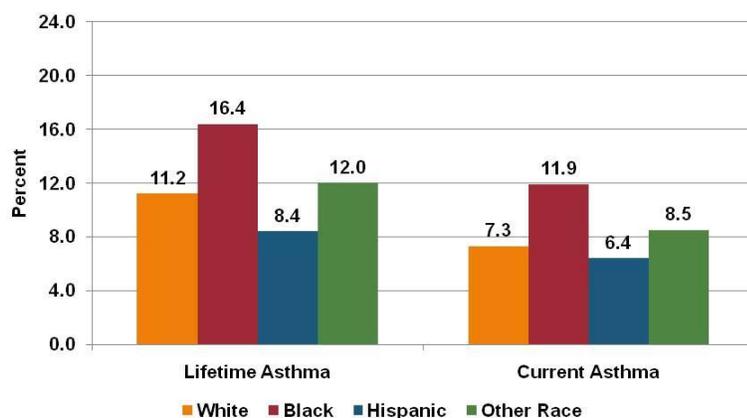


\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

A comparison of lifetime and current asthma among adults by gender shows that prevalence for both lifetime and current asthma was higher among adult females (12.6% and 9.5%, respectively) than among adult males (10.3% and 5.5%, respectively) in 2009. These differences are statistically significant for current asthma.

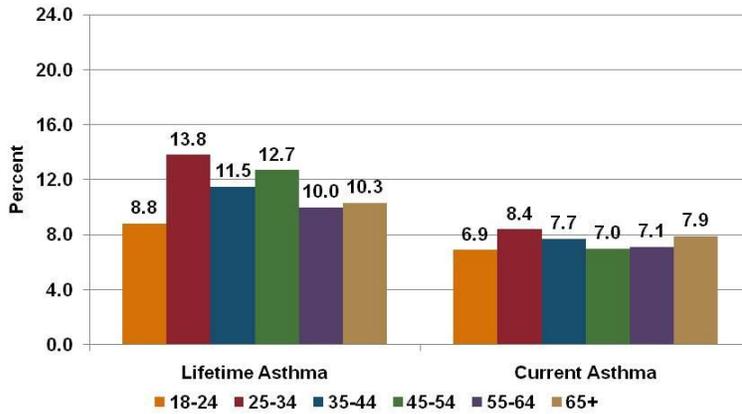
Prevalence for both lifetime and current asthma was highest among Blacks (16.4%, 11.9%) and lowest among Hispanics (8.4%, 6.4%). These differences are not statistically significant due to small sample size.

**Figure 4. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Race/Ethnicity Arkansas, 2009**



\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

**Figure 5. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Age Arkansas, 2009**

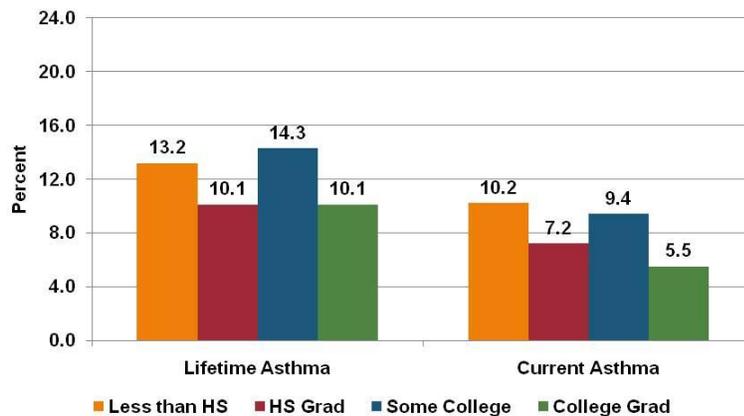


\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

Lifetime asthma was highest among adults 25-34 years of age (13.8%) with no consistent trends for the other age groups. Current asthma prevalence was highest among adults 25-34 at 8.4%. All other age groups were statistically equivalent.

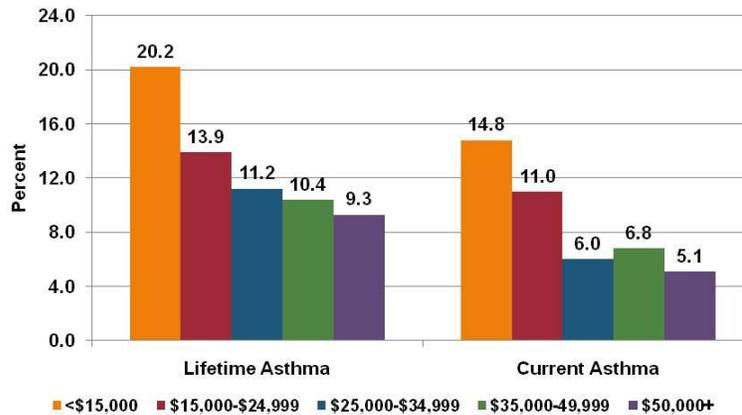
Adults with some college education or less than high school education were more likely to have lifetime asthma at 14.3% and 13.2%, respectively. Current asthma prevalence was highest among adults with less than a high school education and some college at 10.2% and 9.4%, respectively. There was no consistent relationship between lifetime or current asthma and increasing levels of education.

**Figure 6. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Education Arkansas, 2009**



\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

**Figure 7. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Household Income Arkansas, 2009**



\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

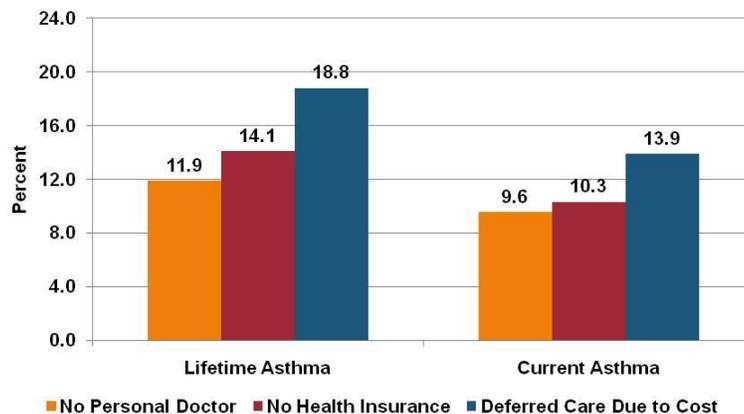
There were statistically significant trends by household income level among Arkansas adults with lifetime and current asthma. Adults with annual household income below \$15,000 were more likely to have lifetime asthma (20.2%). This finding was also seen for current asthma (14.8%). This seems to support reported findings that adults living in poverty are more at risk than more affluent adults.

### Health Care Access

Lack of health care access is a problem faced not only by people with asthma but also by many Arkansans generally. Lack of health insurance may contribute to the lack of periodic visits with their own personal doctor. The cost of care without health insurance can contribute to the individual delaying treatment until a problem becomes serious or life threatening.

A substantial percentage of Arkansas adults with lifetime asthma (18.8%) as well as adults with current asthma (13.9%) deferred care due to cost.

**Figure 8. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Health Care Access Arkansas, 2009**

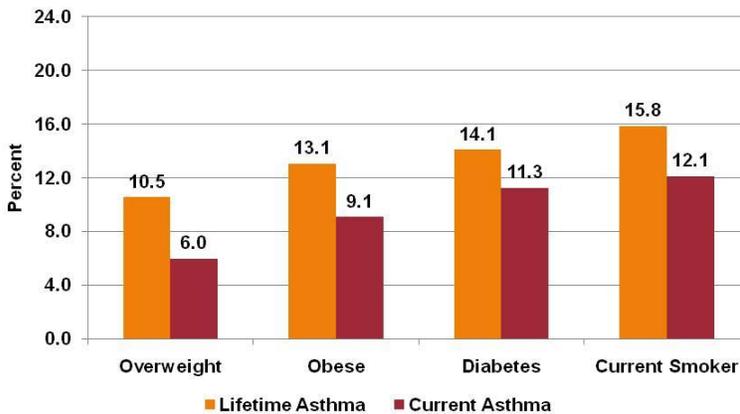


\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

## Risk Factors

A number of factors are thought to increase the chances of developing asthma. These may include: having a parent or sibling with asthma, having an allergic condition such as atopic dermatitis or hay fever, being overweight or obese, and being a smoker or being exposed to secondhand smoke.<sup>5</sup> Exposure to allergens, exposure to certain germs, and having some types of bacterial or viral infections may also be risk factors.

**Figure 9. Prevalence of Risk Factors Among Adults by Lifetime\* & Current\*\* Asthma Arkansas, 2009**

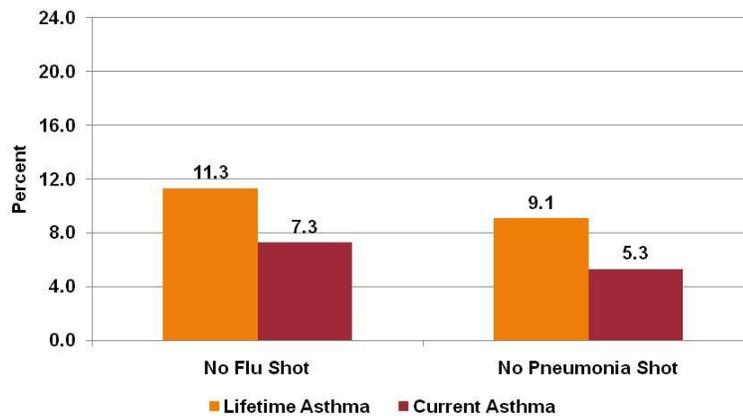


\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

In 2009, the prevalence of risk factors was higher among Arkansas adults with lifetime asthma than those with current asthma. The prevalence of current smoker was highest for both lifetime asthma (15.8%) and current asthma (12.1%) compared to their respective groups of other risk factors.

Lack of preventive immunizations was higher among those adults with lifetime asthma at 11.3% for both no flu shot and 9.1% for no pneumonia shot. The prevalence among adults with current asthma was 7.3% and 5.3%, respectively.

**Figure 10. Prevalence of Immunization Status Among Adults by Lifetime\* & Current\*\* Asthma Arkansas, 2009**



\*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

## Health-Related Quality of Life

Physicians have often used health-related quality of life to measure the effects of chronic illness in their patients to better understand how an illness interferes with a person's day-to-day life.<sup>6</sup> Among public health professionals, quality of life is used to measure the effects of numerous disorders, short- and long-term disabilities, and diseases in different populations. Tracking health-related quality of life in different populations can identify subgroups with poor physical or mental health and can help guide policies or interventions to improve their health.

**Table 1. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Health-Related Quality of Life Measures Arkansas, 2009**

Quality of Life Measure	Non Asthma (%)	Current Asthma (%)	Lifetime Asthma (%)
Fair or Poor General Health	18.0	15.0	19.4
Activity Limitation	20.6	15.4	20.1
14+ Physically Unhealthy Days	11.2	19.2	23.5
14+ Mentally Unhealthy Days	10.7	12.7	17.2
14+ Physically or Mentally Unhealthy Days	14.7	15.0	18.7

Note: Unhealthy days refers to the number of days in the past 30 days.  
 \*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

Arkansas adults with lifetime asthma (19.4%) were more likely than adults with current asthma (15.0%) to report their general health as fair or poor. The prevalence of 14+ physically unhealthy days (23.5%) and mentally unhealthy (17.2%) days was also higher among adults with lifetime asthma as opposed to adults with current asthma (19.2% and 12.7%, respectively).

Although the prevalence of 14+ unhealthy days was greater among Arkansas adults with lifetime asthma, the average number of unhealthy days was greater among Arkansas adults with current asthma in 2009.

**Table 2. Prevalence of Lifetime\* & Current\*\* Asthma Among Adults by Average Number of Unhealthy Days Arkansas, 2009**

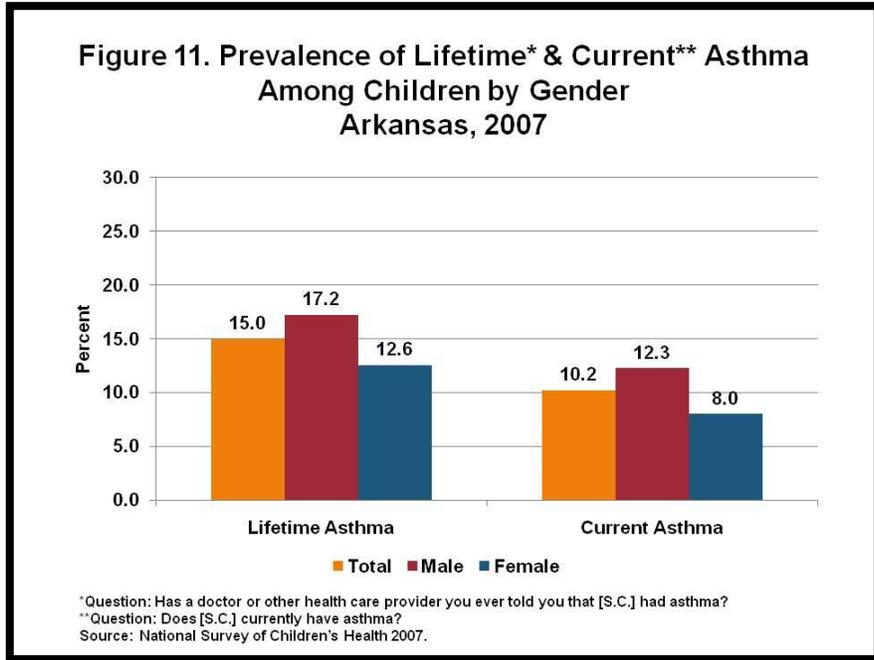
Quality of Life Measure	Non Asthma	Current Asthma	Lifetime Asthma
Physically Unhealthy Days	4.5	11.3	9.9
Mentally Unhealthy Days	3.2	6.6	6.0
Physically or Mentally Unhealthy Days	5.2	8.8	8.1

Note: Unhealthy days refers to the number of days in the past 30 days.  
 \*Question: Have you ever been told by a doctor that you have asthma?  
 \*\*Question: Have you ever been told by a doctor that you have asthma and still have asthma?  
 Source: CDC Behavioral Risk Factor Surveillance System 2009.

# Asthma Prevalence - Children

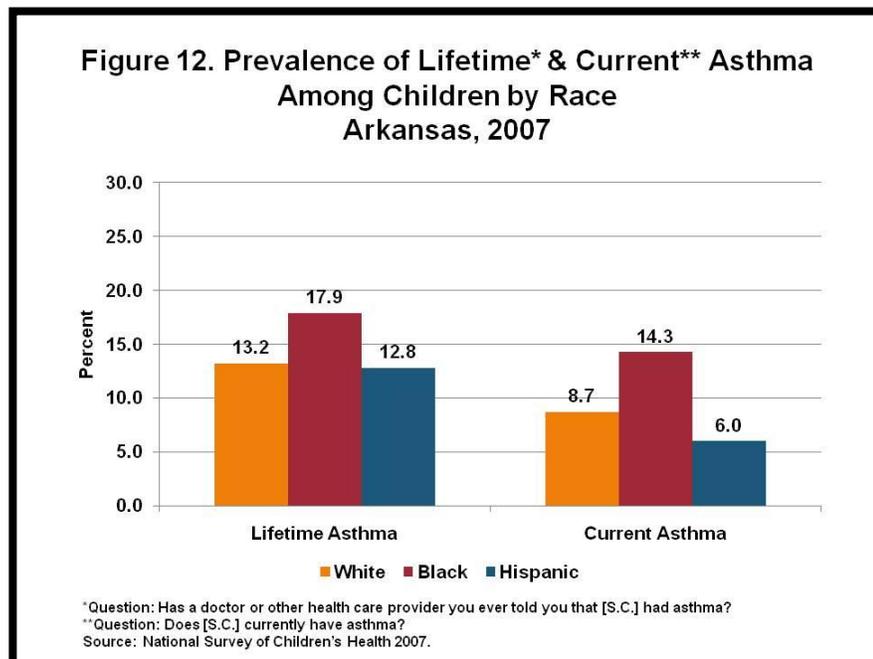
Asthma is the leading cause of chronic illness in children.<sup>7</sup> It affects as many as 10%-12% of children in the U.S. Of the estimated 24.6 million Americans with current asthma in 2009, 7.1 million were children.<sup>4</sup> Children have smaller airways than adults, which makes asthma especially serious for them.<sup>8</sup> Children with asthma may experience wheezing, coughing, chest tightness and trouble breathing, especially early in the morning or at night.

## Prevalence Among Children



In Arkansas, it was estimated that approximately 71,000 children had current asthma in 2007. Male children were more likely to have both lifetime and current asthma (17.2%, 12.3%, respectively) than females (12.6%, 8.0%). These differences were not statistically significant.

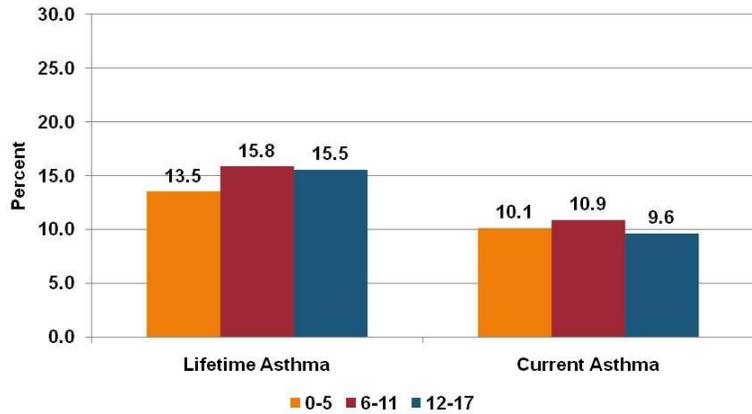
Lifetime and current asthma was highest among Black children (17.9%, 14.3%) and lowest among Hispanic children (12.8%, 6.0%) in 2007. These differences were not statistically significant.



Asthma can begin at any age, but most children have their first symptoms by age five.<sup>7</sup>

In 2007, Arkansas children that were 6-11 years old were more likely to have lifetime asthma (15.8%) and current asthma (10.9%) than in the other age groups. However, there was little variation by age group for either lifetime or current asthma.

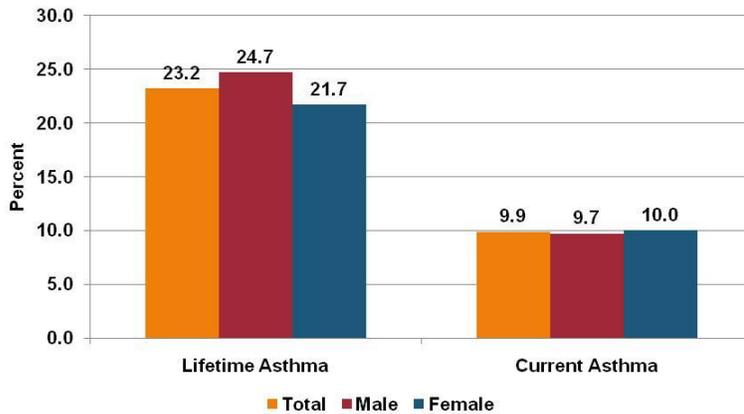
**Figure 13. Prevalence of Lifetime\* & Current\*\* Asthma Among Children by Age Arkansas, 2007**



\*Question: Has a doctor or other health care provider ever told you that [S.C.] had asthma?  
 \*\*Question: Does [S.C.] currently have asthma?  
 Source: National Survey of Children's Health 2007.

### Prevalence Among High School Students

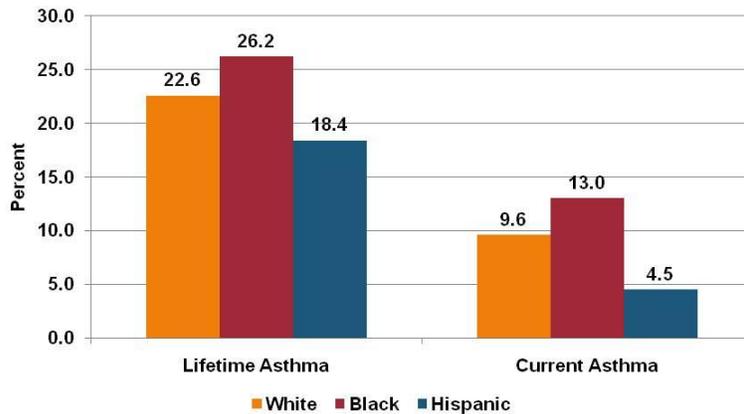
**Figure 14. Prevalence of Lifetime\* & Current\*\* Asthma Among High School Students by Gender Arkansas, 2009**



\*Question: Has a doctor or nurse ever told you that you have asthma?  
 \*\*Question: Do you still have asthma?  
 Source: CDC Youth Risk Behavior Surveillance System 2009.

Among Arkansas high school students, lifetime prevalence was lower among females (21.7%) than males (24.7%) in 2009. This difference was statistically significant. For current asthma, the prevalence among males (9.7%) and females (10.0%) was equivalent.

**Figure 15. Prevalence of Lifetime\* & Current\*\* Asthma Among High School Students by Race/Ethnicity Arkansas, 2009**



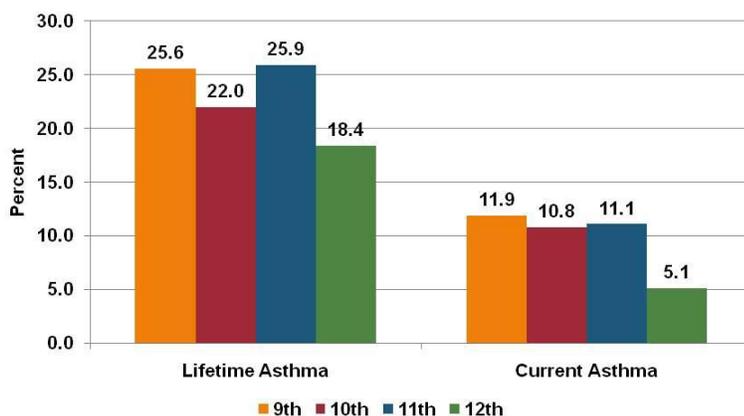
\*Question: Has a doctor or nurse ever told you that you have asthma?  
 \*\*Question: Do you still have asthma?  
 Source: CDC Youth Risk Behavior Surveillance System 2009.

In 2009, lifetime asthma was highest among Arkansas Black high school students (26.2%). This difference was not statistically significant. Current asthma was higher among Black high school students (13.0%) in Arkansas as well.

Among Arkansas high school students, the prevalence of lifetime asthma was significantly higher than the prevalence of current asthma at all grade levels in 2009.

The prevalence of lifetime and current asthma was lowest among 12<sup>th</sup> grade students at 18.4% and 5.1%, respectively.

**Figure 16. Prevalence of Lifetime\* & Current\*\* Asthma Among High School Students by Grade Arkansas, 2009**

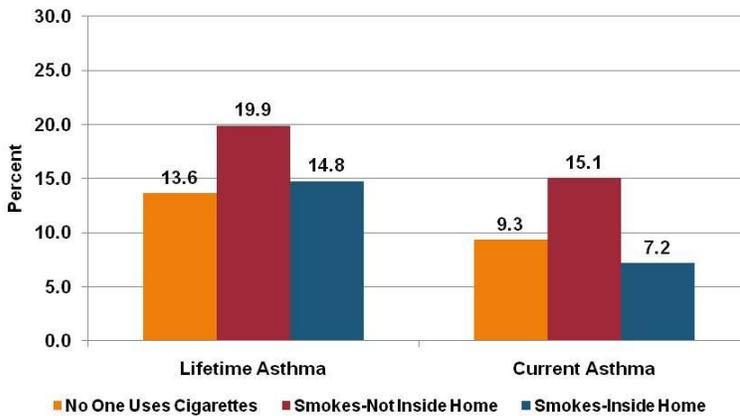


\*Question: Has a doctor or nurse ever told you that you have asthma?  
 \*\*Question: Do you still have asthma?  
 Source: CDC Youth Risk Behavior Surveillance System 2009.

## Risk Factors

There are many risk factors for developing childhood asthma, including allergies, family history of asthma and/or allergies, frequent respiratory infections, low birth weight, exposure to tobacco smoke, being male, being Black, and being in a low-income environment.<sup>7</sup>

**Figure 17. Prevalence of Lifetime\* & Current\*\* Asthma Among Children by Cigarette Use Inside Home Arkansas, 2007**

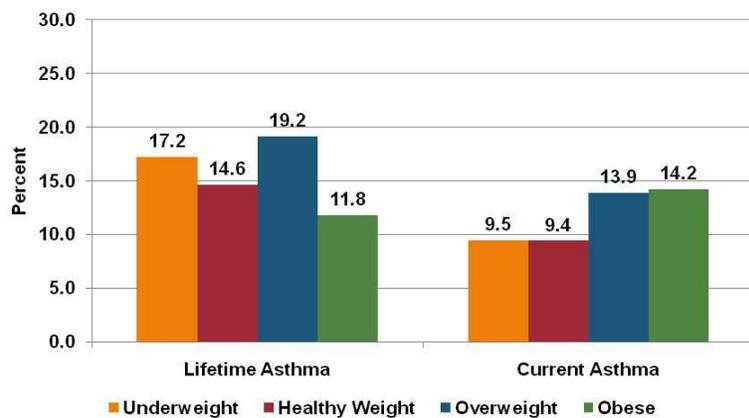


\*Question: Has a doctor or other health care provider you ever told you that [S.C.] had asthma?  
 \*\*Question: Does [S.C.] currently have asthma?  
 Source: National Survey of Children's Health 2007.

Exposure to cigarette smoke presents similar risk patterns for children with asthma. Children with lifetime asthma had a higher prevalence when someone smokes, but not inside the home (19.9%) in 2007. A similar pattern was seen among children with current asthma. Prevalence of exposure to someone who smokes, but not inside in the home (15.1%) was higher as well.

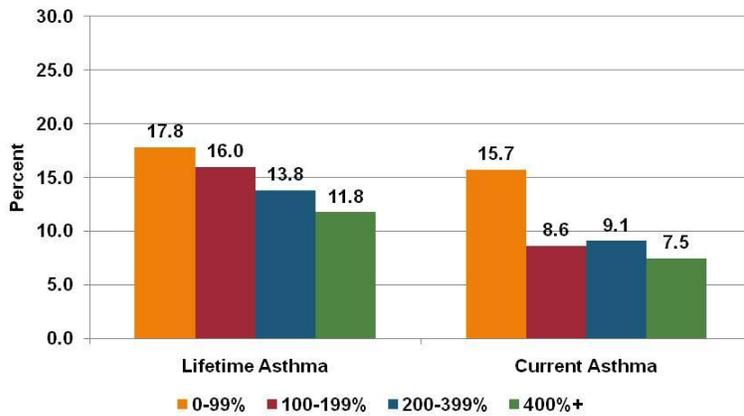
In 2007, there were varying differences in asthma prevalence in regards to weight status. Children with lifetime asthma in 2007 were more likely to be overweight, (19.2%) or underweight (17.2%). Arkansas children with current asthma were more likely to be overweight (13.9%) or obese (14.2%). These differences were not statistically significant.

**Figure 18. Prevalence of Lifetime\* & Current\*\* Asthma Among Children by Weight Status Arkansas, 2007**



\*Question: Has a doctor or other health care provider you ever told you that [S.C.] had asthma?  
 \*\*Question: Does [S.C.] currently have asthma?  
 Source: National Survey of Children's Health 2007.

**Figure 19. Prevalence of Lifetime\* & Current\*\* Asthma Among Children by Poverty Level Arkansas, 2007**

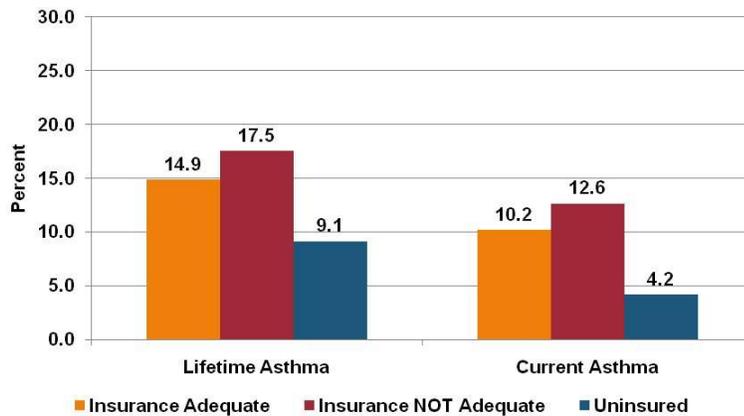


\*Question: Has a doctor or other health care provider you ever told you that [S.C.] had asthma?  
 \*\*Question: Does [S.C.] currently have asthma?  
 Source: National Survey of Children's Health 2007.

Arkansas children with lifetime asthma were more likely to be below 200% of the federal poverty level with 17.8% below 100% of poverty and 16.0% between 100-199% of poverty in 2007. The impact of poverty was more striking among children with current asthma, as 15.7% were below 100% of poverty. The differences were primarily at the lowest income level relative to the higher income groups.

In 2007, in children with lifetime and current asthma, there was a higher prevalence of inadequate insurance (17.5%, 12.6%) and a lower prevalence of uninsured (9.1%, 4.2%). These differences were not statistically significant. This may be an indication that uninsured children are less likely to be seen by a medical professional for the diagnosis of asthma.

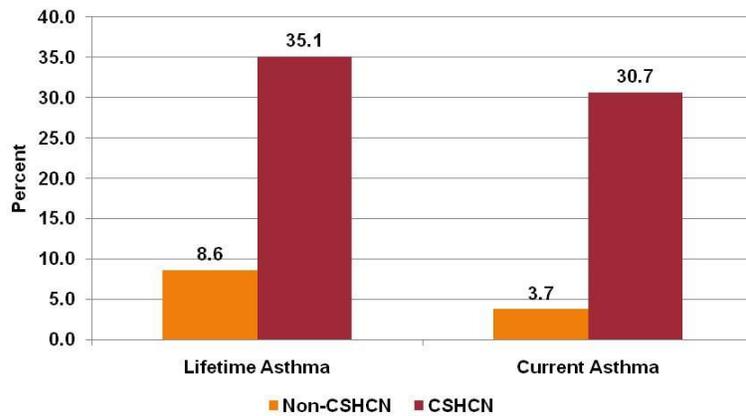
**Figure 20. Prevalence of Lifetime\* & Current\*\* Asthma Among Children by Insurance Status Arkansas, 2007**



\*Question: Has a doctor or other health care provider you ever told you that [S.C.] had asthma?  
 \*\*Question: Does [S.C.] currently have asthma?  
 Source: National Survey of Children's Health 2007.

Children with Special Health Care Needs (CSHCN) are defined by the Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau (MCHB) as: "...those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally."<sup>8</sup> According to MCHB, there were an estimated 120,087 (17.7%) children with special health care needs in Arkansas.

**Figure 21. Prevalence of Lifetime\* & Current\*\* Asthma Among Children by CSHCN Status Arkansas, 2007**



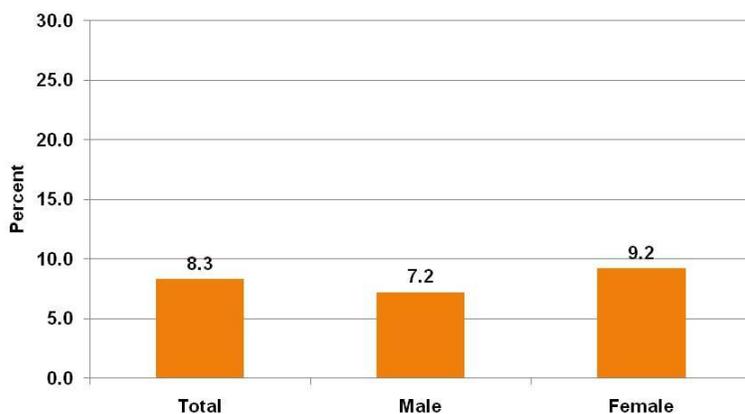
\*Question: Has a doctor or other health care provider you ever told you that [S.C.] had asthma?  
 \*\*Question: Does [S.C.] currently have asthma?  
 Source: National Survey of Children's Health 2007.

Children with Special Health Care Needs are particularly vulnerable to conditions such as asthma. In 2007, Arkansas children with lifetime and current asthma were significantly more likely to be CSHCN (35.1%, 30.7%) than Non-CSHCN (8.6%, 3.7%).

## Asthma Episodes or Attacks

A childhood asthma episode or attack occurs when increased mucus production and narrowed airways causes breathing to be difficult.<sup>9</sup> These episodes or attacks can be mild, moderate or severe. When a child has an asthma attack, he or she may experience the following: tightening of the chest, cough with mucus, wheezing or whistling sound when breathing, difficulty breathing and talking, or trouble sleeping.

**Figure 22. Prevalence of Asthma Episode/Attack\* Among High School Students by Gender Arkansas, 2010**

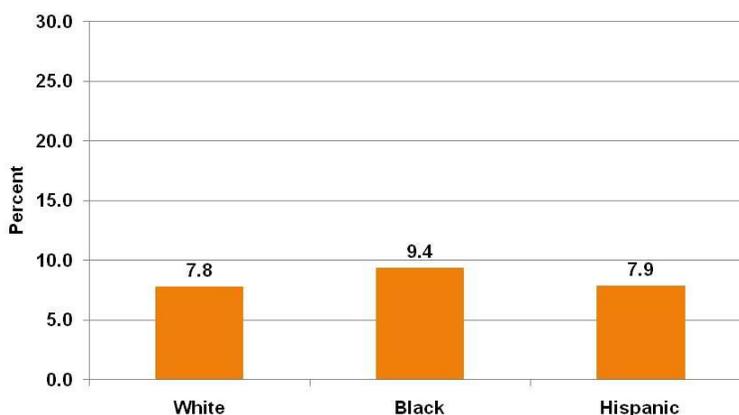


\*Question: During the past 12 months, have you had an episode of asthma or an asthma attack?  
Source: Arkansas Youth Tobacco Survey 2010.

The 2010 Arkansas Youth Tobacco Survey (YTS) found that female high school students (9.2%) were more likely to report having an asthma attack or episode than male high school students (7.2%). These differences were not statistically significant.

The prevalence of an asthma episode or attack was higher among Black high school students at 9.4%. The prevalence for Whites and Hispanics was slightly lower at 7.8% and 7.9%, respectively.

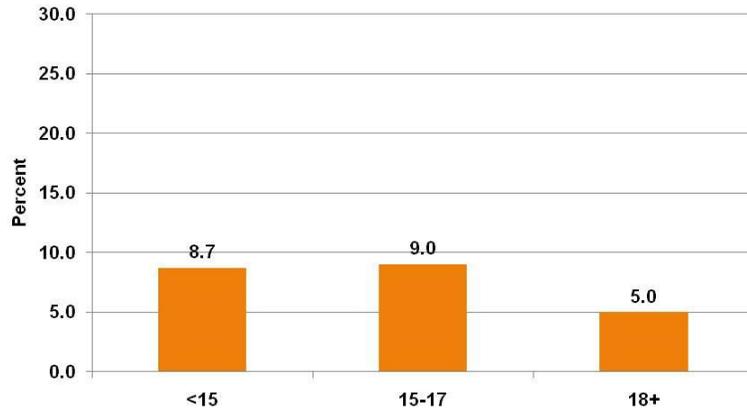
**Figure 23. Prevalence of Asthma Episode/Attack\* Among High School Students by Race/Ethnicity Arkansas, 2010**



\*Question: During the past 12 months, have you had an episode of asthma or an asthma attack?  
Source: Arkansas Youth Tobacco Survey 2010.

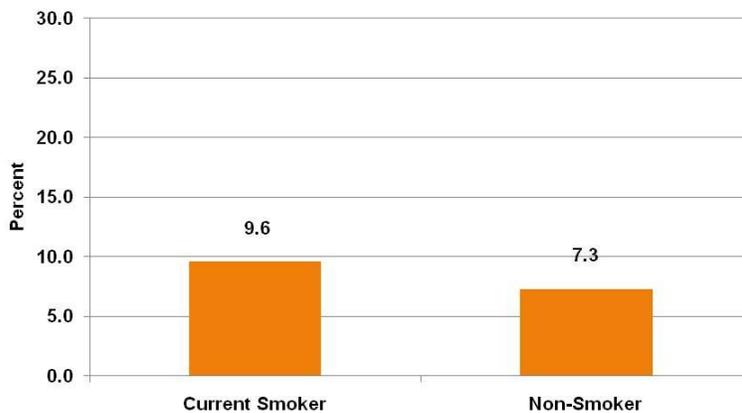
Asthma episodes or attacks were lowest among students 18 years and older (5.0%), while an episode or attack was similar for <15 year old students (8.7%) and 15-17 year old students (9.0%). This suggests that for many children asthma episodes diminish as they reach adolescence.

**Figure 24. Prevalence of Asthma Episode/Attack\* Among High School Students by Age Arkansas, 2010**



\*Question: During the past 12 months, have you had an episode of asthma or an asthma attack?  
Source: Arkansas Youth Tobacco Survey 2010.

**Figure 25. Prevalence of Asthma Episode/Attack\* Among High School Students by Smoking Status Arkansas, 2010**



\*Question: During the past 12 months, have you had an episode of asthma or an asthma attack?  
Source: Arkansas Youth Tobacco Survey 2010.

Arkansas high school students who were current smokers (9.6%) were more likely to experience an asthma episode or attack than non smokers (7.3%). These differences were not statistically significant.

# Hospitalizations

Nationally, there were 456,000 asthma hospitalizations and 1.75 million asthma-related emergency department visits in 2007.<sup>4</sup> Hospitalization rates and emergency visits for asthma were higher among females, children, and Blacks.

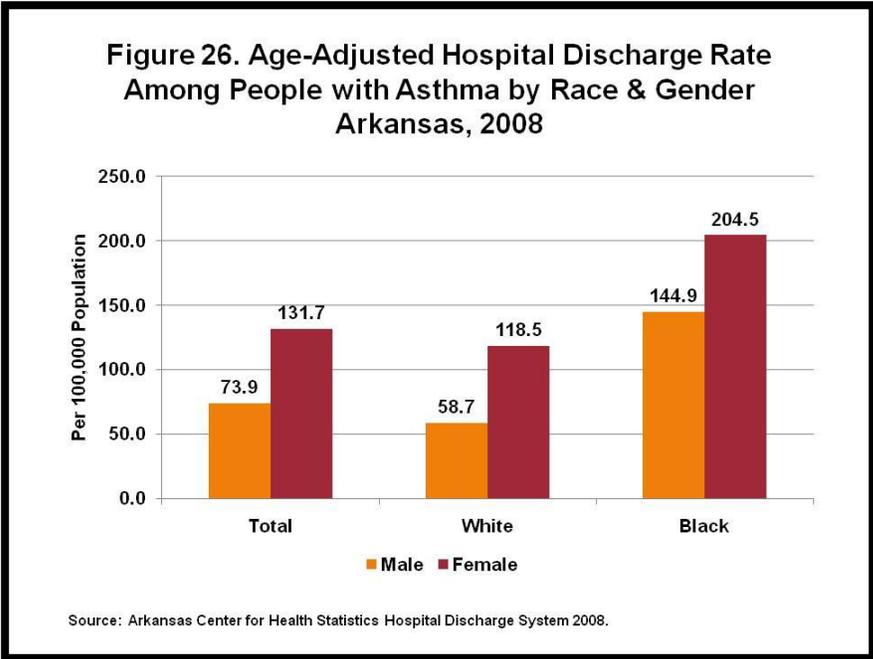
## Hospital Discharges

In Arkansas, there were 3,083 hospital discharges where asthma was the primary diagnosis in 2008. The majority of these were asthma, unspecified (56.6%) which includes asthma unspecified with status asthmaticus and asthma unspecified with (acute) exacerbation. Chronic obstructive asthma accounted for 40.9%.

**Table 3. Hospital Discharges Among People with Asthma by Diagnosis  
Arkansas, 2008**

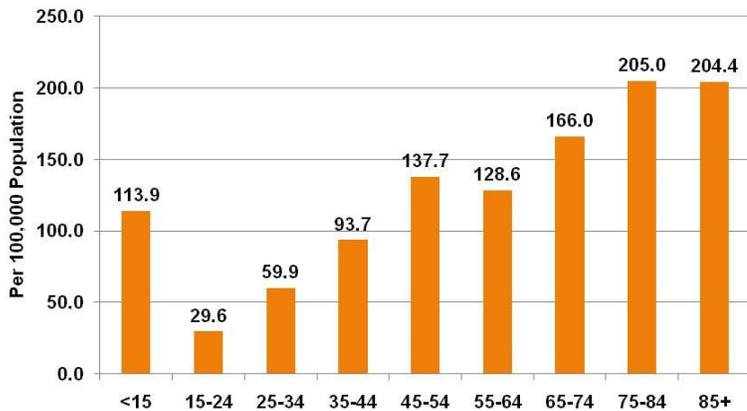
ICD-9 CM	Diagnosis	Number	Percent
493.0	Extrinsic Asthma	59	1.9
493.1	Intrinsic Asthma	13	0.4
493.2	Chronic Obstructive Asthma	1,260	40.9
493.8	Other Forms of Asthma	6	0.2
493.9	Asthma, Unspecified	1,745	56.6
	<b>Total</b>	<b>3,083</b>	<b>100.0</b>

Source: Arkansas Center for Health Statistics Hospital Discharge System 2008.



In 2008, the age-adjusted hospital discharge rate was significantly higher among Arkansas females than Arkansas males for both Whites (118.5 vs. 58.7) and Blacks (204.5 vs. 144.9) per 100,000 population.

**Figure 27. Age-Specific Hospital Discharge Rate Among People with Asthma as Primary Diagnosis Arkansas, 2008**

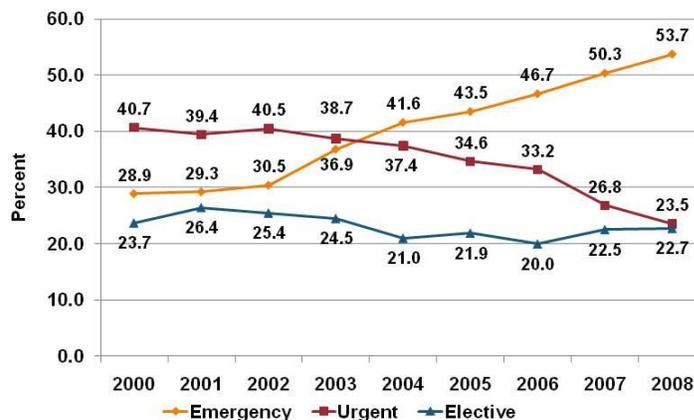


Source: Arkansas Center for Health Statistics Hospital Discharge System 2008.

The distribution of asthma discharges by age starts with a relatively high rate for children, which diminishes in late adolescent and early adulthood. Beginning with the 25-34 year old age group, the rates steadily increase with the successive age groups.

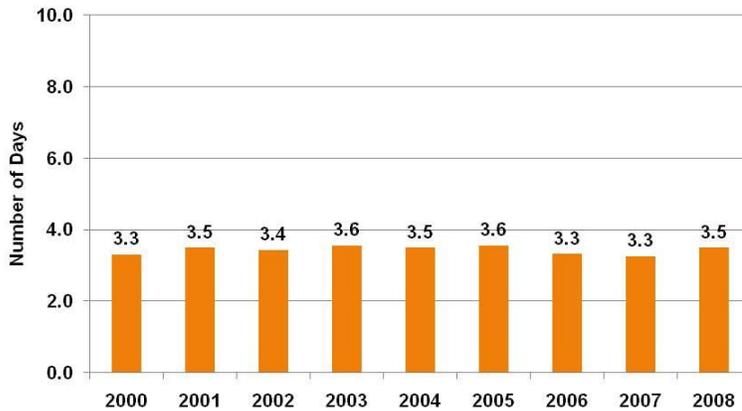
Hospital admissions are of three types: emergency, urgent, or elective. Arkansas asthma admissions occur most often as emergency or urgent. From 2000-2008, asthma hospital admissions in Arkansas classified as emergency admissions increased steadily from 28.9% to 53.7%. During this same time period, urgent admissions declined from 40.7% to 23.5%.

**Figure 28. Hospital Discharges Among People with Asthma as Primary Diagnosis by Type of Admission Arkansas, 2000-2008**



Source: Arkansas Center for Health Statistics Hospital Discharge System 2000-2008.

**Figure 29. Average Length of Hospital Stay Among People with Asthma as Primary Diagnosis Arkansas, 2000-2008**



Source: Arkansas Center for Health Statistics Hospital Discharge System 2000-2008.

There was little variation in average length of stay for asthma admissions from 2000-2008 in Arkansas. During this time period, the average length of stay ranged from 3.3 days to 3.6 days. According to the Agency for Healthcare Research and Quality (AHRQ), the national average was 3.4 days in 2007.

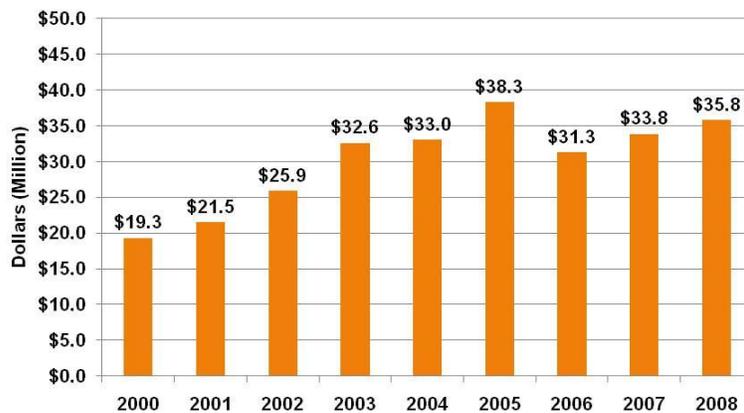
### **Emergency Department Visits**

According to the National Center for Health Statistics, in 2007 there were over 1.75 million visits to emergency departments for asthma in the United States.<sup>4</sup> Approximately 17% of these visits resulted in an admission to the hospital with the remaining 83% being discharged or no hospital admission. Children aged 0-17 years had over 695,000 emergency department visits, 38% of all emergency department asthma visits. The rate of emergency department visits for Blacks is 3.32 times higher than that for Whites. Comparative data on Arkansas emergency department visits were not available.

## Economic Impact

Asthma ranks as one of the most common chronic conditions in the United States. The American Lung Association, Epidemiology and Statistics Unit projected the total economic cost of asthma in the United States as \$20.7 billion.<sup>10</sup> Direct expenditures (hospital care, physician services, and prescription drugs) account for \$15.6 billion with another \$5.1 billion are attributable to indirect costs (morbidity and mortality). In Arkansas, the total costs for asthma have been estimated to be over \$224 million with \$128 million attributable to direct costs and another \$96 million in indirect costs.<sup>11</sup>

**Figure 30. Total Hospital Charges Among People with Asthma as Primary Diagnosis Arkansas, 2000-2008**

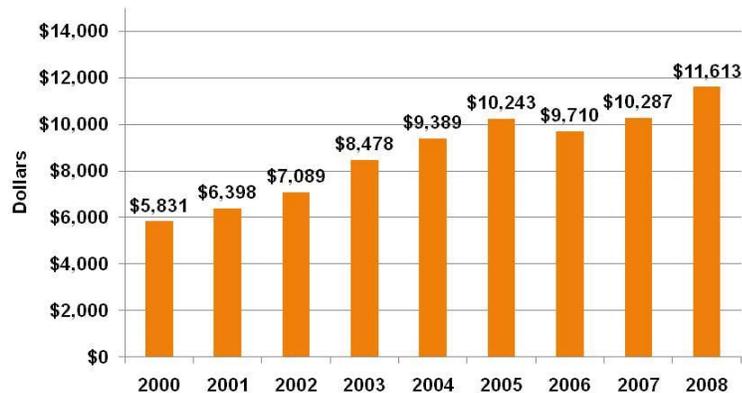


Source: Arkansas Center for Health Statistics Hospital Discharge System 2000-2008.

The Arkansas Hospital Discharge Data System provides an estimate of hospitalization costs where asthma was the primary diagnosis. These charges steadily increased from \$19.3 million in 2000 to \$38.3 million in 2005. With a decline in 2006, total charges again increased to \$35.8 million in 2008.

Since 2000, the average charges for an asthma hospitalization have increased from \$5,831 to \$11,613 in 2008.

**Figure 31. Average Hospital Charges Among People with Asthma as Primary Diagnosis Arkansas, 2000-2008**



Source: Arkansas Center for Health Statistics Hospital Discharge System 2000-2008.

## Other Respiratory Conditions

**Table 4. Hospital Discharges with Other Respiratory Conditions Among People with Asthma as Primary Diagnosis Arkansas, 2004-2008**

Secondary Diagnosis	2004	2005	2006	2007	2008
Acute Bronchitis	268	343	252	237	255
Pneumonia	306	243	222	295	333
Influenza	6	22	17	6	20
Bronchitis	85	88	78	91	84
Emphysema	24	21	28	16	15
Other Chronic Obstructive Pulmonary	14	21	28	14	11

Source: Arkansas Center for Health Statistics Hospital Discharge System 2004-2008.

In many instances, asthma may be present with other respiratory conditions. Chronic bronchitis and emphysema are often present along with asthma, especially among the elderly.<sup>1</sup> From 2004-2008, acute bronchitis and pneumonia were the two most common causes of hospitalization with more than 200 hospitalizations in each category for each year in Arkansas.

In cases where asthma was listed as other diagnosis, pneumonia was the most common primary diagnosis with over 1,600 discharges each year in Arkansas hospitals. Acute bronchitis and bronchitis were the second and third most common primary diagnosis. Still they accounted for only a fraction of hospitalizations relative to pneumonia.

**Table 5. Hospital Discharges where Asthma was Listed as Other Diagnosis Arkansas, 2004-2008**

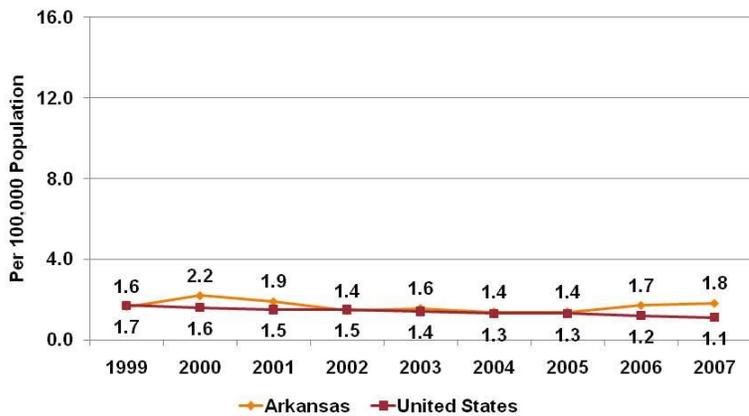
Primary Diagnosis	2004	2005	2006	2007	2008
Acute Bronchitis	323	296	265	257	231
Pneumonia	1,683	1,832	1,666	1,799	1,837
Influenza	17	61	48	34	59
Bronchitis	106	126	98	115	120
Emphysema	5	5	3	4	6
Other Chronic Obstructive Pulmonary	9	3	13	16	12

Source: Arkansas Center for Health Statistics Hospital Discharge System 2004-2008.

# Mortality

Asthma mortality is considered preventable. Many of the deaths due to asthma are avoidable with proper care and treatment.<sup>3</sup> Asthma mortality primarily affects adults, with approximately 67% occurring at or after 45 years of age. In 2007, 3,447 people died from asthma in the United States or 1.1 per 100,000 people. Approximately 63% of these deaths occurred in women.

**Figure 32. Age-Adjusted Asthma Mortality Rate  
Arkansas & United States, 1999-2007**

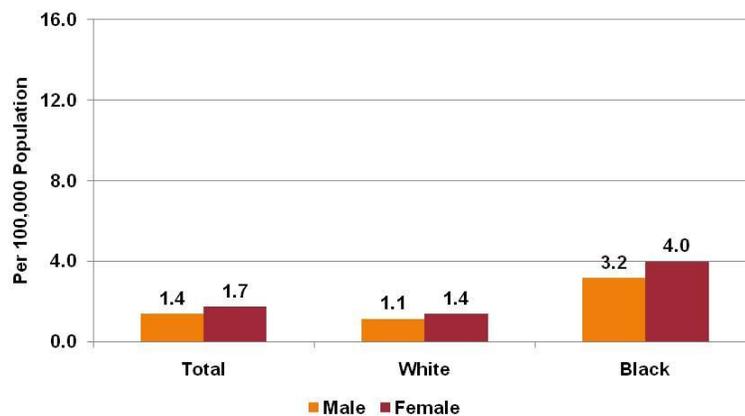


Source: Arkansas Center for Health Statistics Query System & CDC Wonder 1999-2007.

There were a total of 55 Arkansans who died as a result of asthma in 2007 or 1.8 per 100,000 people. From 1999-2007, the age-adjusted asthma mortality rate in Arkansas was slightly higher than the age-adjusted mortality rate in the United States. Neither rate displayed a significant variation.

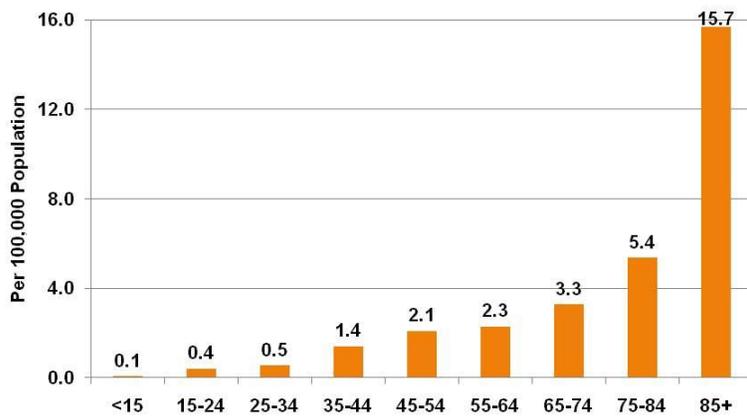
The age-adjusted mortality rate was highest for Black Arkansans with a rate of 3.2 per 100,000 population for males and 4.0 per 100,000 for females, during the 2003-2007 time period. Comparable rates for Whites were 1.1 per 100,000 for males and 1.4 per 100,000 for females. The difference in death rates between Blacks and Whites were statistically significant.

**Figure 33. Age-Adjusted Asthma Mortality Rate  
by Race and Gender  
Arkansas, 2003-2007**



Source: Arkansas Center for Health Statistics Query System 2003-2007.

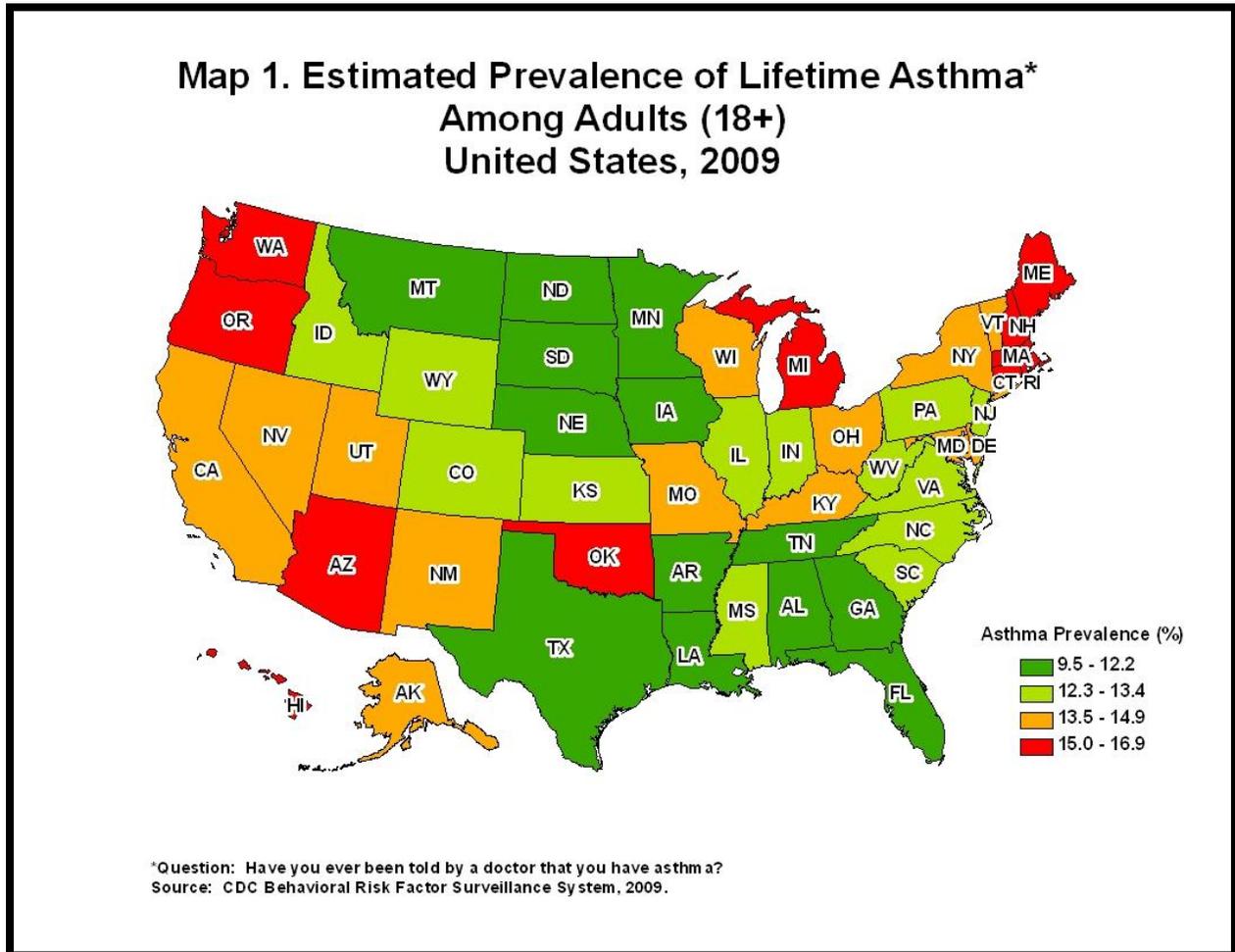
**Figure 34. Age-Specific Asthma Mortality Rate  
Arkansas, 2003-2007**



Source: Arkansas Center for Health Statistics Query System 2003-2007.

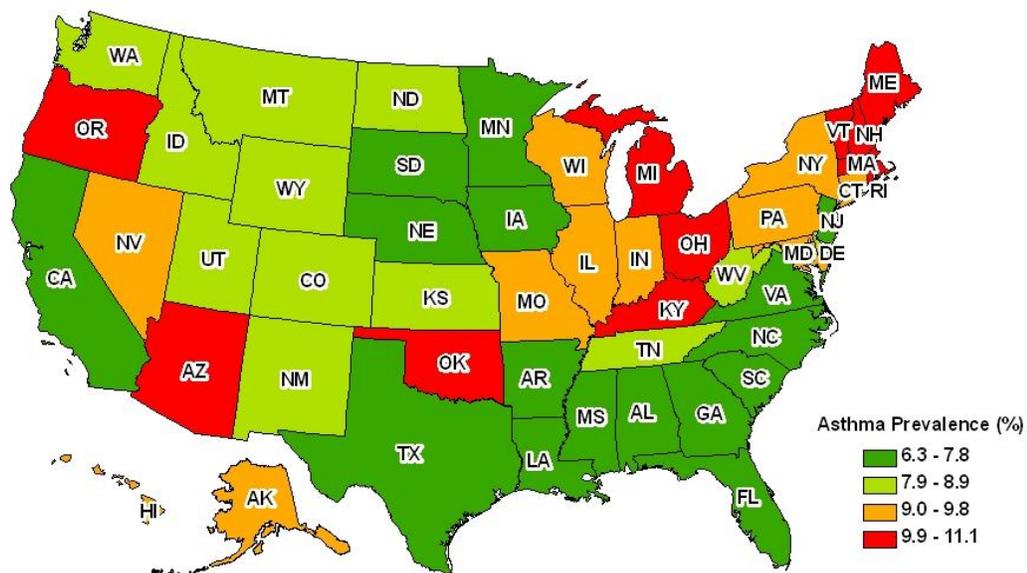
The mortality rate increases steadily by age with a dramatic spike in the 85+ age group. This was significantly higher compared to all other age groups at 15.7 per 100,000 population.

## Geographic Data



- ◆ Prevalence was highest in the Northeastern and Northwestern states as well as many of the Southern states and in Texas in the U.S.
- ◆ Prevalence was lowest in the Southern and Midwestern states.
- ◆ In 2009, Arkansas' prevalence for lifetime asthma among adults fell within the lowest quartile of U.S. states at 11.5%.

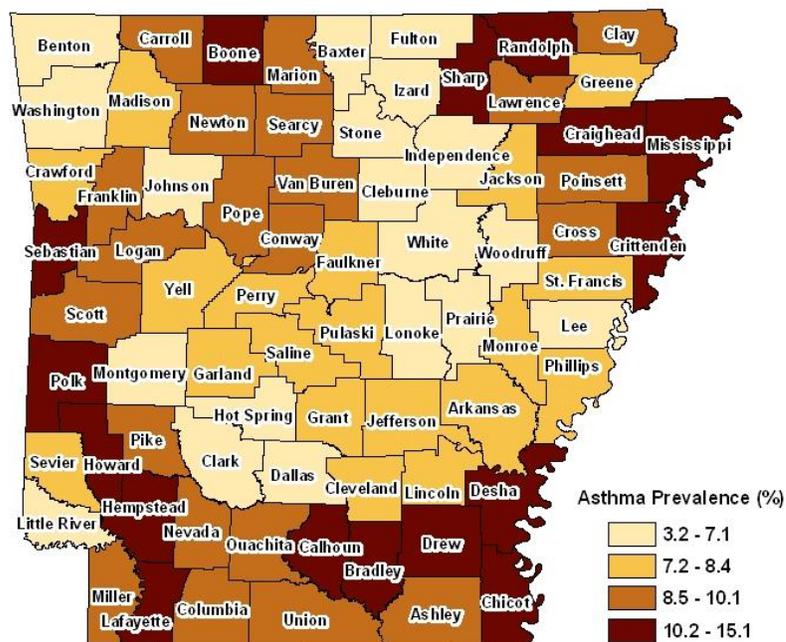
**Map 2. Estimated Prevalence of Current Asthma\*  
Among Adults (18+)  
United States, 2009**



\*Question: Have you ever been told by a doctor that you have asthma & still have asthma?  
Source: CDC Behavioral Risk Factor Surveillance System, 2009.

- ◆ The highest prevalence of current asthma is in the Northeast and Midwest states as well as Oregon, Arizona and Oklahoma.
- ◆ For the most part, lowest prevalence of current asthma is in the Southern and some of the North Plains states as well as California.
- ◆ Arkansas' prevalence for current asthma among adults fell within the lowest quartile at 7.6% in 2009.

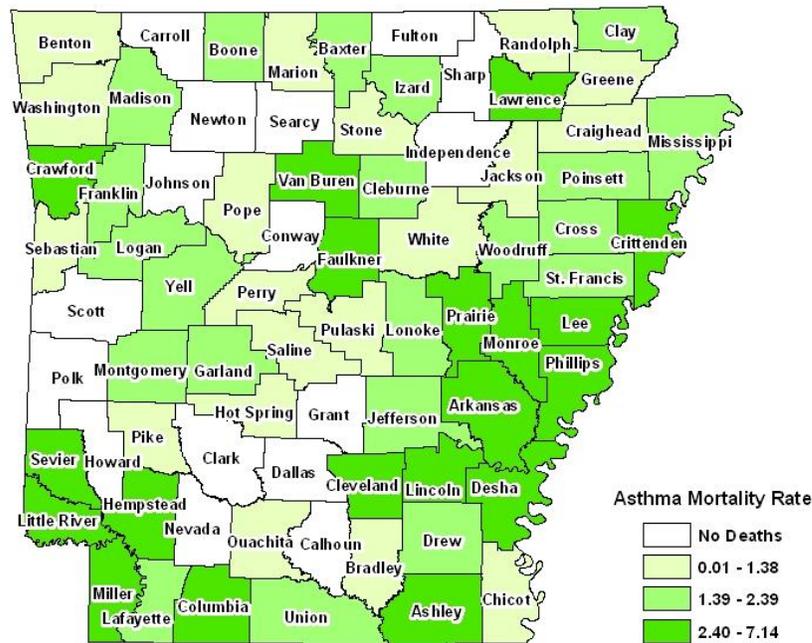
**Map 3. Estimated Prevalence of Current Asthma\*  
Among Adults (18+)  
Arkansas, 2008**



\*Question: Have you ever been told by a doctor that you have asthma & still have asthma?  
Source: CDC Behavioral Risk Factor Surveillance System, 2008.

- ◆ Counties in the Southeastern, Southwestern, and Northeastern part of the state (darker shades) have higher estimated prevalence of asthma among adults.
- ◆ The highest prevalence of asthma among adults was in Boone County at 15.1%.
- ◆ Counties in the Central, North Central and the Northwest (Benton, Washington) have the lowest rates.
- ◆ Baxter County had the lowest prevalence of asthma among adults at 3.2%.

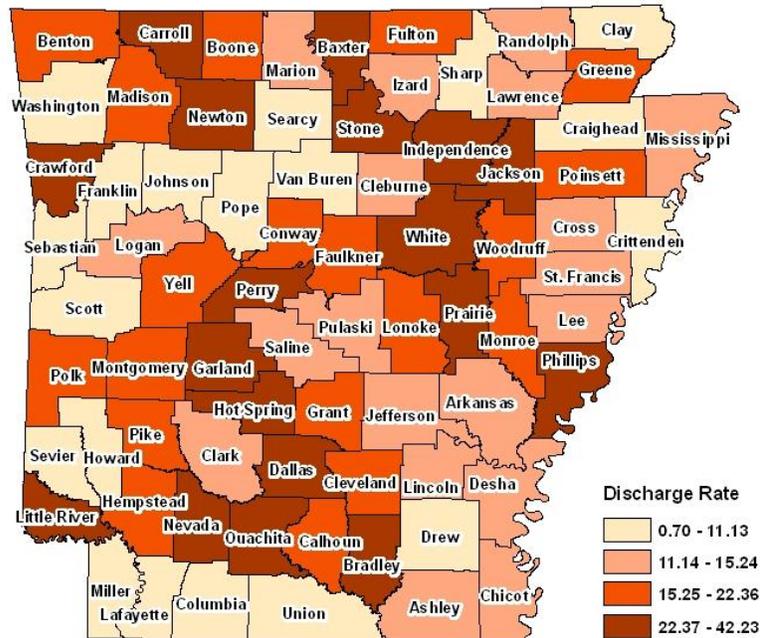
### Map 4. Age-Adjusted Asthma Mortality per 100,000 Population Arkansas, 2003-2007



Source: Arkansas Center for Health Statistics Query System 2003-2007.

- ◆ Statewide asthma accounted for less than one percent of all deaths to Arkansas residents in 2007. During the five-year period of 2003-2007, the age-adjusted mortality rate was 1.56 per 100,000 population.
- ◆ Miller County had the highest five-year age-adjusted asthma mortality rate at 7.14 per 100,000 population for Arkansas residents.
- ◆ Benton County had the lowest five-year age-adjusted asthma mortality rate at 0.2 per 100,000 population for Arkansas residents.
- ◆ Sixteen Arkansas counties had no deaths with asthma as the underlying cause of death during the five-year period.

## Map 5. Hospital Discharges for Pneumonia per 1,000 People with Asthma Arkansas, 2008

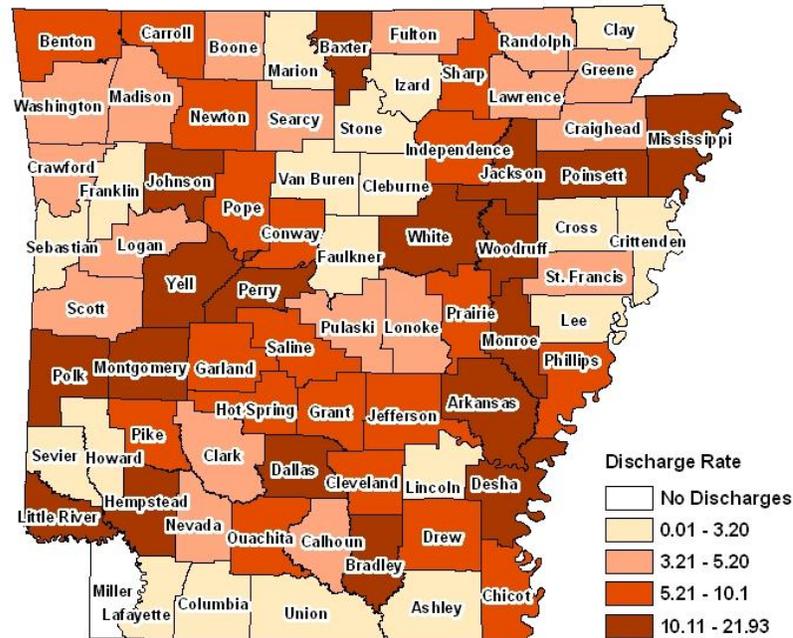


Source: Arkansas Center for Health Statistics Hospital Discharge System 2008.

- ◆ Pneumonia is an infection of one or both lungs which is usually caused by bacteria, viruses, or fungi.<sup>12</sup> Those with asthma are more susceptible to infections such as pneumonia.
- ◆ In 2008, there were a total of 2,744 Arkansas hospital discharges among people with any diagnosis of asthma and pneumonia. This translates to a crude rate of 15.4 per 1,000 people with asthma.
- ◆ Bradley County had the highest hospital discharge rate for pneumonia with asthma in the state at 42.2 per 1,000 people with asthma.

Note: Hospital discharge data are only available for hospitals within the State of Arkansas. Information is not available for those residents admitted to out-of-state hospitals (i.e., Texas receiving Miller County residents or Tennessee receiving Crittenden County residents).

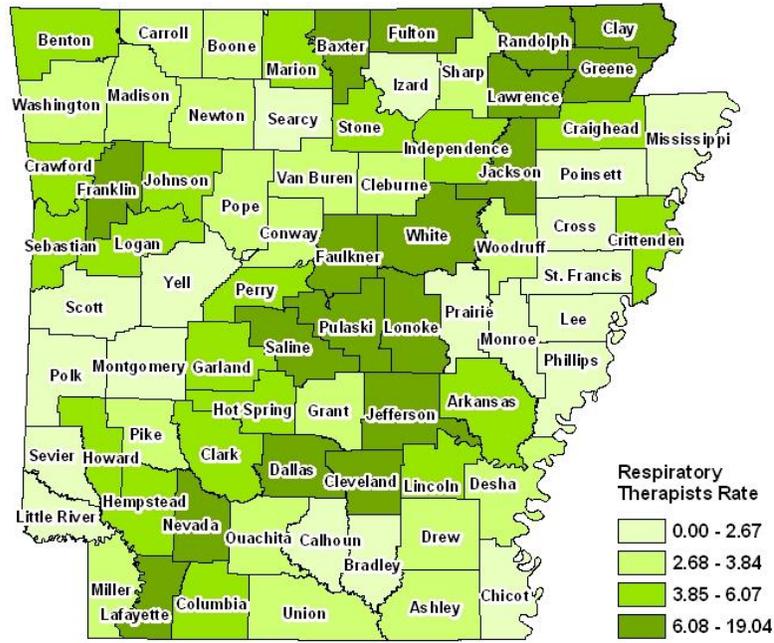
## Map 6. Hospital Discharges for Bronchitis & Acute Bronchitis per 1,000 People with Asthma Arkansas, 2008



Source: Arkansas Center for Health Statistics Hospital Discharge System 2008.

- ◆ Bronchitis is an inflammation of the lining of the bronchial tubes, which carry air to and from your lungs. Bronchitis may be either acute or chronic.<sup>13</sup> Repeated bouts of bronchitis may signal other conditions such as asthma.
- ◆ Acute bronchitis may be treated differently if you have a long-term lung disease, such as chronic obstructive pulmonary disease (COPD).<sup>14</sup>
- ◆ Little River County had the highest rate of hospital discharges for bronchitis & acute bronchitis at 21.93 per 1,000 people with asthma.
- ◆ There were no reported occurrences of bronchitis or acute bronchitis hospital discharges in Miller County for 2008. However, as noted earlier, out-of-state hospital discharges for Miller County are not available for analysis.

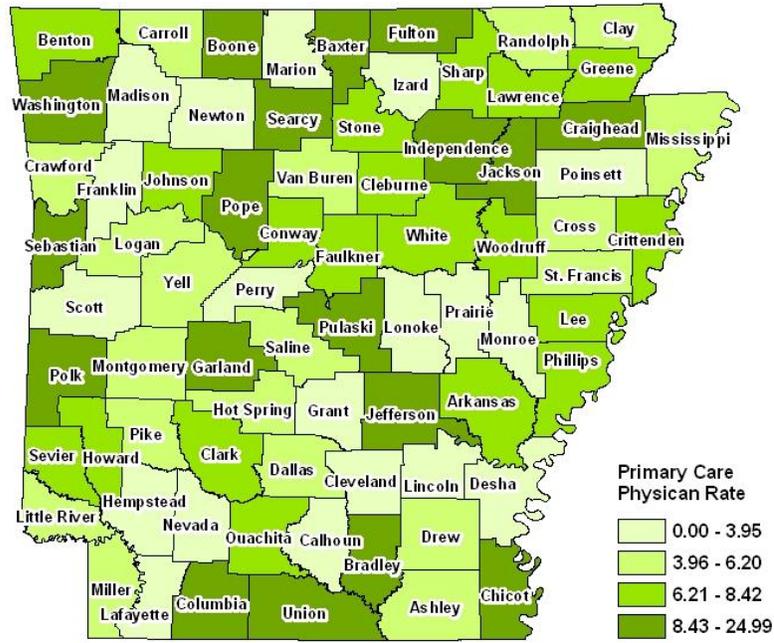
## Map 7. Distribution of Respiratory Therapists per 10,000 Population Arkansas, 2010



Source: Arkansas Center for Health Statistics Health Professions Manpower Assessment 2010.

- ◆ Respiratory therapists, also known as respiratory care practitioners, provide treatment, evaluation, monitoring and management of patients with breathing disorders or cardiovascular problems.<sup>15</sup>
- ◆ Care provided by respiratory therapists may include: administration of oxygen, cardiopulmonary resuscitation, management of mechanical ventilators, administering drugs to the lungs, monitoring cardiopulmonary systems and measuring lung function.<sup>18</sup>
- ◆ The majority of respiratory therapists are in Pulaski and Saline County, nearly one-third of the state total. Thus, the smaller counties in Arkansas are disproportionately affected in the provision of respiratory care for Arkansans with asthma and other lung conditions.

## Map 8. Distribution of Primary Care Physicians per 10,000 Population Arkansas, 2010



Source: Arkansas Center for Health Statistics Health Professions Manpower Assessment 2010

- ◆ Primary care physicians are generalist physicians whose practice is devoted to providing primary care services to a defined population of patients, serving as the entry point for all medical and health care needs.<sup>16</sup>
- ◆ The majority of primary care physicians within the state are in those counties that have large metropolitan areas.
- ◆ Pulaski County has a significantly higher proportion of primary care physicians than the majority of other counties in Arkansas. Thus, the smaller counties in Arkansas are disproportionately affected in the provision of primary health care.

## References

1. National Heart, Lung, and Blood Institute. (2007). Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. Bethesda, MD: National Institutes of Health.
2. Healthwise. (2009). The Four Types of Asthma. Retrieved August 2010 from <http://www.health.com/health/condition-article/print/0,,20287379,00.html>.
3. Asthma and Allergy Foundation of America. (N.D.). Asthma Facts and Figures. Retrieved August, 2010 from <http://www.aafa.org/display.cfm?id=8&sub=42>.
4. Akinbami, L.J., Moorman, J.E., Liu, X. (2011). Asthma prevalence, health care use, and mortality: United States, 2005-2009. National Health Statistics Reports, No 32. Hyattsville, MD: National Center for Health Statistics.
5. MayoClinic.Com. (2010). Asthma. Retrieved August 2010 from <http://www.mayoclinic.com/print/asthma/ds00021/method=print&dsection=all>.
6. National Center for Chronic Disease Prevention and Health Promotion. (2010). Health-Related Quality of Life. Retrieved August 2010 from <http://www.cdc.gov/hrqol>.
7. WebMD. (2009). Asthma in Children: Symptoms and Risk Factors. Retrieved August, 2010 from <http://www.webmd.com/asthma/children?print=true>.
8. Health Resources and Services Administration. (2008). The National Survey Of Children With Special Health Care Needs Chartbook 2005-2006. Retrieved August, 2010 from <http://mchb.hrsa.gov/cshcn05>.
9. American Lung Association. (2010). Asthma & Children Fact Sheet. Retrieved August, 2010 from <http://www.lungusa.org/lung-disease/asthma/resources/facts-and-figures/asthma-children-fact-sheet.html>.
10. Research and Program Services Division. (2010). Trends in Asthma Morbidity and Mortality. Washington, DC: American Lung Association.
11. Agency for Healthcare Research and Quality. (2009). Asthma Care Quality Improvement: A Resource Guide for State Action. Retrieved August 2010 from <http://www.ahrq.gov/qual/asthmacare>.
12. American Lung Association. (2010). Understanding Pneumonia. Retrieved August 2010 from <http://www.lungusa.org/lung-disease/pneumonia/understanding-pneumonia.html>.
13. MayoClinic.com. (2009). Bronchitis. Retrieved August 2010 from <http://www.mayoclinic.com/health/bronchitis/DS00031>.

- 
14. WebMD. (2007). Acute Bronchitis-Topic Overview. Retrieved August 2010 from <http://www.webmd.com/lung/tc/acute-bronchitis-topic-overview>.
  15. Mayo School of Health Sciences. (2003). Respiratory Care Career Overview. Retrieved August 2010 from <http://www.mayo.edu/mshs/resp-career.html>.
  16. American Academy of Family Physicians. (2009). Primary Care. Retrieved September 8, 2009 from <http://www.aafp.org/online/en/home/policy/policies/p/primarycare.html>.

# Methods

## **BRFSS**

The Arkansas Behavioral Risk Factor Surveillance System (BRFSS) data were analyzed to assess asthma prevalence, health behavior and self-management patterns among Arkansas adults. Arkansas BRFSS contracts with an outside agency to conduct the survey, using a Computer-Aided Telephone Interviewing System. Respondents are selected using a “Disproportionate Stratified Random Sampling” design using a two-stage process. First, a telephone number is randomly selected from listed and unlisted telephone numbers. Second, according to BRFSS protocol, when a residence is selected, a random household member (age 18 or older) is chosen for interview.

The BRFSS covers a wide range of health behaviors including health care access, hypertension and cholesterol awareness, physical activity, and dietary consumption, providing estimates of the prevalence of these risk factors for health status and disease. The Arkansas Center for Health Statistics obtains county-specific estimates by including responses from participants in adjacent counties. Using both the sample and actual population, the responses are adjusted so that age, race, and gender characteristics match those of the population for the county. The county specific prevalence estimates for health risk factors are weighted accordingly using the SAS® system.

## **NSCH**

The National Survey for Children’s Health (NSCH) is a national survey which provides a wealth of information on the health and well-being of children. It is collected in such a manner that comparisons can be made among states as well as for the United States in general. Telephone numbers are called at random to identify households with one or more children under 18 years old. In each household, one child was randomly selected to be the subject of the interview. All records have been weighted to represent all non-institutionalized 0-17 year old children in each state and the United States. The Maternal and Child Health Bureau is the principal funding source for the survey. The National Center for Health Statistics of the Centers for Disease Control and Prevention has primary responsibility for oversight of the sampling and the telephone interviews for the survey.

## **YRBSS**

The Youth Risk Behavior Surveillance System (YRBSS) monitors six categories of priority health-risk behaviors among youth and young adults: 1) behaviors that contribute to unintentional injuries and violence; 2) tobacco use; 3) alcohol and other drug use; 4) sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases (STDs), including human immunodeficiency virus (HIV) infection; 5) unhealthy dietary behaviors; and 6) physical inactivity. In addition, YRBSS monitors the prevalence of obesity and asthma. YRBSS includes a national school-based Youth Risk Behavior Survey (YRBS) conducted by CDC and state and local school-based YRBSs conducted by state and local education and health agencies.

Each state and local school-based survey used a two-stage cluster sample design to produce a representative sample of public school students in grades 9-12 in their jurisdiction. In the first

sampling stage, schools with any of grades 9–12 were sampled with probability proportional to school enrollment size in 40 states and six cities; all schools with any of grades 9–12 were sampled in two states and 14 cities. In the second sampling stage, in 41 states and 20 cities, intact classes from either a required subject (e.g., English or social studies) or a required period (e.g., homeroom or second period) were sampled randomly, and all students in the sampled classes were eligible to participate. In one state, all students in sampled schools were eligible to participate.

### **YTS**

The Youth Tobacco Survey (YTS) is a representative sample of all regular public middle (grades 6-8) and high school (grades 9-12) students in the state. The YTS uses a two-stage cluster sampling design to select a representative sample of public school students. There were two sampling frames; one for middle schools and one for high schools. At the first sampling stage schools were selected with probability proportional to enrollment size. The second stage of the sampling involved systematic equal probability sampling of classes from participating schools. All second period classes in selected schools were included in the sampling frames. All students enrolled in selected classes were eligible to participate in the survey.

### **Hospitalizations**

Hospitalization data were obtained from the Arkansas Center for Health Statistics Hospital Discharge System. These data contain discharge information for Arkansas hospitals only. Information from out-of-state hospitals is not collected. The ICD-9 Clinical Modification was used for determining primary and secondary diagnosis of asthma as well as for determining other co-morbidity and complications of asthma. These data were analyzed using the SAS® system Version 9.2.

### **Mortality**

Age-adjusted mortality rates from 1999 through 2007 were obtained from CDC WONDER for U.S. rates and Arkansas Center for Health Statistics Query System for Arkansas rates. International Classification of Diseases 10th Revision Codes (J45-J46) were used. The U.S. 2000 projected population was used as the standard population. Age-specific mortality rates for Arkansas in 2007 were also obtained from the Arkansas Center for Health Statistics Query System.

### **Other Sources**

Information on emergency department visits was obtained from the Agency for Healthcare Research and Quality HCUP Nationwide Emergency Department Sample. Data on Arkansas health professionals were obtained from the Arkansas Center for Health Statistics, Health Professions Manpower Assessment. Aggregate counts by county were provided for primary care physicians and respiratory therapists. The U.S. Census Bureau was used to obtain demographics for the State of Arkansas.

### **Limitations of the data presented in the report**

Although expanded from the 2003 report, particularly depicting the plight of children with asthma and patterns of hospitalization attributable to asthma more than in the past, this report has limitations. There was some missing data, though very little, in each of the datasets used in



report analyses. Surveys were used for prevalence estimates and are subject to sampling error, and sometimes provided small numbers of participants by characteristic, resulting in large relative standard errors. Due to small numbers, we have not reported data for certain categories of variables in study tables. In addition, categories for certain variables, such as race and ethnicity, were defined differently across data sources.

It must be noted that in 1999, a new cause-of-death coding scheme was implemented in the form of ICD-10 (International Classification of Diseases) codes. Before 1999, the ICD-9 classification was used. There are differences in mortality rates between the two codes. In this document, however, no adjustments have been made in mortality rates with respect to ICD-9 and ICD-10 codes.

## Healthy People 2020 Objectives-Respiratory Diseases

Number	Objective Topic Area
RD-1	Reduce asthma deaths. 1.1 Children and adults under age 35 years. 1.2 Adults aged 35 to 64 years old. 1.3 Adults aged 65 years and older.
RD-2	Reduce hospitalizations for asthma. 2.1 Children under age 5 years. 2.2 Children and adults aged 5 to 64 years. 2.3 Adults aged 65 years and older.
RD-3	Reduce hospital emergency department visits for asthma. 3.1 Children under age 5 years. 3.2 Children and adults aged 5 to 64 years. 3.3 Adults aged 65 years and older.
RD-4	Reduce activity limitations among persons with current asthma.
RD-5	Reduce the number of school- or workdays missed among persons with current asthma. 5.1 Reduce the proportion of children aged 5 to 17 years with asthma who miss school days. 5.2 Reduce the proportion of adults aged 18 to 64 years with asthma who miss work days.
RD-6	Increase the proportion of persons with current asthma who receive formal patient education.
RD-7	Increase the proportion of persons with current asthma who receive appropriate asthma care according to National Asthma Education and Prevention Program (NAEPP) guidelines. 7.1 Persons with current asthma who receive written asthma management plans from their health care provider. 7.2 Persons with current asthma with prescribed inhalers who receive instruction on their use. 7.3 Persons with current asthma who receive education about appropriate response to an asthma episode, including recognizing early signs and symptoms or monitoring peak flow results. 7.4 Increase the proportion of persons with current asthma who do not use more than one canister of short-acting inhaled beta agonist per month. 7.5 Persons with current asthma who have been advised by a health professional to change things in their home, school, and work environments to reduce exposure to irritants or allergens to which they are sensitive. 7.6 (Developmental) Persons with current asthma who have had at least one routine follow-up visit in the past 12 months. 7.7 (Developmental) Persons with current asthma whose doctor assessed their asthma control in the past 12 months. 7.8 (Developmental) Adults with current asthma who have discussed with a doctor or other health professional whether their asthma was work related.
RD-8	Increase the numbers of States, Territories, and the District of Columbia with a comprehensive asthma surveillance system for tracking asthma cases, illness, and disability at the State level.
RD-9	Reduce activity limitations among adults with chronic obstructive pulmonary disease (COPD).
RD-10	Reduce deaths from chronic obstructive pulmonary disease (COPD) among adults.
RD-11	Reduce hospitalizations for chronic obstructive pulmonary disease (COPD).
RD-12	Reduce hospital emergency department visits for chronic obstructive pulmonary disease (COPD).
RD-13	(Developmental) Increase the proportion of adults with abnormal lung function whose underlying obstructive disease has been diagnosed.

Source: U.S. Department of Health & Human Services, Healthy People 2020

# Asthma Control Recommendations

Asthma can be controlled with medication as prescribed by a physician and by following an asthma management plan. It is recommended that anyone with asthma take medication as suggested by a doctor, watch for signs that asthma is worsening and acting quickly to stop the attack, stay away from things that can bother your asthma, ask your doctor about any concerns you have about asthma, visit your doctor at least every six months, and test for allergies if asthma is persistent.

## **To achieve control of asthma, the following sequence of activities is recommended:**

- For patients who are not already taking long-term control medications, assess asthma severity and initiate therapy according to the level of severity.
- For patients who are already taking long-term control medications, assess asthma control and step up therapy if the patient's asthma is not well controlled on current therapy. Before stepping up, review the patient's adherence to medications, inhaler technique, and environmental control measures.
- Evaluate asthma control in 2–6 weeks (depending on level of initial severity or control):
  - In general, classify the level of asthma control by the most severe indicator of impairment or risk.
  - The risk domain is usually more strongly associated with morbidity in young children than the impairment domain because young children are often symptom free between exacerbations.
  - If office spirometry suggests worse control than other measures of impairment, consider fixed obstruction and reassess the other measures. If fixed obstruction does not explain the lack of control, step up therapy, because low FEV<sub>1</sub> is a predictor of exacerbations.
  - If the history of exacerbations suggests poorer control than assessment of impairment, reassess impairment measures, and consider a step up in therapy. Review plans for handling exacerbations and include the use of oral systemic corticosteroids, especially for patients who have a history of severe exacerbations.
- If asthma control is not achieved with the above actions:
  - Review the patient's adherence to medications, inhaler technique, environmental control measures (or whether there are new exposures), and management of co-morbid conditions.
  - If adherence and environment control measures are adequate, then step up one step (if not well controlled) or two steps (if very poorly controlled).
  - If an alternative treatment was used initially, discontinue its use and use the preferred treatment option before stepping up therapy.
  - A short course of oral systemic corticosteroids may be considered to gain more rapid control for patients whose asthma frequently interrupts sleep or normal daily activities or who are experiencing an exacerbation at the time of assessment.
  - If lack of control persists, consider alternative diagnoses before stepping up further.
  - If the patient experiences side effects, consider different treatment options.

**To maintain control of asthma, regular follow-up contact is essential because asthma often varies over time:**

- Schedule patient contact at 1- to 6-month intervals; the interval will depend on such factors as the level or duration of asthma control and the level of treatment required.
- Consider a step down in therapy once asthma is well controlled for at least 3 months. A step down is necessary to identify the minimum therapy required to maintain good control. A reduction in therapy should be gradual and must be closely monitored. Studies are limited in guiding therapy reduction. In general, the dose of ICS may be reduced 25 percent to 50 percent every 3 months to the lowest possible dose.
- Consider seasonal periods of daily long-term control therapy for patients who have asthma symptoms only in relation to certain seasons (e.g., seasonal pollens, allergens, or viral respiratory infections) and who have intermittent asthma the rest of the year. This approach has not been rigorously evaluated; close monitoring for 2–6 weeks after therapy is discontinued is essential to assure sustained asthma control.

Source: National Heart, Lung, and Blood Institute.

# Arkansas Demographics, 2009

**Total Population** 2,889,450

## Gender

Male 49.0%  
Female 51.0%

**Median Age** 36.9

## Age Distribution

Under 18 24.7%  
18-24 9.6%  
25-44 26.5%  
45-64 25.2%  
65 & Over 14.0%

## Race/Ethnicity

White 80.6%  
Black/African American 15.8%  
Hispanic American\* 6.0%  
Asian American 1.2%  
Native American/Alaskan Native 0.9%  
Native Hawaiian/Pacific Islander 0.1%

## Educational Attainment (25 years & over)

Less than High school 18.6%  
High School Graduate 35.4%  
Some College 21.4%  
Associate/Bachelor's Degree 18.2%  
Graduate/Professional Degree 6.3%

**Median Household Income** \$38,820.00

## Percent Below Poverty

People Age 65 & over 12%  
Related Children Under 18 25%  
All Families 14%  
Female Householder Families 40%

\*Hispanics may be of any race and are included in applicable race categories.

Source: U.S. Census Bureau

## Certified Asthma Educators (AE-C) in Arkansas, 2011

First	Last	City	State	Zip	Credentials
Rena	Barker	Maumelle	Arkansas	72113	RRT, CRT
Jenny	Bartlett	Heber Springs	Arkansas	72543	RRT, CRT
Susan	Caffey	Little Rock	Arkansas	72212	RN, LPN
Patsy	Calamese	Little Rock	Arkansas	72223	RN, LPN
Pamela	Chrisco	Bentonville	Arkansas	72712	RN, LPN, NP
Gary	Davis	Stuttgart	Arkansas	72160	RRT, CRT
Linda	Ehemann	Little Rock	Arkansas	72207	RN, LPN, NP
Scott	Gee	Little Rock	Arkansas	72202	PA-C
Laura	Hampton	Bay	Arkansas	72411	RRT, CRT
James Michael	Ingram	Little Rock	Arkansas		
Dana	Luper	Little Rock	Arkansas		RRT, CRT
Linda	Mallory	Marion	Arkansas	72364	RRT, CRT
Holly	McDonald	Pine Bluff	Arkansas	71603	RRT, CRT
Anna	Murphy	North Little Rock	Arkansas	72116	RN, LPN, NP
Annette	Peas	North Little Rock	Arkansas	72120	RRT, CRT
Angela	Sanders	Benton	Arkansas	72015	RRT, CRT
Candace	Sanders	Little Rock	Arkansas		RRT, CRT
Micheal	Turner	North Little Rock	Arkansas	72116	CPFT, RPFT
Rita Anne	Williams	Little Rock	Arkansas	72211	RN, LPN, NP
Mary Ann	Winter-Herring	Humphrey	Arkansas	72073	RRT, CRT

Source: National Asthma Educator Certification Board.

## Glossary

**Activity Limitation** – Percentage of adults who answered “yes” to the question, “are you limited in any activities because of physical, mental, or emotional problems?”

**Airway Hyperresponsiveness** – An exaggerated airway narrowing in response to a particular variety of stimuli, such as stress, exercise or environmental agent.

**Age-adjusted Mortality Rate** – A statistical technique for calculating mortality rates that allows for the direct comparison of mortality rates between populations with different age distributions.

**Age-specific Mortality Rate** – A mortality rate limited to a particular age group, in which the numerator is the number of deaths in that age group, and the denominator is the number of persons in that age group in the population.

**Atopic Dermatitis** – A chronic eruption of red patches accompanied by intense itching that usually begins in infancy but may continue into adult life.

**Asthma Episode/Attack** – An asthma episode or attack occurs when a person’s airways are reacting to asthma triggers. During an attack, more mucus is produced and clogs the airways. The airways swell and their muscles tighten, causing the openings to narrow. Both of these things – narrowed airways and increased mucus production – make breathing more difficult.

**Bacterial Infection** – Occurs when harmful bacteria enter your body or existing bacteria have an opportunity to increase significantly in number.

**Body Mass Index (BMI)** – Surrogate measure of body fatness expressed as weight (measured in kilograms) divided by height (measured in meters) squared.

**Bronchodilator** – A drug that widens the air passages of the lungs and eases breathing by relaxing bronchial smooth muscle.

**Children with Special Health Care Needs (CSHCN)** – Children who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.

**Chronic Obstructive Asthma** – Condition where there is chronic obstruction of the flow of air through the airways and out of the lungs, and the obstruction generally is permanent and may be progressive over time.

**Current Asthma** - Person who has ever been told by a medical professional that they have asthma and still have asthma.

**Current Smoker (Adult)** – Adults who reported they had smoked at least 100 cigarettes in their life and smoked everyday or some days.

**Current Smoker (Youth)** – High school students who reported they had smoked cigarettes on one or more days in the past 30 days.

**Diagnosed Diabetes** – Person with diabetes that has been determined by medical examination to have diabetes.

**Elective Admission** – The patient’s condition permits adequate time to schedule the availability of a suitable accommodation.

**Emergency Admission** – The patient requires immediate medical intervention as a result of severe, life threatening or potentially disabling conditions.

**Extrinsic Asthma** – Type of asthma that is triggered by exposure to an allergen. Extrinsic asthma involves constriction and inflammation of the airways in response to exposure to the allergen.

**Hay Fever** – An allergic condition affecting the mucous membranes of the upper respiratory tract and the eyes, most often characterized by nasal discharge, sneezing, and itchy, watery eyes and usually caused by an abnormal sensitivity to airborne pollen.

**Health Related Quality of Life** – Refers to a person's perceived physical and mental health over time.

**Healthy Weight** – Percentage of children who were healthy weight (i.e.,  $\geq 5^{\text{th}}$  percentile but less than  $85^{\text{th}}$  percentile for body mass index, by age and sex, based on reference data).

**Influenza Shot** – An inactivated vaccine (containing killed virus) that is given with a needle, usually in the arm. The flu shot is approved for use in people older than 6 months, including healthy people and people with chronic medical conditions.

**Intrinsic Asthma** – Type of asthma where inflammation and constriction of the airways is not caused by exposure to an allergen.

**Lifetime Asthma** – Persons who have ever been told they have asthma by a medical professional.

**Lung Function Tests (pulmonary function tests)** – Evaluate how well your lungs work. The tests determine how much air your lungs can hold, how quickly you can move air in and out of your lungs, and how well your lungs put oxygen into and remove carbon dioxide from your blood.

**Mentally Unhealthy** – Percentage of adults reporting mental health not good for 14 or more days in the past 30 days.

**Obese (Adult)** – Percentage of adults with Body Mass Index greater than or equal to 30.0.

**Obese (Youth)** – Percentage of children who were obese (i.e.,  $\geq 95^{\text{th}}$  percentile for body mass index, by age and sex, based on reference data).

**Oral Systemic Corticosteroids** – The medical term for a steroid medicine taken by mouth that has an effect on the whole body (systemic, or system-wide).

**Overweight (Adult)** – Percentage of adults with Body Mass Index greater than or equal to 25.0 but less than 30.0.

**Overweight (Youth)** – Percentage of children who were overweight (i.e.,  $\geq 85^{\text{th}}$  percentile but  $< 95^{\text{th}}$  percentile for body mass index, by age and sex, based on reference data).

**Peak Expiratory Flow (PEF)** – Lung function test that measures how quickly you can exhale.

**Physically Unhealthy** – Percentage of adults reporting physical health not good for 14 or more days in the past 30 days.

**Pneumonia Shot** – Given to prevent one specific type of pneumonia, the pneumonia caused by the Pneumococcus (*Streptococcus pneumoniae*) bacterium.

**Poverty Level** – The minimum amount of income that a family needs for food, clothing, transportation, shelter and other necessities. In the United States, this level is determined by the Department of Health and Human Services. The Federal Poverty Level varies according to family size.

**Prevalence** – The percent (proportion) of a population that has a disease or a risk factor at a given point in time.

**Risk Factor** – Characteristic or behavior that is consistently associated with increased probability of disease or event.

**Secondhand Smoke (SHS)** – Also called environmental tobacco smoke (ETS), is the inhalation of smoke from tobacco products used by others.

**Spirometry** – The measuring of breath; the most common of the Pulmonary Function Tests (PFTs), measuring lung function, specifically the measurement of the amount (volume) and/or speed (flow) of air that can be inhaled and exhaled.

**Status Asthmaticus** – a long-lasting and severe asthma episode that does not respond to standard treatment. It occurs when asthma symptoms - difficulty breathing, wheezing, and coughing - fail to improve with emergency medication treatment.

**Underinsured (inadequate insurance)** – Refers to persons who have some form of health insurance, but lack the financial protection needed to cover out-of-pocket medical care expenses.



**Underlying Cause of Death** – Disease or injury that initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence that produced the fatal injury.

**Underweight** – Percentage of children who were underweight (i.e., <5<sup>th</sup> percentile for body mass index, by age and sex, based on reference data).

**Uninsured** – Refers to those persons who do not have health insurance coverage.

**Urgent Admission** – The patient requires immediate attention for the care and treatment of a physical or mental disorder.

**Viral Infection** – Infection caused by the presence of a virus in the body.