

**2009**  
**PENNSYLVANIA**

# THE 2009 ASTHMA BURDEN REPORT

Age Group	2006			2007		
	Percent	95% CI*	USA	Percent	95% CI*	USA
0-4	13	10-14	14	15	13-17	13
5-9	15	12-18	16	16	13-19	15
10-14	11	7-13	11	14	11-17	11
15-19	9	8-17	8	10	7-15	8
20-24	14	11-17	16	16	13-19	15
25-29	13	9-14	15	18	14-22	15
30-34	12	8-15	15	17	11-24	15
35-39	13	11-17	16	17	11-24	15
40-44	13	11-17	16	17	11-24	15
45-49	13	11-17	16	17	11-24	15
50-54	13	11-17	16	17	11-24	15
55-59	13	11-17	16	17	11-24	15
60-64	13	11-17	16	17	11-24	15
65-69	13	11-17	16	17	11-24	15
70-74	13	11-17	16	17	11-24	15
75-79	13	11-17	16	17	11-24	15
80-84	13	11-17	16	17	11-24	15
85-89	13	11-17	16	17	11-24	15
90-94	13	11-17	16	17	11-24	15
95-99	13	11-17	16	17	11-24	15
Total	13	10-14	14	15	13-17	13



**pennsylvania**  
DEPARTMENT OF HEALTH

**ASTHMA CONTROL PROGRAM**  
**PENNSYLVANIA ASTHMA SURVEILLANCE SYSTEM**



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# INTRODUCTION

Asthma is a pulmonary disease that results from oversensitivity of the airways in the lungs, causing the airways to narrow and clog in response to irritants. The cause or causes of asthma are not well understood and likely differ among individuals. Heredity and environmental exposures such as pollen, dust, animal dander, industrial chemicals, viral infections, changes in the weather, exercise, emotional stress, etc., all play a role. Asthma is a chronic and potentially serious respiratory disease that, if not treated, can cause permanent lung damage, disability and even death.

In 2003, the Bureau of Health Promotion and Risk Reduction of the Pennsylvania Department of Health (PA DOH) received funding from the Centers for Disease Control and Prevention (CDC) to address the burden of asthma in Pennsylvania. In 2006, the grant was renewed for three years, and in the same year, Pennsylvania Asthma Strategic Plan was implemented.

The 2006 Pennsylvania Asthma Burden Report was produced as an initial effort to systematize available data on the burden of asthma. In 2007, the Pennsylvania Asthma Focus Report was produced, containing measures of asthma management and control in the state of Pennsylvania. In 2008, the Asthma Hospitalization Report was generated, describing the burden of asthma hospitalization for 2003-2006 on the people of Pennsylvania.

The 2009 Asthma Burden Report provides information about the prevalence of asthma among children and adults, asthma hospitalizations (including the Medicaid population), mortality and the cost of asthma. Data about the mortality and morbidity of asthma in Pennsylvania were compared to the Healthy People 2010 objectives where applicable. This report also provides information state-wide and at health district and county levels (where appropriate) to assist public health programs and policy makers in designing solutions for the reduction of the burden of asthma in Pennsylvania.

Based on age (age group), gender, race, ethnicity and socioeconomic status, Pennsylvania asthma surveillance data help to identify populations where the burden of asthma in the state is particularly high. Forming strong collaborations and partnerships with key asthma stakeholders around the state has been one of the program's greatest priorities over the past few years.

The Asthma Burden Reports are the most comprehensive sources of information about asthma in Pennsylvania. The 2009 Asthma Burden Report will be used mainly for the Asthma Education and Prevention Program, and for guidelines to implement interventions that address asthma in this state.

Overall, many of the measures of the burden of asthma have improved since the 2006 report. Rates of asthma hospitalization and mortality have declined. However, there is still much work to be done in order to continue improving the quality of life for asthma sufferers.

# SECTION 1: Asthma Prevalence

The prevalence of asthma is defined as the total number of individuals with asthma in the population at a given time, or the total number of individuals with asthma in the population divided by the number of individuals in the population. It is used as an estimate of how common asthma is within a population at a specific point in time. It helps health professionals understand the probability of asthma and describes the asthma burden on a given population. The Pennsylvania Behavioral Risk Factor Surveillance System (PA BRFSS) provides the Pennsylvania Asthma Program with lifetime and current asthma prevalence data.

The BRFSS is the world's largest, on-going telephone health survey system, tracking health conditions and risk behaviors in the United States yearly since 1984. The Pennsylvania Behavioral Risk Factor Surveillance System (PA BRFSS) is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices and health care access primarily related to chronic disease and injury.

The BRFSS is the only available source for the Pennsylvania Asthma Program of timely, accurate asthma prevalence data. The 2009 Asthma Burden Report provides asthma data and analyses for 2003-2007. The 95% confidence intervals (CI) for these prevalence estimates are provided. Estimates are considered "significantly higher or lower" when CIs did not overlap each other.

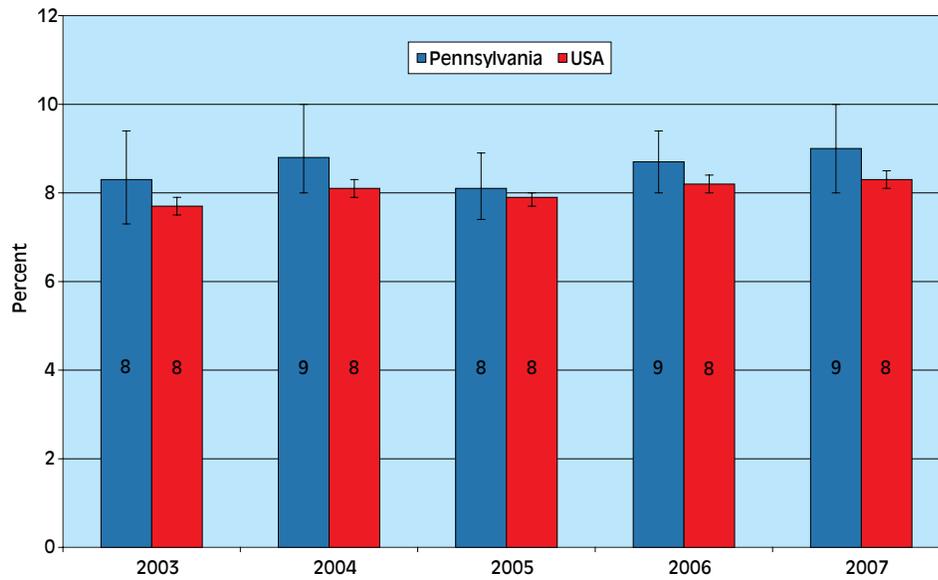
The BRFSS as the source of asthma data consists of three parts. The first is a standard set of two asthma questions regarding asthma prevalence among adults. The second part asks questions about adult and child asthma history. The third part is the Asthma Call Back Survey, which provides more detailed information on treatment and health status

Data were collected by telephone interviews each year, and then weighted. A sample of telephone numbers was selected using a list-assisted, random-digit dialed methodology. From this survey, the prevalence of asthma can be determined for adults (18+) and children (0-17). Data for children were based on information provided by an adult respondent about children living at home. Due to small sample size, descriptive information regarding children is limited, and estimated prevalence of asthma for smaller geographical areas is not considered reliable.

The BRFSS has a certain number of limitations. Only non-institutionalized adults with home telephones were included in the survey. Institutionalized adults, adults in the military service and adults without land line telephones were not included in the survey population. The BRFSS data are self-reported and cannot be verified.

Asthma BRFSS and hospitalization data provide valuable information about the financial costs of asthma, as well as the impacts on personal health associated with the disease. Mortality data also provide an important indicator of the need for more effective asthma prevention and control that is still required to save lives.

**Figure 1-1:** Prevalence of Current Asthma Among Adults (18+), Pennsylvania vs. USA, 2003-2007 BRFSS

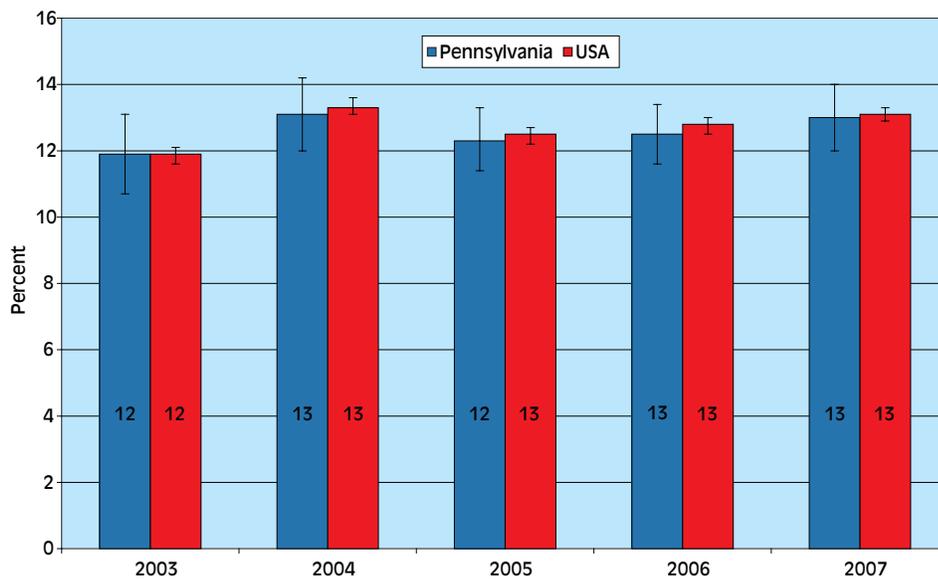


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS) and 2003-2007 National Health Interview Survey (NHIS). Prevalence rates are presented with 95% Confidence Intervals.

During the five-year period of 2003-2007, the annual prevalence estimate of current asthma among adults in Pennsylvania remained fairly stable, ranging from a low of 8 percent in 2005 to a high of 9 percent in 2007. In general, the prevalence of current asthma among adults in Pennsylvania was somewhat higher than the U.S. prevalence for each year. However, there were no statistically significant differences to indicate any real change in the prevalence of asthma among adults in Pennsylvania between 2003 and 2007. In addition, there were no significant differences in the estimated annual prevalence for Pennsylvania compared to the United States.



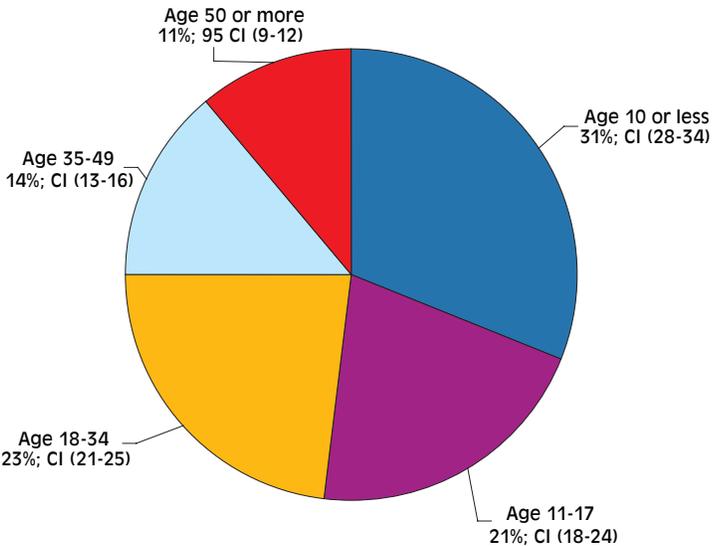
**Figure 1-2:** Prevalence of Lifetime Asthma Among Adults (18+), Pennsylvania vs. USA, 2003-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS) and 2003-2007 National Health Interview Survey (NHIS). Prevalence rates are presented with 95% Confidence Intervals.

The estimated prevalence of lifetime asthma among adults in Pennsylvania for 2003-2007 was slightly lower than for the U.S. each year, with the exception of 2003. The highest estimated prevalence of lifetime asthma among adults in Pennsylvania was in 2007 (13 percent) and the lowest was in 2003 (12 percent). There were no statistically significant differences between the Pennsylvania and U.S. estimates.

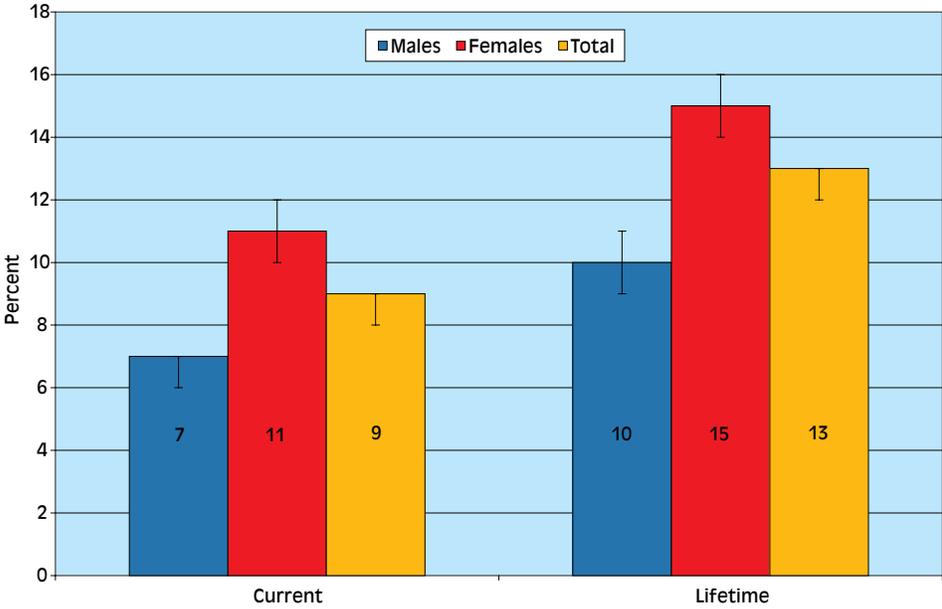
**Figure 1-3:** Age at Which the Respondent was First Diagnosed with Asthma, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence intervals.

According to 2005-2007 BRFSS data, approximately 52 percent of adults reported that they were first diagnosed with asthma when they were under 18 years of age. Another 23 percent reported first diagnosis at ages 18-34. First diagnosis at age 50 or older occurred among only 11 percent of adults.

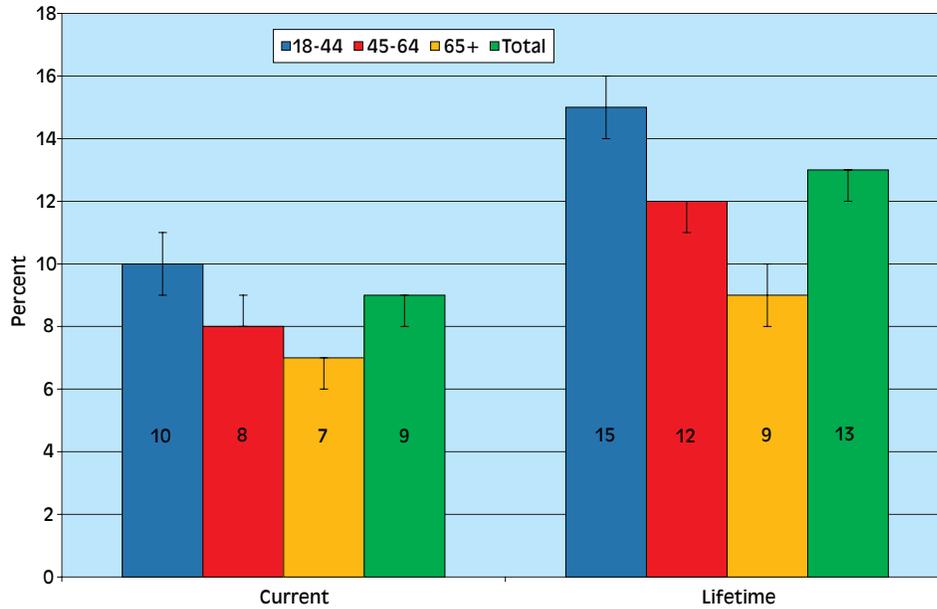
**Figure 1-4:** Prevalence of Current and Lifetime Asthma Among Adults (18+) by Gender, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

According to 2005-2007 BRFSS data, significantly higher percentages of adult females reported that they had current or lifetime asthma than adult males (11 percent of females and 7 percent of males for current asthma; 15 percent of females and 10 percent of males for lifetime asthma).

**Figure 1-5:** Prevalence of Current and Lifetime Asthma Among Adults (18+) by Age Group, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

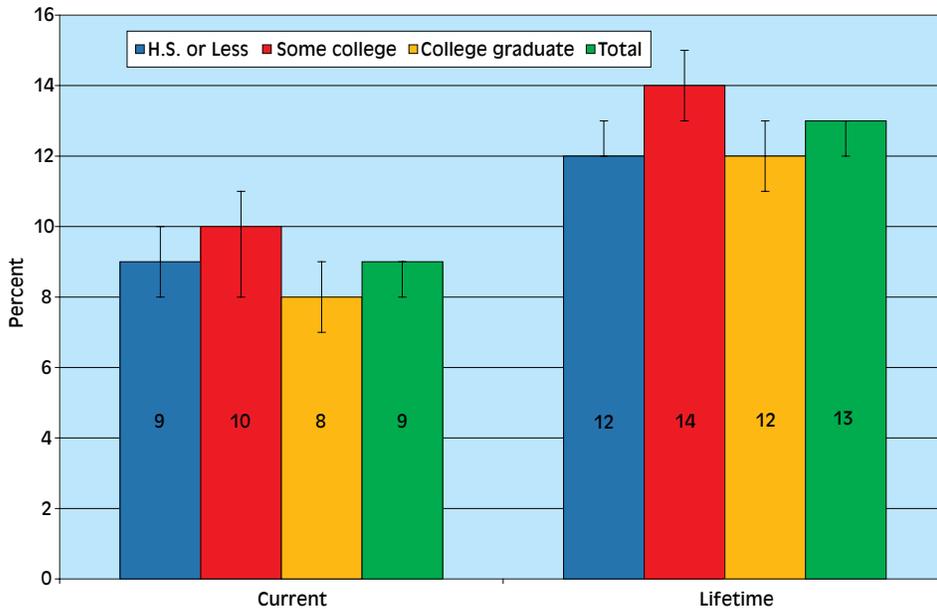
#### Current Asthma by Age Group

The age group 18-44 had a significantly higher prevalence of current asthma than either of the other two age groups – 10 percent, compared to 8 percent for those ages 45-64 and 7 percent for adults aged 65+ during the three-year period of 2005-2007.

#### Lifetime Asthma by Age Group

The age groups 18-44 and 45-64 had a significantly higher prevalence of lifetime asthma (15 percent and 12 percent, respectively) compared to those aged 65+ (9 percent) for the period of 2005-2007. The youngest age group of 18-44 also had a significantly higher prevalence than those aged 45-64.

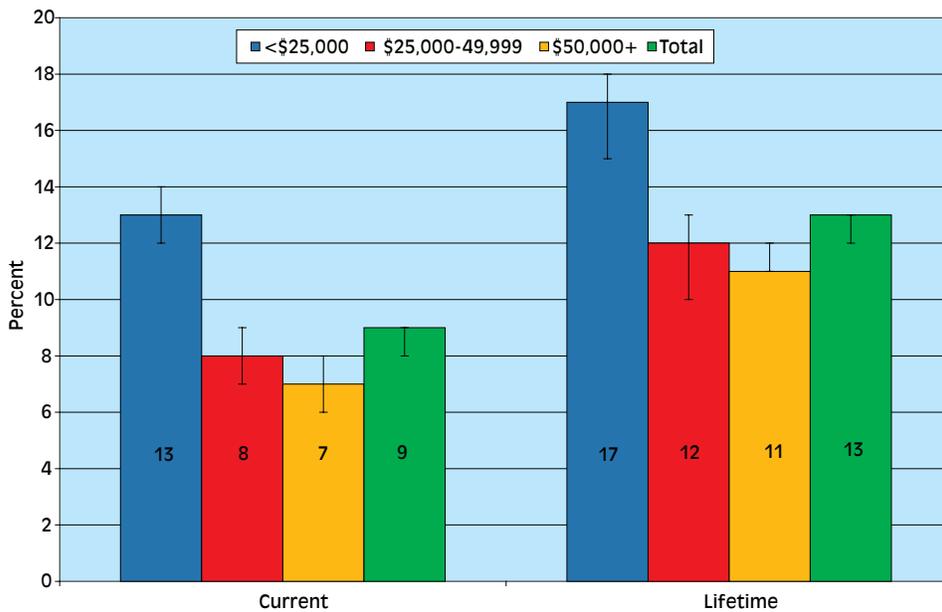
**Figure 1-6:** Prevalence of Current and Lifetime Asthma Among Adults (18+) by Educational Level, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

During 2005-2007, the prevalence of current and lifetime asthma among adults in Pennsylvania varied somewhat by reported educational attainment, although there were no significant differences between these groups. However, the prevalence of lifetime asthma was higher among adults who reported that they had some college education and who had graduated from college.

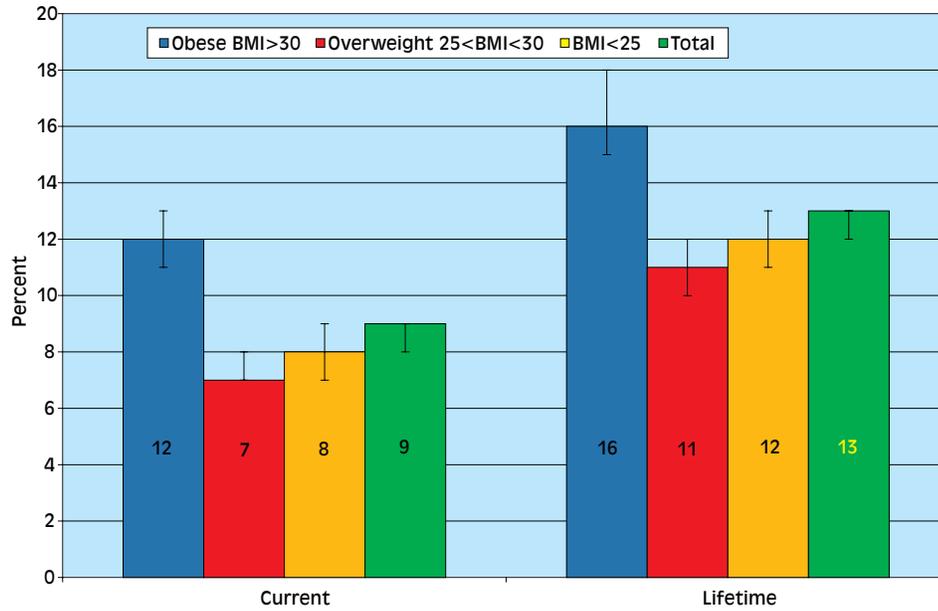
**Figure 1-7:** Prevalence of Current and Lifetime Asthma Among Adults (18+) by Household Income Level, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

Overall, the prevalence of current and lifetime asthma among adults in Pennsylvania decreased with increasing household income. In 2005-2007, the prevalence of asthma was significantly higher in adults whose household annually earned less than \$25,000 than in adults with household annual incomes of \$25,000 or more.

**Figure 1-8:** Prevalence of Current and Lifetime Asthma Among Adults (18+) by Body Mass Index Level, Pennsylvania 2005-2007 BRFSS

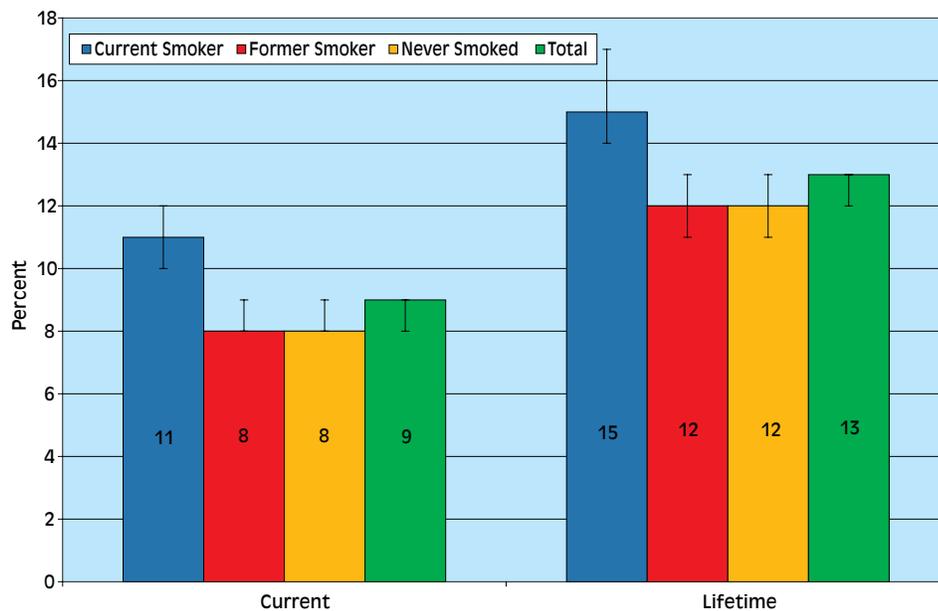


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

In 2005-2007, the prevalence of current and lifetime asthma was significantly higher for adults who are obese (12 percent current and 16 percent lifetime) compared to those who were overweight (25 < BMI < 30) or non-overweight (BMI < 25).



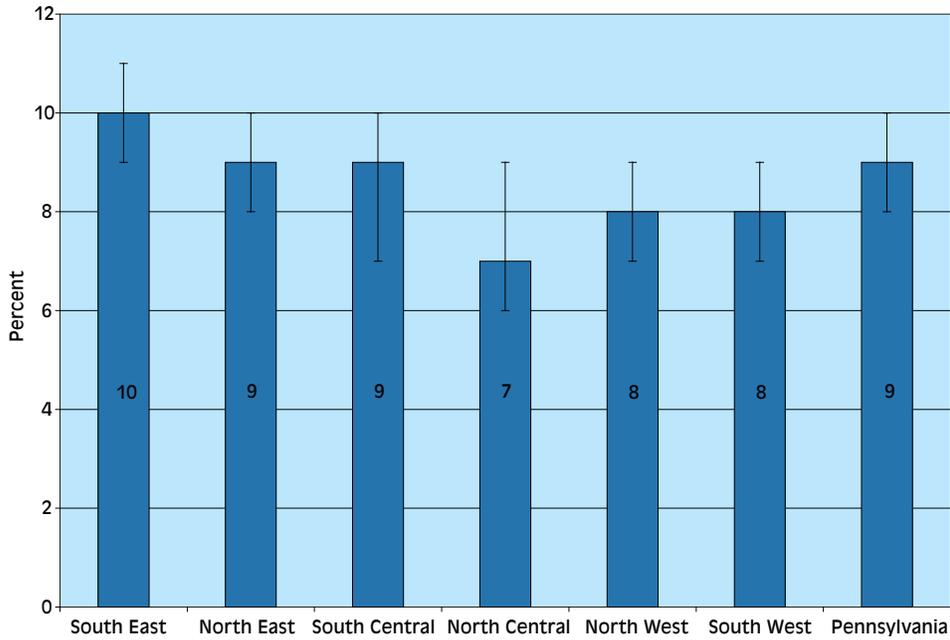
**Figure 1-9:** Prevalence of Current and Lifetime Asthma Among Adults (18+) by Smoking Status, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

During 2005-2007, the prevalence of current and lifetime asthma among adults in Pennsylvania was higher in current smokers compared to former smokers and those who never smoked.

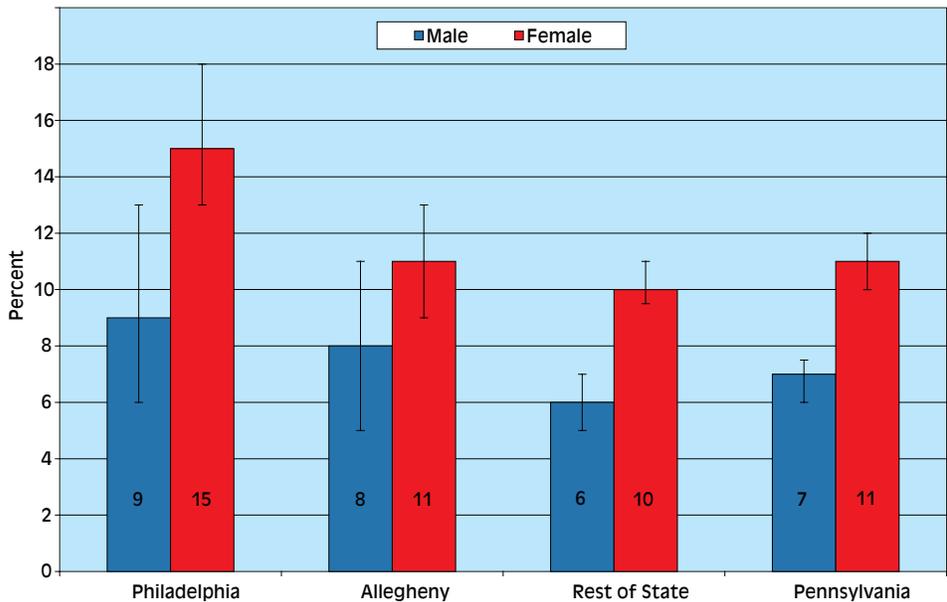
**Figure 1-10:** Prevalence of Current Asthma Among Adults (18+) by Health District, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

In 2005-2007, the prevalence of current asthma among adults in the South East District (10 percent) was higher than in the North Central, North West, South West Districts, and the entire State of Pennsylvania.

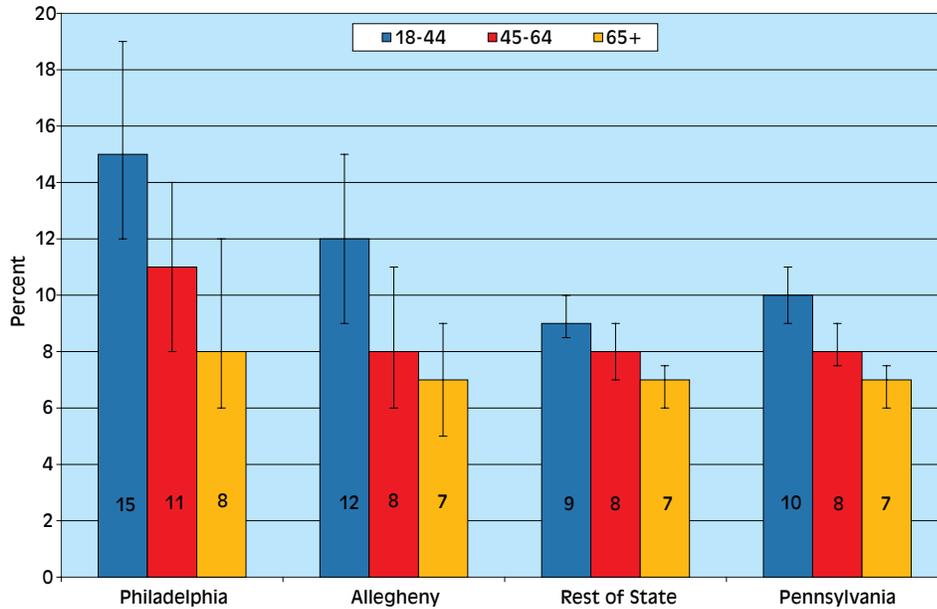
**Figure 1-11:** Prevalence of Current Asthma Among Adults (18+) by Gender and Region, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

In 2005-2007, the prevalence of current asthma among females in Philadelphia County, the Rest of State and Pennsylvania as a whole, was higher than male prevalence. The highest prevalence of current asthma among females and males was in Philadelphia; the lowest was in the Rest of State.

**Figure 1-12:** Prevalence of Current Asthma Among Adults (18+) by Age Group and Region, Pennsylvania 2005-2007 BRFSS

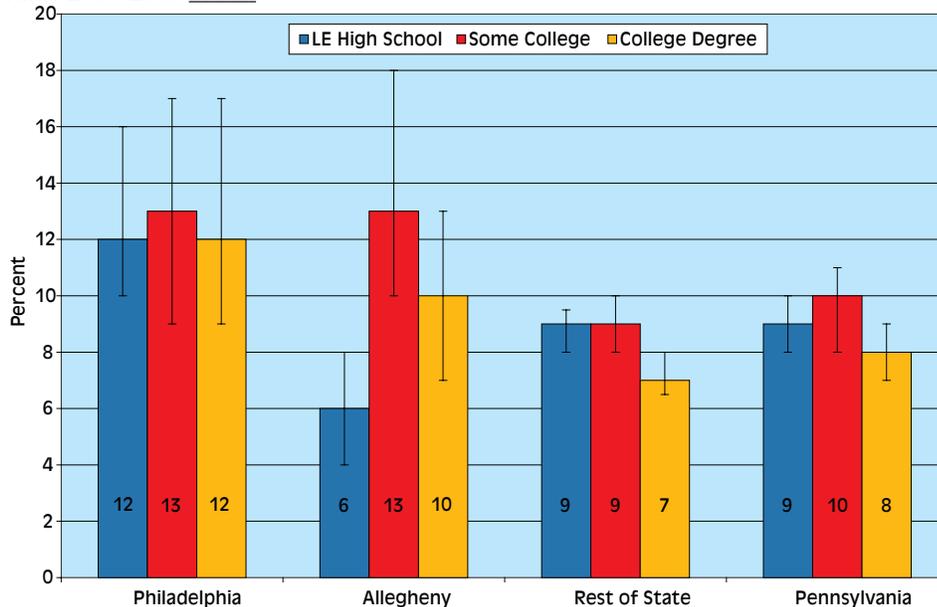


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

During 2005-2007, the prevalence of current asthma among adults in Philadelphia County was significantly higher in the 18-44 age group, compared to Rest of State and Pennsylvania. Overall, the highest prevalence of current asthma among all age groups was in Philadelphia County for ages 18-44 (15 percent); 45-64 (11 percent) and 65+ (8 percent).



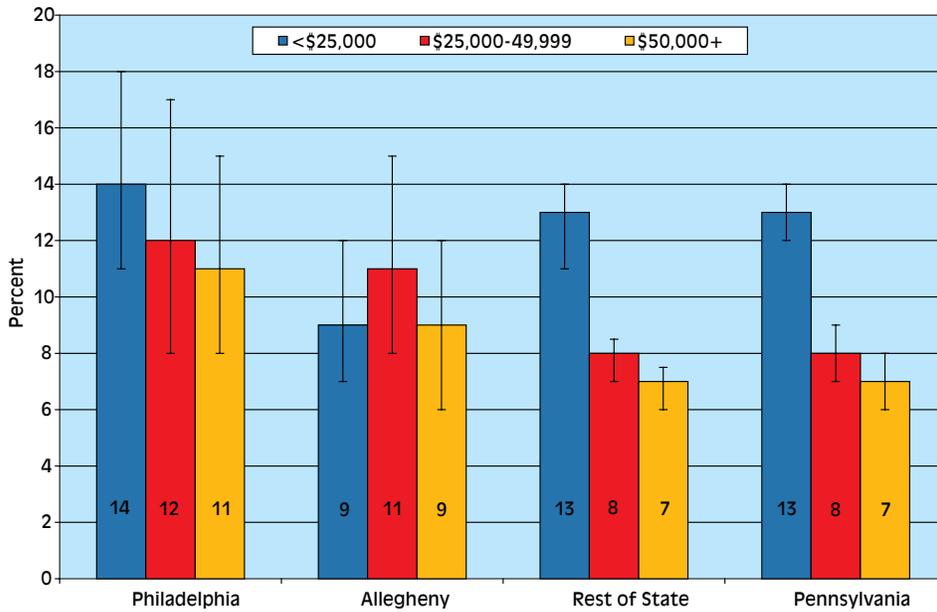
**Figure 1-13:** Prevalence of Current Asthma Among Adults (18+) by Educational Level and Region, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

In 2005-2007, the prevalence of current asthma among adults in Philadelphia County was significantly higher for those with a high school degree or less, compared to other regions. Among college graduates, Philadelphia County had a higher prevalence than other regions. Adults in Allegheny County who reported that they had some college education had higher prevalence of current asthma compared to the same category of responders in other regions of Pennsylvania.

**Figure 1-14:** Prevalence of Current Asthma Among Adults (18+) by Household Income Level and Region, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

Overall, in 2005-2007, the prevalence of current asthma among adults in Philadelphia with any household incomes was higher in comparison with other regions. There were differences in the prevalence of current asthma among people with income less than \$49,999 residing in Philadelphia County, compared with the Rest of State and Pennsylvania as a whole.

**Table 1-1:** Current Asthma Prevalence among Children (<18) by Selected Characteristics, Pennsylvania and USA, 2005-2007 BRFSS

	2005			2006			2007		
	Pennsylvania		USA	Pennsylvania		USA	Pennsylvania		USA
	Percent	95% CI*	Percent	Percent	95% CI*	Percent	Percent	95% CI*	Percent
All Children	10	9-11	9	8	7-10	9	11	9-13	9
Sex									
Male	11	9-14	10	9	7-12	11	11	9-14	10
Female	9	7-11	8	7	5-10	8	10	8-13	9
Age									
0-4	6	4-9	7	8	5-13	6	8	5-12	7
5-12	11	9-13	10	9	7-12	12	12	10-15	9
13-17	13	10-17	10	8	6-11	10	11	8-14	11
Race/Ethnicity									
NH White	9	8-10	8	7	6-9	9	9	8-11	8
NH Black	14	10-21	13	13	7-22	13	17	11-25	16
Hispanic**	12	7-20	9	12	6-24	9	12	6-23	9

Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS) and National Center for Health Statistics (NCHS).  
\*CI Confidence Interval=95%  
Hispanic\*\*-can be any race

DISCLAIMER: PA BRFSS data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions.

**Table 1-2:** Lifetime Asthma Prevalence among Children (<18) by Selected Characteristics, Pennsylvania and USA, 2005-2007 BRFSS

	2005			2006			2007		
	Pennsylvania		USA	Pennsylvania		USA	Pennsylvania		USA
	Percent	95% CI*	Percent	Percent	95% CI*	Percent	Percent	95% CI*	Percent
All Children	14	12-16	13	12	10-14	14	15	13-17	13
Sex									
Male	17	14-19	15	14	12-18	16	16	13-19	15
Female	12	10-14	11	10	7-13	11	14	11-17	11
Age									
0-4	8	5-11	9	12	8-17	8	10	7-15	8
5-12	15	13-18	13	14	11-17	16	16	13-19	13
13-17	19	15-23	15	11	8-14	15	18	14-22	17
Race/Ethnicity									
NH White	13	11-14	12	11	9-13	13	12	11-15	11
NH Black	17	12-24	18	20	13-31	17	24	17-33	20
Hispanic**	18	12-27	13	16	8-28	13	21	12-33	13

Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS) and National Center for Health Statistics (NCHS).

\*CI Confidence Interval=95%

Hispanic\*\*-can be any race

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The questions asked of the respondents were: "Has a doctor, nurse or other health professional ever said that the child has asthma?" and "Does the child still have asthma?"

During 2005-2007, boys were more likely than girls to have been diagnosed with asthma at some time or to still have asthma.

In Pennsylvania, non-Hispanic (NH) Blacks had higher current and lifetime asthma prevalence compared to NH Whites and Hispanics in 2005-2006 and significantly higher than NH Whites in 2007. The lifetime asthma prevalence rate among NH Blacks was steadily on the rise for the three year period.

In 2005, children aged 13-17 years had significantly higher current and lifetime asthma prevalence rates compared to the age group less than 5 years old. In 2006, no significant differences were found between those age groups. In 2007, children aged 13-17 years had higher current and lifetime asthma prevalence rates compared to age group 0-4.

Overall, in 2005 and 2007, current and lifetime asthma prevalence rates were higher in Pennsylvania than in the USA. In contrast, in 2006, the USA had a higher asthma prevalence rate compared to Pennsylvania.

## **SECTION 2: Asthma Management and the Quality of Life**

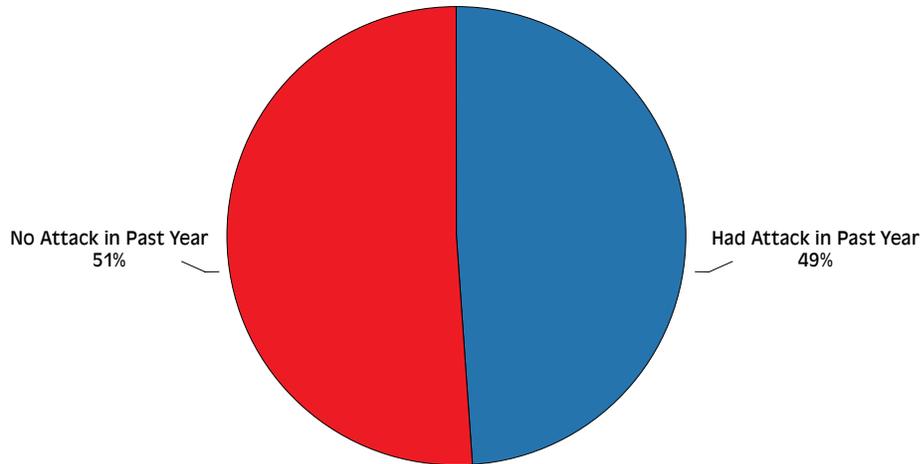
This section presents information on asthma management and the quality of life (emergency room, urgent treatment and routine checkup visits; frequency of asthma attacks and asthma symptoms; activity limitations; sleep difficulties; percentage of adults taking prescribed preventive asthma medications and prescribed asthma inhalers) for 2005-2007. Data was combined for three years in order to increase the sample size and produce more valuable results.

The Pennsylvania Behavioral Risk Factor Surveillance System (PA BRFSS) provided the Pennsylvania Asthma Program with data from the Adult Asthma Module, which included asthma related questions. Answers from all respondents to this module were used to measure the level of asthma control in respondents with current asthma.

Asthma severity was classified using National Asthma Education and Prevention Program (NAEPP) guidelines, based on the frequency of asthma daytime and nighttime symptoms reported by respondents with current asthma. The national guidelines define severity classes and recommend the appropriate medication regimen to maintain long-term control. There are two different types of medication: (1) long-term-control medications to control chronic symptoms and prevent asthma attacks (the most important type of treatment for most people with asthma), which should be taken every day on a long-term basis, and (2) medications for rapid, short-term relief of symptoms-used to prevent or treat an asthma attack.

Weighted percentages and 95% confidence intervals (CI) for these estimates are provided in this report. Confidence intervals were calculated using SUDAAN, a software package developed by the Research Triangle Institute that properly estimates sample variances for complex sample designs. Percentages were not calculated and shown for subgroups of the population when their sample size was less than 50 or when the portion of the sample being represented was of size greater than or equal to 50 but the calculated percentage was deemed to be statistically unreliable. The method used to determine the reliability of percentages calculated from sample sizes of 50 or more consisted of a comparison of the relative standard error of the calculated percentage with the relative standard error of the same percentage outcome for a simple random sample. If the relative standard error for the percentage being tested was smaller than the relative standard error of the same percentage outcome for the simple random sample, then the calculated percentage was considered reliable.

**Figure 2-1:** Percent of Adults (18+) With Current Asthma That Had Asthma Attack(s) in the Past 12 Months, Pennsylvania 2005-2007 BRFSS

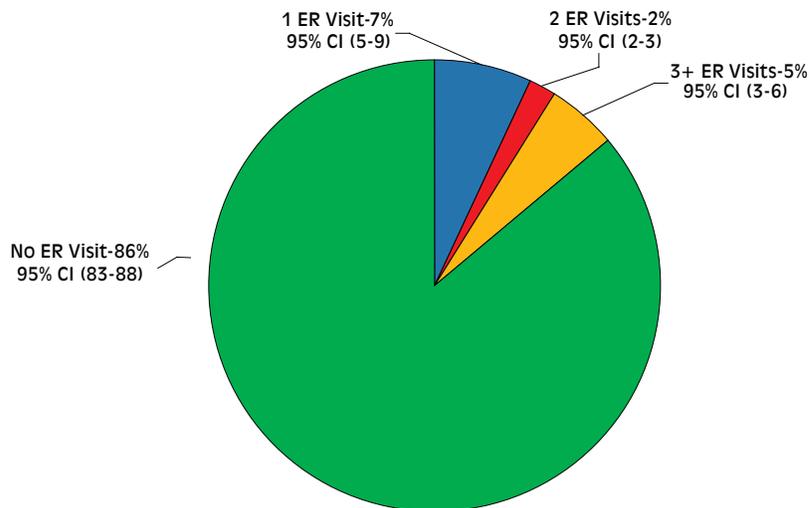


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 12 months, have you had an episode of asthma or an asthma attack?"

It is estimated that from 2005-2007 about 49 percent of respondents with current asthma said they had asthma attacks in the past 12 months, while 51 percent of respondents stated that they did not have any asthma attacks in the same period of time.

**Figure 2-2:** Percent of Adults (18+) With Current Asthma That Had Emergency Room (ER) Visit(s) or Urgent Care Center Visit(s) in the Past 12 Months, Pennsylvania 2005-2007 BRFSS

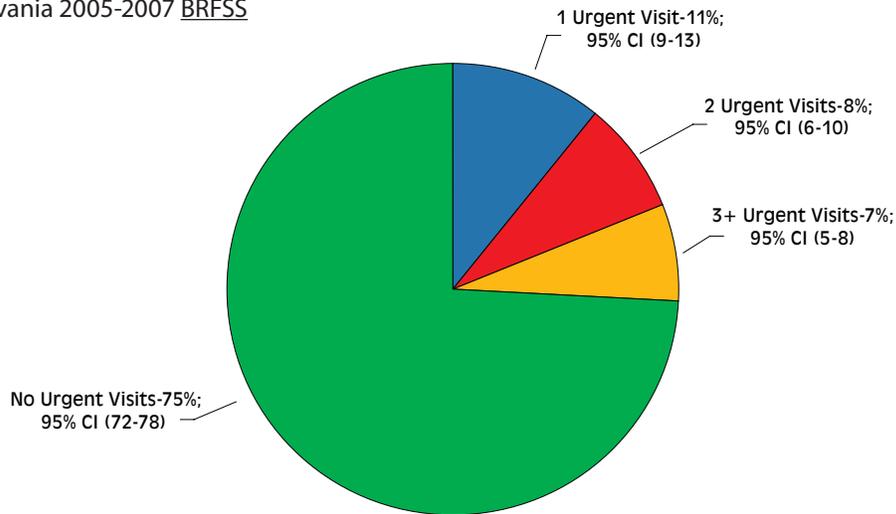


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 12 months, have you had an episode of asthma or an asthma attack?"

During 2005-2007, among adults with current asthma, approximately 86 percent did not visit the ER or urgent care center for treatment of their asthma in the past 12 months; nearly 7 percent had one ER visit during the past 12 months; about 2 percent had visited an ER twice in the past 12 months, and approximately 5 percent had three or more ER visits in the past 12 months due to asthma.

**Figure 2-3:** Percent of Adults (18+) With Current Asthma That Had Been Seen by a Health Professional for Urgent Treatment of Worsening Asthma Symptoms in the Past 12 Months, Pennsylvania 2005-2007 BRFSS

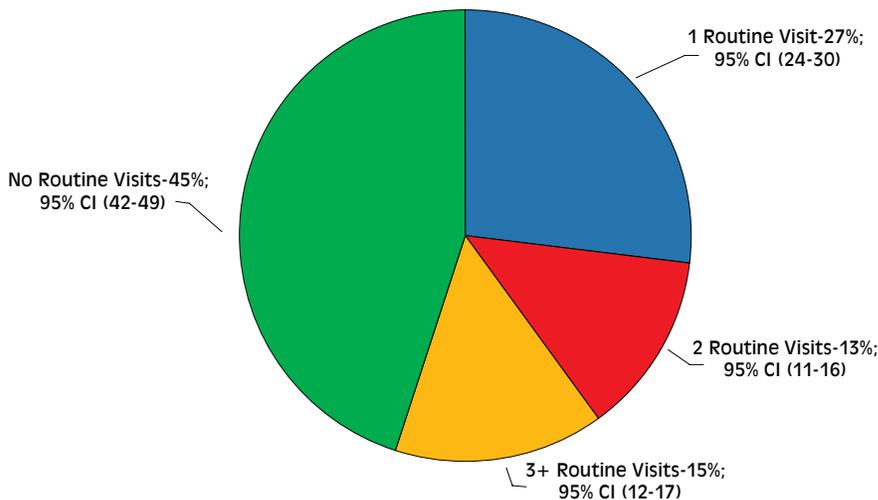


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.  
Note: During rounding, percentage may not be equal to 100%

The question asked of the respondent was: "During the past 12 months, how many times did you see you a doctor, nurse or other health professional for urgent treatment of worsening asthma symptoms?"

During 2005-2007, among adults with current asthma, approximately 74 percent had not been seen by a health professional for urgent treatment of worsening asthma symptoms in the past 12 months; roughly 11 percent had one urgent visit in the past 12 months; about 8 percent had been seen by a health professional twice in the past 12 months, and around 7 percent had three or more urgent visits in the past 12 months due to asthma.

**Figure 2-4:** Percent of Adults (18+) With Current Asthma That Had Seen a Health Care Professional for a Routine Checkup of Their Asthma in the Past 12 Months, Pennsylvania 2005-2007 BRFSS

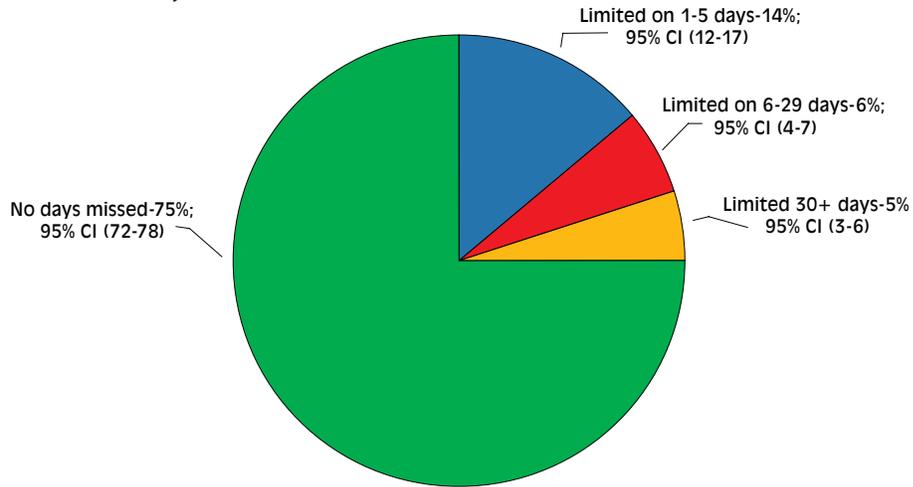


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 12 months, how many times did you see you a doctor, nurse or other health professional for a routine checkup for your asthma?"

During 2005-2007, among adults with current asthma, approximately 45 percent had no routine visits in the past 12 months; 27 percent had one routine checkup in the past 12 months; nearly 13 percent had two, and 15 percent had three or more routine checkups in the past 12 months due to asthma.

**Figure 2-5:** Percent of Adults (18+) With Current Asthma Unable to Work or Carry out Usual Activities in the Past 12 Months, Pennsylvania 2005-2007 BRFSS



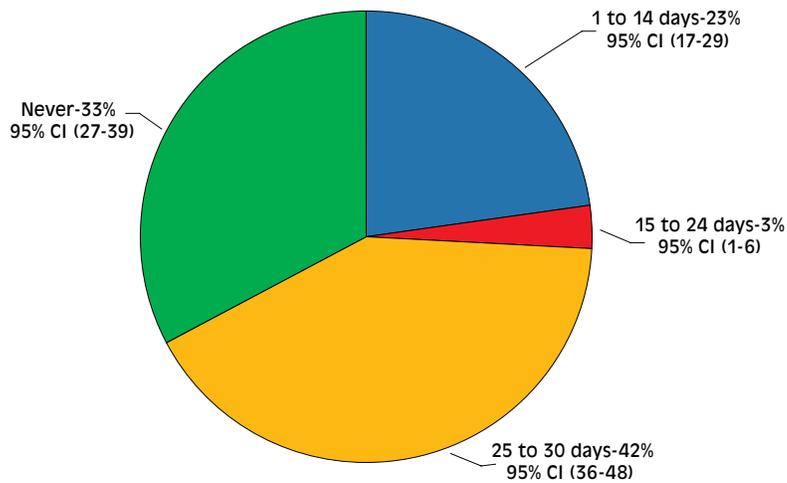
Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS). Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 12 months, how many days were you unable to work or carry out your usual activities because of your asthma?"

During 2005-2007, the majority of respondents (75 percent) with current asthma did not experience any days when they were unable to work or carry out usual activities in the past 12 months; 14 percent reported they were unable to work or carry out usual activities for 1-5 days; 6 percent said they had limited activity for 6-29 days, and 5 percent were unable to work or carry out usual activities for 30 days or more in the past 12 months due to asthma.



**Figure 2-6:** Percent of Adults (18+) With Current Asthma That Took Prescribed Preventive Asthma Medications in the Past 30 Days, Pennsylvania 2005-2007 BRFSS

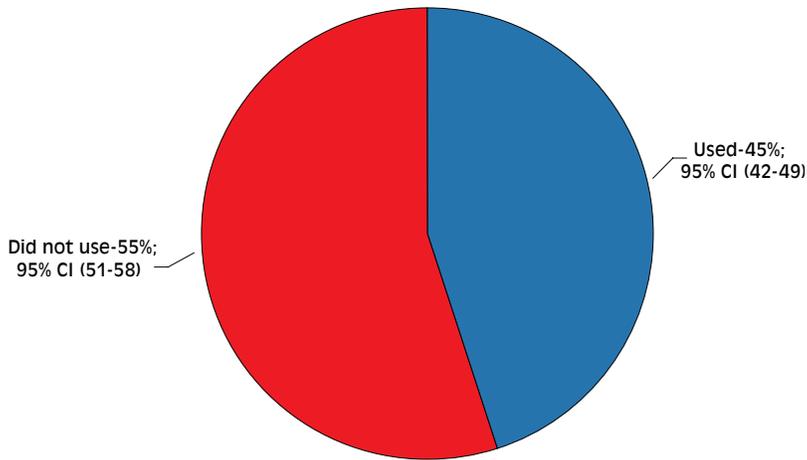


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS). Prevalence rates are presented with 95% Confidence Intervals. Note: During rounding, percentage may not be equal to 100%

The question asked of the respondent was: "During the past 30 days, how often did you take a prescription asthma medication to prevent an asthma attack from occurring?"

During 2005-2007, the majority of respondents (41 percent) with current asthma took prescribed preventive asthma medications from 25 to 30 days in the past 30 days; 23 percent reported taking prescribed preventive asthma medications for 1-14 days in the past 30 days; 3 percent said they were taking prescribed preventive asthma medications for 15 to 24 days in the past 30 days, and 33 percent did not take any prescribed preventive asthma medications at all in the past 30 days.

**Figure 2-7:** Percent of Adults (18+) With Current Asthma That Used a Prescribed Asthma Inhaler in the Past 30 Days, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 30 days, how often did you use a prescription asthma inhaler during an asthma attack to stop it?"

During 2005-2007, 55 percent of adults with current asthma reported that they did not use a prescribed asthma inhaler in the past 30 days, and 45 percent of respondents with current asthma said they used a prescribed asthma inhaler in the past 30 days.

## Asthma Severity Classification

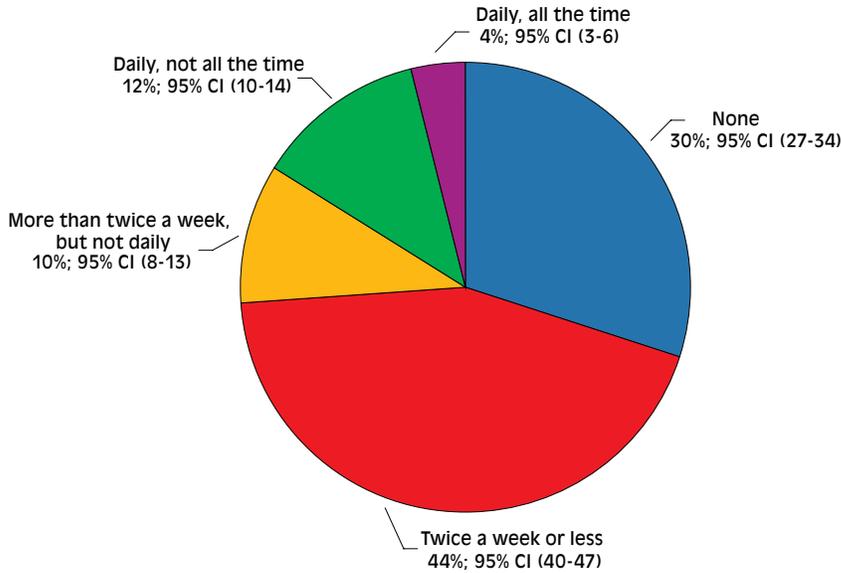
In 2006, the National Heart, Lung and Blood Institute released the National Asthma Education and Prevention Program's (NAEPP) Guidelines for the Diagnosis and Management of Asthma. The guidelines describe the following criteria for the asthma classifications: mild intermittent, mild persistent, moderate persistent and severe persistent. Based on level of asthma severity health care providers determine appropriate medication and intensity of asthma management.

Classification of Asthma Severity by the National Asthma Education and Prevention Program: Expert Panel Report 2			
Clinical Features Before Treatment*			
Classifications	Symptoms †	Nighttime Symptoms	Lung Function
<b>Step 1</b>			
Mild intermittent	<ul style="list-style-type: none"> <li>• Symptoms <math>\leq</math> 2 times/week</li> <li>• Asymptomatic and normal PEF between exacerbations</li> <li>• Exacerbations brief (from a few hours to a few days); intensity may vary</li> </ul>	$\leq$ 2 times/month	FEV <sub>1</sub> or PEF $\geq$ 80% predicted PEF variability <20%
<b>Step 2</b>			
Mild persistent	<ul style="list-style-type: none"> <li>• Symptoms &gt;2 times/week but &lt;1 time/day</li> <li>• Exacerbations may affect activity</li> </ul>	>2 times/month	FEV <sub>1</sub> or PEF $\geq$ 80% predicted PEF variability 20%
<b>Step 3</b>			
Moderate persistent	<ul style="list-style-type: none"> <li>• Daily symptoms</li> <li>• Daily use of inhaled short-acting <math>\beta</math>2agonist</li> <li>• Exacerbations affect activity</li> <li>• Exacerbations <math>\geq</math> 2 times/week; may last days</li> </ul>	>1 time/week	FEV <sub>1</sub> or PEF >60% to 80% predicted PEF variability >30% to 30%
<b>Step 4</b>			
Severe persistent	<ul style="list-style-type: none"> <li>• Continual symptoms</li> <li>• Limited physical activity</li> <li>• Frequent exacerbations</li> </ul>	Frequent	FEV <sub>1</sub> or PEF $\leq$ 60% predicted PEF variability >30%
Abbreviations: FEV <sub>1</sub> , forced expiratory volume in 1 second; peak expiratory flow.			
*The presence of one of the features of severity is sufficient to place a patient in that category. An individual should be assigned to the most severe grade in which any feature occurs. The characteristics noted in this table are general and may overlap because asthma is highly variable. Furthermore, an individual's classification may change over time.			
†Patients at any level of severity can have mild, moderate, or severe exacerbations. Some patients with intermittent asthma experience severe and life-threatening exacerbations separated by long periods of normal lung function and no symptoms. Clinical Practice Guidelines. Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma. Bethesda, Md: US Dept of Health and Human Services; 1997. NIH publication 97-4051			

The self-reported frequency of asthma symptoms from 2005–2007 PA BRFSS allows us to make approximate estimation of the severity of asthma among adults (18+) with current asthma. Since lung function measures (FEV<sub>1</sub> and PEF) are not available from the BRFSS, the severity classification is based only on the frequency of day and nighttime symptoms.

Based on National Asthma Education and Prevention Program (NAEPP) criteria, approximately 44 percent of respondents with asthma in Pennsylvania had mild intermittent asthma; 10 percent had mild persistent asthma and about 16 percent of respondents had more severe classifications of asthma with 12 percent representing moderate persistent and 4 percent representing severe persistent asthma, (Figure 2-8).

**Figure 2-8:** Percent of Adults (18+) With Current Asthma That Had Any Symptoms of Asthma in the Past 30 Days, Pennsylvania 2005-2007 BRFSS

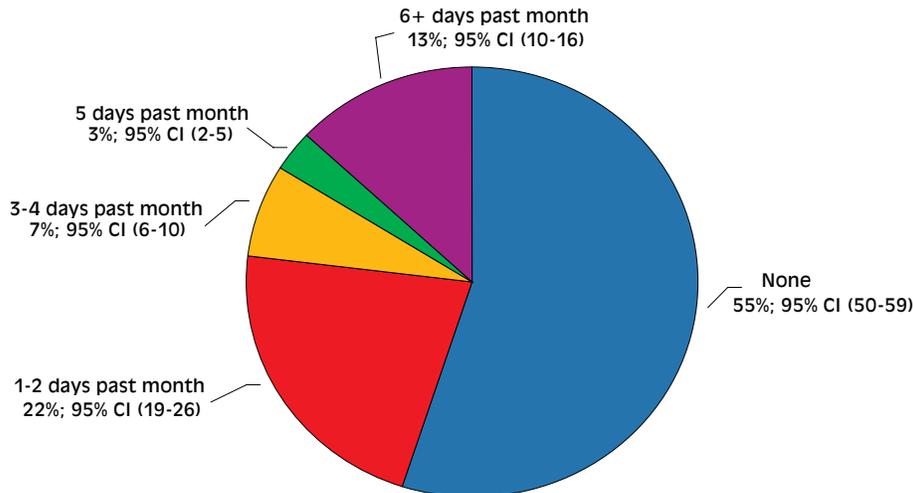


Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 30 days, on how many days did you have any symptoms of asthma?"

During 2005-2007, 30 percent of adults with current asthma did not have any symptoms of asthma in the past 30 days, 44 percent experienced asthma symptoms twice a week or less; 10 percent of respondents reported that they had symptoms of asthma more than twice a week in the past 30 days. Daily symptoms of asthma affected 16 percent of respondents.

**Figure 2-9:** Percent of Adults (18+) With Current Asthma That Had Difficulties with Sleep in the Past 30 Days, Pennsylvania 2005-2007 BRFSS



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).  
Prevalence rates are presented with 95% Confidence Intervals.

The question asked of the respondent was: "During the past 30 days, on how many days did symptoms of asthma make it difficult for you to stay asleep?"

During 2005-2007, 55 percent of adults with current asthma reported that they did not have difficulties with sleep in the past 30 days; 22 percent of respondents had difficulties with sleep for 1-2 days in the past 30 days; 7 percent experienced difficulties with sleep for 3-4 days in the past 30 days; and 16 percent said that had difficulties with sleep for 5 days or more in the past 30 days due to asthma.

**Table 2-1:** Prevalence of Current Asthma Among Adults (18+) by Race/Ethnicity, Age Group, Education and Income Levels, Pennsylvania 2003-2007 BRFSS

	2003		2004		2005		2006		2007	
	Percent	95% CI*								
All Adults	8	7-9	9	8-10	8	7-9	9	8-9	9	8-10
<b>Race/Ethnicity</b>										
Non-Hispanic White	8	7-9	8	7-9	8	7-8	8	7-9	8	7-9
Non-Hispanic Black	12	7-16	13	9-18	13	9-18	13	10-16	11	8-15
Hispanic	9	4-17	14	8-22	11	6-17	15	10-22	22	13-35
<b>Age Group</b>										
18 to 29	9	7-12	12	10-16	10	8-13	12	10-15	15	11-20
30 to 44	7	6-9	8	7-10	9	8-11	8	7-10	8	7-10
45 to 64	9	7-10	10	8-11	8	7-9	8	7-9	8	7-10
65+	8	7-11	6	4-7	6	5-7	7	6-8	7	6-8
<b>Education</b>										
Less than H.S.	15	11-20	15	11-20	11	8-14	12	10-16	13	8-19
H.S graduate	8	7-10	8	6-9	8	7-9	8	7-9	9	7-10
Some college	8	6-10	10	8-12	8	6-9	10	8-12	10	8-13
College graduate	7	6-9	8	6-9	7	6-9	8	7-9	9	7-11
<b>Income</b>										
Less than \$15,000	14	9-19	13	10-16	15	12-18	16	14-20	16	11-23
\$15,000 to \$24,999	10	7-12	10	8-13	10	8-13	10	8-12	11	9-14
\$25,000 to \$49,999	8	6-10	9	7-11	7	6-9	8	7-9	8	6-10
\$50,000 to \$74,999	7	5-9	8	6-11	7	5-9	6	5-8	8	5-12
\$75,000+	6	5-8	7	5-9	6	5-8	8	6-9	7	6-9

Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).

\*CI Confidence Interval=95%

DISCLAIMER: These data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions.

**Table 2-2:** Prevalence of Lifetime Asthma Among Adults (18+) by Race/Ethnicity, Age Group, Education and Income Levels, Pennsylvania 2003-2007 BRFSS

	2003		2004		2005		2006		2007	
	Percent	95% CI*								
All Adults	12	11-13	13	12-14	12	11-13	12	12-13	13	12-14
<b>Race/Ethnicity</b>										
Non-Hispanic White	11	10-13	12	11-13	12	11-13	12	11-13	12	11-13
Non-Hispanic Black	16	10-21	16	12-21	17	13-22	16	13-20	14	11-19
Hispanic	10	5-18	18	12-27	16	10-23	18	13-25	27	17-40
<b>Age Group</b>										
18 to 29	14	11-18	20	16-24	17	14-21	18	15-21	20	16-25
30 to 44	12	10-14	12	11-14	14	12-15	12	10-13	13	11-15
45 to 64	11	9-13	13	11-15	11	10-12	12	11-13	12	11-14
65+	11	9-13	8	7-10	8	7-9	9	8-11	8	7-10
<b>Education</b>										
Less than H.S.	19	14-24	19	14-24	16	13-20	15	13-19	16	12-23
H.S graduate	11	9-13	11	10-13	12	11-14	11	10-13	12	10-14
Some college	12	10-15	14	12-17	12	10-14	14	12-17	14	11-16
College graduate	10	9-12	13	11-15	12	10-13	11	10-13	13	11-15
<b>Income</b>										
Less than \$15,000	18	13-23	17	14-21	18	15-22	22	19-26	20	14-26
\$15,000 to \$24,999	13	10-16	13	11-16	15	12-17	14	12-17	14	12-17
\$25,000 to \$49,999	11	9-13	12	10-15	11	10-13	11	9-13	12	10-14
\$50,000 to \$74,999	10	8-13	14	11-17	12	10-15	10	8-12	12	9-15
\$75,000 +	9	7-12	12	10-15	10	8-12	12	10-14	11	9-13

Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS).

\*CI Confidence Interval=95%

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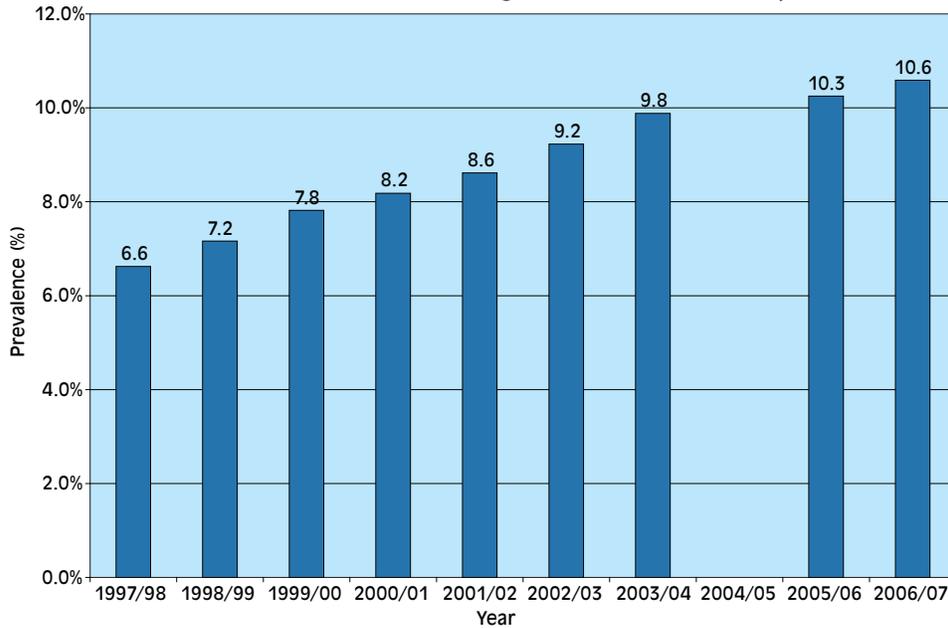
## **SECTION 3: Asthma Lifetime Prevalence Rates Among School Students (1997/98-2006/07)**

Data were obtained from the Department of Health's Division of School Health database. All information in the database was submitted annually to the Department of Health by Pennsylvania's public school districts, comprehensive vocational-technical schools and charter schools. Data were not available by age, grade, sex or race. There are over 630 reporting school entities, 67 counties and six health districts in Pennsylvania.

The Department of Health's Division of School Health's report, Students with Medical Diagnosis of Asthma by Health District and County, includes a count of the total number of students with a medical diagnosis of asthma, the average daily enrollment and the calculated percent of students (K-12) with asthma. The data cover a nine-year period, beginning with the 1997/98 school year and extending through the 2006/07 school year. Due to problems with the validation process, school data for 2004/05 are missing. The data were aggregated by county, health district and specified school year and illustrate the asthma lifetime prevalence rates among school students in public and private/non-public schools. For inclusion in the report, students had to meet one of the following two criteria: have a medical diagnosis of asthma by a primary care provider/medical specialist or have a medication order for treating asthma from a primary care provider/medical specialist within the past twelve months. A primary care provider is defined as a physician, physician assistant or certified registered nurse practitioner.

Students included in the report should have documentation (e.g. primary care provider notification, updated health history/physical exam form, medication order, formalized medically necessary plan of care) regarding their asthma condition in their school health record.

**Figure 3-1:** Prevalence of Lifetime Asthma Among School Students, Pennsylvania 1997/98-2006/07



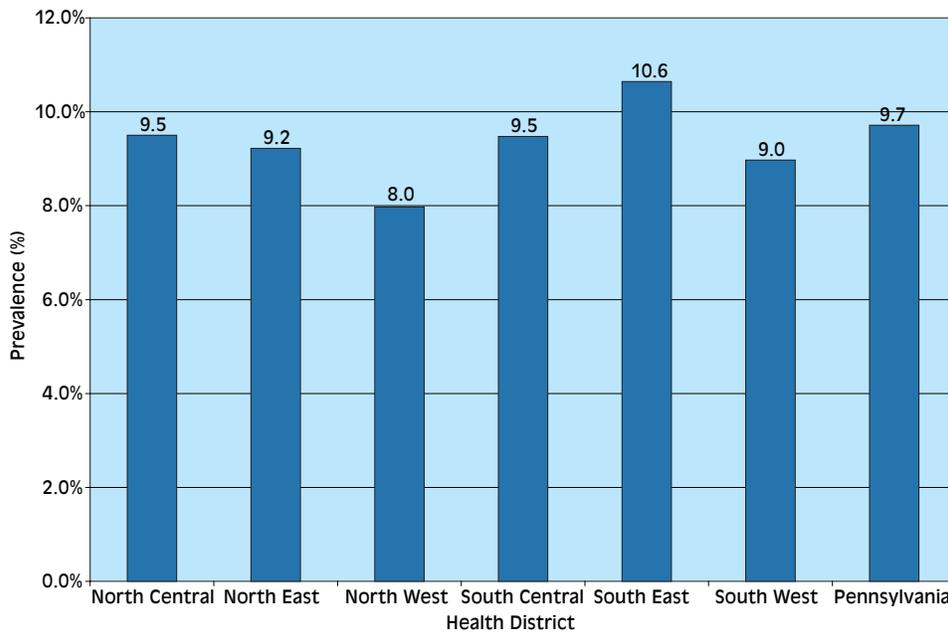
Data Source: Bureau of Community Health Systems, Division of School Health.

Note: the 2004-2005 School Year is missing.

The reported statewide rate of asthma has steadily increased over time (from 6.6 percent in 1997/98 to 10.6 percent in 2006/07), with the exception of 2004/05 for which data is not included. In the 2006/07 school year, approximately 215,000 students out of 2 million children in kindergarten through grade 12 in Pennsylvania schools had been diagnosed with asthma.



**Figure 3-2:** Prevalence of Lifetime Asthma Among School Students by Health District, Pennsylvania 2001/02-2006/07 (Combined Data)



Data Source: Bureau of Community Health Systems, Division of School Health.

Note: the 2004-2005 School Year is missing.

Data for children diagnosed with asthma from school years 2001/02 to 2006/07 were combined by Health District. The highest percent of children with asthma was in the South East (10.6 percent) and the lowest in the North West (8.0 percent). The South East had a higher percentage of students with asthma than the state in general (9.7 percent).

**Table 3-1:** Lifetime Asthma Prevalence Among School Students Health District and County, Pennsylvania 2001/02-2006/07

Health District	Counties	2001-2002		2002-2003		2003-2004		2005-2006		2006-2007		
		Number	Percent									
North Central	Bradford	924	7.9%	943	8.2%	976	8.6%	971	8.9%	988	9.2%	
	Centre	1,665	11.1%	1,486	10.0%	1,870	12.6%	1,640	11.0%	1,390	9.5%	
	Clinton	323	6.8%	315	6.2%	321	6.1%	263	5.3%	273	5.5%	
	Columbia	1,023	8.9%	1,071	9.3%	1,150	9.9%	995	9.0%	1,100	10.2%	
	Lycoming	2,574	12.8%	2,361	12.5%	2,399	13.0%	1,461	8.1%	1,565	8.8%	
	Montour	408	13.5%	383	13.0%	393	13.7%	310	11.8%	385	14.7%	
	Northumberland	1,373	9.4%	1,454	10.1%	1,276	9.0%	1,127	8.2%	1,307	9.6%	
	Potter	197	6.1%	219	7.0%	213	7.2%	235	8.6%	228	8.6%	
	Snyder	543	9.7%	532	9.5%	655	12.0%	477	9.1%	532	10.0%	
	Sullivan	48	5.6%	38	4.5%	22	2.8%	28	3.7%	25	3.4%	
	Tioga	465	6.6%	413	6.0%	396	6.2%	488	7.6%	397	6.3%	
	Union	373	8.4%	390	8.9%	493	11.2%	408	9.8%	414	9.9%	
Summary		9,916	9.7%	9,605	9.6%	10,164	10.3%	8,403	8.8%	8,604	9.1%	
North East	Carbon	848	9.1%	828	8.8%	807	8.6%	802	8.8%	853	8.8%	
	Lackawanna	2,737	8.2%	2,716	8.2%	3,021	9.1%	3,198	9.9%	3,422	10.2%	
	Lehigh	4,914	9.4%	5,132	9.7%	5,305	10.3%	5,343	10.1%	6,039	11.5%	
	Luzerne	2,569	4.7%	2,774	5.8%	3,175	6.6%	3,165	6.7%	3,341	7.1%	
	Monroe	3,210	10.5%	3,508	11.0%	3,825	11.8%	3,825	11.3%	4,126	12.3%	
	Northampton	4,495	9.2%	5,154	10.4%	5,033	10.0%	5,419	10.4%	5,613	10.6%	
	Pike	519	10.1%	483	9.2%	445	8.2%	481	8.4%	579	10.0%	
	Susquehanna	540	6.7%	573	7.1%	623	7.9%	635	8.0%	641	8.2%	
	Wayne	876	8.8%	912	9.0%	957	9.5%	1,056	10.4%	1,082	10.8%	
	Wyoming	327	6.7%	462	9.6%	446	10.0%	433	9.9%	408	9.5%	
	Summary		21,035	8.2%	22,542	8.9%	23,637	9.4%	24,357	9.5%	26,104	10.2%
	North West	Cameron	27	2.6%	37	3.7%	17	1.8%	36	4.1%	43	5.0%
Clarion		615	8.1%	628	8.4%	565	7.5%	500	7.0%	545	7.8%	
Clearfield		1,660	10.3%	1,786	11.2%	1,927	12.2%	1,665	11.1%	1,977	13.5%	
Crawford		675	5.7%	645	6.1%	672	5.9%	772	6.8%	853	7.6%	
Elk		315	5.3%	338	5.9%	364	6.4%	335	6.3%	348	6.6%	
Erie		3,511	6.9%	3,618	7.1%	3,577	7.2%	3,474	7.2%	3,366	7.0%	
Forest		48	6.7%	38	5.4%	39	5.7%	44	6.8%	39	6.1%	
Jefferson		540	7.9%	582	8.4%	497	7.5%	477	7.6%	611	10.0%	
Lawrence		1,025	6.5%	1,005	6.5%	919	5.9%	1,037	6.9%	1,119	7.6%	
McKean		1,047	13.3%	968	12.4%	1,038	13.5%	883	11.9%	931	12.7%	
Mercer		1,548	7.6%	1,480	7.3%	1,544	7.8%	1,654	8.4%	1,706	9.5%	
Venango		1,005	9.4%	969	9.3%	1,023	10.0%	827	8.4%	872	8.9%	
Warren		420	6.2%	398	6.2%	430	6.8%	370	6.1%	420	7.0%	
Summary			12,436	7.6%	12,492	7.8%	12,612	8.0%	12,074	7.9%	12,830	8.6%

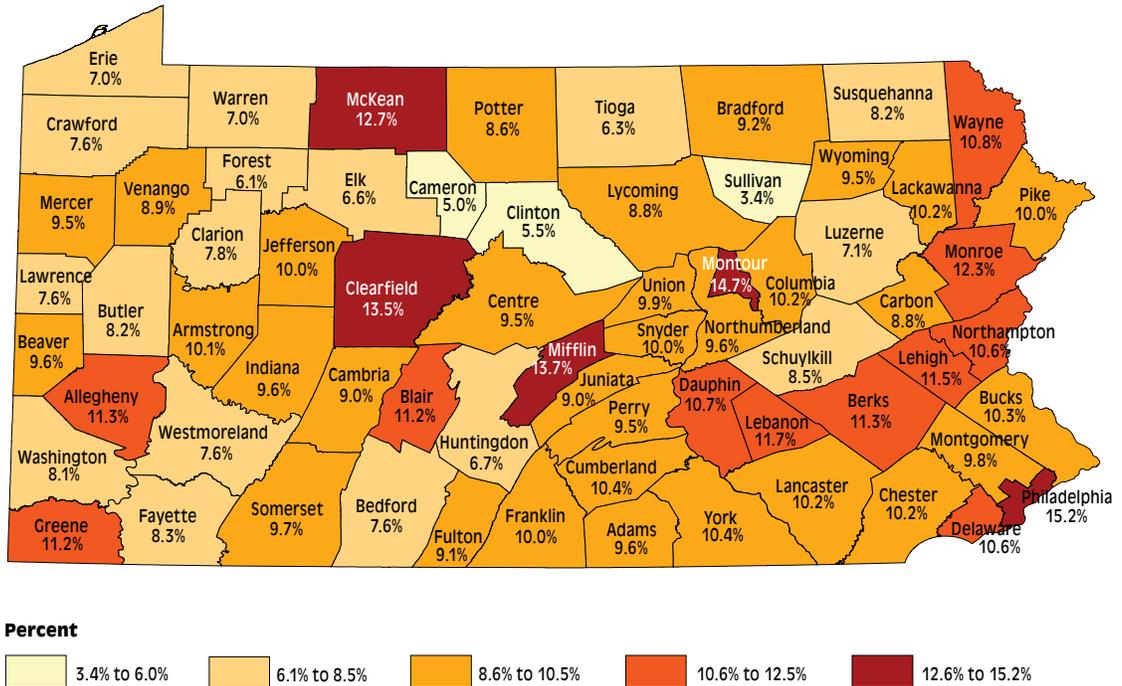
Data Source: Bureau of Community Health Systems, Division of School Health.  
Note: the 2004-2005 School Year is missing.

**Table 3-1: (continued)** Lifetime Asthma Prevalence Among School Students Health District and County, Pennsylvania 2001/02-2006/07

Health District	Counties	2001-2002		2002-2003		2003-2004		2005-2006		2006-2007	
		Number	Percent								
South Central	Adams	1,550	9.2%	1,381	8.2%	1,544	9.2%	1,640	9.7%	1,594	9.6%
	Bedford	446	5.4%	531	6.6%	582	7.2%	524	6.5%	600	7.6%
	Blair	1,719	8.1%	1,699	8.1%	1,747	8.5%	2,086	10.3%	2,158	10.8%
	Cumberland	3,674	9.1%	2,692	8.6%	3,049	9.7%	3,237	10.0%	3,375	10.4%
	Dauphin	3,592	8.5%	4,500	10.6%	4,025	9.4%	4,137	10.0%	4,444	10.7%
	Franklin	1,786	9.3%	1,931	10.0%	1,908	9.8%	2,061	10.1%	2,034	10.0%
	Fulton	176	7.4%	243	9.9%	187	7.9%	177	7.1%	227	9.1%
	Huntingdon	392	6.3%	364	5.8%	428	7.0%	412	6.6%	413	6.7%
	Juniata	243	7.0%	288	8.3%	306	9.1%	297	8.9%	303	9.0%
	Lebanon	1,939	10.0%	1,863	9.7%	2,079	10.6%	2,339	12.1%	2,288	11.7%
	Mifflin	738	11.1%	774	11.8%	804	12.5%	746	12.2%	842	13.7%
	Perry	498	6.7%	543	7.3%	533	7.3%	610	8.4%	670	9.5%
	York	4,823	7.9%	6,432	9.1%	7,079	9.9%	7,402	10.3%	7,588	10.4%
Summary	21,576	8.5%	23,241	9.1%	24,271	9.5%	25,668	10.0%	26,536	10.3%	
South East	Berks	8,516	12.4%	9,188	13.0%	10,368	14.7%	9,193	12.6%	8,740	11.3%
	Bucks	9,514	8.6%	9,749	8.9%	10,053	9.3%	10,893	10.1%	11,079	10.3%
	Chester	7,344	9.4%	7,951	9.7%	8,122	9.7%	8,298	9.8%	8,799	10.2%
	Delaware	8,228	9.3%	8,953	9.5%	9,736	10.4%	9,850	10.7%	9,742	10.6%
	Lancaster	7,370	7.3%	7,053	9.1%	7,437	9.6%	7,604	9.7%	8,257	10.2%
	Montgomery	11,397	8.8%	12,053	9.1%	13,356	10.0%	13,778	10.1%	13,302	9.8%
	Philadelphia	25,473	9.2%	28,258	10.7%	30,388	11.8%	35,531	14.2%	38,210	15.2%
	Schuylkill	1,785	8.0%	1,799	8.2%	1,919	8.9%	1,874	8.7%	1,788	8.5%
	Summary	79,627	9.1%	85,004	10.0%	91,379	10.8%	97,021	11.5%	99,917	11.7%
	South West	Allegheny	18,737	9.2%	18,543	9.3%	20,096	10.2%	20,793	11.0%	20,798
Armstrong		1,220	10.0%	1,312	10.9%	1,379	11.7%	1,093	9.6%	1,138	10.1%
Beaver		2,280	7.5%	2,458	8.2%	2,454	8.2%	2,838	9.1%	3,084	9.6%
Butler		2,060	7.1%	2,018	6.9%	2,139	7.4%	2,384	8.2%	2,378	8.2%
Cambria		1,337	7.2%	1,873	8.3%	1,802	8.2%	1,829	8.6%	1,886	9.0%
Fayette		1,310	5.9%	1,523	7.0%	1,557	7.3%	1,639	7.9%	1,704	8.3%
Greene		460	7.2%	562	9.2%	588	9.8%	618	10.9%	627	11.2%
Indiana		1,162	9.4%	1,034	8.7%	1,219	10.5%	1,091	9.8%	1,067	9.6%
Somerset		883	7.0%	910	7.4%	1,061	8.9%	1,049	9.0%	1,109	9.7%
Washington		2,134	6.7%	2,358	7.5%	2,497	7.9%	2,446	8.0%	2,444	8.1%
Westmoreland		3,905	6.5%	4,222	7.1%	4,233	7.1%	4,183	7.2%	4,335	7.6%
Summary		35,488	8.1%	36,813	8.4%	39,025	9.0%	39,963	9.5%	40,570	9.8%

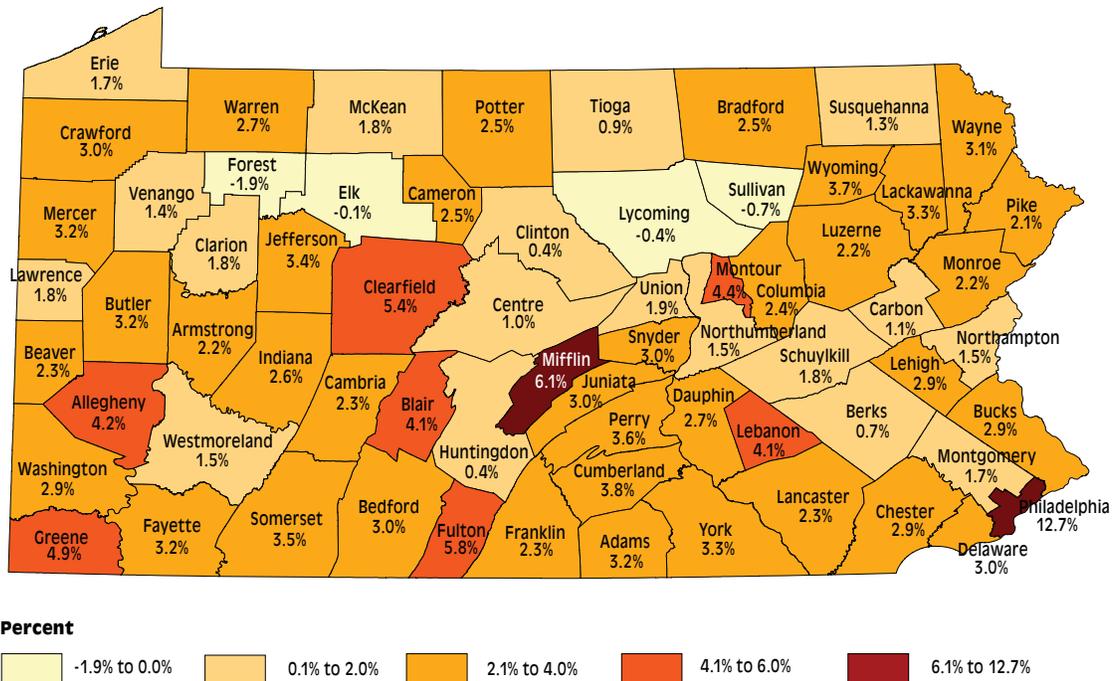
Data Source: Bureau of Community Health Systems, Division of School Health.  
 Note: the 2004-2005 School Year is missing.

**Figure 3-3:** Prevalence of Lifetime Asthma Among School Students by County, Pennsylvania 2006-2007



Disclaimer: Data is reported annually by school districts to the Pennsylvania Department of Health. Responsibility for data accuracy lies with individual educational institutions. The Department specifically disclaims responsibility for any analysis, interpretations or conclusions made by the user.

**Figure 3-4:** Change in Asthma Lifetime Prevalence Among School Students by County, Pennsylvania 1997/98 to 2006/07



Disclaimer: Data is reported annually by school districts to the Pennsylvania Department of Health. Responsibility for data accuracy lies with individual educational institutions. The Department specifically disclaims responsibility for any analysis, interpretations or conclusions made by the user.

## SECTION 4: Asthma Medicaid Data

This chapter represents indicators of asthma burden and management measured with Medicaid claims data in Pennsylvania. Asthma Medicaid data was provided to the Asthma Control Program by Offices of Clinical Quality Improvement and Medical Assistance Programs, Department of Public Welfare, Commonwealth of Pennsylvania. Data shown in this section is the first step in analysis of asthma in the Medicaid population. The study population covered 2004-2007 and included recipients with full Medical Assistance (MA).

All recipients with asthma were identified as recipients that had a claim with asthma as the principal diagnosis (ICD-9 code 493.00-499.00) within this period of time. Recipients (age 0-64) were eligible for MA as of the last day of each year. All methodology is based on HEDIS's (Healthcare Effectiveness Data and Information Set) 2004-2008 Technical Specifications.

Among the Medicaid population the following indicators of asthma burden were measured: prevalence (percent) of current and persistent asthma; annual rates of emergency room (ER) visits, hospitalizations and office visits; annual cost of asthma medications and asthma-related services; and the percentage of Medicaid recipients with persistent asthma receiving appropriate long-term control medications.

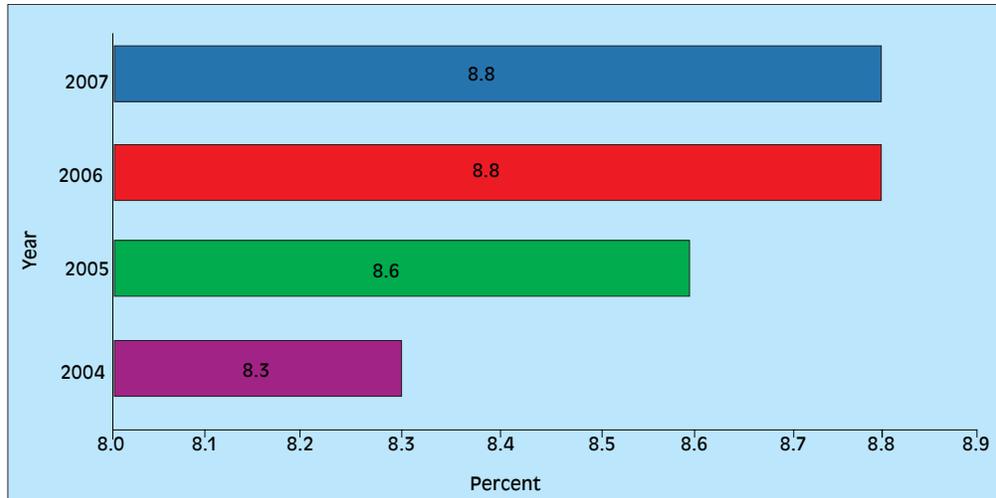
According to HEDIS 2007 specifications, persistent asthma is defined in a living patient by meeting one of four criteria:

- At least four outpatient asthma medication dispensing events. A dispensing event is one prescription of an amount lasting 30 days or less during a specified 12 months period of time.
- At least one emergency department (ED) visit with asthma as the principal diagnosis (ICD-9 code 493.00-499.00) during a specified 12 month period of time.
- At least one acute inpatient discharge with asthma as principal diagnosis (ICD-9 code 493.00-499.00) during a specified 12 month period of time.
- At least four outpatient asthma visits with asthma (ICD-9 code 493.00-499.00) as one of the listed diagnoses and at least two asthma medications dispensing events during a specified 12 months period of time.

The national guidelines define severity classes and recommend the appropriate medication regimen to maintain long-term control. There are two different types of medication—one for long-term control and another for treating acute asthma symptoms. Long-term asthma control medications control symptoms and prevent asthma attacks and are, therefore, the most important type of treatment for most people with asthma. However, this type of medicine does not help with quick relief from asthma symptoms.

Note: In 2004, the Department of Public Welfare converted to a new medical management information system, and data for 2004 may reflect underreporting for that year. Data for 2005 – 2007 was not affected by the data management conversion.

**Figure 4-1:** Prevalence of Recipients with Current Asthma Among Medicaid Recipients, Pennsylvania, 2004-2007

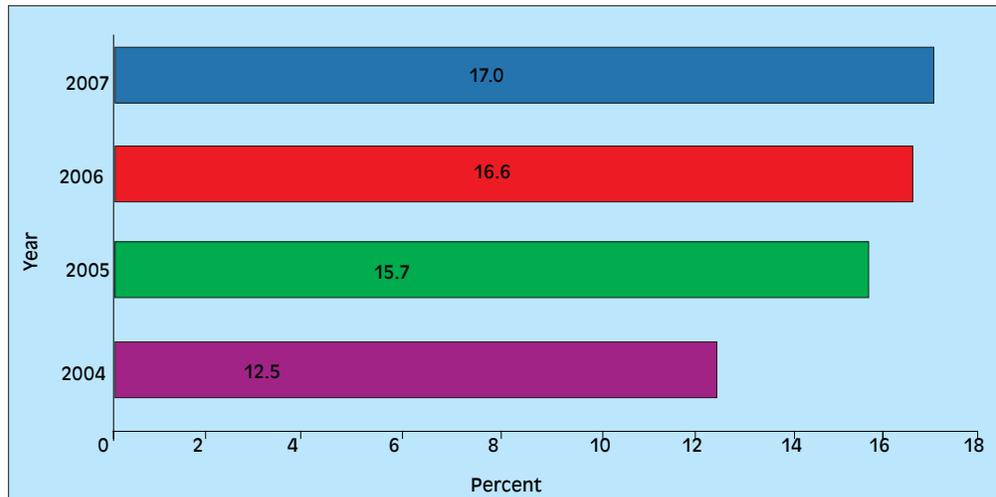


Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2006, the prevalence of recipients with asthma in the Medicaid population increased. The number of people with asthma enrolled in Medicaid constantly rose (from almost 125,000 in 2004 to 137,000 in 2007).



**Figure 4-2:** Prevalence of Recipients with Persistent Asthma among Medicaid Recipients with Asthma, Pennsylvania, 2004-2007



\*if the recipient was determined to be a persistent asthmatic in the previous calendar year and was still eligible the last day of the next year, the recipient was still determined to have persistent asthma

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

The prevalence of recipients with persistent asthma among people with asthma in the Medicaid program increased over time. In 2007, the prevalence of recipients with persistent asthma was the highest for the last four years of the analysis and increased 36 percent compared to 2004. The number of people with persistent asthma enrolled in Medicaid increased from almost 16,000 in 2004 to almost 23,000 in 2007.

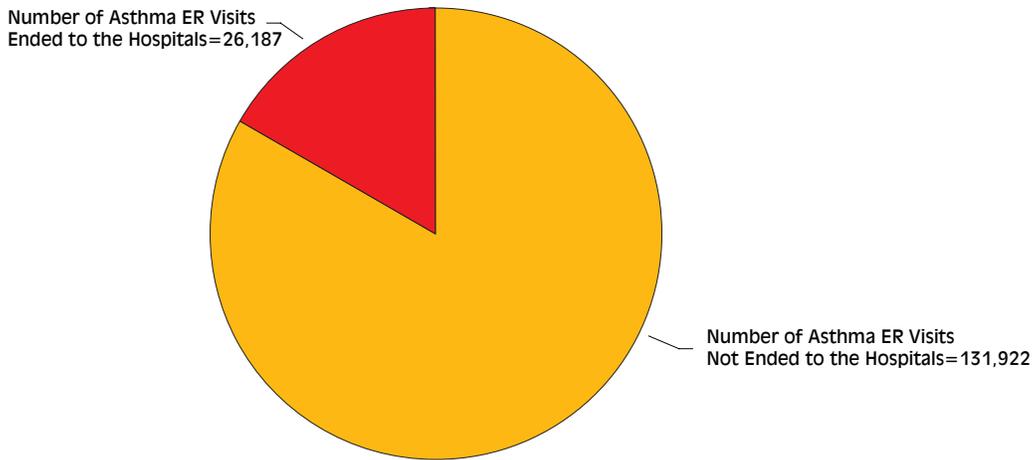
**Table 4-1:** Annual Rates for Asthma Emergency Room (ER) Visits, Asthma Inpatient Hospitalizations, and Office Visits Due to Asthma among Medicaid Recipients (0-64) with Asthma, Pennsylvania 2004-2007

Year	Eligible Asthmatic Population	Asthma Emergency Room Visits		Asthma Inpatient Hospitalizations		Office Visits Due To Asthma	
		Number of Visits	Per 1,000 Eligible Recipients	Number of Visits	Per 1,000 Eligible Recipients	Number of Visits	Per 1,000 Eligible Recipients
2004	124,917	30,010	240	5,755	46	88,617	709
2005	135,511	33,150	245	5,652	42	100,356	741
2006	138,931	34,962	252	6,449	46	113,957	820
2007	136,685	33,800	247	6,023	44	105,309	770

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

There was increase of asthma ER visits in 2007 of almost 12.6 percent compared to 2004; in 2007, the number of visits decreased approximately 3.5 percent compared to 2006. The number of asthma inpatient hospitalizations in 2007 increased 4.6 percent compared to 2004. The number of office visits due to asthma in 2007 increased almost 18.8 percent in comparison to 2004. The rate for asthma ER visits was lowest in 2004 (240 per 1,000) and highest in 2006 (252 per 1,000). The rate of asthma hospitalizations was lowest in 2005 (42 per 1,000) and highest in 2004 and 2006 (46 per 1,000). The lowest rate of office visits due to asthma occurred in 2004 (709 per 1,000) and the highest in 2006 (820 per 1,000).

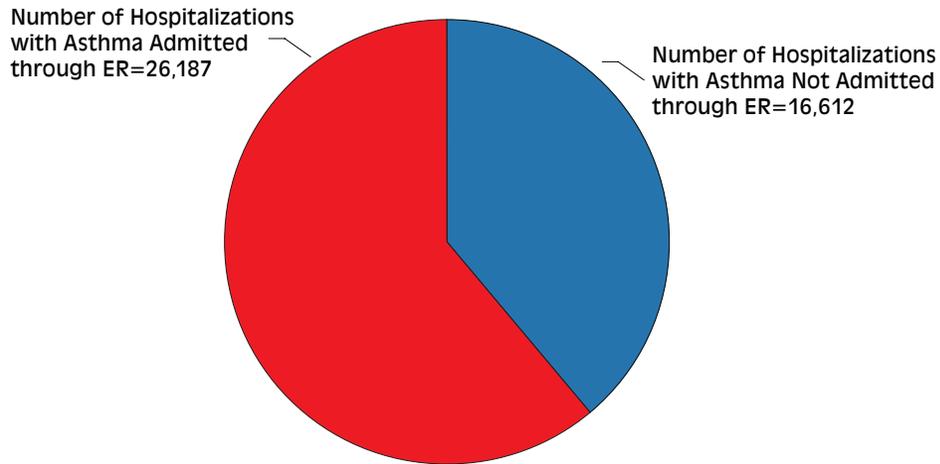
**Figure 4-3:** Total Number and Distribution of Asthma Emergency Room (ER) Visits Followed by Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis Among Medicaid Recipients (0-64), Pennsylvania 2004-2007 (Combined Data)



Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2007, the total number of asthma ER Visits among Medicaid recipients was 158,109, of which around 26,187 resulted in hospitalization. An average of 40,000 asthma ER Visits occur every year among Medicaid recipients. Around 16.5 percent of all asthma ER visits require hospitalization.

**Figure 4-4:** Total Number and Distribution of Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis That Started as an ER Visit Among Medicaid Recipients (0-64), Pennsylvania 2004-2007 (Combined Data)



Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2007, the total number of inpatient hospitalizations with asthma as the primary discharge diagnosis among Medicaid recipients was 42,799. More than half of all admissions (around 61 percent) admitted to the hospital through ER. There were approximately 10,000 admissions with asthma among Medicaid recipients every year.

**Table 4-2:** Direct Annual Paid Claims of Asthma Medications and Asthma Related Services Among Medicaid Recipients (0-64) with Asthma, Pennsylvania 2004-2007

Year	Pharmacy Paid Amount		Medical Service Paid Amount*		Cost of Asthma	
	Paid Claims	Cost Per Recipient	Paid Claims	Cost Per Recipient	Paid Claims	Cost Per Recipient
2004	\$14,267,942	\$114.22	\$24,086,925	\$192.82	\$38,354,867	\$307.04
2005	\$14,228,231	\$105.00	\$26,522,374	\$195.72	\$40,750,605	\$300.72
2006	\$29,948,228	\$215.56	\$31,053,562	\$223.52	\$61,001,790	\$439.08
2007	\$52,135,668	\$381.43	\$28,265,374	\$206.79	\$80,401,042	\$588.22

\*Medical Service includes all kinds of hospitalizations, ER and office visits excluding pharmacy expenses.

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania

During 2004-2007, annual paid claims for asthma medications and asthma related services among Medicaid recipients with asthma significantly increased, with the exception of 2005. Overall, the pharmacy-paid claim amount in 2007 increased almost 40 percent compared to 2004. Medical services paid claims were approximately 17 percent more in 2007 than in 2004. The total number of paid claims for asthma among Medicaid recipients increased in 2007 by almost 36 percent compared to 2004, and the amount of paid claims for asthma per recipient increased nearly 25 percent from 2004 to 2007.

**Table 4-3:** Direct Annual Paid Claims for Asthma Emergency Room Visits (does not include ER asthma visits that resulted in hospitalization), Asthma Inpatient Hospitalizations, and Office Visits Due To Asthma Among Medicaid Percipients (0-64) with Asthma, Pennsylvania 2004-2007

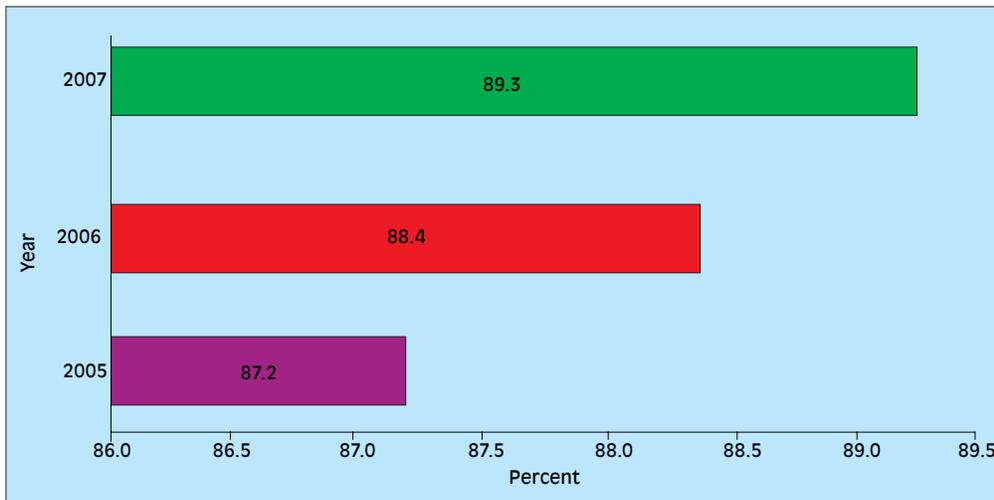
Year	Asthma Emergency Room Visits			Asthma Inpatient Hospitalizations			Office Visits Due To Asthma		
	Total Paid Claims	Number of Visits	Per Visit	Total Paid Claims	Number of Admissions	Per Stay	Total Paid Claims	Number of Visits	Per Visit
2004	\$2,804,874	30,010	\$93.46	\$15,648,765	5,755	\$2,722.24	\$1,127,857	88,617	\$12.73
2005	\$3,854,146	33,150	\$116.26	\$16,961,157	5,652	\$3,137.57	\$1,172,746	100,356	\$11.69
2006	\$4,611,151	34,962	\$131.89	\$20,375,552	6,449	\$3,379.42	\$2,220,147	113,957	\$19.48
2007	\$5,020,663	33,800	\$148.54	\$20,116,329	6,023	\$3,640.95	\$1,936,125	105,309	\$18.39

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2004-2007, annual paid claims of asthma emergency room visits increased nearly 80 percent from \$2,804,874 in 2004 to \$5,020,663 in 2007. Annual paid claims for office visits due to asthma increased 70 percent in 2007 compared to 2004. Total paid claims for asthma admissions increased 28 percent from 2004 to 2007, while per visits and stay increased almost 60 percent, 33 percent, 50 percent for ER, inpatient hospitalizations, and office visits accordingly (in 2007 compared to 2004).

Note: The paid claim amount per visit for office visits, and the total paid claim amount for office visits are believed to be underreported, due to the capitation of Medicaid Managed Care Plans.

**Figure 4-5:** Percentage of Medicaid Recipients (0-64) with Persistent Asthma Receiving Appropriate Long-Term Control Medications, Pennsylvania 2005-2007



Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

During 2005-2007, the percentage of Medicaid recipients with persistent asthma receiving appropriate long-term control medications increased from 87.2.8% in 2005 to 89.3% in 2007.

**Table 4-4:** Prevalence of the Persistent Asthma and Asthma Among Medicaid Recipients with Asthma by Age Group, Pennsylvania 2004-2007

2004				
Age Group	Population with asthma	Population with Persistent persistent asthma	Prevalence of asthma	Prevalence of Persistent asthma
0-4	29,913	2,341	11.4%	7.8%
5-14	39,321	4,336	9.3%	11.0%
15-24	18,437	2,145	6.6%	11.6%
25-34	10,875	1,598	7.0%	14.7%
35-44	11,930	2,211	7.7%	18.5%
45-54	9,385	2,000	7.1%	21.3%
55-64	5,055	1,007	5.3%	19.9%
<b>TOTAL</b>	<b>124,916</b>	<b>15,638</b>	<b>8.3%</b>	<b>12.5%</b>
2005				
Age Group	Population with asthma	Population with Persistent persistent asthma	Prevalence of asthma	Prevalence of Persistent asthma
0-4	30,913	3,062	11.3%	9.9%
5-14	43,234	6,237	10.0%	14.4%
15-24	20,540	2,995	6.9%	14.6%
25-34	11,827	2,117	7.2%	17.9%
35-44	12,942	2,875	8.1%	22.2%
45-54	10,467	2,641	7.4%	25.2%
55-64	5,588	1,375	5.6%	24.6%
<b>TOTAL</b>	<b>135,511</b>	<b>21,302</b>	<b>8.6%</b>	<b>15.7%</b>
2006				
Age Group	Population with asthma	Population with Persistent persistent asthma	Prevalence of asthma	Prevalence of Persistent asthma
0-4	30,930	3,187	11.2%	10.3%
5-14	44,247	6,853	10.4%	15.5%
15-24	21,740	3,381	7.2%	15.6%
25-34	12,301	2,277	7.4%	18.5%
35-44	12,961	3,003	8.3%	23.2%
45-54	10,967	2,864	7.5%	26.1%
55-64	5,786	1,474	5.6%	25.5%
<b>TOTAL</b>	<b>138,932</b>	<b>23,039</b>	<b>8.8%</b>	<b>16.6%</b>
2007				
Age Group	Population with asthma	Population with Persistent persistent asthma	Prevalence of asthma	Prevalence of Persistent asthma
0-4	29,952	3,223	10.8%	10.8%
5-14	44,087	7,435	10.6%	16.9%
15-24	21,690	3,617	7.3%	16.7%
25-34	11,939	2,237	7.2%	18.7%
35-44	12,397	2,781	8.2%	22.4%
45-54	10,799	2,667	7.3%	24.7%
55-64	5,821	1,314	5.6%	22.6%
<b>TOTAL</b>	<b>136,685</b>	<b>23,274</b>	<b>8.8%</b>	<b>17.0%</b>

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

**Table 4-5:** Prevalence of the Persistent Asthma Among Medicaid Recipients with Asthma by County, Pennsylvania 2005-2007

Health District/ County	2005			2006			2007		
	Eligible	Number of	Percent	Eligible	Number of	Percent	Eligible	Number of	Percent
	asthmatics population	persistent asthmatics*		asthmatics population	persistent asthmatics*		asthmatics population	persistent asthmatics*	
<b>South West</b>									
Allegheny	11,161	1,899	17.0%	11,434	1,964	17.2%	11,154	1,994	17.9%
Armstrong	676	82	12.1%	698	95	13.6%	690	94	13.6%
Beaver	1,777	199	11.2%	1,829	202	11.0%	1,729	215	12.4%
Butler	904	104	11.5%	929	115	12.4%	945	131	13.9%
Cambria	1,536	156	10.2%	1,685	184	10.9%	1,733	239	13.8%
Fayette	2,111	331	15.7%	2,077	317	15.3%	1,945	303	15.6%
Greene	606	95	15.7%	577	89	15.4%	557	85	15.3%
Indiana	800	99	12.4%	732	102	13.9%	675	90	13.3%
Somerset	781	63	8.1%	749	75	10.0%	752	86	11.4%
Washington	1,452	245	16.9%	1,494	265	17.7%	1,492	250	16.8%
Westmoreland	2,738	351	12.8%	2,687	378	14.1%	2,716	399	14.7%
<b>Total</b>	<b>24,542</b>	<b>3,624</b>	<b>14.8%</b>	<b>24,891</b>	<b>3,786</b>	<b>15.2%</b>	<b>24,388</b>	<b>3,886</b>	<b>15.9%</b>
<b>South Central</b>									
Adams	579	79	13.6%	551	87	15.8%	524	78	14.9%
Bedford	377	34	9.0%	389	33	8.5%	385	36	9.4%
Blair	1,666	132	7.9%	1,644	174	10.6%	1,707	198	11.6%
Cumberland	905	107	11.8%	997	115	11.5%	919	123	13.4%
Dauphin	2,578	347	13.5%	2,629	374	14.2%	2,656	399	15.0%
Franklin	870	111	12.8%	813	105	12.9%	763	112	14.7%
Fulton	72	N/D*	N/D*	88	11	12.5%	106	20	18.9%
Huntingdon	482	46	9.5%	463	46	9.9%	438	54	12.3%
Juniata	145	23	15.9%	157	25	15.9%	144	24	16.7%
Lebanon	1,070	186	17.4%	1,087	182	16.7%	1,101	163	14.8%
Mifflin	546	95	17.4%	578	95	16.4%	548	92	16.8%
Perry	252	26	10.3%	265	38	14.3%	270	32	11.9%
York	3,070	415	13.5%	3,181	455	14.3%	2,999	440	14.7%
<b>Total</b>	<b>12,612</b>	<b>1,609</b>	<b>12.8%</b>	<b>12,842</b>	<b>1,740</b>	<b>13.5%</b>	<b>12,560</b>	<b>1,771</b>	<b>14.1%</b>
<b>South East</b>									
Berks	4,943	714	14.4%	5,246	710	13.5%	5,319	713	13.4%
Bucks	2,345	318	13.6%	2,321	329	14.2%	2,294	307	13.4%
Chester	1,795	169	9.4%	1,830	186	10.2%	1,780	201	11.3%
Delaware	5,415	781	14.4%	5,444	815	15.0%	5,425	814	15.0%
Lancaster	3,984	545	13.7%	4,183	569	13.6%	4,031	557	13.8%
Montgomery	2,817	391	13.9%	2,896	420	14.5%	2,885	400	13.9%
Philadelphia	44,396	8,950	20.2%	45,451	9,947	21.9%	44,319	9,863	22.3%
Schuylkill	1,369	174	12.7%	1,429	178	12.5%	1,428	178	12.5%
<b>Total</b>	<b>67,064</b>	<b>12,042</b>	<b>18.0%</b>	<b>68,800</b>	<b>13,154</b>	<b>19.1%</b>	<b>67,481</b>	<b>13,033</b>	<b>19.3%</b>

N/D\*=Not Displayed if count <10

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

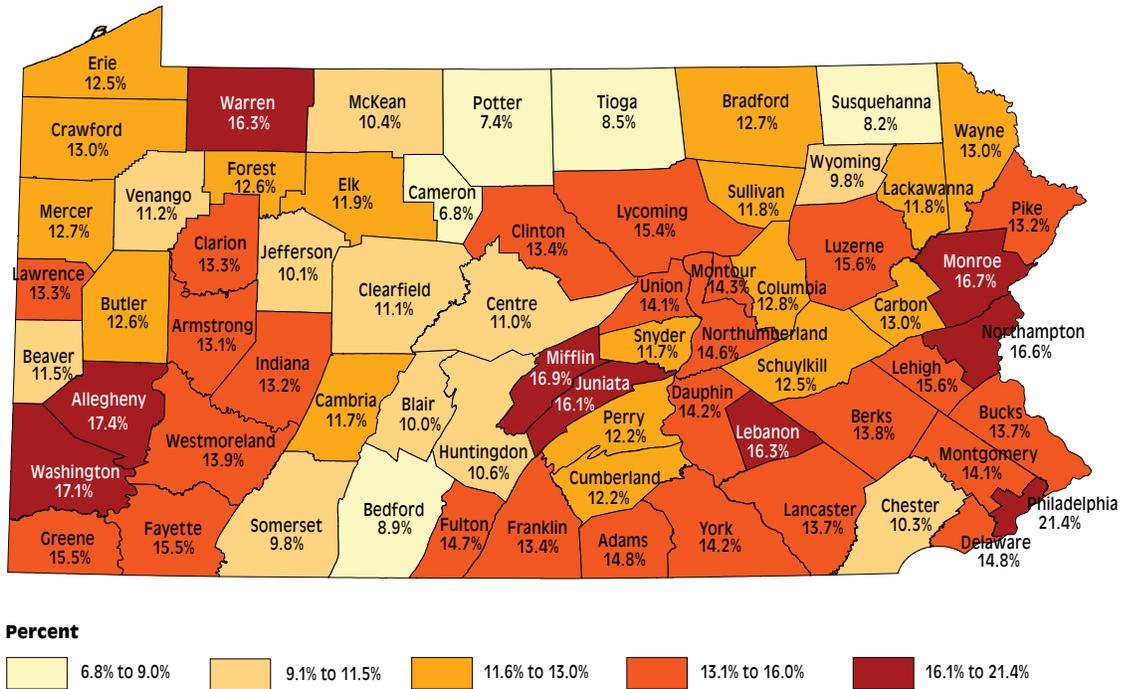
**Table 4-5: (continued)** Prevalence of the Persistent Asthma Among Medicaid Recipients with Asthma by County, Pennsylvania 2005-2007

Health District/ County	2005			2006			2007		
	Eligible asthmatics population	Number of persistent asthmatics	Percent	Eligible asthmatics population	Number of persistent asthmatics	Percent	Eligible asthmatics population	Number of persistent asthmatics	Percent
<b>North West</b>									
Cameron	34	N/D*	N/D*	43	N/D*	N/D*	40	N/D*	N/D*
Clarion	395	50	12.7%	417	54	12.9%	410	58	14.1%
Clearfield	1,287	134	10.4%	1,332	159	11.9%	1,340	147	11.0%
Crawford	1,068	127	11.9%	999	141	14.1%	938	122	13.0%
Elk	318	37	11.6%	340	39	11.5%	348	44	12.6%
Erie	2,745	321	11.7%	2,890	331	11.5%	3,202	450	14.1%
Forest	30	N/D*	N/D*	39	N/D*	10.3%	34	N/D*	14.7%
Jefferson	674	66	9.8%	706	71	10.1%	704	73	10.4%
Lawrence	1,031	134	13.0%	964	126	13.1%	854	120	14.1%
McKean	740	80	10.8%	722	71	9.8%	646	69	10.7%
Mercer	1,417	171	12.1%	1,468	190	12.9%	1,524	199	13.1%
Venango	681	79	11.6%	673	71	10.5%	641	74	11.5%
Warren	296	46	15.5%	315	54	17.1%	269	43	16.0%
<b>Total</b>	<b>10,716</b>	<b>1,251</b>	<b>11.7%</b>	<b>10,908</b>	<b>1,313</b>	<b>12.0%</b>	<b>10950</b>	<b>1408</b>	<b>12.9%</b>
<b>North Central</b>									
Bradford	755	87	11.5%	706	90	12.7%	693	97	14.0%
Centre	592	71	12.0%	652	69	10.6%	687	72	10.5%
Clinton	303	44	14.5%	326	45	13.8%	354	43	12.1%
Columbia	556	79	14.2%	586	77	13.1%	621	69	11.1%
Lycoming	1,345	200	14.9%	1,360	209	15.4%	1,356	218	16.1%
Montour	178	24	13.5%	157	24	15.3%	128	18	14.1%
Northumberland	781	105	13.4%	813	116	14.3%	873	139	15.9%
Potter	229	15	6.6%	265	18	6.8%	250	22	8.8%
Snyder	228	27	11.8%	244	28	11.5%	237	28	11.8%
Sullivan	42	N/D*	N/D*	33	N/D*	18.2%	35	N/D*	11.4%
Tioga	492	34	6.9%	459	41	8.9%	385	39	10.1%
Union	233	27	11.6%	257	41	16.0%	234	34	14.5%
<b>Total</b>	<b>5,734</b>	<b>716</b>	<b>12.5%</b>	<b>5,858</b>	<b>764</b>	<b>13.0%</b>	<b>5,853</b>	<b>783</b>	<b>13.4%</b>
<b>North East</b>									
Carbon	644	77	12.0%	612	82	13.4%	613	84	13.7%
Lackawanna	2,366	264	11.2%	2,463	290	11.8%	2,390	300	12.6%
Lehigh	4,145	623	15.0%	4,473	689	15.4%	4,322	704	16.3%
Luzerne	2,573	390	15.2%	2,698	427	15.8%	2,760	433	15.7%
Monroe	1,310	190	14.5%	1,403	229	16.3%	1,491	285	19.1%
Northampton	2,170	352	16.2%	2,294	375	16.3%	2,220	385	17.3%
Pike	407	46	11.3%	417	58	13.9%	396	57	14.4%
Susquehanna	489	31	6.3%	488	43	8.8%	498	47	9.4%
Wayne	508	65	12.8%	536	69	12.9%	518	69	13.3%
Wyoming	231	22	9.5%	249	20	8.0%	245	29	11.8%
<b>Total</b>	<b>14,843</b>	<b>2,060</b>	<b>13.9%</b>	<b>15,633</b>	<b>2,282</b>	<b>14.6%</b>	<b>15,453</b>	<b>2,393</b>	<b>15.5%</b>
<b>PA/Total</b>	<b>135,511</b>	<b>21,302</b>	<b>15.7%</b>	<b>138,932</b>	<b>23,039</b>	<b>16.6%</b>	<b>136,685</b>	<b>23,274</b>	<b>17.0%</b>

N/D\*=Not Displayed if count &lt;10

Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

**Figure 4-6:** Average Prevalence of Persistent Asthma Among Medicaid Recipients with Asthma by County, Pennsylvania 2005-2007



Data Source: Department of Public Welfare, Commonwealth of Pennsylvania.

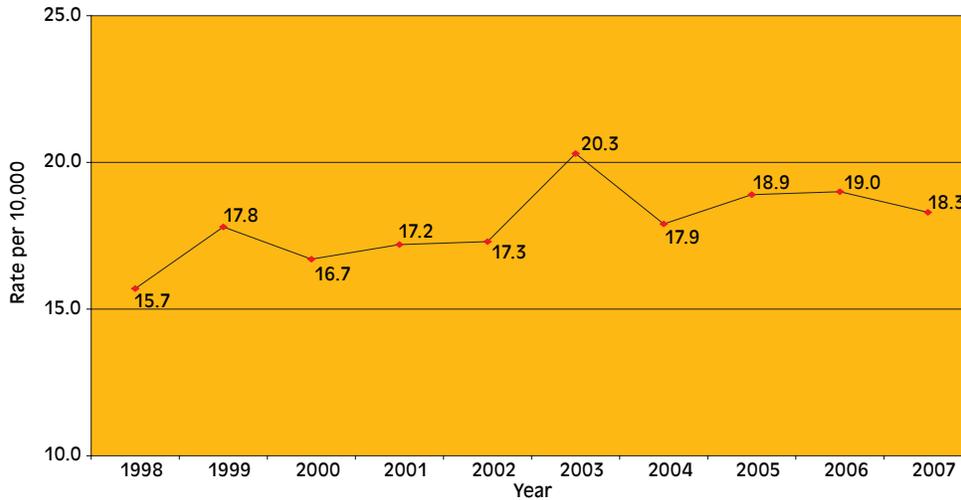
## SECTION 5: Asthma Hospitalization Data

The Pennsylvania Health Care Cost Containment Council (PHC4) is the only source of asthma hospitalization data in Pennsylvania. The PHC4 provides information concerning asthma as the primary discharge diagnosis (ICD-9-493.00-493.99), in the form of inpatient and outpatient discharge data. Data includes length of stay, hospital charges, sources of payment, admission type, type of hospital, as well as the patient's home county code, sex, age, race, ethnicity and gender. This section represents analysis of the last 5-10 years and provides information at the state-wide and region/county levels.

Asthma hospitalization data is collected by PHC4. Inpatient asthma hospitalization data has been available since 1996 for the PA DOH to utilize. Such data ranges from the years of 1996-2007. However, the majority of data in this report represents the burden of asthma from 2003-2007.

The unit of analysis for this report is asthma as the primary discharge diagnosis, ICD-9 (493.00-493.99). Only hospitalizations for Pennsylvania residents who were admitted to Pennsylvania hospitals are included in this report. Data was analyzed using SAS 9.1.3 and Excel. Age-adjusted rates were adjusted to the 2000 US standard population via the direct method. Crude rates were calculated per 10,000 PA residents.

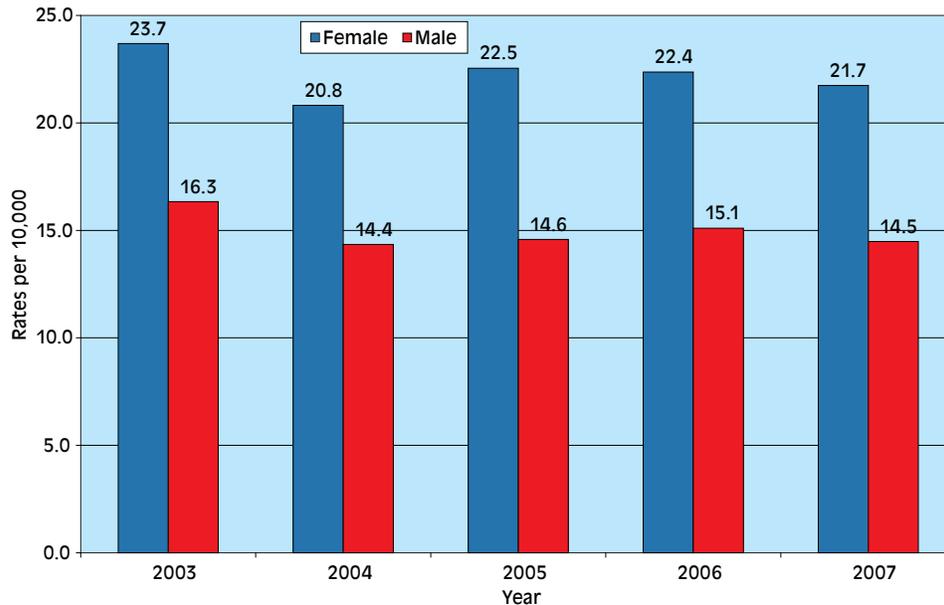
**Figure 5-1:** Annual Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis, Pennsylvania 1998-2007



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

Age-adjusted rates for inpatient hospitalizations with asthma as the primary discharge diagnosis slightly increased from 2000 to 2002 and from 2004 to 2006. From 2006 to 2007, asthma age-adjusted rates decreased.

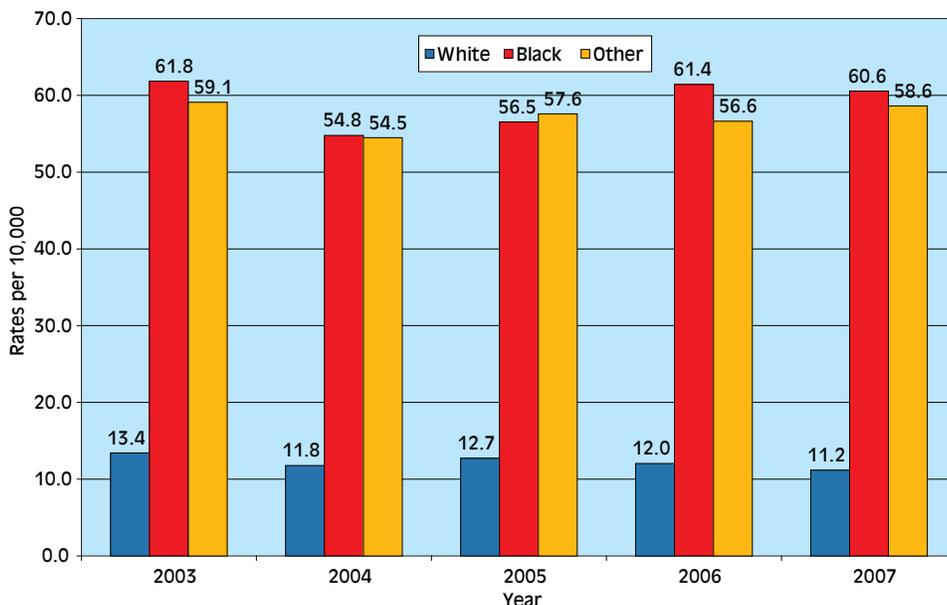
**Figure 5-2:** Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, Pennsylvania 2003-2007



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

Age-adjusted rates for inpatient hospitalizations with asthma as the primary discharge diagnoses were significantly higher among females than males in 2003-2007 (by approximately 30 percent). The highest rates among females and males were in 2003 (23.7 and 16.3 accordingly). The lowest rates were in 2004 (20.8 for females and 14.4 for males) [P<0.05].

**Figure 5-3:** Age-Adjusted Rates for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis by Race, Pennsylvania 2003-2007

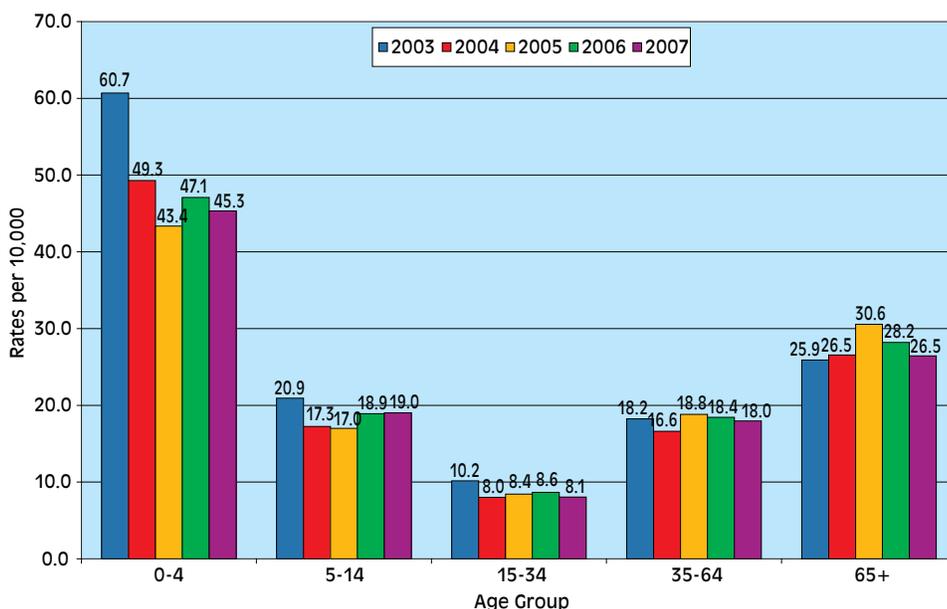


Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

Age-adjusted rates for inpatient hospitalizations with asthma as the primary discharge diagnosis were significantly lower among whites compared to blacks and others ( $P < 0.05$ ) throughout 2003-2007. The highest rates among whites, blacks and others were in 2003 (13.4; 61.8; 59.1) and lowest in 2004 (54.8; 54.5) for blacks and others. The lowest rate for whites was in 2007 (11.2).



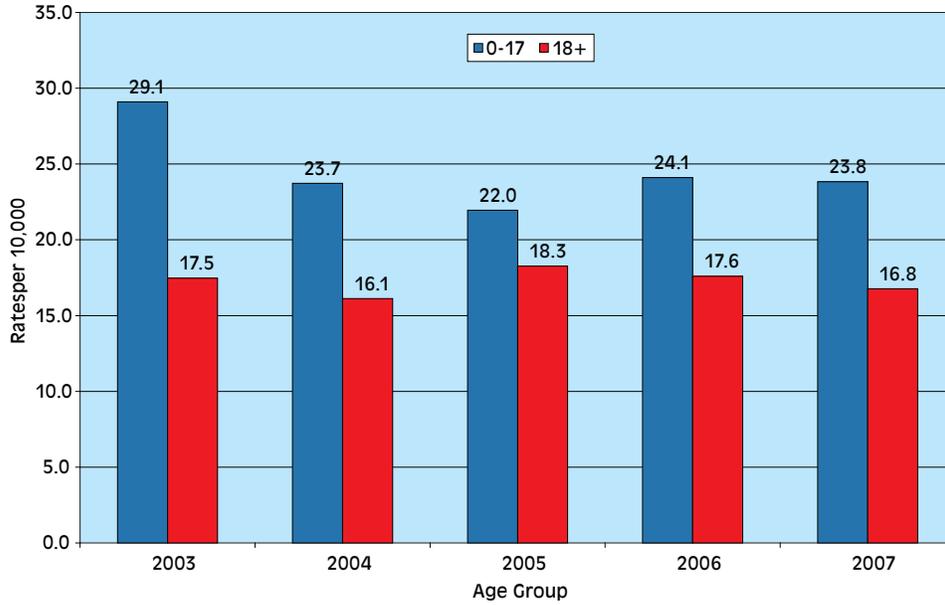
**Figure 5-4:** Age-Adjusted Rates for Inpatient Hospitalization with Asthma as the Primary Discharge Diagnosis by Age Group, Pennsylvania 2003-2007



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

In 2003-2007, among all ages groups, children aged 0-4 years had a significantly higher hospitalization rate compared to other age groups ( $P < 0.05$ ). The lowest rate was in the 15-34 age group. The asthma hospitalization rates varied slightly from year to year, with the exception of 2003 and 2007 for the 0-4 age group and for the 65+ age group in 2003 and 2005.

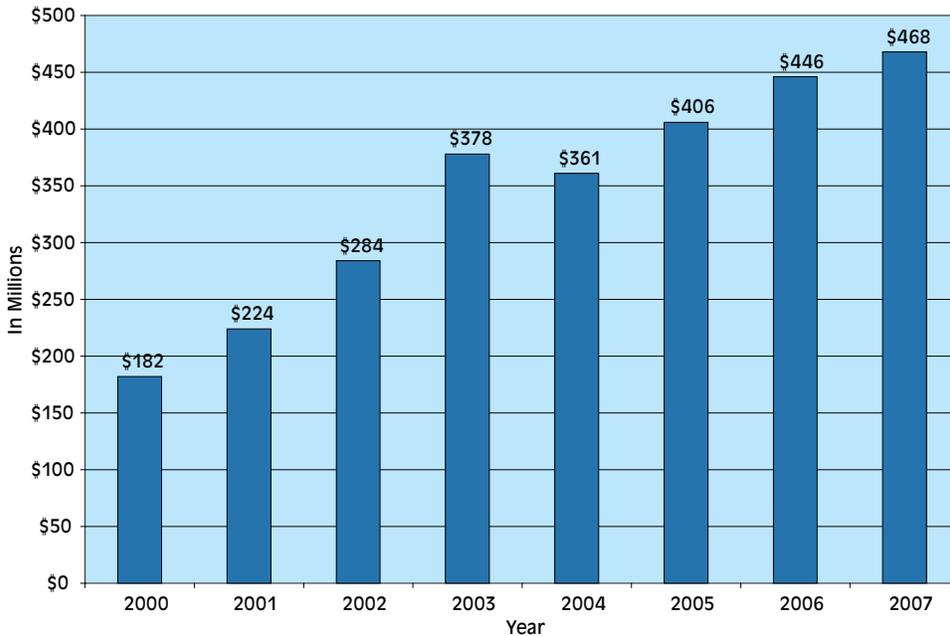
**Figure 5-5:** Age-Specific Rates for Inpatient Hospitalization with Asthma as Primary Discharge Diagnosis among Children (0-17) and Adults (18+), Pennsylvania 2003-2007



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

In 2003-2007, age-adjusted rates for inpatient hospitalizations with asthma as the primary discharge diagnosis were significantly higher among children (0-17) compared to adults (18+). The highest rate for children was in 2003 (29.1) and lowest in 2005 (22.0). Among adults the highest rate was in 2005 (18.3), and the lowest was in 2004 (16.1).

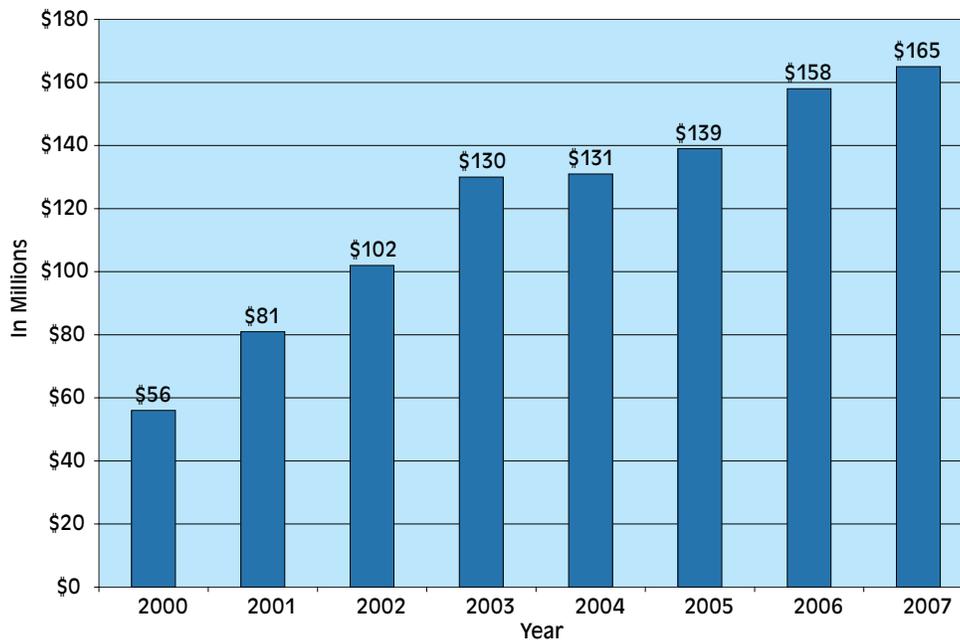
**Figure 5-6:** Total Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis, Pennsylvania 2000-2007 (do not include professional fees)



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

In 2003-2007, the total charges for inpatient hospitalizations with asthma as the primary discharge diagnosis were overall on the rise, with a one-year exception. In 2000, total charges for asthma admissions were approximately \$182 million. In 2007, the amount rose almost 2.6 times to \$468 million.

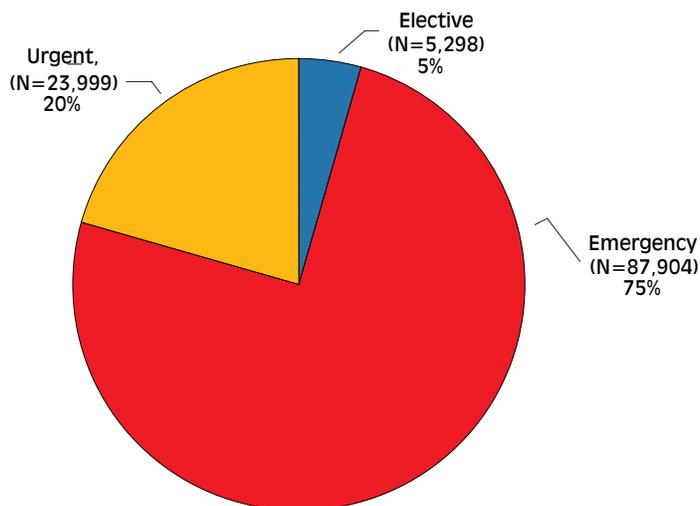
**Figure 5-7** Total Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis Charged to Medicaid, Pennsylvania 2000-2007 (do not include professional fees)



Data Source: Pennsylvania Health Care Cost Containment Council (PHCA).

In 2000-2007, the Medicaid charges for inpatient hospitalizations with asthma as the primary discharge diagnoses were consistently on the rise. In 2007, Medicaid charges increased nearly 3 times the 2000 amount (from \$56 million to \$165 million).

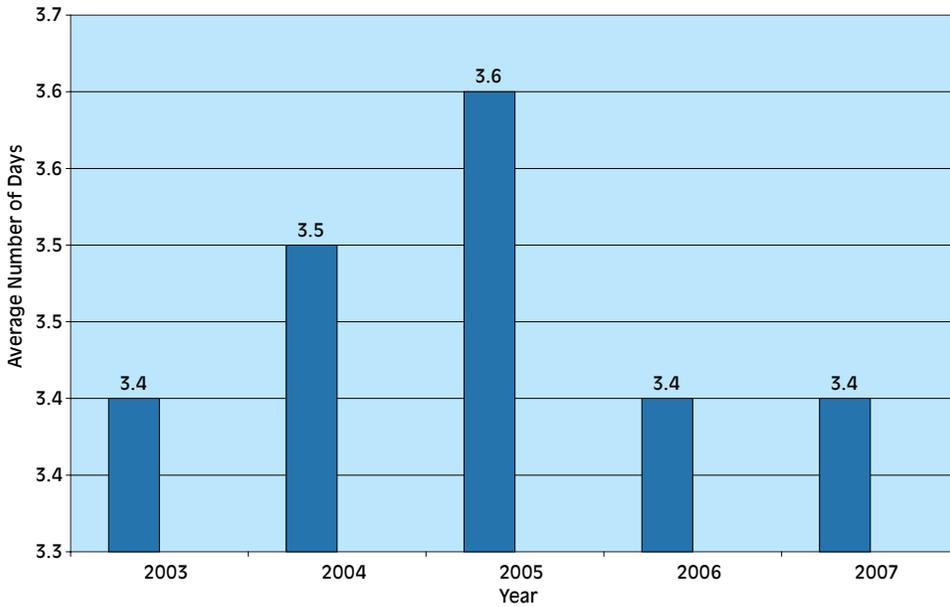
**Figure 5-8:** Total Number and Distribution of the Admission Types for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis, Pennsylvania 2003-2007 (Combined Data)



Data Source: Pennsylvania Health Care Cost Containment Council (PHCA).

In 2003-2007, the number of admissions with asthma as the primary discharge diagnosis as a so-called “emergency” accounted for almost 75 percent of all asthma admissions, followed by “urgent” at 20 percent and “elective” at 5 percent.

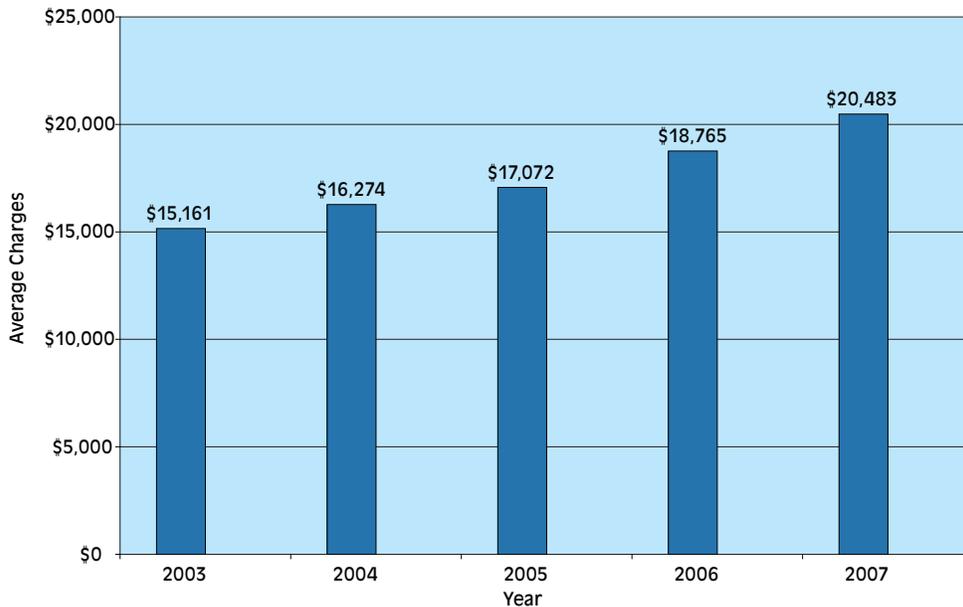
**Figure 5-9:** Average Length of Stay (LOS) for Inpatient Hospitalizations with the Primary Discharge Diagnosis of Asthma, Pennsylvania 2003-2007



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

The average LOS for inpatient hospitalizations with asthma as the primary discharge diagnosis was the highest in 2005 (3.6 days) and lowest in 2003, 2004, 2006, and 2007 (3.4 days).

**Figure 5-10:** Average Charges for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis, Pennsylvania 2003-2007 (do not include professional fees)



Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

In 2003-2007, average charges for inpatient hospitalizations with asthma as the primary discharge diagnoses were on the rise. By 2007, these charges had grown almost 32.5 percent compared to 2003 (from \$15,161 to \$20,483).

**Table 5-1** Annual Inpatient Hospitalization Rates with Asthma as Primary Discharge Diagnosis Among Children (0-17) and Adults (18+) by Health District, Pennsylvania 2003-2007.

	North East			North West			North Central		
	0-17	18+	Overall	0-17	18+	Overall	0-17	18+	Overall
2003	20.51	15.5	16.6	18.9	14.3	15.4	12.8	9.4	10.1
2004	15.5	14.4	14.6	14.6	14.9	14.8	9.4	8.8	8.9
2005	14.9	16.7	16.3	13.7	15.8	15.4	7.4	10.1	9.6
2006	14.6	17.0	16.5	11.9	13.4	13.0	9.7	9.3	9.4
2007	14.1	15.7	15.3	9.4	12.4	11.7	7.4	8.9	8.6
	South East			South West			South Central		
	0-17	18+	Overall	0-17	18+	Overall	0-17	18+	Overall
2003	45.6	20.8	26.9	16.6	20.0	19.3	15.7	10.1	11.5
2004	37.6	18.7	23.4	14.5	19.4	18.3	11.6	8.2	9.1
2005	34.5	20.9	24.3	14.7	22.3	20.7	9.3	9.5	9.4
2006	38.7	21.3	25.6	15.7	20.3	19.3	11.1	8.5	9.1
2007	39.0	20.7	25.1	16.4	19.4	18.7	9.7	7.7	8.2

Data Source: Pennsylvania Health Care Containment Council (PHC4).

During 2003-2005, the South East had the highest asthma rates compared to other regions in Pennsylvania. Overall, in 2007, asthma hospitalizations rates decreased in all regions compared to 2003, with the exception of the North East (18+). The lowest asthma hospitalization rates for children (0-17) in 2007 were in the North Central Health District (7.4), and the highest asthma rates were in the South East (39.0). The lowest rates for adults were in the South Central Health District (7.7), and the highest rates were in the South East (20.7).

**Table 5-2:** Asthma Inpatient Hospitalization Rate per 10,000 Residents by Age Group Compared to Healthy People 2010 Objectives, Pennsylvania 2003-2007.

Age Groups		Pennsylvania					Goal
Age Group (0-4)		2003	2004	2005	2006	2007	Healthy People 2010
Per 10,000 under 5							
	All	60.7	49.3	43.4	47.1	45.3	25
	Male	76.9	61.1	55.7	59.1	56.3	25
	Female	43.7	37.0	30.5	34.5	33.8	25
	White	33.7	26.8	22.7	24.4	21.9	25
	Black	174.6	144.2	132.5	146.9	141.8	25
	Hispanics*	117.2	74.0	58.6	68.1	67.4	25
Age Group (5-64)		2003	2004	2005	2006	2007	Healthy People 2010
Per 10,000 ages 5-64							
(age-adjusted to 2000 std population)							
	All	15.8	13.6	14.7	14.9	12.5	7.7
	Male	11.0	9.7	10.1	10.7	8.5	7.7
	Female	20.5	17.4	19.1	18.9	16.4	7.7
	White	10.0	8.5	9.3	8.8	7.0	7.7
	Black	52.9	46.2	48.9	53.0	43.1	7.7
	Hispanics*	34.1	25.9	26.3	24.8	25.6	7.7
Age Group (65+)		2003	2004	2005	2006	2007	Healthy People 2010
Per 10,000 age 65+							
(age-adjusted to 2000 std population)							
	All	25.8	26.3	30.3	28.2	26.5	11
	Male	16.8	17.6	19.9	18.1	17.7	11
	Female	31.8	32.2	37.3	35.1	32.5	11
	White	23.0	23.6	27.5	24.7	22.8	11
	Black	53.2	53.2	56.0	57.9	56.7	11
	Hispanics*	89.8	63.7	60.6	64.3	85.8	11

Sample data include 95% Confidence Interval ( $\pm$ ).

NOTE: Data are for residents unless specified otherwise.

Hispanics\* can be any race

Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health, and Pennsylvania Health Care Containment Council (PHC4).

During 2003-2007, the asthma inpatient hospitalization rates remain higher than 2010 Healthy People Objectives. However, compared to 2003, asthma hospitalization rates decreased, with some exceptions for the age group 65 and older. Age 0-4 and 5-64 rates decreased from 10 percent to 40 percent. Despite decreasing asthma hospitalization rates, Pennsylvania exceeds the HP2010 targets for each of the age groups, except for white 0-4 and white 5-64 age groups.

**Table 5-3** Age-Adjusted Asthma Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis by County, Pennsylvania 2003-2007 (Combined Data).

Health District	County	Hospitalizations (Numbers)					Rate
		2003	2004	2005	2006	2007	
South West	Allegheny	2,470	2,369	2,752	2,586	2,521	19.7
	Armstrong	99	100	119	95	88	13.3
	Beaver	396	354	400	367	300	18.6
	Butler	190	181	227	221	205	10.9
	Cambria	198	167	188	192	181	11.6
	Fayette	351	292	341	289	337	20.2
	Greene	58	61	50	65	71	14.5
	Indiana	142	148	178	161	154	18.1
	Somerset	99	81	98	67	61	9.6
	Washington	417	457	444	400	381	13.8
	Westmoreland	912	850	881	812	769	21.1
<b>South West/Total</b>		<b>5,332</b>	<b>5,060</b>	<b>5,678</b>	<b>5,255</b>	<b>5,068</b>	<b>18.2</b>
South Central	Adams	131	80	80	76	67	8.7
	Bedford	38	30	41	28	37	6.5
	Blair	131	100	121	122	120	9.3
	Cumberland	255	201	196	193	173	9.1
	Dauphin	300	250	297	300	303	11.4
	Franklin	149	155	131	122	107	9.4
	Fulton	19	N/D*	14	N/D*	N/D*	9.0
	Huntingdon	78	54	78	65	52	14.5
	Juniata	22	15	21	12	20	7.6
	Lebanon	117	115	90	98	98	8.3
	Mifflin	96	69	79	67	58	15.3
	Perry	49	37	36	48	14	8.2
	York	414	318	325	329	274	8.1
<b>South Central/Total</b>		<b>1,799</b>	<b>1,432</b>	<b>1,509</b>	<b>1,473</b>	<b>1,331</b>	<b>9.3</b>
South East	Berks	807	649	721	630	594	16.8
	Bucks	795	721	802	843	837	12.9
	Chester	454	375	421	401	399	8.7
	Delaware	1,207	1,040	1,083	1,142	1,082	20.3
	Lancaster	610	490	491	453	410	9.9
	Montgomery	1,197	992	1,043	1,013	988	13.2
	Philadelphia	7,862	6,961	7,132	7,815	7,900	53.1
	Schuylkill	253	237	261	293	191	16.7
	<b>South East/Total</b>		<b>13,185</b>	<b>11,465</b>	<b>11,954</b>	<b>12,590</b>	<b>12,401</b>

To protect confidentiality and ensure compliance with HIPPA regulations, some hospitalization numbers were omitted and not displayed as needed.

N/D\*=Not displayed if count 10

Note: Data have been updated for some years.

Asthma listed as a primary discharge diagnosis, ICD-9 (493.00-493.99).

Standard 2000 US population used for direct age-adjustment.

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

**Table 5-3: (continued)** Age-Adjusted Asthma Inpatient Hospitalization Rates with Asthma as the Primary Discharge Diagnosis by County, Pennsylvania 2003-2007 (Combined Data).

Health District	County	Hospitalizations (Numbers)					Rate
		2003	2004	2005	2006	2007	
North West	Cameron	11	N/D*	N/D*	N/D*	N/D*	12.4
	Clarion	76	70	58	55	47	14.2
	Clearfield	123	104	78	106	99	12.1
	Crawford	141	122	162	113	101	14.0
	Elk	48	57	45	46	40	13.4
	Erie	338	305	320	270	218	10.4
	Forest	N/D*	N/D*	N/D*	N/D*	N/D*	11.3
	Jefferson	52	42	43	38	49	10.2
	Lawrence	274	292	314	262	229	27.7
	McKean	68	85	80	65	54	16.2
	Mercer	176	180	205	177	156	14.4
	Venango	114	106	92	59	57	14.4
	Warren	18	23	29	19	24	5.5
	North West/Total		1,439	1,391	1,435	1,217	1,086
North East	Carbon	142	102	147	147	115	19.5
	Lackawanna	320	318	367	321	339	15.5
	Lehigh	596	500	533	438	414	14.9
	Luzerne	486	432	549	573	514	15.9
	Monroe	256	231	224	332	359	17.5
	Northampton	495	407	454	538	464	16.0
	Pike	44	39	38	39	34	7.4
	Susquehanna	82	97	91	73	42	19.0
	Wayne	42	51	68	55	59	10.9
	Wyoming	44	55	50	53	53	17.8
North East/Total		2,507	2,232	2,521	2,569	2,393	15.6
North Central	Bradford	55	72	62	63	47	9.4
	Centre	130	107	146	129	100	10.5
	Clinton	29	21	37	33	27	7.4
	Columbia	110	100	93	107	126	16.6
	Lycoming	119	91	82	115	107	8.8
	Montour	14	12	18	17	16	8.7
	Northumberland	110	107	113	95	80	10.5
	Potter	25	13	11	12	15	8.6
	Snyder	21	20	23	18	16	5.1
	Sullivan	N/D*	N/D*	N/D*	N/D*	N/D*	3.8
	Tioga	46	41	41	33	36	9.4
	Union	28	23	24	14	N/D*	4.8
	North Central/Total		688	610	652	638	583

To protect confidentiality and ensure compliance with HIPPA regulations, some hospitalization numbers were omitted and not displayed as needed.

N/D\*=Not displayed if count 10

Note: Data have been updated for some years.

Asthma listed as a primary discharge diagnosis, ICD-9 (493.00-493.99).

Standard 2000 US population used for direct age-adjustment.

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

**Table 5-4** Annual Number, Age-Specific and Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, Race, Ethnicity and Age Group, Pennsylvania 2003

Age-Group	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	4,436	60.7	1,558	43.7	2,878	76.9
5-14	3,401	20.9	1,368	17.3	2,033	24.4
15-34	3,256	10.2	2,208	13.9	1,048	6.5
35-64	8,939	18.2	6,694	26.7	2,245	9.4
65+	4,927	25.9	3,652	32.2	1,274	16.6
Overall	24,959	20.3	15,480	23.7	9,478	16.3
<b>WHITE</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	2,022	33.7	674	23.1	1,348	43.8
5-14	1,333	10.0	537	8.3	796	11.6
15-34	1,774	6.7	1,284	9.7	490	3.6
35-64	5,479	12.7	4,142	18.9	1,337	6.3
65+	4,067	23.2	2,996	28.7	1,071	15.1
Overall	14,675	13.4	9,633	16.4	5,042	10.0
<b>BLACK</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,715	174.7	624	129.8	1,091	217.7
5-14	1,653	74.1	663	60.5	990	87.2
15-34	1,178	30.4	734	37.7	444	23.0
35-64	2,809	62.3	2,094	86.2	715	34.4
65+	665	52.9	528	66.5	137	29.5
Overall	8,020	61.8	4,643	69.7	3,377	51.0
<b>OTHER</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	699	211.8	260	159.9	439	262.3
5-14	414	61.1	167	50.1	247	71.7
15-34	304	20.6	190	25.9	114	15.4
35-64	651	50.1	458	68.1	193	30.7
65+	194	84.4	128	99.4	66	65.2
Overall	2,262	59.1	1,203	64.2	1,059	52.8
<b>HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	509	117.2	192	90.3	317	143.0
5-14	300	35.0	128	30.5	172	39.3
15-34	238	15.8	148	20.7	90	11.3
35-64	595	47.6	422	68.5	173	27.3
65+	167	90.6	117	113.3	50	61.6
Overall	1,809	47.3	1,007	57.0	802	37.0
<b>NON-HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,927	57.1	1,366	40.7	2,561	72.7
5-14	3,101	20.1	1,240	16.5	1,861	23.6
15-34	3,018	9.9	2,060	13.6	958	6.2
35-64	8,344	17.5	6,272	25.7	2,072	8.9
65+	4,760	25.3	3,535	31.4	1,224	16.1
Overall	23,150	19.5	14,473	22.8	8,676	12.6

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

**Table 5-5:** Annual Number, Age-Specific and Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, Race, Ethnicity and Age Group, Pennsylvania 2004

Age-Group	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,600	49.3	1,320	37.0	2,280	61.1
5-14	2,775	17.3	1,081	13.8	1,694	20.6
15-34	2,589	8.0	1,724	10.8	865	5.3
35-64	8,200	16.6	6,005	23.8	2,195	9.1
65+	5,035	26.6	3,705	32.8	1,330	17.4
Overall	22,199	17.9	13,835	20.8	8,364	14.4
<b>WHITE</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,612	26.8	529	18.0	1,083	35.2
5-14	986	7.5	390	6.1	596	8.8
15-34	1,391	5.1	964	7.2	427	3.1
35-64	4,992	11.5	3,746	17.0	1,246	5.8
65+	4,176	23.9	3,050	29.4	1,126	15.9
Overall	13,157	11.8	8,679	14.3	4,478	8.8
<b>BLACK</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,419	144.2	552	114.2	867	173.2
5-14	1,429	64.7	549	50.5	880	78.4
15-34	975	24.3	632	31.5	343	17.1
35-64	2,611	57.2	1,844	74.9	767	36.5
65+	665	53.1	519	65.8	146	31.6
Overall	7,099	54.8	4,096	61.0	3,003	46.1
<b>OTHER</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	569	187.9	239	160.8	330	214.2
5-14	360	55.8	142	44.4	218	67.0
15-34	223	17.3	128	20.0	95	14.7
35-64	597	47.6	415	63.5	182	30.3
65+	194	81.6	136	102.7	58	55.0
Overall	1,943	54.5	1,060	60.5	883	47.2
<b>HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	387	74.0	155	60.8	232	86.7
5-14	283	28.9	108	21.9	175	36.0
15-34	186	11.8	106	13.5	80	10.1
35-64	523	35.6	368	49.8	155	21.3
65+	129	63.4	88	77.3	41	45.8
Overall	1,508	34.3	825	40.0	683	28.0
<b>NON-HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,213	47.4	1,165	35.1	2,048	59.1
5-14	2,492	16.5	973	13.2	1,519	19.6
15-34	2,403	7.8	1,618	10.6	785	5.0
35-64	7,677	16.0	5,637	23.1	2,040	8.7
65+	4,906	26.2	3,617	32.3	1,289	17.0
Overall	20,691	17.3	13,010	20.2	7,681	13.8

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

**Table 5-6** Annual Number, Age-Specific and Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, Race, Ethnicity and Age Group, Pennsylvania 2005

Age-Group	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,170	43.4	1,090	30.5	2,080	55.7
5-14	2,711	17.0	1,062	13.6	1,649	20.2
15-34	2,738	8.4	1,838	11.4	900	5.5
35-64	9,321	18.8	6,916	27.4	2,405	9.9
65+	5,816	30.6	4,320	38.0	1,496	19.6
Overall	23,756	18.9	15,226	22.5	8,530	14.6
<b>WHITE</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,369	22.8	439	14.9	930	30.2
5-14	942	7.2	365	5.7	577	8.6
15-34	1,480	5.5	1,044	7.8	436	3.2
35-64	5,766	13.2	4,298	19.4	1,468	6.8
65+	4,902	27.9	3,627	34.6	1,275	18.0
Overall	14,459	12.7	9,773	15.8	4,686	9.1
<b>BLACK</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,308	132.5	465	95.5	843	168.5
5-14	1,429	65.5	566	52.6	863	77.9
15-34	975	24.0	621	30.6	354	17.4
35-64	2,901	63.0	2,134	85.8	767	36.2
65+	696	55.9	535	68.2	161	35.0
Overall	7,309	56.5	4,321	64.3	2,988	46.1
<b>OTHER</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	493	161.0	186	124.7	307	195.5
5-14	340	52.4	131	40.7	209	64.0
15-34	283	21.8	173	26.7	110	16.9
35-64	654	50.6	484	71.9	170	27.4
65+	218	106.5	158	137.2	60	67.1
Overall	1,988	57.6	1,132	66.8	856	46.4
<b>HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	336	58.6	122	43.6	214	72.9
5-14	240	22.7	97	18.0	143	27.6
15-34	235	14.0	145	17.2	90	10.8
35-64	560	36.4	421	53.5	139	18.5
65+	135	61.5	102	82.9	33	34.2
Overall	1,506	33.0	887	41.4	619	23.5
<b>NON-HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	2,834	42.1	968	29.4	1,866	54.2
5-14	2,468	16.6	964	13.3	1,504	19.7
15-34	2,503	8.1	1,693	11.1	810	5.2
35-64	8,761	18.3	6,495	26.5	2,266	9.7
65+	5,681	30.2	4,218	37.5	1,463	19.4
Overall	22,247	18.4	14,338	21.9	7,909	14.2

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

**Table 5-7:** Annual Number, Age-Specific and Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, Race, Ethnicity and Age Group, Pennsylvania 2006

Age-Group	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,442	47.1	1,233	34.5	2,209	59.1
5-14	2,991	18.9	1,154	14.9	1,837	22.7
15-34	2,833	8.7	1,834	11.3	999	6.0
35-64	9,161	18.5	6,738	26.6	2,423	10.0
65+	5,317	28.2	3,969	35.5	1,348	17.6
Overall	23,744	19.0	14,928	22.4	8,816	15.1
<b>WHITE</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,440	24.4	458	15.9	982	32.5
5-14	974	7.5	361	5.7	613	9.3
15-34	1,421	5.3	963	7.2	458	3.3
35-64	5,310	12.2	3,934	17.8	1,376	6.4
65+	4,297	24.8	3,198	31.3	1,099	15.5
Overall	13,442	12.0	8,914	14.7	4,528	8.9
<b>BLACK</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,462	146.9	545	111.3	917	181.4
5-14	1,629	75.4	648	61.1	981	89.2
15-34	1,103	26.1	686	32.1	417	19.9
35-64	3,071	67.1	2,254	90.6	817	39.1
65+	736	57.9	571	71.4	165	35.0
Overall	8,001	61.4	4,704	69.3	3,297	50.5
<b>OTHER</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	540	131.4	230	113.9	310	148.2
5-14	387	51.4	144	38.2	243	64.5
15-34	309	20.9	185	25.1	124	16.7
35-64	780	54.6	550	74.7	230	33.2
65+	284	105.5	200	133.8	84	70.1
Overall	2,300	56.6	1,309	66.0	991	45.9
<b>HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	390	68.1	153	54.7	237	81.0
5-14	295	29.0	110	21.9	185	35.8
15-34	208	11.5	124	14.3	84	8.9
35-64	520	31.9	387	48.4	133	16.0
65+	151	63.7	109	81.8	42	40.5
Overall	1,564	32.4	883	39.9	681	24.5
<b>NON-HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,052	45.3	1,080	32.8	1,972	57.2
5-14	2,696	18.2	1,044	14.4	1,652	21.8
15-34	2,625	8.5	1,710	11.1	915	5.9
35-64	8,641	18.0	6,351	25.9	2,290	9.8
65+	5,166	27.8	3,860	34.9	1,306	17.3
Overall	22,180	18.5	14,045	21.8	8,135	14.7

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

**Table 5-8** Annual Number, Age-Specific and Age-Adjusted Rates for Inpatient Hospitalizations with Asthma as the Primary Discharge Diagnosis by Gender, Race, Ethnicity and Age Group, Pennsylvania 2007

Age-Group	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	3,322	45.3	1,210	33.8	2,112	56.3
5-14	2,981	19.0	1,186	15.5	1,795	22.4
15-34	2,647	8.1	1,707	10.5	940	5.7
35-64	8,913	18.0	6,683	26.4	2,230	9.2
65+	4,999	26.5	3,632	32.5	1,367	17.7
Overall	22,862	18.4	14,418	21.7	8,444	14.5
<b>WHITE</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,298	21.9	477	16.5	821	27.1
5-14	934	7.3	353	5.7	581	8.9
15-34	1,260	4.7	865	6.5	395	2.9
35-64	5,020	11.5	3,747	16.7	1,273	5.9
65+	3,958	22.8	2,876	28.1	1,082	15.2
Overall	12,470	11.2	8,318	13.8	4,152	8.2
<b>BLACK</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	1,427	141.8	499	10.1	928	181.8
5-14	1,603	75.4	673	64.5	930	86.0
15-34	1,053	24.5	635	29.6	418	19.5
35-64	3,093	67.3	2,355	94.4	738	35.1
65+	716	56.7	536	67.4	180	38.6
Overall	7,892	60.6	4,698	69.3	3,194	48.8
<b>OTHER</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	597	148.1	234	118.8	363	176.2
5-14	444	58.0	160	41.9	284	73.9
15-34	334	22.8	207	28.4	127	17.3
35-64	800	54.4	581	76.6	219	30.7
65+	325	114.0	220	138.9	105	82.8
Overall	2,500	60.2	1,402	69.1	1,098	50.0
<b>HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	418	67.4	157	51.8	261	82.4
5-14	332	30.9	120	22.5	212	39.2
15-34	256	12.1	151	16.2	105	10.1
35-64	657	40.0	489	59.8	168	20.4
65+	217	85.8	156	110.1	61	54.8
Overall	1,880	38.9	1,073	48.2	807	28.9
<b>NON-HISPANIC</b>						
	Total		Female		Male	
	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate	Hospitalizations (#)	Rate
0-4	2,904	43.3	1,053	32.1	1,851	53.9
5-14	2,649	18.2	1,066	15.0	1,583	21.2
15-34	2,390	7.7	1,555	10.2	835	5.4
35-64	8,255	17.2	6,194	25.3	2,061	8.8
65+	4,781	25.6	3,475	31.5	1,306	17.2
Overall	20,979	17.6	13,343	20.9	7,636	13.8

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).

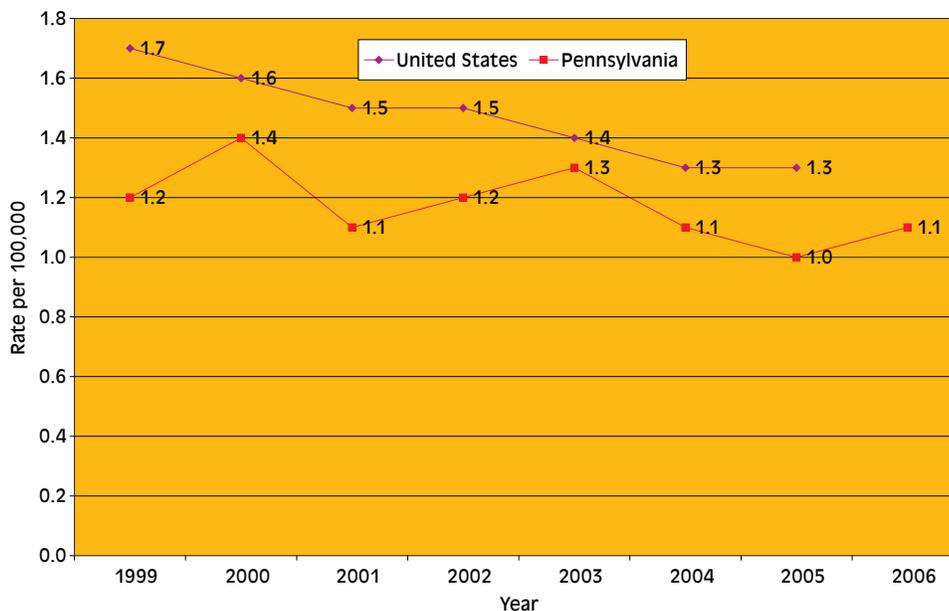
## SECTION 6: Asthma Mortality

For the years 1979-1998, asthma deaths, defined as the underlying cause of death, were classified according to ICD-9 (493.0-493.9). Asthma deaths that occurred in 1999 and later are classified according to ICD-10 (J45-J46). Asthma as the underlying cause of death is rare; however, mortality represents the most serious consequence of asthma. Improving access to health care, education and proper disease management could prevent many asthma-related deaths. This section describes mortality data of Pennsylvania residents who died of asthma from 1998 to 2006.

Asthma mortality data among residents of Pennsylvania are based on the underlying cause of death listed on the death certificate. The source of the asthma mortality data is the Pennsylvania Certificate of Death, and the data were obtained from the Bureau of Health Statistics and Research, Pennsylvania Department of Health.

Death rates have been age-adjusted to the year 2000 standard million population. Mortality rates for demographic units with a small number of events (less than 10 events) were not calculated, because these rates were statistically unreliable. In addition, asthma death data were combined for more than one year and were aggregated by age, gender, race/ethnicity and geographic region.

**Figure 6-1** Age-Adjusted Mortality Rate with Asthma as the Underlying Cause of Death, Pennsylvania and the USA 1999-2006

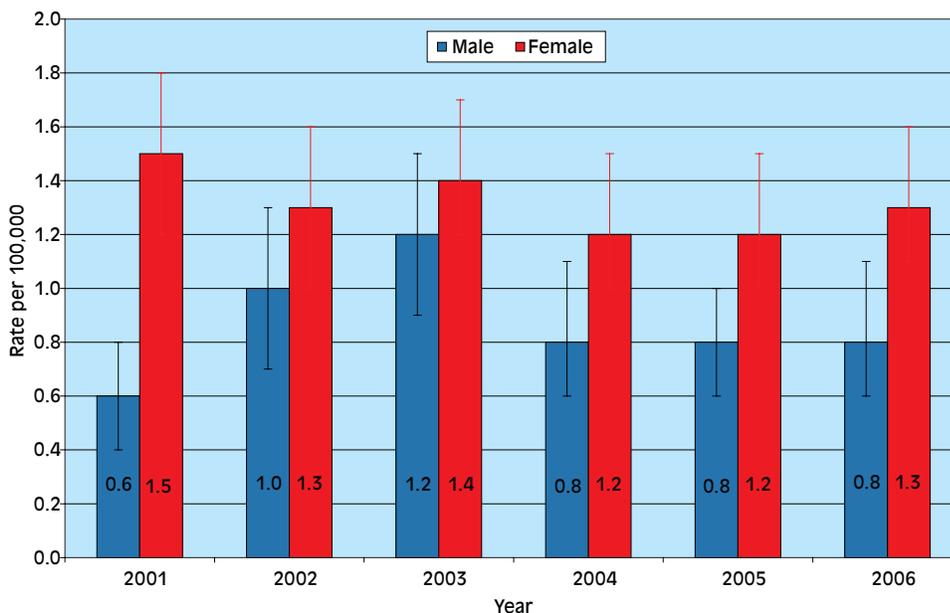


Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health.

During 1999-2005, the age-adjusted asthma mortality rate with asthma as the underlying cause of death in USA decreased from 1.7 deaths per 100,000 population in 1999 to 1.3 deaths per 100,000 population in 2005. Among residents of Pennsylvania, the asthma age-adjusted asthma mortality rate decreased from 1.2 deaths per 100,000 population in 1999 to 1.0 deaths per 100,000 population in 2005, with a slight increase in 2006.



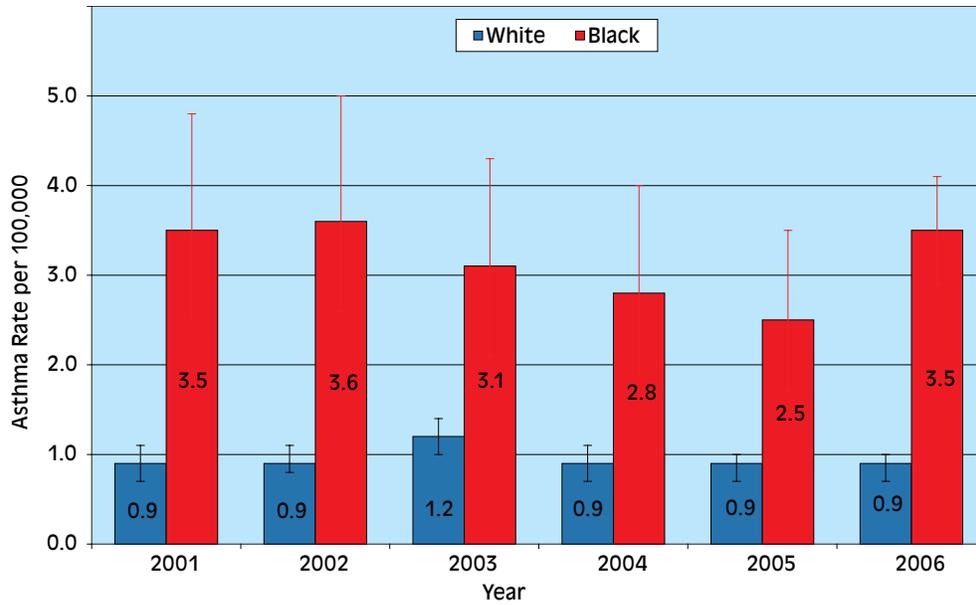
**Figure 6-2:** Age-Adjusted Mortality Rate with Asthma as the Underlying Cause of Death by Gender, Pennsylvania 2001-2006



Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health.

During 2001-2006, the age-adjusted asthma mortality rate with asthma as the underlying cause of death was significantly higher among females than males in 2001 ( $P < 0.05$ ) and higher in 2002, 2003, 2004, 2005 and 2006.

**Figure 6-3:** Age-Adjusted Mortality Rate with Asthma as the Underlying Cause of Death by Race, Pennsylvania, 2001-2006



Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health.

During 2001-2006, the age-adjusted asthma mortality rate with asthma as the underlying cause of death was significantly higher among Blacks (approximately two to four times higher) compared to Whites ( $P < 0.05$ ).

**Table 6-1** Age-Specific Mortality Rate with Asthma as the Underlying Cause of Death by Gender, Race, Ethnicity and Region, Pennsylvania 2004-2006

	Philadelphia				Allegheny				Pennsylvania			
	Age 0-17		Age 18+		Age 0-17		Age 18+		Age 0-17		Age 18+	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Total	9	DSU	71	2.2	1	DSU	47	1.6	19	0.2	424	1.5
Male	6	DSU	22	1.5	1	DSU	14	1.0	11	0.2	132	1.0
Female	3	DSU	49	2.7	0	-----	33	2.1	8	DSU	292	1.9
White	4	DSU	16	1.0	0	-----	39	1.6	11	0.2	327	1.3
Black	5	DSU	53	3.8	1	DSU	8	DSU	8	DSU	92	3.3
Asian/PI*	0	-----	2	DSU	0	-----	0	-----	0	-----	5	DSU
Hispanic	3	DSU	5	DSU	0	-----	1	DSU	3	DSU	11	1.2

Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health.

\*Pacific Islander

Notes: Those of Hispanic origin can be of any race.

DSU = Data Statistically Unreliable

Rates are not calculated and displayed for counts less than 10. This is due to the unreliability of statistics based on small numbers of events. Rates are per 100,000.

These data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health.

The Department specifically disclaims responsibility for any analysis, interpretations or conclusions.

During 2004-2006, the age-specific asthma mortality rate with asthma as the underlying cause of death among children (0-17) wasn't calculated in Philadelphia and Allegheny counties, on account of small numbers. The highest mortality rate among adults of age 18+ took place in Philadelphia County, compared to Allegheny County and Pennsylvania as a whole. However, the age-specific asthma mortality rate with asthma as the underlying cause of death among Whites was the highest in Allegheny County (1.6 deaths per 100,000 population), followed by the state of Pennsylvania (1.3 deaths per 100,000 population) and Philadelphia (1.0 deaths per 100,000 population). At the national level, Blacks had an elevated age-adjusted asthma mortality rate compared to Whites.

**Table 6-2:** Age-Specific Mortality Rate with Asthma as the Underlying Cause of Death by Age Group, Gender, Race, Ethnicity Compared to 2010 Objectives Related to Asthma Death Rate, Pennsylvania 1998-2006

		Pennsylvania			Healthy People 2010
		1998-00	2001-03	2004-06	Goal
Age Group (0-4)	All	DSU	DSU	DSU	1.0
	Male	DSU	DSU	DSU	1.0
	Female	NE	DSU	DSU	1.0
	White	NE	DSU	DSU	1.0
	Black	DSU	DSU	DSU	1.0
	Hispanics*	NE	DSU	NE	1.0
Age Group (5-14)	All	2.5	DSU	3.1	1.0
	Male	DSU	DSU	DSU	1.0
	Female	DSU	DSU	DSU	1.0
	White	DSU	DSU	DSU	1.0
	Black	DSU	DSU	DSU	1.0
	Hispanics*	DSU	DSU	DSU	1.0
Age Group (15-34)	All	4.8	5.2	2.8	2.0
	Male	6.2	5.2	2.4	2.0
	Female	3.3	5.3	3.1	2.0
	White	3.3	4.0	DSU	2.0
	Black	17.4	15.9	15.4	2.0
	Hispanics*	DSU	DSU	NE	2.0
Age Group (35-64)	All	12.2	12.9	12.3	9.0
	Male	8.5	9.7	9.8	9.0
	Female	15.8	15.9	14.8	9.0
	White	8.0	9.6	9.5	9.0
	Black	56.4	47.0	41.5	9.0
	Hispanics*	DSU	38.8	DSU	9.0
Age Group 65+	All	55.6	42.8	37.8	60.0
	Male	34.7	26.1	21.7	60.0
	Female	69.3	54.0	48.7	60.0
	White	52.8	40.5	37.2	60.0
	Black	86.4	81.5	45.1	60.0
	Hispanics*	DSU	DSU	DSU	60.0

Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health.

Notes: Those of Hispanic origin can be of any race.

DSU = Data Statistically Unreliable

NE=No Events

Rates were not calculated and displayed for counts less than 10. This was due to the unreliability of statistics based on small numbers of events.

Rates were calculated per 1,000,000 population of specific age group.

These data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health.

The Department specifically disclaims responsibility for any analysis, interpretations or conclusions.

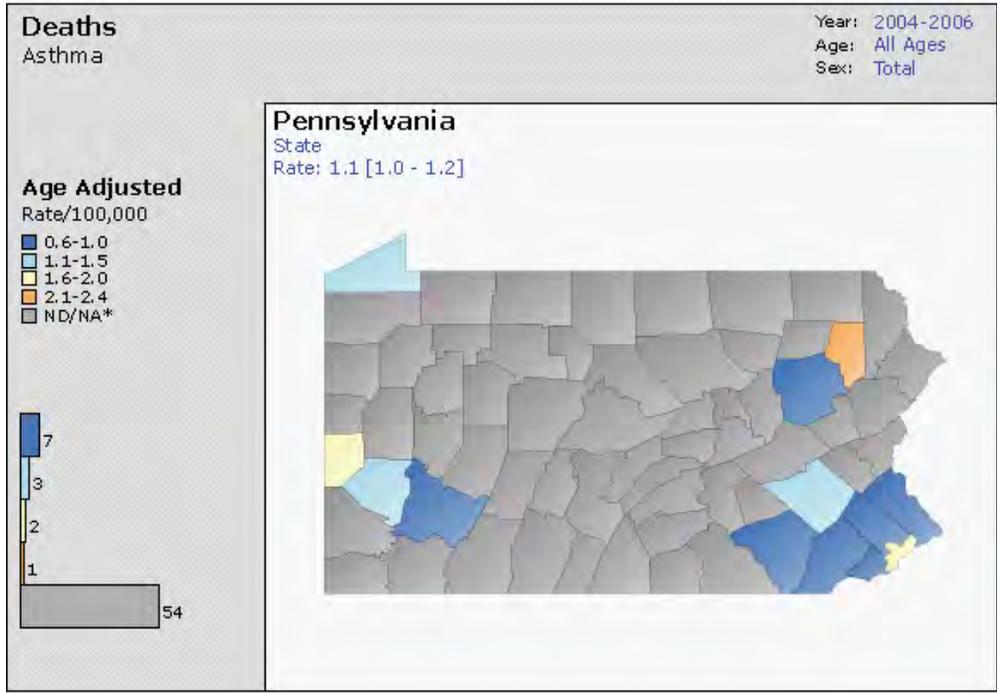
## SECTION VI: ASTHMA MORTALITY

Healthy People 2010 (HP2010) is a comprehensive set of national objectives for the decade. It is composed of 28 focus areas and 467 specific objectives. The respiratory disease section of HP2010 contains eight objectives that represent the most important issues in asthma for this decade. The objectives target deaths from asthma, hospitalizations for asthma, hospital emergency department visits for asthma, activity limitations, school or work days lost, patient education, appropriate asthma care and asthma surveillance systems. Currently, Pennsylvania tracks asthma mortality and hospitalization objectives.

During 1998-2006, the age-specific asthma death rate with asthma as the underlying cause of death increased with age. Pennsylvania asthma mortality rates for age groups 0-4 and 65+ met the 2010 Healthy People Objectives. However, asthma mortality rates for age groups 5-14, 15-34 and 35-65 still remain higher compared to 2010 Healthy People Objectives.

Overall, age-specific asthma death data for age 0-4 was not displayed, due to small numbers. For age group 5-14, the age-specific death rate with asthma as the underlying cause of death declined from 1998-2000 to 2001-2003. However, in 2004-2006 the rate of asthma deaths increased approximately 25 percent, compared to 1998-2000. From 1998-2000 to 2004-2006, asthma death rates have decreased for the age group 15-34 by approximately 40 percent. The age-specific asthma death rate for age groups 15-34 and 35-64 among Black residents was from four to seven times higher than the rate among Whites. During 1998-2006, the rate of asthma deaths was highest among people over age 65. However, there was a decreased death rate in age 65+ for 1998-2006 from 55.6 per 1,000,000 population in 1998-2000 to 37.8 per 1,000,000 population in 2004-2006.

**Figure 6-4:** Age-Adjusted Mortality Rate with Asthma as the Underlying Cause of Death by County, Pennsylvania 2004-2006



Data Source: Bureau of Health Statistics and Research, Pennsylvania Department of Health.  
 ND\* = Not displayed if count <10 (age-adjusted/specific rates and SMRs) or <3 (all other rates)  
 NA\* = Data not available to calculate statistic.  
 Direct method per 100,000 US 2000 std million population used for an age-adjusted rates.  
 These data were provided by the Bureau of Health Statistics and Research, Pennsylvania Department of Health.  
 The Department specifically disclaims responsibility for any analysis, interpretations or conclusions.

In 2004-2006 the age-adjusted mortality rate with asthma as the underlying cause of death varied by county. Among residents of Pennsylvania, the age-adjusted mortality rate was the highest in Lackawanna County (2.4 deaths per 100,000 population), followed by Philadelphia (1.8 per 100,000 population), Beaver (1.7 per 100,000 population), Berks (1.4 per 100,000 population), Erie (1.3 per 100,000 population) and Allegheny (1.1 per 100,000 population).

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# APPENDIX: GLOSSARY OF TERMS

## **Admission Types:**

**Emergency** - the patient requires immediate medical intervention as a result of severe, life threatening asthma attack.

**Urgent** - the patient's requires immediate attention for the care and treatment of asthma attack.

**Elective** - the patient's condition permits adequate time to schedule the availability of suitable accommodation.

## **Age-Adjusted Rate:**

A rate calculated in a manner that allows areas with different age structures to be compared. Rates are standardized to a control population (2000 year)

## **Average Charges:**

The average sum of the hospital charges (excluding professional fees) for each hospitalization.

## **Average Length of Stay:**

The average number of days per hospitalization that patients stayed in the facility.

## **Body Mass Index (BMI):**

BMI is a mathematical method to determine obesity by dividing a person's metric weight by the square of the person's metric height.

## **Confidence Interval (CI):**

is a way to measure sampling error and define the range of values where percentages estimated by multiple samples of the same population.

## **Crude Rate:**

Summary rate of the actual number of observed events (cases) in a population over a given time period (year)

## **Current Asthma:**

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

## **Inhaled Corticosteroid:**

Inhaled corticosteroids are anti-inflammatory drugs taken on a daily, ongoing basis to prevent asthma attacks.

## **Inhaled Short-acting Beta2-agonist:**

Inhaled short-acting beta2-agonists are medications that quickly loosen the tightened muscles around swollen airways and are often called rescue medications.

## **Prevalence:**

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

## **Lifetime Asthma:**

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

## **Primary Payer:**

The main source from which hospitals expect to receive payment for hospitalization charges.

## **Rest of State:**

Refers to the 65 (out of 67) counties of Pennsylvania, excluding Philadelphia and Pittsburgh.

## **Statistically Significant:**

In this report a P-value<0.05 was considered statistically significant; P-value means the data are statistically different.

## **Surveillance:**

The ongoing systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation and evaluation of public health practice.

## **Total Charges:**

The sum of the hospital charges (excluding professional fees) for an entire year.

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The 2009 Pennsylvania Asthma Burden Report can be downloaded from the PA DOH website

[www.health.state.pa.us](http://www.health.state.pa.us)

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