Asthma in Maryland 2003

Prepared by the State of Maryland
Department of Health and Mental Hygiene
Family Health Administration
Maryland Asthma Control Program

MARYLAND ASTHMA SURVEILLANCE REPORT

2003

ACKNOWLEDGEMENTS

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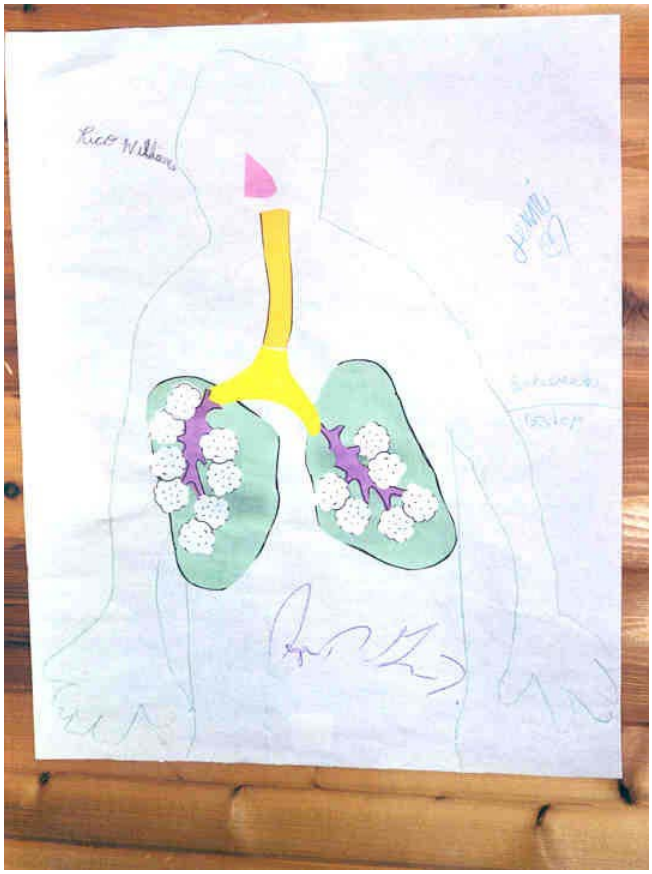

Photo Source: American Lung Association of Maryland

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Main Findings

- Statewide, it is estimated that 511,000 Maryland adults and 151,000 Maryland children have a history of asthma.
- In an average year, approximately 8,000 Maryland residents are hospitalized for asthma, and more than 32,000 Maryland residents are treated in emergency departments for asthma.
- Asthma causes an average of 88 deaths in Maryland each year.
- Asthma affects some Marylanders more than others. Persons at increased risk for asthma and its complications include the very young, the elderly, African-Americans, low-income individuals, and individuals in some jurisdictions, particularly Baltimore City.
- In 2002, charges for asthma hospitalizations in Maryland totaled $33 million. Charges for emergency visits totaled an additional $28 million.
- Compared to those without asthma, adults with asthma perceive their general health less favorably than those without asthma. More than 1/3 of children with asthma have missed school because of their illness.

Introduction

Asthma is a chronic inflammatory disease of the small airways in the lungs. Asthma is characterized by recurring episodes of swelling and narrowing of the small airways in response to "triggers" such as upper respiratory infections, inhaled allergens, and irritants such as tobacco smoke. Symptoms during an asthma attack may include wheezing, cough, shortness of breath and chest pain or tightness. Asthma affects both adults and children, and it is the most common chronic disease of childhood, affecting 12.7% of all U.S. children (Bloom et al, 2003). Nearly 12% of the U.S. adult population has reported being diagnosed with asthma at some time during their lifetime (BRFSS, 2002). In 2000, asthma was responsible for 1.8 million emergency department visits, 465,000 hospitalizations, and 4,487 deaths in the United States. (NCHS Asthma Prevalence, Health Care Use and Mortality 2000-2001). The prevalence of asthma in the United States has been increasing over the past several decades.

In September 2001, the Maryland Department of Health and Mental Hygiene (DHMH) received a grant from the Centers for Disease Control and Prevention (CDC) to develop a State Asthma Surveillance Program and Plan. Maryland House Bill 420, enacted in the 2002 legislative session, placed the Maryland Asthma Control Program in statute. The goals of the program are to examine how the prevalence and severity of asthma in Maryland compares to the national experience and to understand the impact of asthma to citizens of Maryland. Such information will help achieve the ultimate goal of the Maryland Asthma Control Program, which is to reduce the morbidity and mortality due to asthma in Maryland, particularly for its most vulnerable populations. In this second annual surveillance report we present current data on asthma prevalence, mortality, and health care utilization, and compare current state data to previous years, as well as to national data.

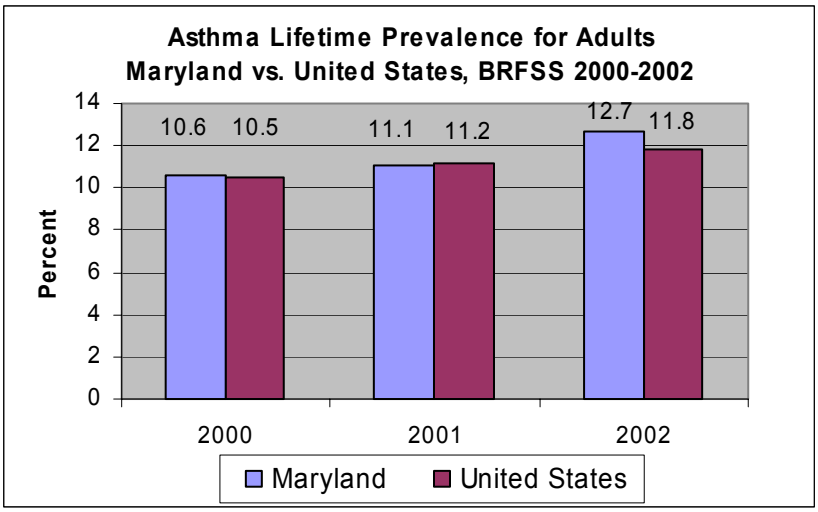
This report is based on existing data from the CDC Behavioral Risk Factor Surveillance System (BRFSS), the Maryland Health Services Cost Review Commission (HSCRC), and the Maryland Vital Statistics Administration. For BRFSS data, asthma is identified by report from the questionnaire respondent. For HSCRC data, asthma is identified by the use of International Classification of Disease, 9th Edition (ICD-9) codes. Asthma includes all codes from 493.0 to 493.9. For mortality data, asthma was identified through ICD-9 codes until 2001. ICD-10 codes of J45 to J46 are used for 2001 and 2002 mortality data. Where possible, data have been age-adjusted to the 2000 U.S. estimated population in order to reliably compare populations who may have different age distributions.

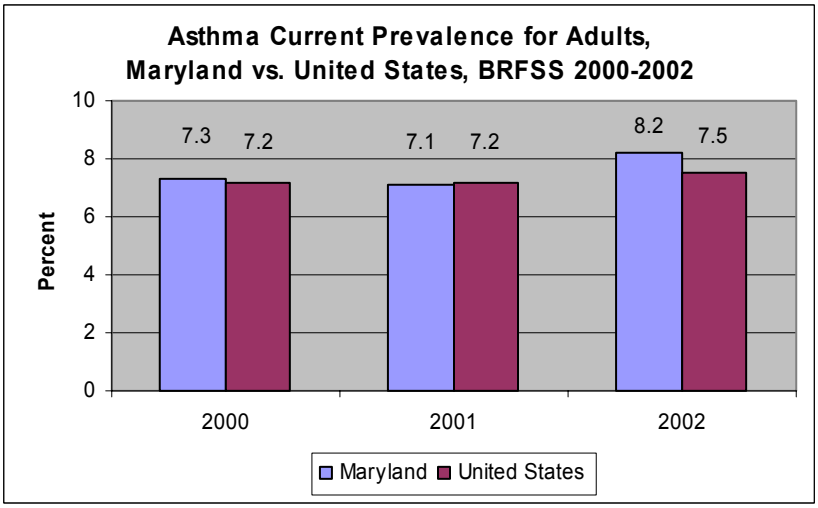
Photo Source: Asthma and Allergy Foundation of America, Maryland-Greater Washington, D.C. Chapter

Prevalence

Prevalence is the proportion of individuals who have asthma at a specific point in time. Lifetime prevalence is the proportion of individuals who have **ever** been diagnosed with asthma. Current prevalence refers to the proportion of individuals who still have a diagnosis of asthma at the time the question is asked.

Asthma prevalence in Maryland was measured using the Behavioral Risk Factor Surveillance System (BRFSS), a statewide telephone survey of adults coordinated by the CDC and conducted in all 50 states. The survey includes questions about the respondents' lifetime and current asthma prevalence. Asthma questions in the BRFSS have been standardized nationally since 2000. However, the lifetime prevalence question changed slightly from 2000 to 2001. The lifetime prevalence question is currently, "Have you ever been told by a doctor, nurse, or health professional that you had asthma?" The 2000 question asked only about diagnosis by a doctor. Current prevalence is assessed by the question, "Do you still have asthma?"

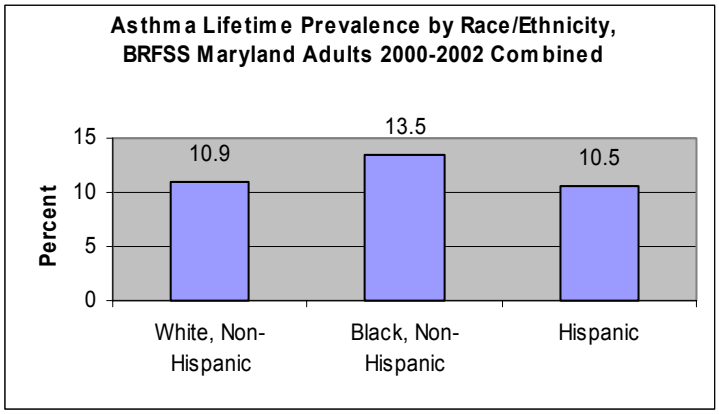


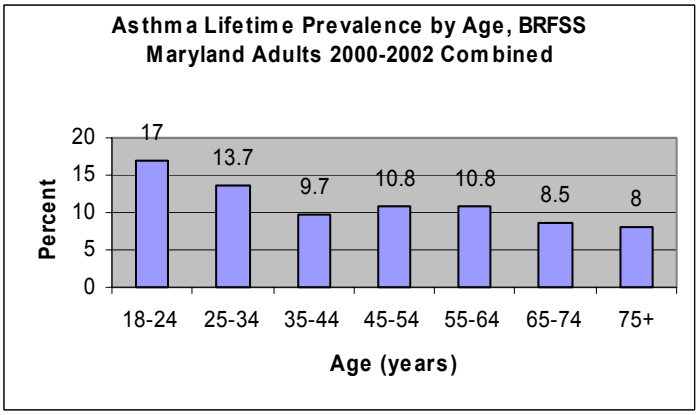


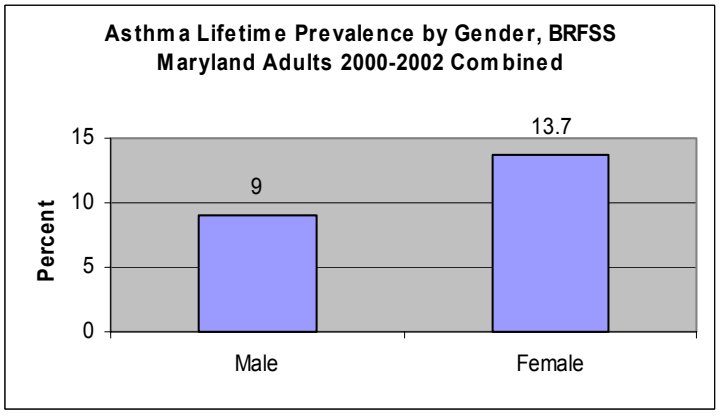
Lifetime asthma prevalence for Maryland residents over 18 years of age was 12.7% in 2002, and current prevalence was 8.2%. Therefore, it is estimated that 511,000 Maryland adults have a history of asthma and approximately 331,000 adults currently have asthma. Both lifetime and current asthma prevalence in Maryland were similar to United States rates in 2002.

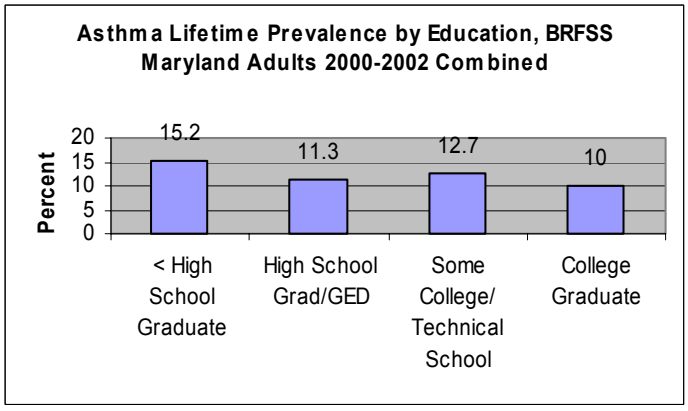
Asthma prevalence rates vary by race, gender, age, education, and income. Among those over 18 years of age, African-Americans, women, and young adults are disproportionately burdened by asthma, currently and over the course of their lifetime, as are persons with low income and limited education.

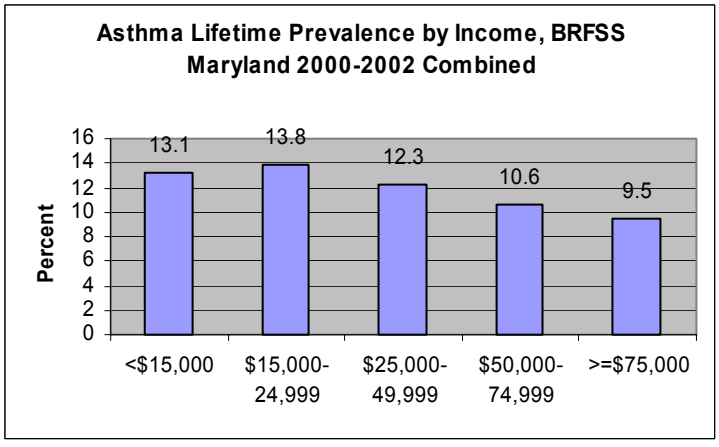
The 2002 Maryland BRFSS asked additional questions about children in the home diagnosed with asthma. These data included a total of 3076 children in the homes surveyed. The survey indicated that 11% of Maryland children have been diagnosed with asthma. Therefore, it is estimated that 150,624 children in Maryland have been diagnosed with asthma. The proportion of children with asthma in 2002 is higher than the 2001 prevalence of 10.6%. Maryland adults that are African-American, Hispanic, unmarried, poor, or with limited education are more likely to have children with asthma in the home, and these children miss a disproportionate number of school days because of asthma.







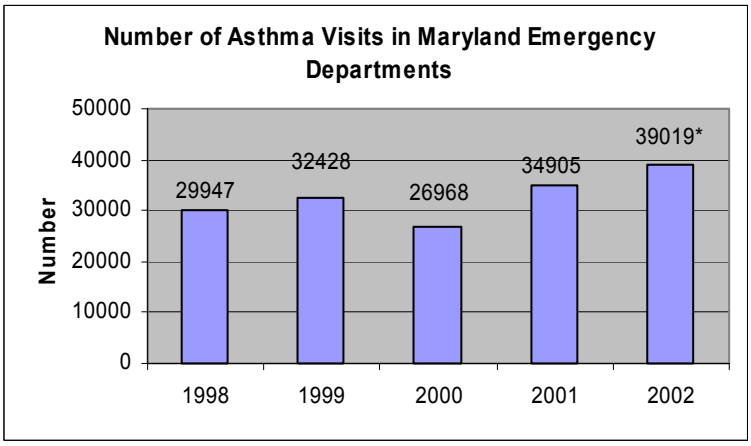




Emergency Department Visits

Individuals with asthma can usually manage their condition through the avoidance of triggers, appropriate use of medications, and health care by their primary care providers with specialty consultation as needed. Emergency department visits occur when persons with asthma develop symptoms that cannot be managed at home.

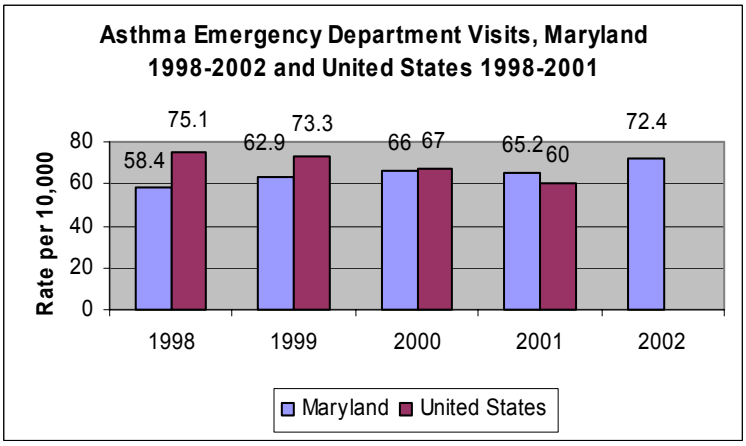
Information regarding emergency department visits for asthma has been abstracted from the Maryland Health Services Cost Review Commission ambulatory care file. Data are collected only for non-federal hospitals within Maryland, and are available from April of 1997. In 2002, there were 39,019 emergency department visits for asthma. This represents an increase of more than 4,000 visits compared to 2001, and an increase of more than 8,000 visits over the 1998-2001 average of 31,000 visits. Some of this increase may be attributed to a change in method of data abstraction. Prior to 2002, HSCRC data were obtained on a quarterly basis, with some cases missed because of late addition to the database. Also, before 2002, data were excluded if any demographic information was missing. Finally, the method of assigning Maryland residence also has changed. The age-adjusted rate of emergency department visits for 2002 was 72.4 per 10,000 population, higher than the 2001 national rate of 60 visits per 10,000 population.



Data from HSCRC
*See text

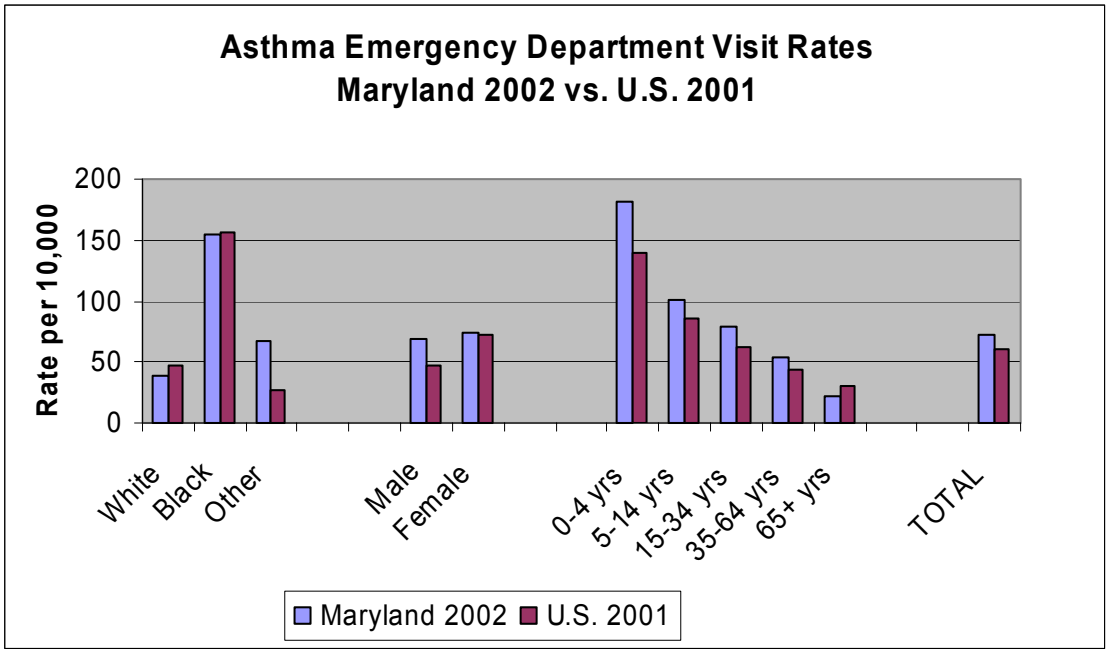
African-Americans in Maryland have more than four times the rate of emergency department visits for asthma than whites. Females are seen in the emergency department slightly more often than males, and young children have more emergency department visits when compared to adults.

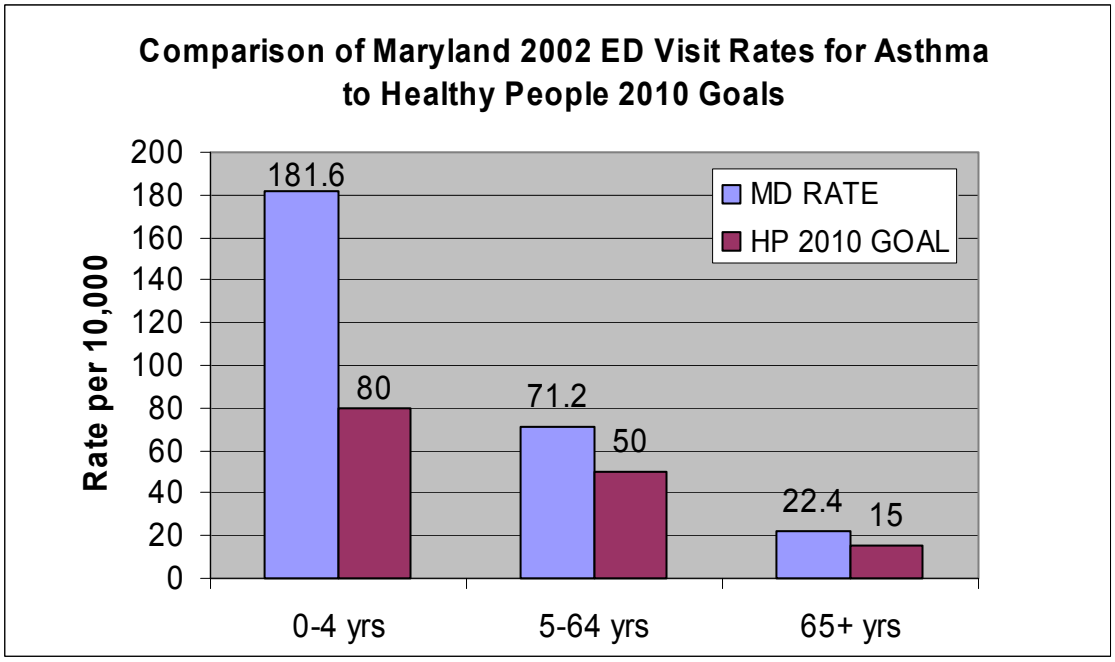
Maryland emergency department visit rates exceed the Healthy People 2010 goals for all age groups. This difference is most dramatic for children under 5 years of age. While the Healthy People 2010 goal is 80 visits per 10,000 population, Maryland's youngest children (age 0-4) had 182 visits per 10,000.



Maryland data from HSCRC.
United States data from MCHS & MMWR (2002 not yet available)
All rates are age adjusted to the 2000 U.S. estimated population

Many of these emergency department visits could have been prevented through appropriate preventive and therapeutic care. Guidelines on asthma management are available from the National Heart, Lung, and Blood Institute of the National Institutes of Health (http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm). These guidelines can assist patients and providers in working together to establish an optimal asthma control regimen and to assure adherence to this regimen.



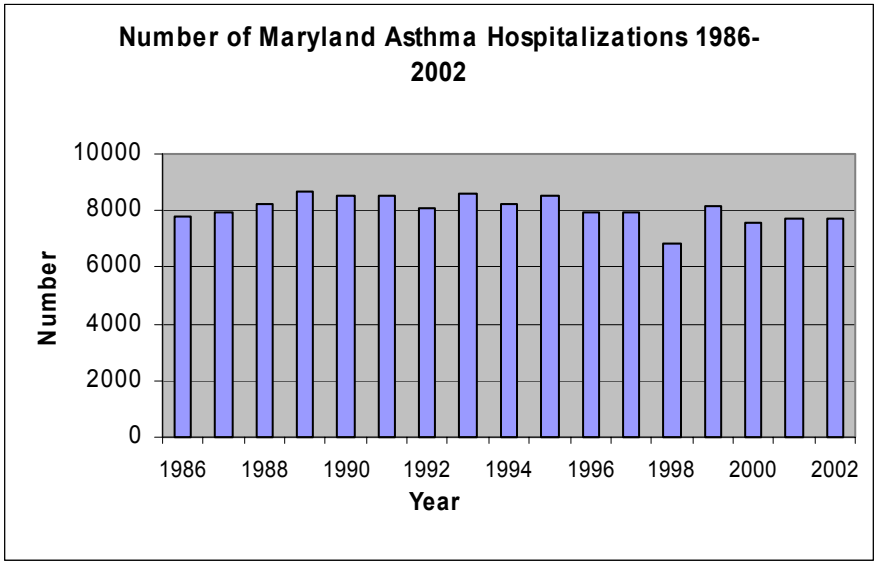


Data for age groups 5-64 and 65+ years are age adjusted to the 2000 U.S. estimated population

Hospitalizations

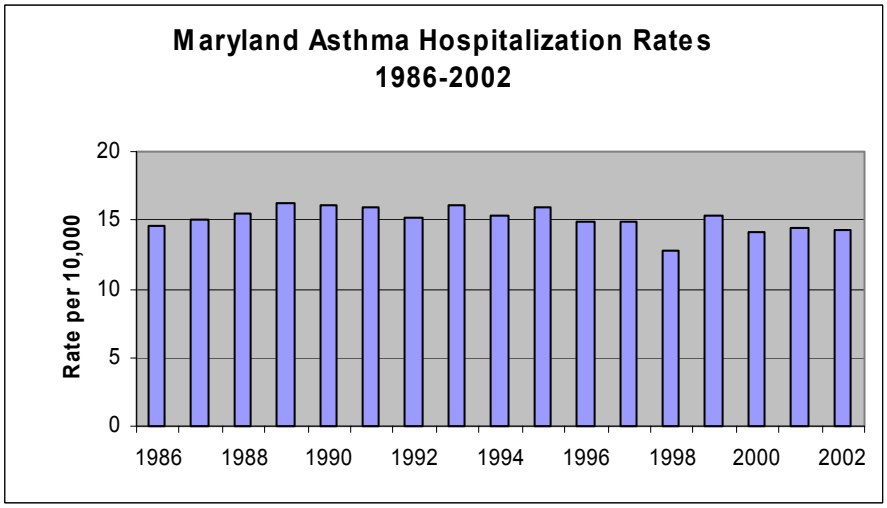
Hospitalization for asthma is generally considered a failure of outpatient management.
Maryland hospitalization data from 1986-2002 were obtained from the Maryland Health Services Cost Review Commission. Because some Maryland residents are hospitalized in neighboring states, we have supplemented the information from Maryland hospitals with data from the District of Columbia and West Virginia when possible. Hospitalization data from other neighboring states were not available at the time this report was drafted. In 2000, there were 639 hospitalizations of Maryland residents in neighboring jurisdictions, of which 85% occurred in the District of Columbia. Therefore, it is likely that the majority of out-of-state hospitalizations have been included in the 2002 data analysis.

In Maryland hospitals, there were 7695 hospitalizations of Maryland residents for asthma as a primary diagnosis in 2002, consistent with previous years, in which there were approximately 8000 hospitalizations per year for asthma. An additional 521 Maryland residents were hospitalized for asthma in the District of Columbia and West Virginia. The hospitalization rate for Maryland residents was 15.2 hospitalizations per 10,000 population, lower than the national rate of 17.4 per 10,000 in 2002. Hospitalization rates for African-Americans in 2002 were nearly three times that of whites. Females were hospitalized more frequently than males. Children under 5 years of age have the highest hospitalization rate of any age group at 41.7 hospitalizations per 10,000 population, much higher than the HP 2010 goal of 25 hospitalizations per 10,000. The Maryland hospitalization rates for 5-64 year olds and those over 65 years of age also exceeded the Healthy People 2010 goals.



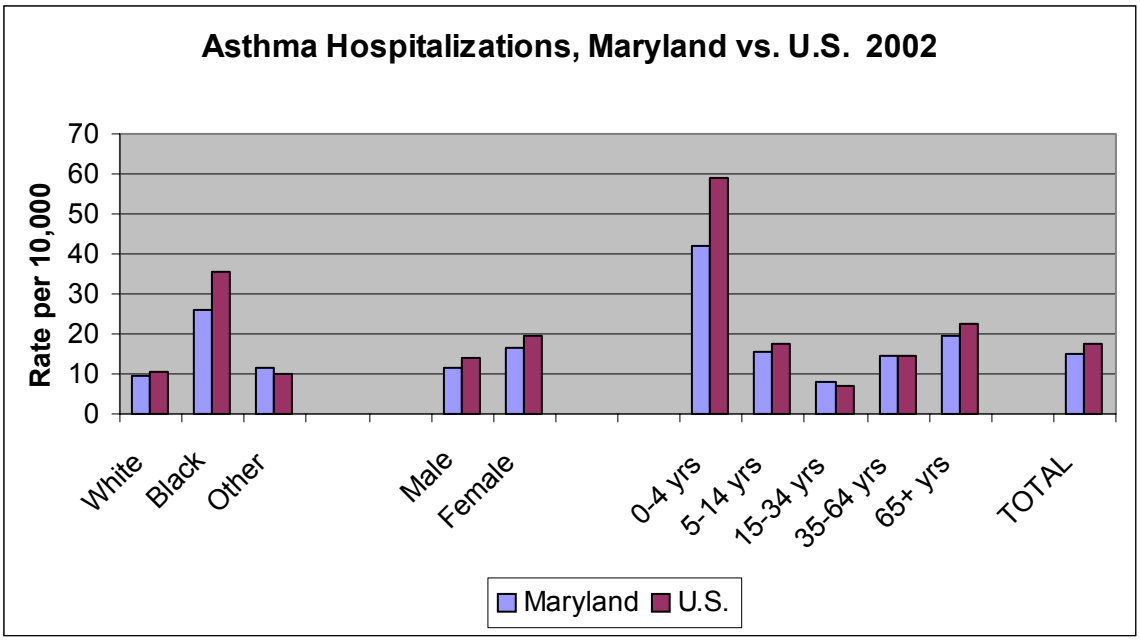
Data from HSCRC for Maryland residents hospitalized in Maryland hospitals. For 1986-2001, hospitalizations/year determined by admission date. For 2002, hospitalizations/year determined by discharge date.

Maryland residents hospitalized for asthma spend an average of 3 days in the hospital (median of 2 days). The length of hospitalization increases with age. While children under age 5 years spend, on average, 1.8 days in the hospital, adults over 65 years of age spend, on average, 4.7 days in the hospital. The increased length of stay among the elderly may be a reflection of the number and severity of underlying conditions in this age group as compared to younger patients.

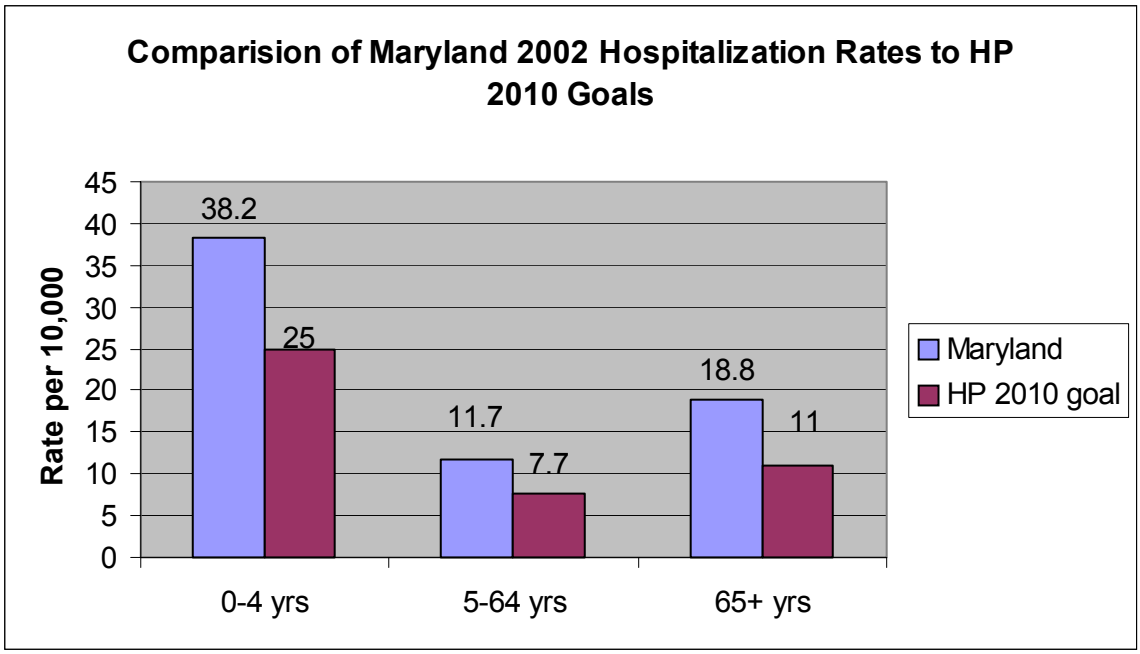


Data from HSCRC for Maryland residents hospitalized in Maryland hospitals. For 1986-2001, hospitalizations/year determined by admission date. For 2002, hospitalizations/year determined by discharge date.

Maryland residents over 65 years of age had additional diagnoses that included congestive heart failure, hypertension and diabetes while children hospitalized with asthma had mainly acute infections such as non-bacterial pneumonias, upper respiratory infections, and ear infections.



Maryland hospitalization data from HSCRC
Total hospitalization rate and hospitalization rates by race and sex are age adjusted to the 2000 U.S. estimated population
Hospitalizations of Maryland residents in West Virginia are included in all data
Hospitalizations of Maryland residents in the District of Columbia are included in total hospitalization rate and hospitalization rates by age.

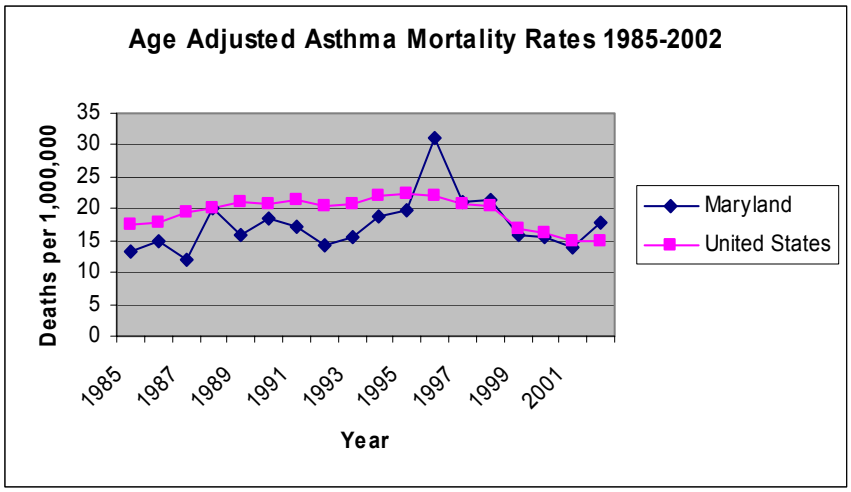


Data for age groups 5-64 and 65+ years age adjusted to the 2000 U.S. estimated population
Hospitalizations of Maryland residents in West Virginia are included in data.
Hospitalizations of Maryland residents in the District of Columbia are not included in data because we were unable to age adjust D.C. data in a comparable manner to HP 2010 data

Deaths

Although many deaths from asthma are potentially preventable, from 1998-2002, an average of 88 Maryland residents per year have died from asthma. Asthma was a contributing cause of death for another 131 Maryland residents per year, on average.

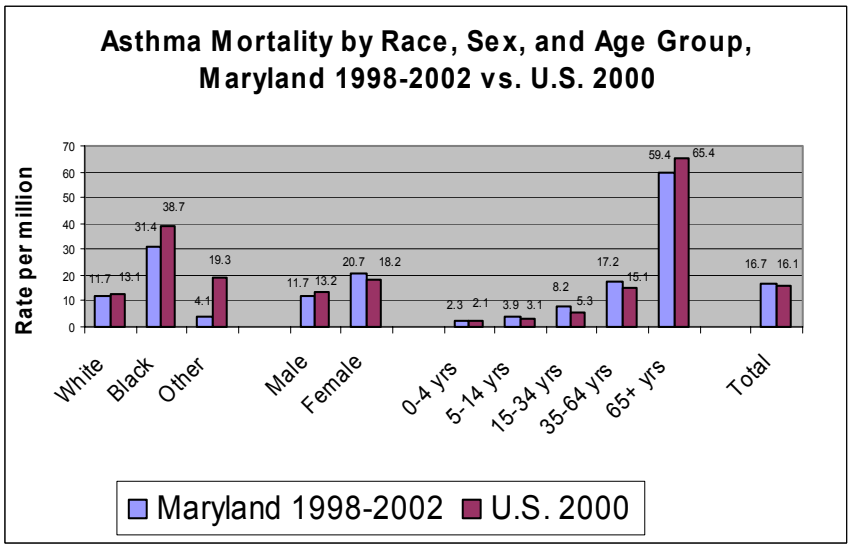
Mortality data from 1985-2002 were obtained from the Maryland Vital Statistics Administration. For the 2003 report, out-of-state deaths of Maryland residents have been added to the totals. In addition, mortality rates have been age-adjusted to the 2000 U.S. estimated population. During these 18 years, the average asthma mortality rate was 17.6 per 1,000,000 population. While the average asthma mortality rate for 1993-1997 was 21.1 per 1,000,000 population, the average mortality rate during the last 5 years has been somewhat lower at 16.9 per 1,000,000 population.



Maryland mortality data from Maryland Vital Statistics Administration
U.S. mortality data from CDC Wonder

Maryland asthma mortality rates can be compared to national statistics through 2002. Mortality rates for the total state population have been quite similar to U.S. mortality rates. Maryland asthma deaths between 1985 and 2002 did not show any specific trends by month of death or season of death.

Disparities in asthma mortality continue to exist, both in Maryland and nationally. Over the last five years in Maryland, the mortality rate for African-Americans has been three times that of whites. Women had nearly twice the mortality rate of men. Asthma mortality rates are highest in the elderly and lowest in children under 15 years of age. Asthma mortality rates over the past 5 years have exceeded Healthy People 2010 goals for all age groups.



Maryland data from Maryland Vital Statistics Administration
U.S. data from CDC Wonder
Total mortality rate, and rates by race and sex are age adjusted to the 2000 U.S. estimated population.
Data from Maryland Vital Statistics Administration

As noted above, asthma deaths are believed to be preventable with regular health care and good asthma management. Understanding the specific circumstances surrounding death from asthma is essential in order to help other patients and their health care providers avoid the conditions that lead to a fatal event and may underscore issues in management that have broad implications for all individuals with asthma.

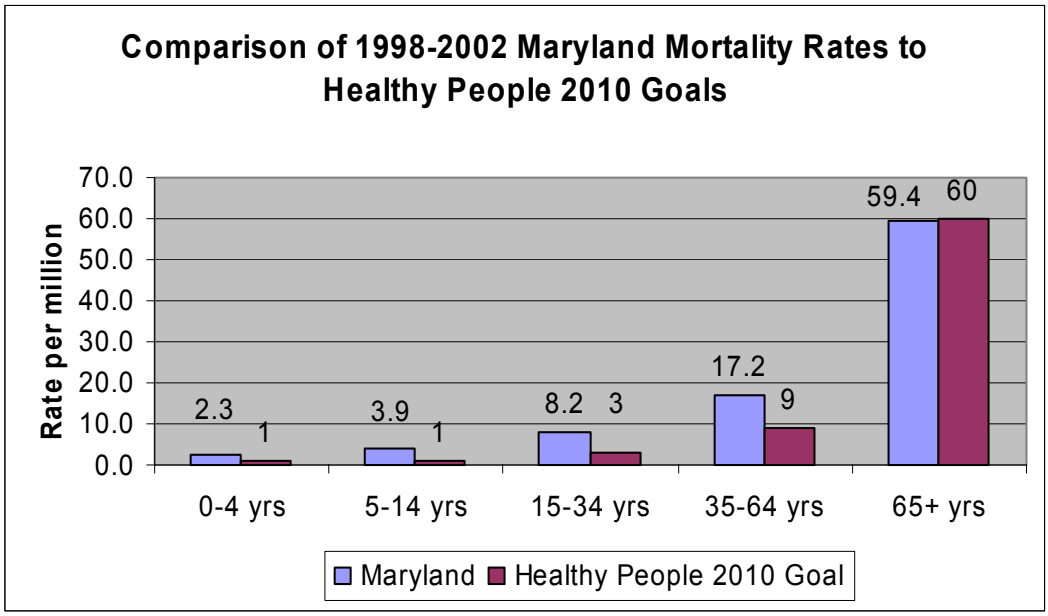


Photo Source: Asthma and Allergy Foundation of America, Maryland-Greater Washington, D.C. Chapter

Photo Source: Asthma and Allergy Foundation of America, Maryland-Greater Washington, D.C. Chapter

Maryland Jurisdictions and Asthma

The burden of the prevalence, hospitalizations, emergency department visits, and deaths from asthma differs across the state. Baltimore City residents have the highest prevalence of asthma, and the highest rates of emergency department visits, hospitalizations, and deaths from asthma compared to other Maryland jurisdictions. This increased asthma burden is similar to the experience of urban populations around the country.

While the emergency department visit rate, hospitalization rate, and mortality rate are all above the Maryland average in Baltimore city, other counties may have high rates in one category, but lower rates in others. This is because multiple factors such as differences in population risk, access to primary care, access to emergency care, and quality of care may affect emergency department visit, hospitalization, and death rates.

For prevalence data using the BRFSS, sample sizes are relatively small per year, but greater stability of the estimates is obtained when years are combined. Since asthma questions were first included in the core BRFSS questionnaire in 2000, prevalence data by jurisdiction are presented for 2000-2002. Years are combined for mortality data because of the small number of annual asthma deaths. Mortality data has been available for a longer period of time than BRFSS data; therefore a 5-year average mortality rate by jurisdiction is presented for 1998-2002.

In contrast, the numbers of hospitalizations and emergency department visits for asthma are large and therefore data are presented for 2002 only. One limitation of this data is that the Health Services Cost Review Commission collects data from Maryland hospitals only. Therefore, counties in which residents utilize facilities in neighboring states or the District of Columbia are underrepresented when examining the Health Services Cost Review Commission data alone. Data regarding hospitalizations of Maryland residents in neighboring states has been added when available. Data for 2002 have been obtained from the District of Columbia and West Virginia. As noted previously, hospitals in the District of Columbia admit the largest percentage of Maryland residents (85% in 2000). There were 521 hospitalizations of Maryland residents in D.C. in 2002, the majority of whom lived in either Prince George's (73.9%) or Montgomery (14.2%) counties. Hospitalization rates may be underestimated in counties that border Pennsylvania, Delaware, and Virginia as these data were not available at the time this report was drafted. In addition, emergency department visit rates may be underestimated in most counties, as this data from out-of-state hospitals was unavailable. However, the number of out-of-state emergency department visits is likely very small, as patients requiring emergency care may go to the hospital emergency department that is closest to home, generally a Maryland facility.

Photo Source: American Lung Association of Maryland

Asthma Lifetime and Current Prevalence, Maryland 2000-2002 Three-year average; Hospitalization and Emergency Department Visit Rates by Region and Jurisdiction, Maryland 2002. Mortality Rates by Region and Jurisdiction 1998-2002 Five-year average.

Region or Jurisdiction	Lifetime Prevalence (%) 2000-02	Current Prevalence (%) 2000-02	Emergency Department visit rate per 10,000 population 2002	Hospitalization Rate per 10,000 population 2002	Mortality Rate per 1,000,000 population 1998-2002
Northwest			**54.3****	**13.5**	**20.0****
Garrett	11.2	7.6	54.2**	8.9**	17.8
Allegany	12.5	8.7	78.9	21.4**	26.2**
Washington	10.8	8.8	65.6	10.2**	20.7**
Frederick	10.7	7.7	38.9**	13.8	16.0
Baltimore Metro			**90.5****	**18.2****	**18.3**
Baltimore City	14.6	10.6	187.8**	35.9**	36.2**
Baltimore County	11.2	7.4	68.4	15.1	15.5
Anne Arundel	11.6	7.4	52.0**	12.5**	8.2**
Carroll	12.1	10.4	41.0**	9.6**	15.3
Howard	10.4	5.8	51.2**	6.8**	11.2**
Harford	8.5	5.4	55.3**	10.9**	11.5**
National Capital			**53.7****	**15.8**	**15.8**
Montgomery	9.8	6.2	42.9**	8.4**	13.3
Prince Georges	12.3	7.1	65.1	14.6	18.8
Southern MD			**64.0**	**15.8**	**17.7**
Calvert	9.4	6.0	60.3	13.8	25.4**
Charles	11.8	7.9	65.8	15.0	10.8**
Saint Mary's	14.2	9.2	65	19.1**	19.1
Eastern Shore			**65.4**	**16.0**	**11.1****
Cecil	11.1	8.1	38.8**	14.8	4.9**
Kent	11.4	7.3	47.5**	20.6**	37.3**
Queen Anne's	11.5	6.4	47.1**	13.5	9.0**
Caroline	13.1	6.7	73.5	27.8**	13.8
Talbot	7.6	5.3	92.4**	17.0	12.6**
Dorchester	10.6	7.0	105.0**	22.0**	23.8**
Wicomico	11.6	8.1	95.5**	12.9	7.1**
Somerset	14.1	9.9	91.9**	24.1**	8.3**
Worcester	11.5	8.8	69.1	9.6**	8.2**
Maryland Total	**11.5**	**7.5**	**72.8**	**15.3**	**17.8**

Total Number of Residents with Lifetime History of Asthma & Current History of Asthma, 2000-2002, Three-year average. Total Number of Emergency Department Visits and Hospitalizations, 2002. Average Number of Deaths 1998-2002. Data by Region and Jurisdiction

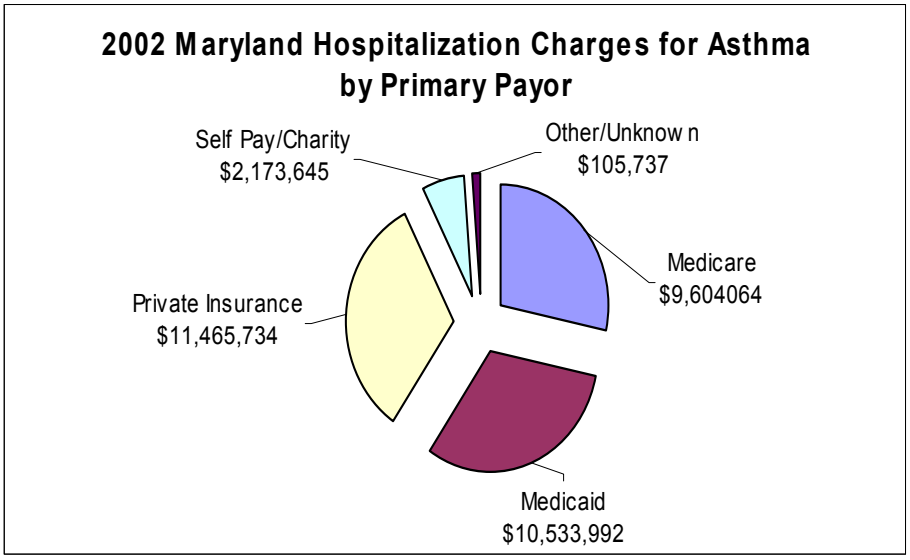
Region or Jurisdiction	Number of Residents who Ever Had Asthma Ave 2000-02	Number of Residents who Currently Have Asthma Ave 2000-02	Number of Emergency Department Visits 2002	Number of Hospitalizations 2002	Average Number of Deaths per year 1998-2002
Northwest			**2335**	**598**	**8.8**
Garrett	2545	1699	153	28	<1
Allegany	6913	4825	550	166	2.4
Washington	11,173	9021	840	131	3.0
Frederick	14,953	10,690	792	273	2.8
Baltimore Metro			**22,717**	**4628**	**46.0**
Baltimore City	67,796	49,083	12,023	2295	23.2
Baltimore County	65,518	43,405	4956	1149	12.4
Anne Arundel	43,244	27,568	2579	623	3.8
Carroll	13,101	11,274	622	148	2.2
Howard	18,845	10,371	1336	172	2.2
Harford	14,274	8919	1201	241	2.2
National Capital			**9324**	**1912**	**24.0**
Montgomery	68,328	42,758	3815	761	10.8
Prince Georges	70,872	40,504	5509	1151	13.2
Southern MD			**1875**	**439**	**3.2**
Calvert	5623	3600	455	103	1.6
Charles	10,423	6964	843	175	1.2
Saint Mary's	8529	5536	577	161	<1
Eastern Shore			**2702**	**642**	**5.8**
Cecil	6732	4880	340	129	<1
Kent	1501	959	89	42	<1
Queen Anne's	3655	2031	185	55	<1
Caroline	3304	1704	214	84	<1
Talbot	2089	1465	284	55	<1
Dorchester	2809	1856	293	67	<1
Wicomico	7804	5404	810	108	<1
Somerset	1929	1355	210	56	1.0
Worcester	4720	3611	307	46	<1
Maryland Total	**456,676**	**299,484**	**39,019***	**8221**	**87.8**

For the above two tables:
Lifetime and Current Prevalence data from BRFSS
Emergency Department and Hospitalization data from HSCRC
Mortality Data from Maryland Vital Statistics Administration. Five year average provided because of small number of deaths per year.
All rates are age adjusted to the 2000 U.S. estimated population
*Total number of ED visits greater than sum of counties because county information not available for all ED visit data
**Rate significantly different from State of Maryland rate (p<=.05)

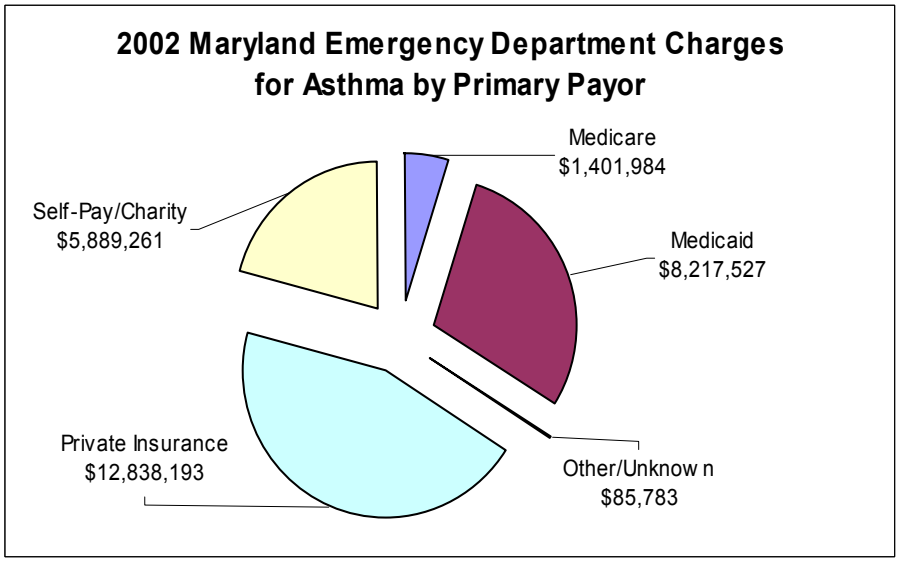
Cost of Asthma

The burden of asthma in Maryland includes both monetary and non-monetary costs. Direct financial costs of asthma may include costs for hospitalization, emergency department and other outpatient visits, and costs for medication and durable medical equipment such as nebulizers, spacers, and peak flow meters. Poor health, limited activity, and days lost from school and work may lead to diminished productivity, and may therefore contribute to the indirect financial cost of asthma. In addition, poor health and limited activity may lead to non-monetary costs, such as reduction in the quality of life for persons with asthma.

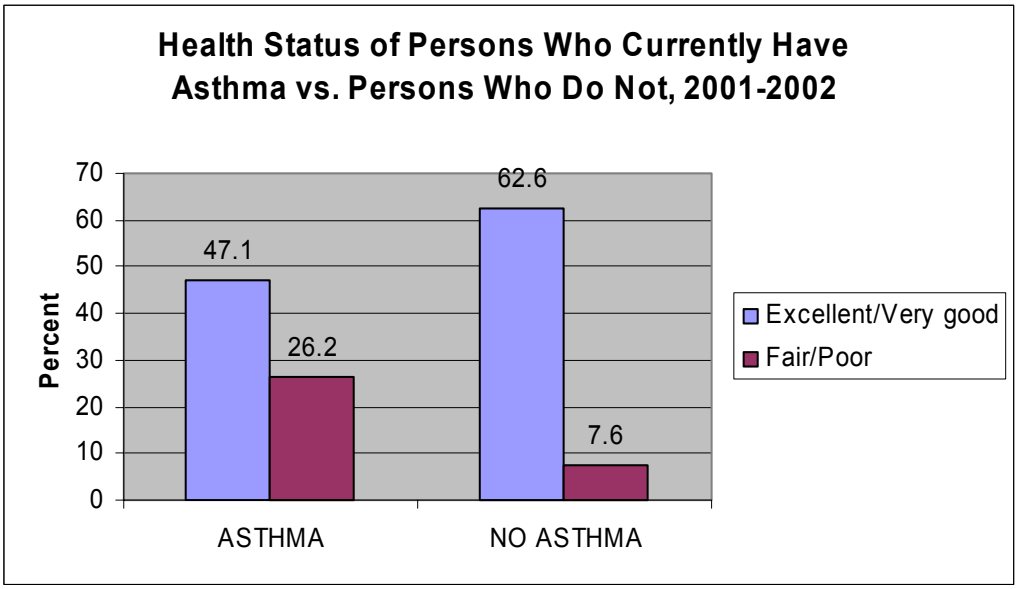
Direct financial costs of asthma hospitalization and emergency department visits can be estimated from total charges included in the HSCRC data. The average charge for an inpatient stay in 2002 was $4403. The average charge for an emergency department visit in 2002 was $730. The total charges for asthma hospitalizations in 2002 was $33,883,173. Emergency department visits accounted for an additional $28,432,749. Between 2000 and 2002, there has been a shift in the proportion of charges for asthma hospitalizations from the private to the public sector. While Medicare and Medicaid charges increased from 52% to 59% of total charges, private insurance charges decreased from 41% to 34% of total charges.



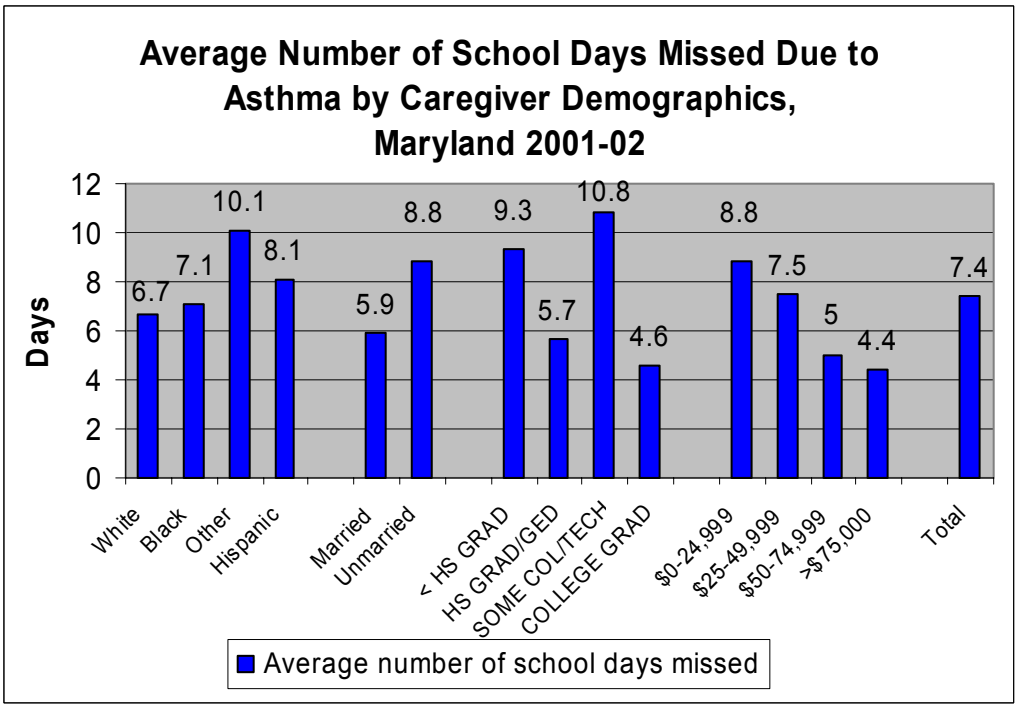
BRFSS data indicate that adults with asthma are more likely to consider their health status as fair or poor compared to those without asthma. For 2001-02, 26.2% of adults who currently have asthma consider their health to be fair or poor, while only 7.6% of adults without asthma consider themselves to be in fair or poor health.



Asthma exacerbations in children may result in missed school days due to illness, medical appointments, and hospitalization. In 2002, children with asthma missed an average of 7.4 days of school. Nearly 6% of children with asthma missed more than 10 days of school as a direct result of their asthma. An additional 38.3% missed up to 10 days of school. A disproportionate number of school days are missed by children living in families where the survey respondent is African-American, Hispanic, unmarried, and/or low income.



Data from 2001-02 BRFSS



Data from 2001-02 BRFSS

Conclusions

This report confirms that asthma is a major health problem in Maryland, as it is in the rest of the nation. An estimated 11% of children and 12.7% of adults have been diagnosed with asthma, and 8.2% of adults in Maryland currently have asthma. These rates are higher than those from the 2002 report, and are now higher than the rates for the U.S. as a whole. Hospitalization and emergency department visit rates for asthma in Maryland are similar to U.S. rates, however, they remain well above the Healthy People 2010 goals. Mortality from asthma persists in Maryland, with rates remaining fairly stable over the past five years. Mortality rates from asthma remain above Healthy People 2010 goals for all age groups except persons 65 years of age and older. Asthma and its complications continue to disproportionately affect the very young, the elderly, African-Americans, low-income individuals, and individuals in some jurisdictions, particularly Baltimore City. The cost of asthma to individuals and Maryland society as a whole is substantial. Additional tracking of asthma prevalence and complications is vital to improve understanding of individual and environmental factors that contribute. Information gleaned from analyzing the epidemiology of asthma is critical to planning, implementing, and evaluating activities aimed at reducing the public and personal health burden of asthma for Maryland residents.

Photo Source: American Lung Association of Maryland

Future Directions

The Maryland Asthma Control Program expects to produce ongoing surveillance reports. The data presented here will be refined and expanded with enhanced statistical analysis. In addition, plans exist for the inclusion of data from the expanded BRFSS asthma module, and the inclusion of additional datasets. Efforts are underway to assess the burden of occupational asthma in Maryland, and the burden of asthma on Medicaid recipients, obese individuals and the elderly. Plans have also been made to enhance local level data, to correlate emergency department visit rates with influenza activity, and to obtain data on outpatient asthma visits.

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