

TRENDS IN ASTHMA MORBIDITY AND MORTALITY

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Introduction

Many Americans are affected by asthma, a serious chronic lung condition characterized by episodes or attacks of inflammation and narrowing of the small airways in response to asthma triggers. Over the past two decades, the burden of asthma in the United States has increased. However, within the last few years, mortality and hospitalizations due to asthma have plateaued, indicating a higher level of disease management. The following delineates information available from national surveys and reports on the mortality, prevalence, hospitalizations, ambulatory care visits and economic costs due to asthma.

Asthma Mortality

Beginning with 1999 mortality data, the population standard used for calculating age-adjusted death rates was changed from the 1940 population to the 2000 population. This change had three important outcomes: (i) provided age-adjusted rates that are less divergent from crude rates (ii) ensured that all government agencies use the same standard and (iii) corrected the public perception that age adjustment to the 1940 population provides out-of-date statistics. Use of the 2000 population standard placed more weight on death rates at older ages and less weight on death rates at younger ages. Because most lung disease rates increase with age, death rates using the new standard were higher than those using the old standard. Figure 1 compares the asthma age-adjusted death rates based on the 1940 and 2000 standard populations from 1979-2000. Age-adjusted death rates for asthma were approximately 1.5 times greater using the 2000 standard population than those based on the 1940 standard population.

In addition, starting with 1999 data, the tenth revision of international classification of diseases (ICD-10) replaced ICD-9 in coding and classifying mortality data from death certificates. The ICD is periodically revised to reflect changes in the medical field. This change has several consequences: (i) new cause-of-death titles and corresponding cause-of-death codes, i.e. ICD-10 has alphanumeric categories rather than numeric categories, (ii) breaks in comparability of cause-of-death statistics, and (iii) restructuring of the leading causes of death. In order to assess the net effect of the new revision on death statistics, a comparability ratio is derived. The comparability ratio is calculated by dividing the number of deaths for a selected cause of death classified by the new revision by the number of deaths classified to the most nearly comparable cause of death by the previous revision. A comparability ratio of 1 denotes no change between revisions; a ratio of less than 1 signifies a decrease and a ratio of greater than 1 symbolizes an increase in deaths. The comparability ratio for asthma was 0.8938, indicating an 11% decrease in assignments of deaths due to asthma when using ICD-10.

Due to decennial revisions of the International Classification of Diseases (ICD) coding system and the change in age-adjusted standard population, the number and rate of asthma deaths for 1999-2000 are not directly comparable to those reported between 1978 and 1998.

Table 1 documents the number of deaths by race and sex between 1979 and 2000. In 2000, 4,487 people died of asthma. Approximately 65% of these deaths occurred in women. Table 2 displays the age-adjusted death rate per 100,000 population by race and sex for the same years. The age-adjusted death rate in 2000 was 1.6 per 100,000. The female death rate was 39 percent greater than the rate seen in males and the age-adjusted death rate for asthma in the black population (3.9 per

100,000) was three times the rate in the white population (1.3 per 100,000). Black women had the highest mortality rate due to asthma in 2000 (4.2 per 100,000).

Table 3 delineates the number of deaths and age-adjusted death rate per 100,000 population by Hispanic origin. In 2000, 292 Hispanics died of asthma - an age-adjusted death rate of 1.5 per 100,000 population. Age-adjusted death rates in Hispanics were 63% lower than non-Hispanic blacks, but 15% higher than non-Hispanic whites. However, a recently published study found that Puerto Ricans had higher age-adjusted death rates than all other Hispanic subgroups and non-Hispanic whites and blacks.¹

Tables 4 and 5 delineate the number of deaths and mortality rates for asthma by 10-year age groups from 1979 to 2000. Asthma deaths are rare among children and highest among those over 85. In 2000, 223 children ages 0-17, or 0.3 per 100,000, died from asthma compared to 707 adults 85 and over, or 16.5 per 100,000 population. The rate in those 85 and over was 139% greater than the second highest mortality rate of 6.9 per 100,000 population, which was seen in the 75-84 year olds.

Unlike morbidity estimates, which are drawn from sample populations and extrapolated to the overall population, mortality data is obtained from the general population by way of death certificates. Therefore, the sex- and race-specific numbers and rates denote true differences.

As seen in recent years the number deaths due to asthma continue to decline, even after the ICD-10 revision is taken into account. The number of asthma deaths seen in 2000 has decreased by 6.5% and 4% from 1998 and 1999, respectively.

Asthma Prevalence

National Health Interview Survey, 1982-1996 and 1997-2001

The National Health Interview Survey (NHIS) is a multi-purpose health survey conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). It is the principal source of information on the health of the civilian, noninstitutionalized, household population of the United States.

Despite the periodic revision of the NHIS Core questionnaire, Supplements began to play an increasingly important role in the survey as a means of enhancing topic coverage in the Core section. The unintended result was an increasingly unwieldy survey instrument and longer interviewing sessions: recent questionnaires (Core and Supplements combined) ran almost 300 pages, while the interviews averaged two hours. This imposed an unacceptable burden on NCHS staff, US Bureau of Census interviewers, the data collection budget, and on the NHIS respondents. Furthermore, the excessive length of NHIS interviews contributed to declines in both response rate and data quality. For all these reasons, NCHS implemented a redesigned NHIS questionnaire in 1997.

Between 1997 and 2000, the revised questionnaire made it impossible to compare asthma estimates with those prior to 1997. The revised questionnaire evaluated both lifetime and attack prevalence of asthma. Respondents or their proxies were asked if they had ever been diagnosed with asthma by a health professional in their lifetime and if so, had they had an asthmatic attack or episode in

the past 12 months. The question on asthma attack prevalence assists public health professionals plan interventions by measuring the population at risk for serious outcomes from asthma.

Beginning with the 2001 National Health Interview Survey respondents or their proxies who answered yes to being diagnosed with asthma in their lifetime were also asked if they still had asthma. This comes closest to the question asked in the 1982-1996 National Health Interview Survey – “Has someone in your family had asthma during the past 12 months?” However, the redesigned questionnaire measures physician-diagnosed asthma, not self-reported asthma.

These estimates most likely continue to reflect an underestimate of true asthma prevalence, since studies have shown that there are many individuals suffering from undiagnosed asthma.

Lifetime Prevalence

Based on the 2001 NHIS sample, it was estimated that 31.3 million Americans, or 113.4 per 1,000 persons, had been diagnosed with asthma by a health professional within their lifetime. Between 1997 and 1999 asthma lifetime prevalence rate decreased by 6%, however it has increased 25% since 1999. Between 1997 and 2001, children 5-17 years of age have had the highest prevalence rates. In 2001, 144.2 per 1,000 children ages 5-17 had been diagnosed with asthma in their lifetime.

Females have had consistently higher rates than males. In 2001, females were about 10% more likely than males to ever have been diagnosed with asthma. This was the first time that the difference between sexes for lifetime prevalence was statistically significant.

In 2001, the prevalence rate in blacks was close to 15 percent higher than in whites. Since 1997 the differences in lifetime asthma prevalence between races have been statistically significant.

These data are displayed in Table 6.

Current Prevalence

Data between 1982 and 1996 should not be compared to 2001 estimates.

Age-specific current asthma prevalence trends are shown in Table 7. Close to 20.3 million Americans (6.3 million children) had asthma in 2001; a rate of 73.4 per 1,000 population. The highest prevalence rate was seen in those 5-17 years of age (98.1 per 1,000 population), with rates decreasing with age. Overall, the rate in those under 18 (87 per 1,000) was significantly greater than those over 18 (69 per 1,000).

Sex-specific current asthma prevalence trends are delineated in Table 8. In 2001, 8.6 million males and 11.7 million females had asthma. The prevalence rate in females (82.6 per 1,000 persons) was 30% greater than the rate in males (63.6 per 1,000 persons). However this pattern was reversed among children. The current asthma prevalence rate for boys aged 0-17 years (99.0 per 1,000) was over 30% higher than the rate among girls (74.4 per 1,000). The difference in rates between sexes was statistically significant in both children and adults.

Race-specific current asthma prevalence trends are displayed in Table 9. In 2001, the current asthma prevalence rate was 22.7% higher in blacks than in whites. This difference between races was significant. Whites had the lowest prevalence rates in those under 5 and blacks had the lowest in those over 65. The highest prevalence rates for both races were among the 5-17 age group.

Attack Prevalence

In 2001, an estimated 12 million Americans (4 million children under 18) had an asthma attack. This represents 59% of the 20.3 million people who currently had asthma. The asthma attack rate was 43.4 per 1,000 population in 2001. As with lifetime prevalence, the attack prevalence rate decreased by 7.4% between 1997 and 1999, but has increased by 12% since then.

For the past five years, 5-17 year olds had the highest attack prevalence rates while those over 65 had the lowest. For all five years the rate in those under 18 was significantly greater than those over 18.

Between 1997 and 2001, the attack prevalence rate increased 3.0 percent in males and 4.8 percent in females. Females tend to have consistently higher attack prevalence rates than males. In 2001, 7.1 million females (50.1 per 1,000) had an asthma attack compared to 4.9 million males (36.3 per 1,000). The difference in attack prevalence rates between sexes has been significant since 1997.

The attack prevalence rate in blacks was 32% higher than the rate in whites. The difference was significant. Prevalence rates in whites tend to be highest among the 5-17 age group and lowest in the over 65. Prevalence rates in blacks tend to be highest among those under 5 and lowest in those 45-64. Between 1997 and 2001 both races experienced increases in attack prevalence rates, 10.4% in whites and 11.2% among blacks.

These data are displayed in Table 10.

Asthma in Hispanics

Table 11 displays the number of conditions and prevalence rates by Hispanic origin. In 2001 over 3.2 million Hispanic Americans had been diagnosed with asthma in their lifetime. Two million Hispanic Americans reported that they still have the disease, and 1.2 million of those experienced an asthma attack in the past year. Prevalence rates in Hispanics were significantly lower than Non-Hispanic blacks and Non-Hispanic whites in 2001. Studies have suggested that within Hispanic subgroups, Puerto Ricans may have higher rates of asthma than other Hispanic subgroups and non-Hispanic whites.²

Percentage Distribution of Conditions

Percentage distributions of lifetime asthma, current asthma and asthma attacks in 2001 are displayed in Figures 2, 3, and 4, respectively. Each figure displays the distribution of asthma by sex, age group, ethnicity and geographic region. The overall percentage of asthma sufferers tend to be highest in the South, in Non-Hispanic whites, in 18-44 year olds, and in females.

Behavioral Risk Factor Surveillance System, 2000-2001

The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based survey of the noninstitutionalized U.S. population aged 18 and over that collects information about modifiable risk factors for chronic diseases and other leading causes of death. This is the first survey to collect state-specific asthma prevalence data.

Questions on lifetime and current asthma prevalence are comparable to the National Health Interview Survey, but national estimates vary slightly due to sample design and survey differences. The Behavioral Risk Factor Surveillance System reports on adults, aged 18 years and older while the National Health Interview Survey reports on all ages. In addition, the Behavioral Risk Factor Surveillance System is conducted by telephone while the National Health Interview Survey is conducted by in-person interviews. In any given year, the number of people participating in a telephone survey will outweigh those participating in an in-person interview, leading to higher estimates.

An estimated 23.2 million adults (11.0%) had lifetime asthma and 15.1 million adults (7.1%) had current asthma in 2001, according to the BRFSS. This compares to 22.2 million adults (10.9%) and 14.0 million adults (6.9%) who were diagnosed with lifetime and current asthma, respectively, in the 2001 National Health Interview Survey. However, confidence intervals around the prevalence rates from the National Health Interview Survey encompass the Behavioral Risk Factor Surveillance System rates.

Table 12 displays estimated state-specific lifetime and current asthma prevalence estimates for 2000 and 2001 according to the Behavioral Risk Factor Surveillance System. Figure 5 shows the estimated state-specific current asthma prevalence for 2001. Prevalence ranged from 5.3% in Louisiana and South Dakota to 9.4% in Maine and Massachusetts.

First-Listed Asthma Hospital Discharges, 1979-2000

A first listed diagnosis is the diagnosis identified as the principal diagnosis or listed first on the medical record. Due to a change in the design of the survey, data from 1988-2000 is not directly comparable to that of earlier years. The hospital discharge rate for asthma increased dramatically from 1979 to 1988, remained stable in the early 1990s, and peaked at 511,000 discharges (19.5 per 10,000 population) in 1995. During 2000, 465,000 discharges (16.7 per 10,000 population) were due to asthma.

Table 13 delineates the trend in the number of hospital discharges and rates by sex from 1979-2000. Between 1995 and 2000 the number of hospital discharges decreased 9 percent overall, 5.7% in males and 11.3% in females. Between 1999 and 2000 the number of discharges in males increased 4.2% while decreasing 7.3% in females. In 2000, a total of 267,000 discharges were reported in females and 198,000 were reported in males. However, the discharge rate in females (18.8 per 10,000) was not significantly different from that reported in males (14.5 per 10,000).

As shown in Table 14, hospital discharge rates for asthma decreased in all age groups between 1995 and 2000. Unlike other chronic lung diseases, asthma discharges are very common among the pediatric population. Over 43% of the asthma discharges in 2000 were in those under 15,

however only 22% of the U.S. population was less than 15 years old. However, the discharge rate in the population under 15 was only statistically greater than the rate in those 15-44. Figure 6 depicts this age-specific trend.

The trend in hospital discharges by race is delineated in Table 15. The 2000 discharge rate for asthma was highest in blacks (32.9 per 10,000). The rate in whites and in all other races was the same (10.3 per 10,000). These rates, however, should be interpreted with caution due to the large percentage of discharges (17% in 2000) for which race was not reported. Figure 7 displays this race-specific trend.

Asthma Ambulatory Care Visits, 1989-2000

Table 16 displays the trend in visits to physician offices, hospital outpatient departments and emergency departments in the United States from 1989-2000. In 2000 there were 9.3 million physician office visits, 1 million hospital outpatient department visits and 1.8 million emergency room visits due to asthma.

Economic Cost of Asthma

Estimates of direct medical expenditures and indirect costs (in 2002 dollars) attributed to asthma are shown in Table 17. Asthma entails an annual economic cost to our nation in direct health care costs of \$9.4 billion; indirect costs (lost productivity) add another \$4.6 billion for a total of \$14.0 billion. Inpatient hospital services represented the largest single direct medical expenditure, over \$4 billion. The value of reduced productivity due to loss of school days represented the largest single indirect cost at \$1.4 billion.

A recent study by the American Lung Association Asthma Clinical Research Centers found that the inactivated influenza vaccine is safe to administer to adults and children with asthma, including those with severe asthma.³ Influenza causes substantial morbidity in adults and children with asthma, and vaccination can prevent influenza and its complications. Currently, fewer than 10% of patients with asthma receive the influenza vaccine. If the percentage increased to 50%, then close to 95,000 hospitalizations would be prevented and \$530 million dollars would be saved.

Summary

After a long period of steady increase, there seemed to be a decline in asthma prevalence from 1997 to 1999. However, rates in 2000 and 2001 indicate a return to the rising trend. Between 1999 and 2001 lifetime and attack prevalence rates increased 27% and 12%, respectively. New to the 2001 version of the National Health Interview Survey was a question collecting information on current asthma prevalence. In 2001, approximately 20.3 million Americans had asthma.

In contrast, mortality and hospital discharge estimates continue to decline. The number of deaths due to asthma in 2000 was approximately 4% lower than the number of deaths seen in 1999. The hospital discharge rate has declined 14% since it peaked at 19.5 per 10,000 in 1995.

Thus asthma remains a major public health concern. Asthma accounts for an estimated 14.5 million lost workdays for adults and 14 million lost school days in children annually. Asthma ranks within

the top ten prevalent conditions causing limitation of activity and costs our nation \$14.0 billion in health care costs annually.

FOOTNOTES

1. Homa, D. et al. *Asthma Mortality in U.S. Hispanics of Mexican, Puerto Rican, and Cuban Heritage, 1990-1995*. American Journal of Respiratory and Critical Care Medicine, 2000; 161: 504-509.
2. Ledogar, R. et al. *Asthma and Latino Cultures: Different Prevalence Reported Among Groups Sharing the Same Environment*. American Journal of Public Health, 2000; 90 (6):929-935.
3. American Lung Association Asthma Clinical Research Centers. *The Safety of Inactivated Influenza Vaccine in Adults and Children with Asthma*. New England Journal of Medicine, 2001; 345(21): 1529-1536.

GLOSSARY

Prevalence:	The proportion of existing cases of a particular condition, disease, or other occurrence (e.g., persons smoking) at a given time.
Lifetime Prevalence:	The proportion of cases that exist within a population at any point during a specified period of time, otherwise known as period prevalence.
Current Prevalence:	The proportion of cases that exist within a population at a single point in time, otherwise known as point prevalence.
Attack Prevalence:	The proportion of attacks that occur within a population at a single point in time, also a point prevalence measure.
Crude Rate:	Cases in a particular population quantity- e.g. per hundred.
Age-Adjusted Rate:	A figure that is statistically corrected to remove the distorting effect of age when comparing populations of different age structures.
P value:	The probability of observing a result as extreme as that observed solely to chance. If $p \leq 0.05$, then there is no more than a 5% chance of seeing that result again, but if $p > 0.05$, then chance cannot be excluded as a likely explanation and the findings are said to be not significant at that level.

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9. Kevin B. Weiss, M.D., Peter J. Gergen, M.D., M.P.H., and Thomas A. Hodgson, Ph.D. *An Economic Evaluation of Asthma in the U.S.* The New England Journal of Medicine, 1992, 326:862-6.
10. National Heart, Lung and Blood Institute Chartbook, U.S. Department of Health and Human Services, National Institute of Health, 2002.

TABLE 1: ASTHMA - NUMBER OF DEATHS BY RACE AND SEX, 1979-1998, 1999-2000

YEAR	TOTAL			WHITE			ALL OTHER ⁽¹⁾					
							TOTAL			BLACK		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
1979 ⁽²⁾	2,598	1,133	1,465	2,095	898	1,197	503	235	268	470	214	256
1980	2,891	1,292	1,599	2,291	1,008	1,283	600	284	316	557	260	297
1981	3,054	1,287	1,767	2,426	977	1,449	628	310	318	576	281	295
1982	3,154	1,314	1,840	2,450	983	1,467	704	331	373	647	301	346
1983	3,561	1,455	2,106	2,751	1,084	1,667	810	371	439	732	336	396
1984	3,564	1,467	2,097	2,779	1,106	1,673	785	361	424	701	312	389
1985	3,880	1,551	2,329	3,026	1,140	1,886	854	411	443	778	371	407
1986	3,955	1,584	2,371	3,036	1,178	1,858	919	406	513	828	360	468
1987	4,360	1,730	2,630	3,327	1,244	2,083	1,033	486	547	920	428	492
1988	4,597	1,822	2,775	3,473	1,299	2,174	1,124	523	601	1,012	460	552
1989	4,869	1,848	3,021	3,761	1,352	2,409	1,108	496	612	984	434	550
1990	4,819	1,885	2,934	3,696	1,358	2,338	1,123	527	596	986	460	526
1991	5,106	1,927	3,179	3,915	1,388	2,527	1,191	539	652	1,043	472	571
1992	4,964	1,869	3,095	3,789	1,362	2,427	1,175	507	668	1,036	433	603
1993	5,167	1,928	3,239	3,910	1,384	2,526	1,257	544	713	1,112	465	647
1994	5,487	2,101	3,386	4,134	1,492	2,642	1,353	609	744	1,186	525	661
1995	5,637	2,079	3,558	4,208	1,454	2,754	1,429	625	804	1,247	538	709
1996	5,667	2,075	3,592	4,110	1,426	2,684	1,557	649	908	1,325	540	785
1997	5,434	1,986	3,448	4,002	1,383	2,619	1,432	603	829	1,200	498	702
1998	5,438	2,000	3,438	3,947	1,366	2,581	1,491	634	857	1,290	536	754
1999 ⁽³⁾	4,657	1,620	3,037	3,328	1,046	2,282	1,329	574	755	1,145	481	664
2000 ⁽³⁾	4,487	1,632	2,855	3,144	1,057	2,087	1,343	575	768	1,158	481	677

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, FINAL VITAL STATISTICS REPORT 1979-2000

NOTES:

(1) ALL RACES OTHER THAN WHITE

(2) DEATHS FROM 1979-1998 ARE CODED BY THE 9TH REVISION OF INTERNATIONAL CLASSIFICATION OF DISEASES, CODE 493.

(3) DEATHS FROM 1999-2000 ARE CODED BY THE 10TH REVISION OF INTERNATIONAL CLASSIFICATION OF DISEASES, CODE J45-J46.

TABLE 2: ASTHMA - AGE-ADJUSTED DEATH RATE PER 100,000 POPULATION, BY RACE & SEX, 1979-1998, 1999-2000 ^(1, 4)

YEAR	TOTAL						ALL OTHER ⁽³⁾					
	TOTAL			WHITE			TOTAL			BLACK		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
1979 ⁽⁴⁾	0.9	0.9	0.9	0.8	0.8	0.8	1.8	1.8	1.8	1.9	1.9	2.0
1980	1.0	1.0	1.0	0.8	0.8	0.8	2.0	2.1	1.9	2.2	2.2	2.2
1981	1.0	1.0	1.1	0.9	0.8	0.9	2.1	2.2	1.9	2.3	2.4	2.1
1982	1.0	1.0	1.1	0.9	0.8	0.9	2.2	2.3	2.2	2.5	2.5	2.5
1983	1.2	1.1	1.3	0.9	0.9	1.0	2.5	2.5	2.5	2.8	2.8	2.8
1984	1.1	1.1	1.2	1.0	0.9	1.0	2.3	2.4	2.3	2.6	2.5	2.6
1985	1.2	1.1	1.3	1.0	0.9	1.2	2.5	2.6	2.3	2.8	3.0	2.7
1986	1.2	1.1	1.3	1.0	0.9	1.1	2.6	2.5	2.7	2.9	2.9	3.0
1987	1.3	1.2	1.4	1.1	1.0	1.2	2.9	2.9	2.8	3.2	3.3	3.2
1988	1.4	1.2	1.5	1.1	1.0	1.2	3.0	3.1	3.0	3.5	3.5	3.4
1989	1.4	1.2	1.6	1.2	1.0	1.3	2.8	2.8	2.9	3.3	3.2	3.3
1990	1.4	1.3	1.5	1.2	1.0	1.3	2.9	3.0	2.8	3.4	3.5	3.3
1991	1.5	1.3	1.6	1.2	1.0	1.4	3.0	3.0	3.0	3.5	3.5	3.5
1992	1.4	1.2	1.5	1.1	0.9	1.3	2.8	2.8	2.9	3.3	3.1	3.5
1993	1.4	1.3	1.6	1.2	1.0	1.3	2.9	2.8	3.0	3.5	3.3	3.7
1994	1.5	1.4	1.7	1.2	1.0	1.4	3.1	3.1	3.1	3.7	3.6	3.7
1995	1.5	1.3	1.7	1.3	1.0	1.5	3.2	3.1	3.3	3.8	3.6	3.9
1996	1.5	1.3	1.7	1.2	1.0	1.4	3.3	3.1	3.5	3.9	3.6	4.1
1997	1.4	1.2	1.6	1.1	1.0	1.3	3.0	2.9	3.1	3.5	3.2	3.6
1998	1.4	1.2	1.5	1.1	0.9	1.2	3.0	2.9	3.1	3.7	3.4	3.8
1999 ⁽²⁾	1.7	1.4	2.0	1.4	1.0	1.7	3.4	3.3	3.5	3.9	3.6	4.2
2000 ⁽²⁾	1.6	1.3	1.8	1.3	1.0	1.5	3.3	3.1	3.5	3.9	3.5	4.2

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, FINAL MORTALITY STATISTICS REPORT, 1979-2000

NOTES:

- (1) RATES FOR THE YEARS 1979-1998 ARE AGE-ADJUSTED TO THE 1940 U.S. STANDARD POPULATION.
- (2) RATES FOR 1999-2000 ARE AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION
- (3) ALL RACES OTHER THAN WHITE.
- (4) INTERNATIONAL CLASSIFICATION OF DISEASES, 9TH REVISION (ICD-9) CODE 493.
- (5) INTERNATIONAL CLASSIFICATION OF DISEASES, 10TH REVISION (ICD-10) CODE J45-J46.

TABLE 3: ASTHMA-NUMBER OF DEATHS AND AGE-ADJUSTED DEATH RATE PER 100,000 POPULATION BY ORIGIN AND SEX, 1999-2000 (1,2)

ORIGIN	BOTH SEXES				MALE				FEMALE			
	1999		2000		1999		2000		1999		2000	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
TOTAL	4,657	1.7	4,487	1.6	1,620	1.4	1,632	1.3	3,037	2.0	2,855	1.8
HISPANIC	320	1.7	292	1.5	119	1.2	129	1.3	201	2.0	163	1.6
NON HISPANIC ⁽³⁾	4,324	1.7	4,164	1.6	1,495	1.4	1,486	1.3	2,829	2.0	2,678	1.9
NON HISPANIC WHITE	3,011	1.4	2,836	1.3	930	1.0	920	1.0	2,081	1.7	1,916	1.5
NON HISPANIC BLACK	1,134	4.1	1,145	4.1	474	3.7	472	3.6	660	4.3	673	4.3

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, FINAL MORTALITY STATISTICS REPORT, 1999-2000

NOTES:

- (1) NUMBER OF DEATHS ARE CODED BY THE 10TH REVISION OF THE INTERNATIONAL CLASSIFICATION OF DISEASES, J45-J46.
- (2) RATES ARE AGE-ADJUSTED TO THE 2000 U.S. STANDARD POPULATION.
- (3) INCLUDES RACES OTHER THAN WHITE AND BLACK.

TABLE 4: ASTHMA - NUMBER OF DEATHS IN 10-YEAR AGE GROUPS, 1979-1998, 1999-2000

YEAR	TOTAL	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	NOT STATED
1979 ⁽¹⁾	2,598	5	19	39	99	111	157	282	502	695	499	190	---
1980	2,891	8	21	61	105	130	145	309	529	765	596	222	---
1981	3,054	3	12	72	112	155	178	308	607	803	575	229	---
1982	3,154	8	26	70	162	169	176	341	582	793	593	234	---
1983	3,561	5	28	78	144	186	231	384	686	836	693	290	---
1984	3,564	10	17	79	132	159	227	355	674	905	702	303	1
1985	3,880	6	21	98	156	182	231	378	755	936	785	332	---
1986	3,955	13	17	92	166	197	251	356	688	982	843	350	---
1987	4,360	4	19	101	181	199	341	443	709	1,081	873	408	1
1988	4,597	7	19	93	162	231	343	440	785	1,097	991	429	---
1989	4,869	6	26	95	148	256	346	472	743	1,208	1,094	473	2
1990	4,819	12	24	102	160	237	332	502	738	1,125	1,074	512	1
1991	5,106	5	30	106	183	280	386	510	737	1,155	1,161	553	---
1992	4,964	9	38	88	168	232	373	495	692	1,164	1,097	608	---
1993	5,167	6	32	118	186	240	405	508	738	1,196	1,114	623	1
1994	5,487	5	24	118	215	304	421	597	780	1,223	1,155	644	1
1995	5,637	13	21	130	224	298	498	663	785	1,147	1,195	663	0
1996	5,667	8	34	149	214	288	496	649	816	1,095	1,177	739	2
1997	5,434	5	30	119	174	298	489	636	757	992	1,183	751	1
1998	5,438	7	33	131	214	277	487	647	673	972	1,190	807	---
1999 ⁽²⁾	4,657	5	27	126	182	262	447	607	583	773	925	720	---
2000 ⁽²⁾	4,487	8	32	129	167	249	458	614	540	734	849	707	---

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, FINAL VITAL STATISTICS REPORT, 1979-1998, 1999-2000

NOTES:

(1)Deaths from 1979-1998 are coded by the 9th revision of International Classification of Diseases, 493.

(2)Deaths from 1999-2000 are coded by the 10th revision of International Classification of Diseases, J45-J46.

TABLE 5: ASTHMA - MORTALITY RATE PER 100,000 POPULATION, BY 10-YEAR AGE GROUPS, 1979-1998, 1999-2000

YEAR	TOTAL	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+
1979 ⁽¹⁾	1.2	---	---	0.1	0.2	0.3	0.6	1.2	2.3	4.5	6.6	8.6
1980	1.3	---	0.2	0.2	0.2	0.4	0.6	1.4	2.4	4.9	7.7	9.9
1981	1.3	---	---	0.2	0.3	0.4	0.7	1.4	2.8	5.1	7.2	9.7
1982	1.4	---	0.2	0.2	0.4	0.4	0.6	1.5	2.6	4.9	7.2	9.6
1983	1.5	---	0.2	0.2	0.4	0.5	0.8	1.7	3.1	5.1	8.2	11.5
1984	1.5	---	---	0.2	0.3	0.4	0.7	1.6	3.0	5.4	8.1	11.7
1985	1.6	---	0.1	0.3	0.4	0.4	0.7	1.7	3.4	5.6	8.8	12.4
1986	1.6	---	---	0.3	0.4	0.5	0.8	1.6	3.1	5.7	9.2	12.8
1987	1.8	---	---	0.3	0.5	0.5	1.0	1.9	3.3	6.2	9.3	14.5
1988	1.9	---	---	0.3	0.4	0.5	1.0	1.8	3.6	6.2	10.3	14.9
1989	2.0	---	0.2	0.3	0.4	0.6	1.0	1.9	3.5	6.8	11.1	15.9
1990	1.9	---	0.2	0.3	0.4	0.5	0.9	2.0	3.5	6.2	10.7	16.9
1991	2.0	---	0.2	0.3	0.5	0.7	1.0	2.0	3.5	6.3	11.3	17.5
1992	1.9	---	0.2	0.2	0.5	0.5	0.9	1.8	3.3	6.3	10.4	18.7
1993	2.0	---	0.2	0.3	0.5	0.6	1.0	1.8	3.5	6.4	10.4	18.3
1994	2.1	---	0.2	0.3	0.6	0.7	1.0	2.0	3.7	6.5	10.6	18.3
1995	2.1	---	0.1	0.3	0.6	0.7	1.2	2.1	3.7	6.1	10.7	18.3
1996	2.1	---	0.2	0.4	0.6	0.7	1.1	2.0	3.8	5.9	10.3	19.6
1997	2.0	---	0.2	0.3	0.5	0.8	1.1	1.9	3.5	5.4	10.1	19.4
1998	2.0	---	0.2	0.3	0.6	0.7	1.1	1.9	3.0	5.3	10.0	19.9
1999 ⁽²⁾	1.7	---	0.2	0.3	0.5	0.7	1.0	1.7	2.5	4.2	7.6	17.2
2000 ⁽²⁾	1.6	---	0.2	0.3	0.4	0.7	1.0	1.7	2.3	4.0	6.9	16.5

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, FINAL VITAL STATISTICS REPORT, 1979-2000

NOTE:

--- FIGURE DOES NOT MEET STANDARD OF RELIABILITY OR PRECISION (ESTIMATE BASED ON FEWER THAN 20 DEATHS)

(1) INTERNATIONAL CLASSIFICATION OF DISEASES, 9TH REVISION (ICD-9) CODE 493.

(2) INTERNATIONAL CLASSIFICATION OF DISEASES, 10TH REVISION (ICD-10) CODE J45-J46.

TABLE 6: NUMBER OF PEOPLE EVER TOLD BY A HEALTH PROFESSIONAL THAT THEY HAD ASTHMA AND PREVALENCE RATE PER 1,000 PERSONS, BY AGE, SEX AND RACE, 1997-2001 (LIFETIME PREVALENCE) ¹

	1997			1998			1999		
	NUMBER	RATE	CI OF RATE ²	NUMBER	RATE	CI OF RATE ²	NUMBER	RATE	CI OF RATE ²
AGE									
TOTAL	25,747,105	96.6	(93.3--99.8)	26,394,037	98.1	(94.7--101.6)	24,701,614	90.9	(87.6--94.2)
<5	1,398,233	70.9	(61.0--80.8)	1,627,352	82.6	(71.2--94.1)	1,367,507	69.8	(60.1--79.5)
5-17	6,719,692	130.1	(122.2--138.1)	7,022,501	135.0	(127.0--143.0)	6,393,195	121.8	(113.2--130.4)
<18	8,117,925	113.8	(107.3--120.3)	8,649,853	120.6	(113.8--127.5)	7,760,702	107.7	(100.8--114.6)
18-44	10,377,177	95.7	(90.7--100.8)	9,935,452	91.6	(86.4--96.9)	10,121,640	93.3	(88.2--98.3)
45-64	4,810,974	87.7	(81.0--94.3)	5,304,135	93.6	(86.4--100.7)	4,694,098	80.1	(86.4--100.7)
65+	2,441,029	76.3	(68.9--83.6)	2,504,597	77.7	(70.7--84.8)	2,125,174	65.4	(70.7--84.8)
>18	17,629,180	90.2	(86.7--93.9)	17,744,184	89.9	(86.6--93.6)	16,940,912	84.9	(81.2--88.6)
SEX									
MALE	12,238,763	94.0	(89.3--98.7)	12,589,221	95.8	(90.8--100.8)	11,504,824	86.9	(82.1--91.6)
FEMALE	13,508,342	99.0	(94.6--103.5)	13,804,816	100.3	(95.5--105.2)	13,196,790	94.8	(90.1--99.4)
RACE									
WHITE									
WHITE	20,799,967	95.5	(91.9--99.0)	20,827,971	95.3	(91.5--99.1)	19,540,331	88.9	(85.2--92.6)
<5	944,392	62.1	(50.9--73.2)	1,064,697	70.5	(58.4--82.6)	926,215	62.3	(51.2--73.3)
5-17	5,120,714	128.3	(119.5--137.1)	5,287,332	131.6	(122.8--140.5)	4,615,812	114.4	(105.0--123.7)
18-44	8,514,352	97.4	(91.7--103.0)	7,869,545	90.9	(85.0--96.9)	8,126,454	94.2	(88.4--99.9)
45-64	4,067,545	87.3	(80.0--94.6)	4,437,937	92.1	(84.2--99.9)	3,970,537	80.2	(73.1--87.3)
65+	2,152,964	75.1	(67.3--83.0)	2,168,460	76.0	(68.6--83.4)	1,901,313	66.3	(59.3--73.3)
BLACK									
BLACK	3,659,349	109.8	(101.3--118.3)	4,165,356	124.2	(115.4--132.9)	3,449,728	102.3	(92.5--112.0)
<5	331,716	108.0	(82.3--133.7)	397,810	134.4	(100.3--168.5)	301,060	104.7	(73.7--135.7)
5-17	1,205,433	148.7	(130.4--167.1)	1,311,478	160.7	(136.6--184.7)	1,206,803	147.8	(125.8--169.8)
18-44	1,350,218	97.0	(84.4--109.7)	1,529,102	109.5	(96.2--122.7)	1,320,364	94.1	(80.0--108.2)
45-64	536,779	95.7	(78.7--112.8)	685,390	118.4	(96.5--140.2)	489,047	81.5	(59.3--103.6)
65+	235,203	89.4	(65.0--113.7)	241,576	90.7	(68.5--112.9)	132,454	50.0	(35.6--64.3)
	2000			2001					
	NUMBER	RATE	CI OF RATE ²	NUMBER	RATE	CI OF RATE ²			
AGE									
TOTAL	27,615,006	100.8	(97.3--104.3)	31,353,657	113.4	(109.7--117.1)			
<5	1,535,639	78.3	(68.5--88.1)	1,552,713	78.7	(68.6--88.7)			
5-17	7,382,614	140.0	(131.4--148.7)	7,631,820	144.2	(135.0--153.5)			
<18	8,918,253	123.3	(116.5--130.1)	9,184,533	126.4	(119.2--133.6)			
18-44	10,676,318	98.4	(93.1--103.8)	12,795,275	118.0	(112.3--123.7)			
45-64	5,266,650	87.0	(80.1--93.9)	6,507,867	104.1	(97.2--110.9)			
65+	2,753,785	84.2	(77.3--91.2)	2,865,982	87.2	(79.0--95.4)			
>18	18,696,753	92.7	(89.0--96.4)	22,169,124	108.8	(104.6--112.9)			
SEX									
MALE	13,170,011	98.6	(93.9--103.2)	14,556,517	107.9	(102.8--113.0)			
FEMALE	14,444,995	102.9	(98.2--107.6)	16,797,140	118.6	(113.8--123.5)			
RACE									
WHITE									
WHITE	21,789,410	99.6	(95.6--103.5)	24,771,837	112.1	(107.8--116.4)			
<5	987,127	68.1	(56.7--79.4)	978,206	65.8	(54.2--77.3)			
5-17	5,395,877	135.4	(125.4--145.4)	5,592,504	139.4	(129.0--149.9)			
18-44	8,706,016	102.5	(96.2--108.8)	10,227,098	120.8	(114.0--127.6)			
45-64	4,335,147	85.6	(77.9--93.3)	5,499,261	104.9	(97.3--112.6)			
65+	2,365,243	81.8	(74.6--88.9)	2,474,768	85.4	(76.8--94.0)			
BLACK									
BLACK	3,966,949	115.7	(106.9--124.4)	4,453,467	128.6	(119.3--138.0)			
<5	371,099	126.7	(96.1--157.4)	406,228	137.8	(104.8--170.9)			
5-17	1,427,655	173.0	(152.7--193.2)	1,403,147	170.8	(146.0--195.5)			
18-44	1,235,710	87.4	(74.4--99.8)	1,704,761	119.9	(104.4--135.3)			
45-64	662,438	105.4	(88.4--122.5)	668,693	102.5	(85.8--119.2)			
65+	270,047	100.4	(70.9--130.0)	270,638	99.9	(77.0--122.8)			

Source: National Center for Health Statistics, National Health Interview Survey, 1997-2001

Notes:

(1) Period or Lifetime prevalence is defined as answering yes to "Have you EVER been told by a doctor or other health professional that you had asthma?"

(2) 95% Confidence Interval.

TABLE 7: ASTHMA - NUMBER OF CONDITIONS AND PREVALENCE RATE PER 1,000 PERSONS BY AGE 1982-1996, 2001 (CURRENT PREVALENCE)^{1,2}

YEAR	ALL AGES		UNDER 5		5-17		<18		18-44		45-64		65+	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1982	7,899,000	34.8	*	*	*	*	2,513,000	40.1	2,749,000	29.0	1,603,000	36.3	1,035,000	40.8
1983	8,787,000	38.3	*	*	*	*	2,828,000	45.2	3,487,000	36.1	1,529,000	34.6	943,000	36.4
1984	8,388,000	36.2	*	*	*	*	2,658,000	42.5	3,152,000	32.1	1,485,000	33.5	1,093,000	41.3
1985	8,612,000	36.8	*	*	*	*	2,997,000	47.8	3,323,000	33.4	1,255,000	28.2	1,036,000	38.3
1986	9,690,000	41.0	*	*	*	*	3,223,000	51.1	3,672,000	36.4	1,622,000	36.3	1,173,000	42.6
1987	9,565,000	40.1	*	*	*	*	3,323,000	52.5	3,522,000	34.5	1,633,000	36.3	1,087,000	38.6
1988	9,934,000	41.2	*	*	*	*	3,171,000	49.9	3,989,000	38.7	1,587,000	34.8	1,188,000	41.4
1989	11,621,000	47.7	*	*	*	*	3,901,000	61.0	4,302,000	41.3	1,914,000	41.5	1,504,000	51.5
1990	10,311,000	41.9	*	*	*	*	3,725,000	57.6	3,703,000	35.2	1,800,000	38.6	1,082,000	36.3
1991	11,735,000	47.2	*	*	*	*	4,094,000	62.5	4,594,000	43.4	1,921,000	40.7	1,126,000	37.2
1992	12,375,000	49.2	*	*	*	*	4,218,000	63.4	4,748,000	44.9	2,183,000	45.0	1,226,000	39.8
1993	13,074,000	51.4	*	*	*	*	4,830,000	71.6	4,495,000	42.5	2,242,000	45.0	1,506,000	48.2
1994	14,562,000	56.1	*	*	*	*	4,837,000	69.1	5,598,000	51.7	2,561,000	50.8	1,566,000	50.5
1995	14,878,000	56.8	*	*	*	*	5,294,000	74.9	5,577,000	51.6	2,754,000	53.3	1,253,000	39.8
1996	14,596,000	55.2	*	*	*	*	4,429,000	62.0	6,141,000	56.9	2,581,000	48.6	1,445,000	45.5
2001	20,280,603	73.4	1,127,711	57.1	5,192,266	98.1	6,319,977	87.0	7,796,024	71.9	4,207,483	67.3	1,957,119	59.6

Source: National Center for Health Statistics, National Health Interview Survey, 1982-1996, 2001
 Calculations Performed by the Epidemiology and Statistics Unit

NOTES:

* Data for these age groups were not calculated.

(1) Due to rounding, numbers across may not sum up to totals.

(2) With the revision of the National Health Interview Survey in 1997, the question "During the past 12 months, did anyone in the family have asthma?" was eliminated and was replaced with two questions: "Have you ever been told by a doctor or other health professional that you had asthma?" (Table 6) and "During the past 12 months, have you had an episode of asthma or asthma attack?" (Table 10). Realizing the information gap resulting with the revised questions, "Do you still have asthma?" was added in 2001- reinstating a measure of current prevalence. However, **data between 1982 and 1996 should not be compared to 2001 estimates.**

TABLE 8: ASTHMA- NUMBER OF CONDITIONS AND PREVALENCE RATE PER 1,000 PERSONS BY SEX, 1982-1996, 2001 (CURRENT PREVALENCE) ¹

YEAR	MALE						FEMALE					
	ALL AGES		0-17 years		18 years and over		ALL AGES		0-17 years		18 years and over	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1982	3,994,000	36.5	*	*	*	*	3,906,000	33.2	*	*	*	*
1983	3,818,000	34.5	*	*	*	*	4,968,000	41.9	*	*	*	*
1984	3,924,000	35.1	*	*	*	*	4,464,000	37.3	*	*	*	*
1985	3,864,000	34.2	*	*	*	*	4,748,000	39.3	*	*	*	*
1986	4,670,000	40.8	*	*	*	*	5,019,000	41.1	*	*	*	*
1987	4,609,000	39.9	*	*	*	*	4,956,000	40.3	*	*	*	*
1988	4,650,000	39.9	*	*	*	*	5,285,000	42.5	*	*	*	*
1989	5,593,000	47.4	*	*	*	*	6,028,000	48.0	*	*	*	*
1990	4,741,000	39.7	*	*	*	*	5,570,000	44.0	*	*	*	*
1991	5,724,000	47.4	*	*	*	*	6,011,000	47.0	*	*	*	*
1992	5,516,000	45.1	*	*	*	*	6,859,000	53.1	*	*	*	*
1993	5,946,000	48.1	*	*	*	*	7,127,000	54.6	*	*	*	*
1994	6,542,000	51.7	*	*	*	*	8,019,000	60.2	*	*	*	*
1995	6,687,000	52.4	*	*	*	*	8,190,000	61.0	*	*	*	*
1996	5,751,000	44.4	*	*	*	*	8,845,000	65.3	*	*	*	*
2001	8,579,722	63.6	3,679,050	99.0	4,900,672	50.1	11,700,881	82.6	2,640,927	74.4	9,059,954	85.4

**Source: National Center for Health Statistics, National Health Interview Survey, 1982-1996, 2001
Calculations Performed by the Epidemiology and Statistics Unit**

Notes:

(1) With the revision of the National Health Interview Survey in 1997, the question "During the past 12 months, did anyone in the family have asthma?" was eliminated and was replaced with two questions: "Have you ever been told by a doctor or other health professional that you had asthma?" (Table 6) and "During the past 12 months, have you had an episode of asthma or asthma attack?" (Table 10). Realizing the information gap resulting with the revised questions, "Do you still have asthma?" was added in 2001- reinstating a measure of current prevalence. However, **data between 1982 and 1996 should not be compared to 2001 estimates.**

**TABLE 9: ASTHMA - NUMBER OF CONDITIONS AND PREVALENCE RATE PER 1,000 PERSONS
BY RACE AND AGE 1982-1996, 2001 (CURRENT PREVALENCE) ¹**

YEAR	WHITE											
	ALL AGES		UNDER 5		5-17		18-44		45-64		65+	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1982	6,711,000	34.6	*	*	*	*	*	*	1,423,000	36.5	895,000	39.0
1983	7,412,000	37.7	*	*	*	*	*	*	1,367,000	35.0	848,000	36.2
1984	7,296,000	36.9	*	*	*	*	*	*	1,295,000	33.1	1,019,000	42.6
1985	7,425,000	37.2	*	*	*	*	*	*	1,121,000	28.7	932,000	38.1
1986	8,190,000	40.9	*	*	*	*	*	*	1,451,000	37.2	981,000	39.6
1987	8,126,000	40.3	*	*	*	*	*	*	1,463,000	37.4	987,000	38.8
1988	8,101,000	39.9	*	*	*	*	*	*	1,327,000	33.5	1,046,000	40.5
1989	9,675,000	47.1	*	*	*	*	*	*	1,743,000	43.6	1,313,000	49.9
1990	8,544,000	41.3	*	*	*	*	*	*	1,585,000	39.3	926,000	34.6
1991	9,660,000	46.4	*	*	*	*	*	*	1,689,000	41.6	1,013,000	37.2
1992	10,309,000	49.2	*	*	*	*	*	*	1,900,000	45.5	1,068,000	38.8
1993	10,616,000	50.2	*	*	*	*	*	*	1,904,000	44.5	1,374,000	49.2
1994	12,052,000	56.2	*	*	*	*	*	*	2,258,000	52.3	1,441,000	51.9
1995	12,198,000	56.2	*	*	*	*	*	*	2,323,000	52.5	1,041,000	37.0
1996	11,764,000	53.5	*	*	*	*	*	*	2,168,000	47.4	1,295,000	45.3
2001	15,897,376	71.9	689,084	46.3	3,836,665	95.6	6,209,214	73.3	3,491,749	66.6	1,670,664	57.7

YEAR	BLACK											
	ALL AGES		UNDER 5		5-17		18-44		45-64		65+	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1982	1,055,000	39.2	*	*	*	*	*	*	156,000	37.2*	103,000	48.7*
1983	1,230,000	45.1	*	*	*	*	*	*	150,000	35.5*	95,000	44.5*
1984	965,000	34.8	*	*	*	*	*	*	153,000	35.9*	62,000	28.4*
1985	1,119,000	39.8	*	*	*	*	*	*	122,000	27.5	84,000	37.2*
1986	1,212,000	42.5	*	*	*	*	*	*	164,000	36.5	146,000	63.5*
1987	1,281,000	44.3	*	*	*	*	*	*	148,000	32.5	100,000	42.5*
1988	1,631,000	55.5	*	*	*	*	*	*	225,000	48.5	105,000	43.7*
1989	1,586,000	53.1	*	*	*	*	*	*	112,000	23.8*	170,000	69.3
1990	1,414,000	46.6	*	*	*	*	*	*	180,000	37.6	127,000	50.7*
1991	1,740,000	56.3	*	*	*	*	*	*	195,000	40.1	83,000	32.4*
1992	1,787,000	56.8	*	*	*	*	*	*	249,000	49.9	145,000	55.3*
1993	1,967,000	61.4	*	*	*	*	*	*	315,000	61.3	98,000	36.7*
1994	1,861,000	56.3	*	*	*	*	*	*	255,000	49.7	111,000	44.0*
1995	2,217,000	67.7	*	*	*	*	*	*	313,000	60.0	178,000	70.1*
1996	2,310,000	69.6	*	*	*	*	*	*	275,000	50.7*	109,000	41.7*
2001	3,053,514	88.2	323,209	109.7	960,289	116.9	1,089,907	76.6	488,195	74.8	191,914	70.9

Source: National Center for Health Statistics, National Health Interview Survey, 1982-1996, 2001

NOTES:

* Estimate for which the numerator has a relative standard error of more than 30%.

(1) With the revision of the National Health Interview Survey in 1997, the question "During the past 12 months, did anyone in the family have asthma?" was eliminated and was replaced with two questions: "Have you ever been told by a doctor or other health professional that you had asthma?" (Table 6) and "During the past 12 months, have you had an episode of asthma or asthma attack?" (Table 10). Realizing the information gap resulting with the revised questions, "Do you still have asthma?" was added in 2001- reinstating a measure of current prevalence. However, **data between 1982 and 1996 should not be compared to 2001 estimates.**

TABLE 10: NUMBER OF PEOPLE WHO HAD AN ASTHMA ATTACK OR EPISODE AND PREVALENCE RATE PER 1,000 PERSONS BY AGE, SEX AND RACE, 1997-2001 (ATTACK PREVALENCE) ¹

	1997		1998		1999		2000		2001	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
AGE										
TOTAL	11,113,225	41.7	10,613,056	39.5	10,488,284	38.6	10,979,222	40.1	11,986,059	43.4
<5	812,410	41.2	914,961	46.5	825,304	42.1	853,688	43.5	925,924	46.9
5-17	3,072,538	59.5	2,894,220	55.6	2,973,538	56.7	3,144,009	59.6	3,230,542	61.1
<18	3,884,948	54.4	3,809,181	53.1	3,798,842	52.7	3,997,697	55.3	4,156,466	57.2
18-44	4,367,913	40.3	3,817,945	35.2	4,021,816	37.1	3,865,362	35.6	4,621,288	42.6
45-64	1,985,366	36.2	2,061,312	36.4	1,950,980	33.3	2,187,430	36.1	2,347,541	37.5
65+	874,998	27.3	924,618	28.7	716,646	22.1	928,733	28.4	860,764	26.2
>18	7,228,277	37.0	6,803,875	34.5	6,689,442	33.5	6,981,525	34.6	7,829,593	38.4
SEX										
MALE	4,591,616	35.3	4,550,372	34.6	4,310,426	32.5	4,566,516	34.2	4,894,372	36.3
FEMALE	6,521,609	47.8	6,062,684	44.1	6,177,858	44.4	6,412,706	45.7	7,091,687	50.1
RACE										
WHITE	8,924,460	38.2	8,351,811	38.2	8,225,725	37.4	8,574,362	39.2	9,316,903	42.2
<5	562,767	37.0	600,960	39.8	542,560	36.5	556,163	38.3	585,966	39.4
5-17	2,316,765	58.0	2,191,663	54.6	2,144,632	53.1	2,221,117	55.7	2,388,686	59.5
18-44	3,657,439	41.8	3,001,924	34.7	3,265,910	37.8	3,232,200	38.0	3,678,584	43.5
45-64	1,653,314	35.5	1,755,150	36.4	1,669,630	33.7	1,790,264	35.3	1,946,520	37.1
65+	734,175	25.6	802,114	28.1	602,993	21.0	774,618	26.8	717,147	24.8
BLACK	1,629,383	50.1	1,679,906	50.1	1,535,360	45.5	1,631,233	47.6	1,928,640	55.7
<5	176,626	57.5	208,240	70.4	218,657	76.0	193,908	66.2	240,243	81.5
5-17	596,741	73.6	528,300	64.7	592,920	72.6	663,850	80.4	633,474	77.1
18-44	483,297	34.7	614,097	44.0	495,630	35.3	401,595	28.4	670,130	47.1
45-64	251,084	44.8	265,660	45.9	151,304	25.2	278,686	44.4	271,703	41.6
65+	121,635	46.2	63,609	23.9	76,849	29.0	93,194	34.7	113,090	41.8

Source: National Center for Health Statistics, National Health Interview Survey, 1997-2001

Notes:

(1) Attack prevalence is defined as answering yes to "Have you EVER been told by a doctor or other health professional that you had asthma?" and "During the PAST 12 MONTHS, have you had an episode of asthma or asthma attack?"

TABLE 11: ASTHMA-NUMBER OF CONDITIONS AND PREVALENCE RATE PER 1,000 PERSONS BY ORIGIN, 1997-2001

	Hispanic			Non-Hispanic White			Non-Hispanic Black			Non-Hispanic Others		
	Number	Rate	CI of Rate ¹	Number	Rate	CI of Rate ¹	Number	Rate	CI of Rate ¹	Number	Rate	CI of Rate ¹
Lifetime Prevalence²												
1997	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1998	2,627,891	84.7	(76.4-93.0)	18,887,569	97.2	(93.0-101.4)	4,105,291	124.9	(116.1-133.7)	773,286	71.8	(58.3-85.2)
1999	2,564,233	80.2	(71.6-88.8)	17,833,735	91.1	(87.1-95.1)	3,424,782	102.8	(93.0-112.7)	878,864	82.7	(65.5-99.9)
2000	2,700,985	81.7	(74.4-89.1)	19,958,214	102.2	(98-106.4)	3,900,457	115.8	(107.0-124.6)	1,055,350	87.9	(69.8-106)
2001	3,232,703	94.7	(86.8-102.5)	22,607,687	115.3	(110.7-120.0)	4,291,178	126.2	(116.7-135.6)	1,222,089	99.1	(81.9-116.3)
Current Prevalence³												
2001	2,007,520	58.8	(55.3-62.3)	14,603,075	74.5	(72.3-76.7)	2,933,767	86.2	(80.8-91.7)	736,241	59.7	(51.5-68.0)
Attack Prevalence⁴												
1997	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1998	1,117,182	36.0	(32.3-39.7)	7,570,852	39.0	(37.0-41.0)	1,648,035	50.1	(45.1-55.1)	276,987	25.7	(19.0-32.4)
1999	1,089,428	34.1	(30.2-37.9)	7,500,035	38.3	(36.3-40.3)	1,526,119	45.8	(41.2-50.4)	372,702	35.1	(25.9-44.2)
2000	1,087,330	32.9	(29.7-36.1)	7,864,152	40.3	(36.8-42.5)	1,601,492	47.6	(42.6-52.5)	426,248	35.5	(27.5-43.5)
2001	1,164,204	34.1	(30.2-38.0)	8,581,795	43.8	(41.5-46.0)	1,847,680	54.3	(48.7-59.9)	392,380	31.8	(24.0-39.6)

Source: National Center for Health Statistics, National Health Interview Survey, 1997-2001
 Calculations Performed by the American Lung Association, Epidemiology and Statistics Unit

NOTES:

- (1) 95% Confidence Interval.
- (2) Period or Lifetime prevalence was defined as answering "yes" to "Have you EVER been told by a health professional that you had asthma?"
- (3) With the revision of the National Health Interview Survey in 1997, the question "During the past 12 months, did anyone in the family have asthma?" was eliminated and was replaced with two questions: "Have you ever been told by a doctor or other health professional that you had asthma?" (Table 6) and "During the past 12 months, have you had an episode of asthma or asthma attack?" (Table 10). Realizing the information gap resulting with the revised questions, "Do you still have asthma?" was added in 2001- reinstating a measure of current prevalence. However, **data between 1982 and 1996 should not be compared to 2001 estimates.**
- (4) Attack prevalence was defined as answering yes to " Have you EVER been told by a health professional that you had asthma?" and "During the PAST 12 MONTHS, have you had an episode of asthma or asthma attack?"

TABLE 12: ASTHMA-ESTIMATED LIFETIME AND CURRENT PREVALENCE (%) IN ADULTS, BY STATE, 2000-2001

STATE	LIFETIME PREVALENCE ¹				CURRENT PREVALENCE ²			
	2000		2001		2000		2001	
	NUMBER	%	NUMBER	%	NUMBER	%	NUMBER	%
<i>United States</i>	21,311,096	10.4	23,210,259	11.0	14,665,135	7.2	15,139,313	7.1
Alabama	298,612	9.1	323,695	9.7	199,227	6.1	211,835	6.3
Alaska	48,997	11.3	51,029	11.5	29,977	6.9	32,179	7.2
Arizona	395,300	11.1	474,929	12.4	303,723	8.6	316,659	8.2
Arkansas	189,021	9.9	212,687	10.6	125,142	6.6	139,615	6.9
California	2,832,152	11.5	3,044,855	12.1	1,793,998	7.3	1,751,211	7.0
Colorado	289,301	9.5	394,610	12.1	199,982	6.6	259,324	8.0
Connecticut	269,833	10.8	321,831	12.3	196,115	7.8	204,445	7.8
Delaware	59,724	10.4	71,450	11.9	40,536	7.1	45,025	7.5
District of Columbia	44,925	11.0	54,330	12.0	32,278	7.9	33,283	7.4
Florida	1,076,350	9.1	1,242,381	9.9	672,793	5.7	722,627	5.7
Georgia	557,965	9.6	674,099	11.0	358,829	6.2	442,374	7.2
Hawaii	102,277	11.4	111,954	12.1	65,700	7.3	67,148	7.3
Idaho	96,499	10.8	108,286	11.7	68,229	7.7	73,682	7.9
Illinois	955,071	10.6	1,049,350	11.3	713,374	7.9	729,934	7.8
Indiana	494,719	11.2	515,076	11.3	357,357	8.1	343,028	7.5
Iowa	181,406	8.5	212,254	9.7	134,940	6.3	147,200	6.7
Kansas	214,168	10.9	232,248	11.6	153,546	7.8	161,251	8.1
Kentucky	317,557	10.7	333,057	10.9	230,371	7.8	253,887	8.3
Louisiana	251,523	8.0	293,612	9.1	157,766	5.0	170,990	5.3
Maine	117,749	12.5	121,535	12.6	84,202	8.9	90,243	9.4
Maryland	413,442	10.6	445,760	11.1	284,461	7.3	282,677	7.0
Massachusetts	566,455	11.9	639,174	13.0	403,234	8.5	462,332	9.4
Michigan	751,031	10.3	914,468	12.4	534,161	7.3	665,636	9.0
Minnesota	334,685	9.5	368,504	10.1	251,966	7.2	238,842	6.5
Mississippi	195,389	9.8	188,785	9.2	134,081	6.8	113,916	5.5
Missouri	434,002	10.6	502,586	11.9	294,564	7.2	343,826	8.2
Montana	73,732	11.4	78,547	11.8	53,246	8.3	53,044	8.0
Nebraska	106,027	8.7	106,309	8.4	80,486	6.6	72,885	5.8
Nevada	191,582	13.4	204,462	13.3	117,713	8.3	126,692	8.2
New Hampshire	109,430	12.0	117,309	12.5	75,715	8.3	79,093	8.4
New Jersey	542,781	8.7	610,724	9.4	384,947	6.2	402,339	6.2
New Mexico	124,406	10.0	141,099	10.7	85,785	6.9	90,543	6.9
New York	1,475,831	10.7	1,603,109	11.0	1,058,759	7.7	1,059,051	7.3
North Carolina	595,899	10.1	624,605	10.1	417,570	7.1	397,774	6.4
North Dakota	42,458	9.2	42,783	9.1	34,316	7.4	32,143	6.8
Ohio	912,891	10.9	832,186	9.8	719,001	8.6	615,294	7.2
Oklahoma	229,026	9.2	259,907	10.1	158,064	6.3	178,660	6.9
Oregon	301,185	12.1	335,009	12.9	211,366	8.5	209,380	8.1
Pennsylvania	851,019	9.3	1,007,466	10.7	599,423	6.5	691,529	7.3
Rhode Island	89,469	11.7	98,047	12.1	64,420	8.5	75,642	9.3
South Carolina	300,905	10.4	322,915	10.7	196,081	6.8	195,558	6.5
South Dakota	42,490	8.0	42,124	7.7	29,384	5.6	28,954	5.3
Tennessee	435,098	10.4	406,008	9.3	303,235	7.3	297,976	6.8
Texas	1,534,031	10.5	1,466,052	9.6	949,490	6.5	932,057	6.1
Utah	144,407	10.3	157,803	10.7	106,714	7.6	103,383	7.0
Vermont	43,400	9.7	55,490	12.1	31,945	7.2	40,448	8.8
Virginia	551,390	10.5	616,160	11.4	368,099	7.1	348,225	6.4
Washington	511,851	11.9	530,013	11.9	352,103	8.2	337,123	7.6
West Virginia	162,187	11.7	173,501	12.5	117,033	8.5	128,863	9.3
Wisconsin	411,281	10.6	434,848	10.9	300,402	7.7	310,235	7.8
Wyoming	40,169	11.8	41,239	11.6	29,286	8.6	29,251	8.2

Source: Behavioral Risk Factor Surveillance Survey, 2000-2001

Notes:

(1) Lifetime prevalence was defined as answering yes to "Have you ever been told by a doctor that you have asthma?"

(2) Current prevalence was defined as answering yes to "Have you ever been told by a doctor that you have asthma?" and "Do you still have asthma?"

TABLE 13: ASTHMA - NUMBER OF FIRST-LISTED HOSPITAL DISCHARGES AND RATE PER 10,000 POPULATION BY SEX, 1979-2000 ¹

YEAR	TOTAL		MALE		FEMALE	
	NUMBER OF DISCHARGES	RATE PER 10,000	NUMBER OF DISCHARGES	RATE PER 10,000	NUMBER OF DISCHARGES	RATE PER 10,000
1979	339,000	15.7	143,000	13.1	196,000	17.0
1980	408,000	18.0	180,000	16.3	228,000	19.6
1981	418,000	18.4	180,000	16.2	237,000	20.1
1982	434,000	18.9	190,000	17.1	245,000	20.6
1983	459,000	19.8	190,000	17.0	269,000	22.4
1984	465,000	19.8	197,000	17.1	268,000	22.0
1985	462,000	19.5	195,000	17.0	266,000	21.8
1986	477,000	19.9	206,000	17.8	271,000	21.9
1987	454,000	18.8	193,000	16.5	261,000	20.9
1988 ²	479,000	19.6	210,000	17.7	270,000	21.4
1989	475,000	19.3	204,000	17.1	271,000	21.3
1990	476,000	19.1	191,000	15.8	285,000	22.2
1991	490,000	19.6	221,000	18.2	269,000	20.9
1992	463,000	18.3	201,000	16.3	263,000	20.1
1993	468,000	18.3	191,000	15.3	278,000	21.1
1994	451,000	17.4	189,000	15.0	262,000	19.7
1995	511,000	19.5	210,000	16.5	301,000	22.4
1996	474,000	17.9	195,000	15.1	279,000	20.6
1997	484,000	17.9	204,000	15.4	279,000	20.2
1998	423,000	15.5	168,000	12.6	255,000	18.3
1999	478,000	17.4	190,000	14.1	288,000	20.4
2000	465,000	16.7	198,000	14.5	267,000	18.8

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, NATIONAL HOSPITAL DISCHARGE SURVEY, 1979-2000

NOTES:

(1) DUE TO ROUNDING NUMBERS ACROSS MAY NOT ADD TO THE TOTAL NUMBER OF HOSPITAL DISCHARGES.

(2) DATA FROM 1988-2000 MAY NOT BE COMPARABLE TO EARLIER YEARS DUE TO A REDESIGN OF THE SURVEY.

TABLE 14: ASTHMA - NUMBER OF FIRST-LISTED HOSPITAL DISCHARGES AND RATE PER 10,000 POPULATION BY AGE, 1979-2000 ¹

YEAR	<15		15-44		45-64		65+		TOTAL	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1979	99,000	19.8	94,000	9.5	83,000	19.1	63,000	27.0	339,000	15.7
1980	124,000	24.2	99,000	9.5	101,000	22.7	84,000	32.7	408,000	18.0
1981	128,000	25.0	112,000	10.6	104,000	23.4	74,000	28.2	418,000	18.4
1982	151,000	29.3	104,000	9.7	98,000	22.1	81,000	30.4	434,000	18.9
1983	136,000	26.4	110,000	10.1	119,000	26.7	94,000	34.2	459,000	19.8
1984	150,000	29.0	109,000	9.9	102,000	22.8	105,000	37.4	466,000	19.8
1985	144,000	27.8	124,000	11.1	97,000	21.5	97,000	34.1	462,000	19.5
1986	158,000	30.3	122,000	10.8	99,000	22.0	98,000	33.7	477,000	19.9
1987	149,000	28.4	112,000	9.8	92,000	20.4	101,000	33.8	454,000	18.8
1988 ²	164,000	31.0	110,000	9.6	93,000	20.3	112,000	36.8	479,000	19.6
1989	168,000	31.2	127,000	11.0	88,000	19.0	93,000	29.9	475,000	19.3
1990	169,000	30.8	119,000	10.3	86,000	18.2	102,000	32.4	476,000	19.1
1991	187,000	33.9	128,000	10.9	85,000	18.2	90,000	28.5	490,000	19.6
1992	193,000	34.4	117,000	10.0	78,000	16.1	76,000	23.6	463,000	18.3
1993	159,000	28.0	128,000	10.9	94,000	19.0	87,000	26.6	468,000	18.3
1994	169,000	29.5	125,000	10.6	80,000	15.7	76,000	22.9	451,000	17.4
1995	212,000	36.7	135,000	11.4	87,000	16.7	77,000	23.0	511,000	19.5
1996	195,000	33.8	132,000	11.1	88,000	16.4	59,000	17.4	474,000	17.9
1997	214,000	35.8	117,000	9.6	88,000	15.9	65,000	19.2	484,000	17.9
1998	166,000	27.7	104,000	8.6	92,000	16.2	60,000	17.7	423,000	15.5
1999	190,000	31.5	122,000	10.0	94,000	15.9	73,000	21.3	478,000	17.4
2000	203,000	33.6	111,000	9.1	84,000	13.7	68,000	19.6	465,000	16.7

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS, NATIONAL HOSPITAL DISCHARGE SURVEY, 1979-2000

NOTES:

(1) DUE TO ROUNDING NUMBERS ACROSS MAY NOT ADD TO THE TOTAL NUMBER OF HOSPITAL DISCHARGES.

(2) DATA FROM 1988-2000 MAY NOT BE COMPARABLE TO EARLIER YEARS DUE TO THE REDESIGN OF THE SURVEY.

TABLE 15: ASTHMA - NUMBER OF FIRST-LISTED HOSPITAL DISCHARGES AND RATE PER 10,000 POPULATION BY RACE, 1988-2000

YEAR	NUMBER OF DISCHARGES					RATE PER 10,000 POPULATION ¹			
	TOTAL ²	WHITE	BLACK	ALL OTHER	RACE NOT REPORTED ³	TOTAL	WHITE	BLACK	ALL OTHER
1988	479,000	295,000	116,000	31,000	37,000	19.6	14.4	39.4	36.1
1989	475,000	286,000	117,000	22,000	50,000	19.3	13.9	39.2	24.2
1990	476,000	263,000	116,000	19,000	78,000	19.1	12.7	38.3	19.8
1991	490,000	269,000	120,000	23,000	78,000	19.6	12.8	38.9	22.9
1992	463,000	215,000	134,000	25,000	89,000	18.3	10.2	42.8	23.8
1993	468,000	246,000	103,000	22,000	97,000	18.3	11.5	32.3	20.1
1994	451,000	227,000	125,000	29,000	70,000	17.4	10.5	38.6	26.0
1995	511,000	256,000	140,000	25,000	90,000	19.5	11.6	42.7	21.4
1996	474,000	237,000	133,000	33,000	70,000	17.9	10.8	40.1	27.6
1997	484,000	262,000	125,000	39,000	58,000	17.9	11.8	35.5	30.7
1998	423,000	222,000	115,000	28,000	58,000	15.5	10.0	32.2	21.0
1999	478,000	236,000	128,000	42,000	72,000	17.4	10.4	35.5	31.2
2000	465,000	233,707	117,072	18,267	78,953	16.7	10.3	32.9	10.3

SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS: NATIONAL HOSPITAL DISCHARGE SURVEY, 1988-2000

NOTES:

- (1) RATES SHOWN HERE MAY DIFFER FROM PREVIOUSLY PUBLISHED RATES DUE TO ADJUSTMENTS MADE TO POPULATION USED.
- (2) TOTAL INCLUDES WHITE, BLACK AND OTHER RACE DISCHARGES AS WELL AS DISCHARGES OF AN UNSPECIFIED RACE.
- (3) BETWEEN 1988 AND 2000, THE NUMBER OF DISCHARGES NOT REPORTING RACE INCREASED DRAMATICALLY. IT APPEARS THAT HOSPITAL DISCHARGES IN WHITES MIGHT BE DISPROPORTIONATELY UNDERESTIMATED, PARTICULARLY IN LATER YEARS. FOR THIS REASON, COMPARISONS BETWEEN RACES SHOULD BE MADE WITH CAUTION.

Table 16: Asthma-Number of Visits to Physician Offices, Outpatient Departments and Emergency Departments, 1989-2000

YEAR	COMBINED SETTINGS	PHYSICIAN OFFICES	OUTPATIENT DEPARTMENTS	EMERGENCY DEPARTMENTS
<i>NUMBER OF VISITS IN THOUSANDS</i>				
1989	6,822	6,822	NA	NA
1990	7,137	7,137	NA	NA
1991	NA	NA	NA	NA
1992	11,851	9,740	644	1,467
1993	14,048	11,340	1,022	1,686
1994	13,373	10,757	1,009	1,607
1995	12,192	9,026	1,301	1,865
1996	11,889	9,051	903	1,935
1997	12,848	9,834	1,097	1,917
1998	15,886	12,868	984	2,034
1999	12,805	9,498	1,310	1,997
2000	12,203	9,332	1,036	1,835

SOURCE: NATIONAL AMBULATORY MEDICAL CARE SURVEY, 1989-2000
AND NATIONAL HOSPITAL AMBULATORY MEDICAL CARE SURVEY, 1992-2000

TABLE 17: ECONOMIC COST OF ASTHMA, DIRECT AND INDIRECT EXPENDITURES, US, 2002

CATEGORY	COST
	(in millions)
<i>Direct Medical Expenditures:</i>	
Hospital Care	
Inpatient	4,030.00
Emergency Room	762.30
Outpatient	491.70
Physicians' Services	
Inpatient	377.30
Outpatient	896.60
Medications	2,841.60
All Direct Expenditures	9,400.00
<i>Indirect Costs:</i>	
School days lost	1,389.10
Loss of Work	
Outside Employment	
Men	208.00
Women	326.60
Housekeeping	776.60
Mortality	
Men	904.90
Women	995.10
All Indirect Costs	4,600.00
All Costs:	14,000.00

SOURCE: NEW ENGLAND JOURNAL OF MEDICINE, VOL. 326, NO. 13, MARCH 26, 1992
 NHLBI - CHARTBOOK ON CARDIOVASCULAR, LUNG AND BLOOD DISEASES, 2002

NOTE: ESTIMATES OF DIRECT MEDICAL EXPENDITURES AND INDIRECT COSTS WERE DERIVED USING MORTALITY AND HEALTH SURVEY DATA AVAILABLE FROM THE NATIONAL CENTER FOR HEALTH STATISTICS, HEALTH EXPENDITURE DATA FROM THE HEALTH CARE FINANCING ADMINISTRATION, AND INCOME DATA FROM THE US BUREAU OF CENSUS. THE COST ESTIMATES WERE PROJECTED TO 2002 DOLLARS.

THESE NUMBERS ARE ESTIMATES AND SHOULD BE CITED AS SUCH.