



ASTHMA AMONG ADULTS IN NEWYORK STATE, 1996-2002:

Prevalence and Health Behavior

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Introduction

Asthma is a serious public health problem in New York as well as the rest of the nation. Asthma is a chronic inflammatory disorder of the airways characterized by intermittent, recurrent episodes of wheezing, breathlessness, chest tightness, and cough. The airways of people with asthma often exhibit mucosal edema, epithelial disruption, and infiltration with inflammatory cells.¹ Asthma is the most common chronic disease of childhood,² affecting almost five million children below the age of 18, and has become the fourth leading cause of disability among children less than 18 years old.³

More than 17.3 million Americans, or 7% of the U.S. population, are affected by asthma, with the prevalence increasing steadily over the past several years.⁴ Between 1980 and 1996 the number of people reporting a history of asthma increased by 75%.⁵ The increasing prevalence of asthma is related to a variety of factors, including more frequent diagnosis of the disease, greater exposure to environmental allergens and irritants, increased exposure of children to mothers' tobacco smoke, and psychosocial and socioeconomic factors.⁶

In New York, asthma affects more than 1.1 million adults and over 250,000 children.⁷ Asthma caused an average of 358 deaths per year during 1998-2000, including 12 deaths in children under the age of 15 years.⁸ Total Medicaid health care expenditures for people with asthma in New York State exceeded \$1 billion in fiscal year 2000.⁹

Asthma takes its toll in many ways. Asthma's impact on health, quality of life, and the economy is substantial. Although the prevalence of asthma differs only slightly by race, severe asthma disproportionately affects poor, minority, inner-city populations.¹⁰ Low-income and minority populations experience higher rates of hospital admissions and emergency room visits due to asthma. It results in many lost nights of sleep and disruption of activities for the individual, as well as family members. Parents frequently miss days from work either because of their own asthma or having to stay home with an asthmatic child. In addition to the burdens on patients and their families, the diagnosis and treatment of asthma places great demands on the health care resources of communities.

This report presents prevalence estimates of current, diagnosed asthma for various sociodemographic subgroups of adult New Yorkers and data on selected health risk factors among persons with asthma compared to those without asthma. Additionally, information on treatment and prevention practices among persons with asthma is summarized.

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Methods

The data in this report are based on the 1996, 1997, and 1999-2002 administrations of the New York State (NYS) Behavioral Risk Factor Surveillance System (BRFSS) questionnaire. [No asthma questions were asked on the 1998 questionnaire.] The BRFSS is a continuous telephone-based surveillance system supported in part by the Centers for Disease Control and Prevention and administered by the New York State Department of Health. The system is designed to provide information on behaviors and risk factors for chronic and infectious diseases and other health conditions among the noninstitutionalized, civilian adult (aged 18 years and older) population. The data for this report have been weighted to adjust for the selection probabilities and the estimates of age-sex-race distribution of adults in the state for each of the calendar years. The national estimate of asthma prevalence from analysis of the 2001 BRFSS data by the National Center for Environmental Health¹¹ is presented for comparison where appropriate.

The 1996 and 1997 NYS BRFSS questionnaires included one question for assessing the prevalence of current asthma among the adult population:

- “Have you been told by a doctor that you currently have asthma?”

The 1999, 2000, 2001, and 2002 NYS BRFSS questionnaires included two questions for assessing both lifetime prevalence and current prevalence of asthma:

- “Did a doctor ever tell you that you had asthma?”
- [If “yes”] “Do you still have asthma?”

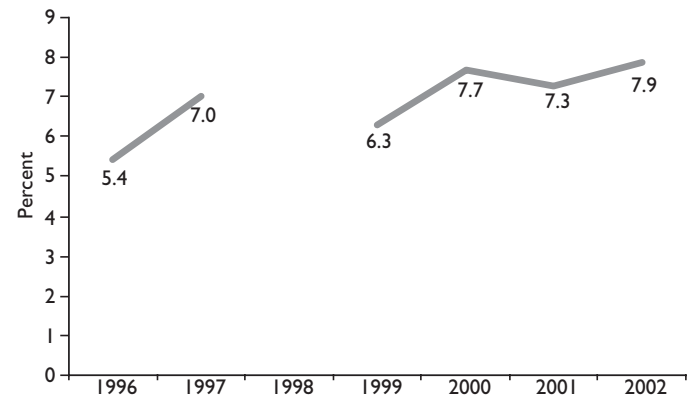
From responses to these questions, estimates of the prevalence of current asthma were determined for each survey year and tested for trend over time. True prevalence may have been underestimated as these totals represent only diagnosed cases. Successive years of data were combined to permit the calculation of stable estimates for subgroup comparisons, producing two-year averages for 1996-1997, 1999-2000, and 2001-2002. In addition to prevalence estimates, 95% confidence intervals (CIs) were calculated to afford a measure of the precision of the estimates as well as to facilitate comparisons between subgroups.

Results

Trend in Prevalence of Current Asthma

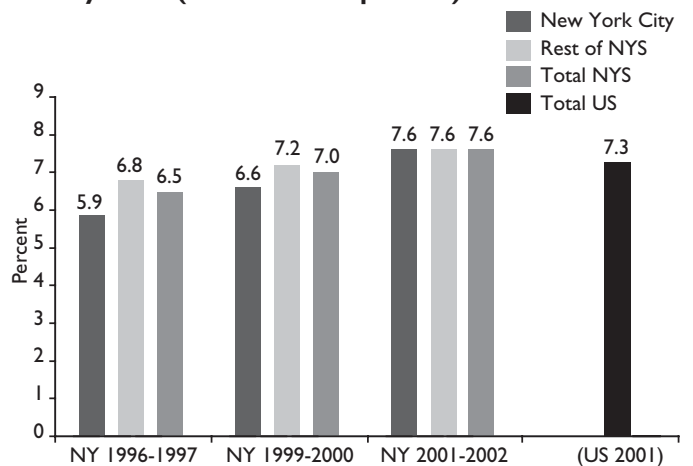
The prevalence of current asthma in adult New Yorkers ranged from a low of 5.4% in 1996 to a high of 7.9% in 2002 (Figure 1). An overall upward trend in prevalence is evident during this time period (test for trend significant, $p < 0.0001$).

Figure 1
Prevalence of Current Asthma, by Survey Year



According to the combined data from the 2001 and 2002 BRFSS, about 1.6 million New York adults (11.3% of the noninstitutionalized population) were told by a doctor, nurse, or other health professional that they have had asthma. Among adults with a history of asthma, nearly 1.1 million (7.6%) had current, diagnosed asthma, a rate that is consistent with the 2001 national estimate (Figure 2). A slight increase in asthma prevalence over time was noted. There was no significant difference in asthma prevalence between New York City and the rest of the state.

Figure 2
Prevalence of Current Asthma, by Region (New York City and Rest of New York State) and Combined Survey Years (2001 US Comparison)



Prevalence by Sociodemographic Characteristics

In the United States, there are substantial racial and economic disparities in asthma prevalence. Such disparities among adult New Yorkers were revealed in these data.

Although more boys develop asthma during childhood, the prevalence in girls surpasses that in boys during adolescence. Among 20-30 year-olds, the prevalence in women is nearly twice as high as in men.¹² The BRFSS results showed this to be true among New Yorkers (Figure 3). In 2001-2002, the rate among women (9.5% [95% CI, 8.6-10.4]) was nearly double that among men (5.5% [95% CI, 4.6-6.4]).

Asthma prevalence by year did not vary substantially by age with the exception of 1996-1997, which showed a higher percentage of individuals with asthma among the youngest age group (aged 18-24 years) as compared to all other age groups (Figure 4).

The prevalence of asthma also differed by race/ethnicity (Figure 5). Non-Hispanic black respondents reported the highest rate of current asthma in both 1999-2000 and 2001-2002 (9.6% and 8.7%, respectively), whereas Hispanic respondents reported the highest rate in 1996-1997 (9.6%). Also noteworthy is the increase in prevalence among “other non-Hispanics” from 1996-1997 (3.6%) to 2001-2002 (8.3%).

Figure 3
Prevalence of Current Asthma, by Gender and Combined Survey Years

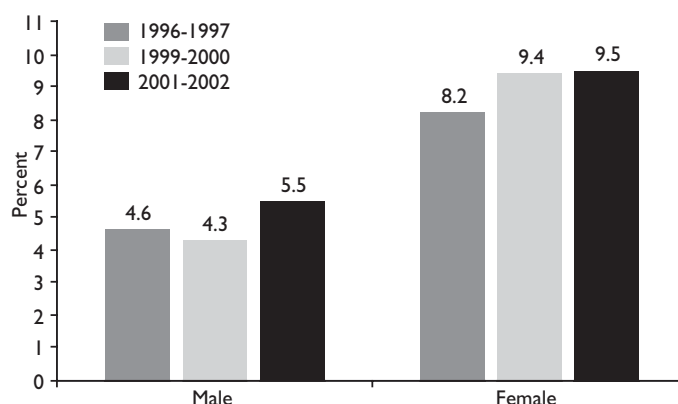


Figure 4
Prevalence of Current Asthma, by Age Group and Combined Survey Years

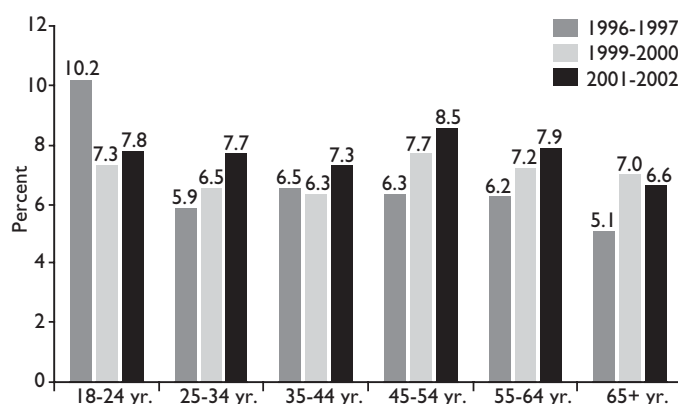
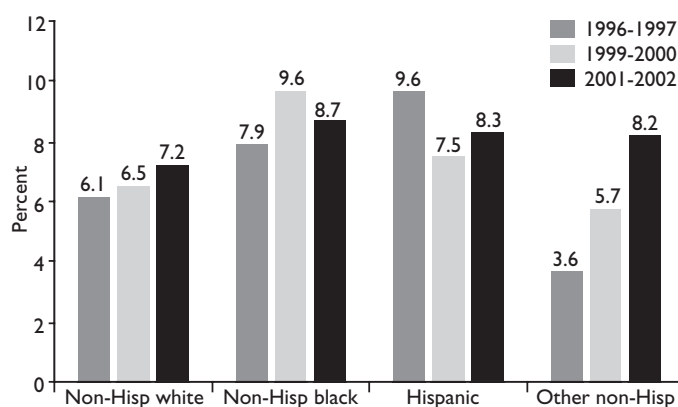
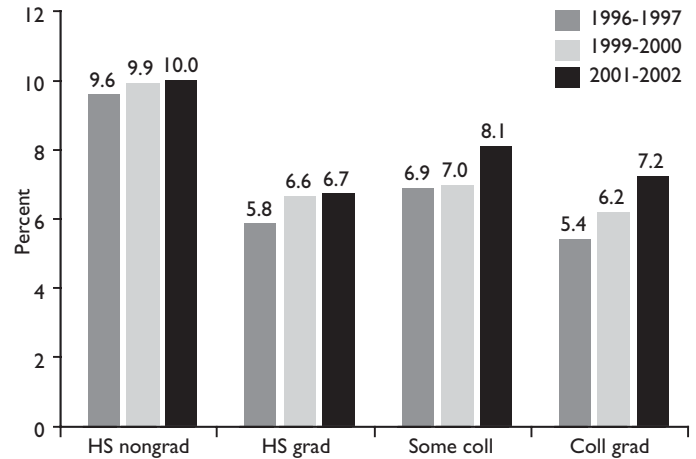


Figure 5
Prevalence of Current Asthma, by Race/Ethnicity and Combined Survey Years



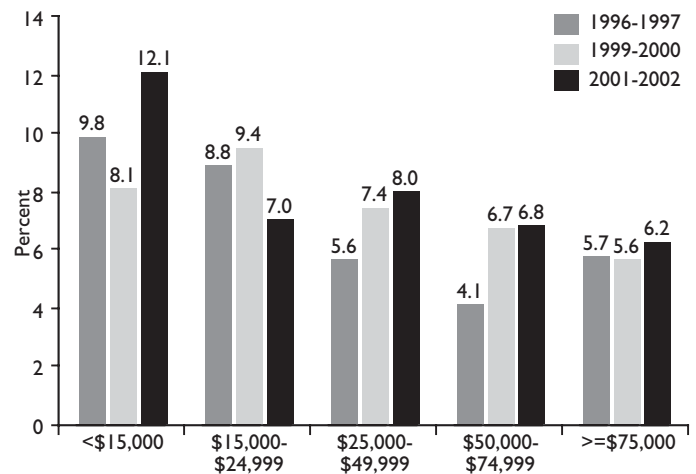
Asthma prevalence varied by reported educational attainment of respondents (Figure 6). In all three survey periods, the highest prevalence was found in adults who had not graduated from high school.

Figure 6
Prevalence of Current Asthma, by Educational Attainment and Combined Survey Years



Asthma prevalence generally decreased as reported annual household income increased (Figure 7). In both 1996-1997 and 2001-2002, asthma was most prevalent among adults reporting annual income of less than \$15,000 and least prevalent among those with annual income of \$50,000 or more. Similar results were found in 1999-2000. [Comparisons of category rates across years should be made with caution, as 1996-1997 and 1999-2000 income levels were not adjusted to 2001-2002 dollar amounts.]

Figure 7
Prevalence of Current Asthma, by Annual Household Income and Combined Survey Years



Treatment and Prevention

Health care use for asthma includes outpatient visits to doctor's offices and hospital outpatient departments, visits to hospital emergency departments, and hospitalizations. The 1999 BRFSS Asthma Module included six questions that addressed issues of treatment and prevention among respondents with current, diagnosed asthma (Table 1). Two of these items (emergency room visits, home cleaning advice) were also a part of the 1996 and 1997 modules. In 1999, 22.5% of adult New Yorkers with asthma reported that during the previous 12 months, they made at least one trip to an emergency room (E.R.) or urgent care clinic because of their asthma, essentially unchanged from 1996-1997 (21.8%). Moreover, 60.1% reported a history of having had their asthma made worse by tobacco smoke. A large majority reported being prepared for asthma attacks, as 70.0% indicated working with a doctor or other health care provider to formulate

an action plan in case of an attack. Slightly more than half (55.1%) reported getting advice from a doctor, nurse, or other health professional about ways to clean or modify their homes so as to reduce asthma problems. This percentage was substantially less than that estimated from the 1996-1997 survey data (67.9%). Nearly three-fourths (74.4%) reported that they currently took medications for their asthma. However, this behavior varied by age, as 69.3% of those aged 18 to 54 years were on medications, compared to 82.6% of those aged 55 years and older. Of those on medications, 58.4% reported taking these medications daily, regardless of whether or not they were having trouble breathing. Again, this practice differed by age. Among those aged 18 to 54 years, only 44.1% took the medication every day, compared to 80.1% among those aged 55 years and older.

Table 1
Treatment and Prevention Behaviors among Adults with Asthma, by Survey Year(s)

Question	1996-1997		1999	
	%	95% CI	%	95% CI
Emergency room or urgent care clinic visit past 12 months because of asthma?	21.8	16.9-26.6	22.5	14.7-30.3
Asthma ever made worse by tobacco smoke?	—	—	60.1	51.2-68.9
Formulated with health provider an action plan for asthma attack?	—	—	70.0	62.4-77.7
Gotten advice from health professional on home cleaning to reduce asthma problems?	67.9	62.4-73.3	55.1	46.0-64.1
Currently take asthma medications?				
18-54 yr.	—	—	69.3	59.3-79.2
55+ yr.	—	—	82.6	71.3-93.9
All ages	—	—	74.0	66.4-81.6
[If take medication] Asthma medications taken daily?				
18-54 yr.	—	—	44.1	30.3-58.0
55+ yr.	—	—	80.1	67.8-93.3
All ages	—	—	58.4	48.1-68.6

Health Risk Behavior

Shortness of breath has been highlighted as one of the most troublesome functional impairments for adults with asthma.¹³ Cigarette smoke is a primary environmental stimulus that triggers shortness of breath. Shortness of breath in turn leads to problems with physical activities such as exercise and sports. Among BRFSS respondents, a “current smoker” is defined as a person who has smoked at least 100 cigarettes in his/her lifetime and now smokes everyday or some days. Results showed that current smoking behavior differed only slightly by asthma status (Figure 8). In 2001-2002, 26.0% (95% CI, 21.9-30.1) of adults with asthma reported that they were current cigarette smokers, compared to 22.5% (95% CI, 21.4-23.7) of those without asthma. These prevalences were consistent with both the 1996-1997 and 1999-2000 results.

Although exercise itself is unlikely to have any major beneficial effect on asthma, general fitness and weight control should be encouraged. A fit person can do a given task with less ventilation than an unfit one, hence the reduced likelihood of exercise-induced asthma.¹⁴ Results from the three survey periods showed that, in general, persons with asthma were more likely than those without asthma to report no leisure-time physical activity (Figure 9). In 2001-2002, 33.2% (95% CI, 28.7-37.5) of adults with asthma reported no exercise or physical activity during the past month, compared to 26.4% (95% CI, 25.2-27.6) of those without asthma. The comparable numbers for 1999-2000 were 36.5% (95% CI, 29.6-43.3) and 28.8% (95% CI, 26.8-30.7), respectively.

Numerous studies have shown an association between obesity and an increased likelihood of asthma.¹⁴ Regular exercise to control weight is thus sensible advice for persons with asthma. The BRFSS data showed an increasing trend for obesity (body mass index [BMI] of 30.0 kg/m² or greater) in both persons with and persons without asthma from 1996-1997 through 2001-2002. However, the difference in prevalence of obesity among asthmatics compared to that among non-asthmatics actually increased across the survey years. The greatest difference was evident in 2001-2002, when 33.6% (95% CI, 29.0-38.2) of adults with asthma were found to be obese compared to 19.4% (95% CI, 18.3-20.5) of those without asthma.

Figure 8
Percentage of Adult New Yorkers Who Currently Smoke, by Asthma Status and Combined Survey Years

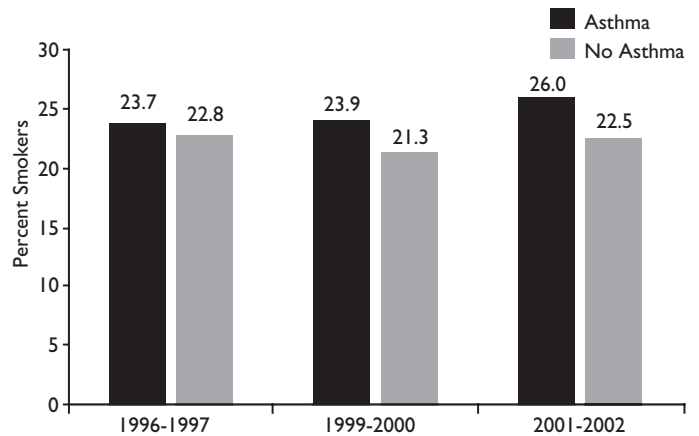


Figure 9
Percentage of Adult New Yorkers Who Have Not Participated in Recent (Past Month) Leisure-Time Physical Activity, by Asthma Status and Combined Survey Year(s)

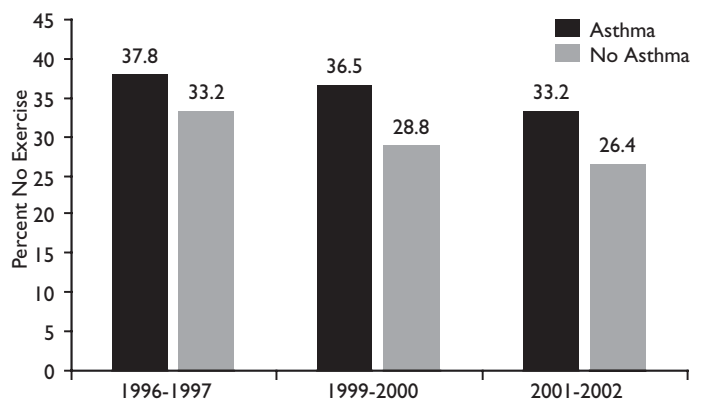
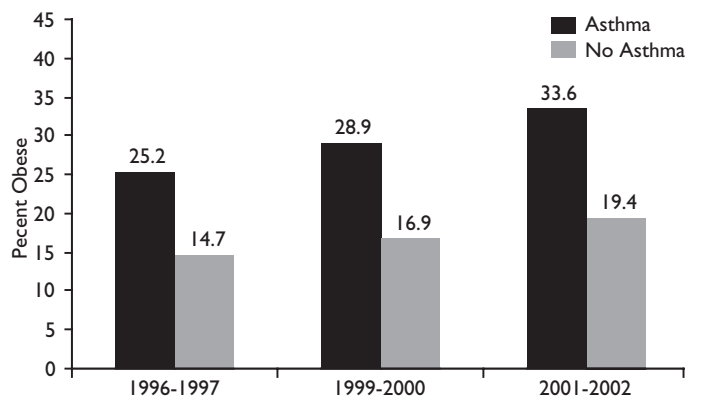


Figure 10
Percentage of Adult New Yorkers Who are Obese (BMI ≥ 30.0 kg/m²), by Asthma Status and Combined Survey Year



Discussion

This study revealed an upward trend in the overall prevalence of current asthma among adult New Yorkers from 1996-2002. Prevalence was found to vary by gender, race/ethnicity, educational attainment, and income. A large majority of respondents with asthma reported that they had formulated an asthma attack action plan with the help of their health care provider. Although a majority of respondents with asthma reported that their asthma was exacerbated by cigarette smoke, the prevalence of current smoking behavior among asthmatics was found to be at least as great as that among those who did not report having asthma. Persons with asthma were also more likely than those with no asthma to report no recent leisure-time physical activity.

Three important areas highlight the role of social and economic factors in asthma.¹⁵ First, there are differences in exposure to predisposing factors that are strongly influenced by sociodemographic factors. Second, there are clear differences in exposure to exacerbating factors. Finally, disparities in the access to care and the quality of care received can have a significant impact on asthma burden.

Diagnosing asthma remains challenging. Although the clinical definition of asthma is the presence of variable airflow obstruction that improves either spontaneously or with treatment, differentiating asthma from other chronic obstructive lung diseases remains difficult, particularly among preschool and older adult populations. The use of surveys such as the BRFSS, which relies on self-reported data, has additional limitations. For example, the majority of asthma estimates are dependent on physicians accurately diagnosing and documenting asthma in patient records, with the potential for either underestimating or overestimating cases. Estimates of asthma prevalence, in addition, require the subjects to recall the physician's diagnosis and are subject to similar

biases.⁵ Moreover, the BRFSS respondents are limited to adults, so estimates for children and adolescents, as well as for people who are institutionalized, cannot be produced.

Asthma is a key component of the Healthy People 2010 objectives,¹⁶ as eight objectives address this chronic condition. In 1998, CDC outlined a strategy to improve the timeliness and geographic specificity of asthma surveillance as part of a comprehensive public health approach to asthma. In 1999, the CDC began developing its National Asthma Control Program with funding of \$1.2 million.¹⁰ The program supports the goals and objectives of Healthy People 2010 for asthma and is based on the public health principles of tracking illness, developing interventions, and building partnerships. The goals of the program are to reduce the number of deaths, hospitalizations, emergency department visits, school or workdays missed, and limitations on activity due to asthma. Under the umbrella of the national program, the New York State Department of Health has developed and secured funding for implementation of an Asthma Plan focusing on surveillance, health care, community-based initiatives, and environmental and occupational health.

Asthma remains a key public health problem in New York State and the rest of United States. Currently, there is no way to prevent the initial onset of asthma, and there is no cure. However, people who have asthma can still lead quality, productive lives if they control their asthma. Asthma can be controlled by taking proper medication and by avoiding contact with environmental "triggers," such as cockroaches, dust mites, furry pets, mold, tobacco smoke, and certain chemicals.¹⁰ Opportunities to improve the understanding of this disease and decrease its substantial impact on health remain. Public health programs must continue to provide scientifically validated programs for improving provider and patient adherence to published guidelines for treating asthma.

References

1. Brownson, RC, Remington, PL, & Davis, JR (Eds.) (1998). ***Chronic disease epidemiology and control (2nd ed.)***. Washington: American Public Health Association.
2. Adams, PF, & Marano, MA (1995). ***Current estimates from the National Health Interview Survey, 1994***. Vital and Health Statistics Vol. 10, No. 94. Hyattsville, MD: National Center for Health Statistics.
3. Centers for Disease Control and Prevention (1995). Disabilities among children aged less than or equal to 17 years-United States, 1991-1992. ***MMWR*, 44**, 609-613.
4. Centers for Disease Control and Prevention (2001). Self-reported asthma prevalence among adults-United States, 2000. ***MMWR*, 50**, 682-686.
5. Centers for Disease Control and Prevention (2002). Surveillance for asthma-United States, 1980-1999. ***MMWR*, 51**, 1-13.
6. Brown, CM, Anderson, HA, & Etzel, RA (1997). Asthma: The states' challenge. ***Public Health Reports*, 112**, 198-205.
7. New York State data extrapolated from: National Center for Health Statistics (2002). Prevalence, 2001: Lifetime asthma diagnosis, current asthma, and asthma attack prevalence. Website: www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm
8. New York State Department of Health (2002). Bureau of Biometrics, Office of Vital Statistics.
9. New York State Department of Health (2002). Claim Detail/Special Reporting System, Office of Medicaid Management.
10. National Center for Environmental Health (2002). National Asthma Control Program: Reducing costs and improving quality of life-2002. Website: www.cdc.gov/nceh/airpollution/asthma.
11. National Center for Environmental Health (2002). Asthma data: Background Information: Behavioral Risk Factor Surveillance System (BRFSS). Website: www.cdc.gov/nceh/airpollution/asthma/brfss.
12. Clough, JB (1993). The effect of gender on the prevalence of atopy and asthma. ***Clinical and Experimental Allergy*, 23**, 883-885.
13. Juniper, EF (2000). Measuring health-related quality of life for persons with asthma: An overview. In KB Weiss, AS Buist, & SD Sullivan (Eds.), ***Asthma's impact on society*** (pp. 77-98). New York: Marcel Dekker, Inc.
14. Rees, J, & Kanabar, D (2000). ***ABC of asthma (4th ed.)***. London: BMJ Books.
15. Smith, LA, & Finkelstein, JA (2000). The impact of sociodemographic factors on asthma. In KB Weiss, AS Buist, & SD Sullivan (Eds.), ***Asthma's impact on society*** (pp. 219-243). New York: Marcel Dekker, Inc.
16. US Department of Health and Human Services (2000). Respiratory diseases [Goal 24]. In ***Healthy People 2010: Toward a national agenda for prevention (2nd ed.)***. Washington, DC: US Government Printing Office.