



**New York State**

**Asthma Surveillance**

**Summary Report**

*October 2007*

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# Introduction

Asthma has emerged as a significant chronic disease over the past 25 years and continues to be a major public health problem in the United States (U.S.). In 2004, approximately 20.5 million Americans, including 6.2 million children, indicated that they currently had asthma.<sup>1</sup> This prevalence rate (7.1%) remained relatively stable throughout 2001-2004. In 2004, asthma accounted for an estimated 14 million lost school days in children 5-17 years and 14.5 million lost work days in adults 18 years of age and older.<sup>2</sup> The annual economic cost of asthma is \$16.1 billion including direct health care costs of \$11.5 billion and indirect costs of \$4.6 billion.<sup>1</sup>

Both asthma hospitalizations and mortality rates decreased for the nation during the period of 1995-2002 by both race<sup>3</sup> and gender.<sup>4</sup> In 2003, 4,099 people died of asthma in the U.S., with an age-adjusted mortality rate of 14 per 1,000,000 residents. The age-adjusted mortality rate for asthma in Blacks (27 per 1,000,000) was more than double the rate in White residents (12 per 1,000,000).<sup>1</sup>

In 2005, asthma affected over 1.1 million New York State (NYS) adults and 370,000 children. During 2003-2005, an average of 300 deaths per year occurred due to asthma in NYS. This represented an age-adjusted rate of 15 deaths per 1,000,000 residents. There was an annual average of approximately 42,400 asthma hospitalizations

for NYS residents in 2003-2005, for an age-adjusted rate of 22 per 10,000 residents. During 2003-2005, an annual average of 14,700 asthma hospitalizations were for NYS children between the ages of 0 to 14 years; the crude rate was 39 per 10,000 residents. Medicaid enrollees accounted for 45% and Medicare enrollees an additional 20% of all asthma hospitalizations. The total cost of asthma hospitalizations in NYS was approximately \$502 million, for an average cost of \$12,700 per hospitalization in 2005. More than \$134 million were spent for asthma-related services for the Medicaid fee-for-service population in 2005.

The NYS Asthma Surveillance Summary Report was first created in 2005 and is updated biennially in order to further assist with understanding the burden of asthma in NYS. Information is presented on a statewide level and, where appropriate, at the county level, to assist public health programs, policy makers and other healthcare providers in their efforts to identify the scope of the problem and design solutions to reduce the burden of asthma in NYS. Data are presented for asthma prevalence in children and adults; risk behaviors; emergency department visits; hospitalizations; mortality; and program-based Medicaid fee-for-service, Medicaid managed care, and occupational health clinic data.

## Summary of Indicators and Data Sources

The data presented in this report are useful in characterizing the population(s) affected by asthma. The following

table summarizes the source(s) of data used for each asthma indicator:

Indicator Type	Source	Most Recent Year of Data
Asthma Prevalence in Children (0-17 Years)	National Asthma Survey – New York State (NAS-NYS)	2002–2003
	New York State Youth Tobacco Survey (NYS YTS)	2006
	Youth Risk Behavior Survey (YRBS)	2005
Asthma Prevalence in Adults (18+ Years)	Behavioral Risk Factor Surveillance System (BRFSS)	2006
Asthma Emergency Department (ED) Visits	Statewide Planning and Research Cooperative System (SPARCS) – Outpatient Records	2005
Asthma Hospital Discharges	SPARCS – Inpatient Records	2005
Asthma Mortality	Vital Records	2005
Asthma Prevalence Among Medicaid Enrollees: <ul style="list-style-type: none"> <li>• Medicaid Fee-for-Service (FFS)</li> <li>• Medicaid Managed Care (MMC)</li> </ul>	Office of Health Insurance Programs (OHIP) Audit, Fiscal and Program Planning Data Mart, and NYSDOH OHIP Medicaid Encounter Data System	2005
Use of Appropriate Medications for People with Asthma	NYSDOH OHIP Medicaid Encounter Data System	2005
Asthma Costs Among Medicaid Enrollees: <ul style="list-style-type: none"> <li>• Asthma Outpatient Visits</li> <li>• ED Visits</li> <li>• Hospitalizations</li> <li>• Pharmacy</li> </ul>	OHIP Audit, Fiscal and Program Planning Data Mart	2005
Asthma Hospitalization Costs	SPARCS – Inpatient Records	2005

## Executive Summary

This report presents New York State asthma data compared to the United States in 2003-2004 and to the Healthy People 2010 objectives. In addition, this report provides information regarding asthma prevalence in children and

adults, risk behaviors, emergency department visits, asthma hospitalizations, asthma mortality, program-based asthma surveillance, work-related asthma, and asthma costs.

### Healthy People 2010

- Compared to the nation, New York State asthma emergency department visit rates were higher for all age groups with the exception of the population aged 65 years and older. New York State asthma emergency department visit rates were higher than the Healthy People 2010 objectives for all age groups, especially among children aged 0-4 years.
- Compared to the 1999-2001 period, 2003-2005 New York State asthma hospital discharge rates showed a reduction (3-7%) for all age groups with the exception of the population aged 65 years and older. However, New York State asthma hospital discharge rates were higher than the United States rates for all age groups. New York rates were roughly two to three times higher than the Healthy People 2010 objectives for each age group.
- Asthma mortality rates in New York State for all age groups were lower during the 2003-2005 period compared to 2001-2003. However, New York State had higher asthma mortality rates than the nation for all age groups except the population aged 65 years and older. While New York State is close to meeting the Healthy People 2010 objective for those aged 65 years and older, the mortality rates were two to five times higher for all other age groups.

### Prevalence and Risk Behavior Information, New York State Asthma Survey Data, 1996–2006

#### ***Asthma Prevalence and Risk Behaviors in Adults (BRFSS), 2005–2006***

- In 2006, approximately 1.3 million adult (18+ years) New Yorkers (8.5%) had self-reported current diagnosed asthma.
- During 2005-2006, the prevalence of current asthma among New York State women (10.6%) was 50% higher than the prevalence in men (7.0%).
- In 2005-2006, non-Hispanic Black (9.2%) and non-Hispanic White (9.2%) New Yorkers had higher current asthma prevalence compared to Hispanic (8.0%) residents.
- Current asthma prevalence in New York State during 2005-2006 was inversely related to annual household income and educational attainment.
- In 2005-2006, the prevalence of current smoking was significantly higher for adult New Yorkers with asthma (23.3%) compared to those without asthma (19.0%).
- The prevalence of obesity in 2005-2006 was higher among adults with asthma (31.0%) compared to non-asthmatic adult New Yorkers (20.4%).
- There has been an upward trend in the prevalence of current asthma for New York State residents from 1996 through 2005. However, prevalence of current asthma declined in 2006.

### ***Asthma Healthcare Utilization in Adults (BRFSS), 2004–2005***

- According to the National Heart, Lung, and Blood Institute criteria for asthma severity, almost 70% of New York adults with asthma were classified at the mild intermittent level while 30% were classified at the persistent level.
- Among adult New Yorkers with asthma, 37.3% did not have a routine asthma checkup in the past year.
- Among adults with asthma, 21.0% utilized the emergency department due to asthma and 14.2% visited the emergency department two or more times in the past year.
- Among New York adults with asthma, 11.0% missed more than a week of work or were unable to carry out their normal activities due to asthma in the past year for an estimated 9.5 million days.

### ***Asthma Prevalence in Children (National Asthma Survey – New York State), July 2002–August 2003***

- Approximately 368,000 children (8.4%) had self-reported current diagnosed asthma.
- Current asthma prevalence was significantly higher for male children (9.8%) compared to female children (6.8%).

- Current asthma prevalence varied by race. Black children had the highest prevalence at 10.0% compared to White (7.2%) and Asian (4.3%) children.
- Hispanic children (10.9%) had higher current asthma prevalence than non-Hispanic children (7.4%).

### ***Asthma Prevalence and Asthma Episodes/Attacks in Middle and High School Students (New York State Youth Tobacco Survey), 2006***

- The current asthma prevalence was 16.9% for middle school students and 19.5% for high school students.
- There were no significant differences in prevalence of current asthma by race/ethnicity among middle school or high school students. Prevalence rates for middle school non-Hispanic White, non-Hispanic Black and Hispanic students were 16.1%, 20.0%, and 20.1%, respectively. Among high school students, prevalence of current asthma among non-Hispanic Whites was 20.2%, among non-Hispanic Blacks was 19.7%, and among Hispanics was 19.4%.
- Among middle school students with current asthma, 44.3% reported having an asthma episode/attack in the past 12 months. This prevalence was 34.6% among high school students with current asthma.

## **Asthma Emergency Department Outpatient Visits, 2005**

- There were 140,539 emergency department visits due to asthma (that did not result in a hospitalization) for New York State residents in 2005, an average of 385 visits per day.
- Children aged 0-4 years had the highest emergency department visit rate (181.4/10,000) compared to all other ages. The asthma emergency department visit rate decreased in older age groups.
- Female New Yorkers had higher crude and age-adjusted asthma emergency department visit rates (74.7/10,000; 77.9/10,000) compared to males (71.2/10,000; 71.7/10,000).
- Black New Yorkers had crude and age-adjusted asthma emergency department visit rates (161.4/10,000; 155.7/10,000) that were more than five times higher than White New Yorkers (30.1/10,000; 31.5/10,000).
- New York City residents had crude and age-adjusted asthma emergency department visit rates (112.7/10,000; 114.5/10,000) that were approximately 2.5 times higher than residents of the Rest of State (43.9/10,000; 45.9/10,000).
- Asthma emergency department visits showed a seasonal pattern with peaks in the fall and spring and a decline in the summer.

## Asthma Hospital Discharges, 1996–2005

- During 1996-2005, the 0-4 year age group had the highest hospital discharge rate compared to all other age groups.
- For the period 2003-2005, female New Yorkers had higher crude and age-adjusted asthma hospital discharge rates (25.1/10,000; 24.6/10,000) compared to males (18.8/10,000; 19.1/10,000).
- During 2003-2005, Black New Yorkers had higher crude and age-adjusted asthma hospital discharge rates (40.7/10,000; 40.9/10,000) compared to White New Yorkers (10.5/10,000; 10.3/10,000).
- New York City residents had higher crude and age-adjusted asthma hospital discharge rates (35.0/10,000; 35.4/10,000) compared to residents of the Rest of State (12.6/10,000; 12.7/10,000) during 2003-2005.
- The number of hospital discharges due to asthma in New York decreased approximately 23% in the last decade from 51,080 in 1996 to 39,518 in 2005.
- Asthma hospital discharge rates showed a 25% decline from 27.5 per 10,000 residents in 1996 to 20.5 per 10,000 in 2005.
- Similar to asthma emergency department visits, asthma hospital discharges showed a seasonal pattern with peaks in the spring and fall and a decline in the summer.

## Asthma Mortality, 1996–2005

- Annually, about 300 people died from asthma in New York State during 2003-2005, for a rate of 15.6 deaths per 1,000,000 residents.
- In 2003-2005, New York State women had a higher age-adjusted asthma mortality rate (16.5 per 1,000,000) compared to male (12.6 per 1,000,000) residents.
- For the period 2003-2005, non-Hispanic Black (36.3 per 1,000,000) and Hispanic (30.0 per 1,000,000) New York State residents had much higher age-adjusted mortality rates compared to non-Hispanic White residents (7.9 per 1,000,000).
- In the past ten years, the New York State asthma mortality rate decreased 39% from 24.4 per 1,000,000 residents in 1996 to 14.9 per 1,000,000 in 2005. Similar decreases were seen for residents of the Rest of State and New York City.

## Program-Based Asthma Surveillance, 2005

### ***Asthma Prevalence Among the Medicaid Population***

- In 2005, nearly 140,000 (8.7%) New York State Medicaid managed care enrollees were classified as having asthma and 28,720 (2.9%) were classified as having persistent asthma.
- More than 64,000 (9.2%) Medicaid fee-for-service enrollees were classified as having asthma and 15,658 (2.7%) were classified as having persistent asthma.

### ***Utilization of Health Services by Medicaid Fee-for-Service Asthmatics***

- During 2005, there were 32,159 doctor visits, 54,614 outpatient visits, 28,814 emergency department visits and 6,660 hospital discharges due to asthma among the Medicaid fee-for-service asthma universe population. During the same time period, 402,745 asthma related pharmacy claims were filled.

- For every 100 asthmatics covered continuously in 2005 by New York's Medicaid fee-for-service, there were: 50 doctor visits; 85 outpatient visits; 45 emergency department visits; 10 hospitalizations; and 627 pharmacy claims related to asthma.

### ***Managed Care Quality Assurance Reporting Requirement (QARR) Asthma-Specific Indicator***

- Among Commercial and Child Health Plus plans, 94% of children with persistent asthma received appropriate medications for asthma, compared to 90% for children with persistent asthma in Medicaid managed care plans. The proportion of adults receiving appropriate asthma medications was similar among Commercial and Medicaid managed care plan enrollees (90% and 89%, respectively).

## Work-Related Asthma, 1996–2005

- During 2005, approximately 140,000 (11.4%) adult asthmatics in New York State indicated that either a health professional had informed them they had work-related asthma, or they had informed a health professional of such.
- In the past decade, the number of work-related asthma hospitalizations in New York State ranged from 50-81 per year. The hospitalization cost for work-related asthma in 2005 was approximately \$600,000.

## Asthma Costs, 1996–2005

- The total cost of asthma hospitalizations in New York State for 2005 was approximately \$502 million, a 62% increase in the cost since 1996 (\$309 million). Adjusting to 2005 dollars, the adjusted asthma hospitalization cost increased 15% from the 1996 adjusted cost of \$437 million.
- The average cost per asthma hospitalization increased 110% from \$6,044 in 1996 to \$12,699 in 2005. The average adjusted asthma hospitalization cost increased 48% over this time period. This occurred despite a 10% drop in the average length of stay from 4.1 days to 3.7 days during the same time period.
- The average cost per asthma hospitalization increased with age. Females had higher average costs than males. Residents of New York City had higher average costs than residents of the Rest of State.
- In 2005, among the Medicaid fee-for-service population, over \$100 million were spent on more than 64,000 asthmatics for asthma-related services. The average cost was \$1,570 per asthma enrollee.

## Asthma and the Environment

### ***NYS School Building Condition Survey, 2005***

- Approximately 12.4% of surveyed school buildings in New York State (exclusive of New York City) were rated as “unsatisfactory,” meaning that at least one building system related to health or safety was not functioning reliably or had exceeded its useful life.
- Approximately 27% of buildings surveyed did not have a formal indoor air quality program in their school district.

### ***Outdoor Air Quality***

- During 2003-2005, there were a few unhealthy ozone days each year at several locations across the state. These days mainly occurred during the “ozone season” from mid-May through mid-September.
- During 2003-2005, the number of days when fine particle concentrations were unhealthy for sensitive groups such as asthmatics was greatest in the New York City area, less in the smaller-sized cities and smallest in rural areas.

# NYSDOH Asthma Plan and Asthma Initiatives

## Overview of NYSDOH Asthma Plan and Asthma Initiatives

New York is committed to improving the quality of life for those with asthma and their families. The goals of the NYS Asthma Plan for 2006-2011 are:

- Seamless, evidence-based, patient/family centered asthma care exists for all New Yorkers with asthma.
- Disparities in asthma diagnosis, treatment and outcomes are eliminated.
- “Asthma-friendly” communities exist in New York.
- Policy makers, health care providers and consumers have an increased understanding of asthma and treat and manage asthma effectively.
- A statewide public/private collaboration exists to shape, implement and monitor New York’s action which will improve asthma outcomes in New York.

Working in close collaboration with our statewide partners, especially in New York City, where asthma hospital discharge rates are the highest, there are many initiatives underway to meet these goals. The NYS Asthma Program has four focus areas: (1) Surveillance and Program Evaluation, (2) Health Care, (3) Community-Based Initiatives, and (4) Environmental and Occupational Health. A selection of New York’s initiatives includes the following:

### **Surveillance and Program Evaluation**

- **Emergency Department Surveillance:** Legislation was passed that requires all NYS hospitals to report emergency department (ED) data as of January 1, 2005. ED data are collected statewide in the NYSDOH Statewide Planning and Research Cooperative System (SPARCS) outpatient data file. Asthma surveillance utilizes these data and produce asthma ED visit information at the aggregate level including ZIP code, county, region and state levels for different age groups.
- **National Asthma Survey – New York State (NAS-NYS):** New York is one of the states that participated in the

National Asthma Survey to better understand the scope of the asthma problem in New York. The NAS-NYS report summarizes data from this survey and is posted on the Department’s public website (see [http://www.health.state.ny.us/statistics/ny\\_asthma/pdf/national\\_asthma\\_survey\\_nys.pdf](http://www.health.state.ny.us/statistics/ny_asthma/pdf/national_asthma_survey_nys.pdf)).

- **Asthma Hospital Discharge Rates by ZIP Code:** ZIP code level data by county are now available on the Department’s asthma website (see [http://www.health.state.ny.us/statistics/ny\\_asthma/index.htm](http://www.health.state.ny.us/statistics/ny_asthma/index.htm)) to assist regional asthma coalitions and others in their asthma prevention and control efforts.
- **Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call-back Survey:** The Asthma Call-back Survey is an independent survey that is linked to the BRFSS. This survey was first administered in NYS in 2006. Respondents to the NYS BRFSS core survey who have asthma were asked to participate in a follow-up survey to gather more information about their asthma. In 2006, 365 adults and 102 children (via proxy) participated in the NYS Asthma Call-back Survey which obtained information about asthma prevalence, severity/control, quality of life, asthma medications and environmental triggers. These data are summarized via specific surveillance publications, presentations and reports.
- **School-Based Health Centers Asthma Learning Collaborative – Project Evaluation and Development of the Asthma Registry:** The Department is conducting an evaluation of the School-based Health Center Learning Collaborative which focuses on asthma interventions in five elementary schools in New York City (see *Community-Based Initiatives for more information*). In addition, an Asthma Registry has been established for the schools in this project to assist with targeting high-risk asthma students and monitoring the effectiveness of interventions in the school-based health centers.



## Health Care

- **Child Health Plus:** Child Health Plus provides coverage to children under the age of 19 residing in NYS with a limited family income and no health insurance (see <http://www.health.state.ny.us/nysdoh/chplus/>).
- **Family Health Plus:** Family Health Plus is available to adults between the ages of 19 and 64 who are residents of NYS and are United States (U.S.) citizens or fall under one of many immigration categories, who do not have health insurance and have incomes too high to qualify for Medicaid (see <http://www.health.state.ny.us/nysdoh/fhplus/>).
- **Healthy New York:** Healthy New York is a unique program for uninsured employed individuals and students who are no longer insured under their family's coverage (see <http://www.ins.state.ny.us/website2/hny/english/hny.htm>).
- **Medicaid Program:** Medicaid recipients have access to a benefit package covering services necessary to manage asthma, including medications/prescription drugs, spacers, peak flow meters, nebulizers, pulmonary diagnostic tests, doctor visits and hospital care (see [http://www.health.state.ny.us/health\\_care/medicaid/index.htm](http://www.health.state.ny.us/health_care/medicaid/index.htm)).
- **Medicaid Asthma Disease Management and Quality Improvement Initiative:** The NYS Medicaid Program is promoting disease management interventions for the treatment of asthma. The purpose of these interventions is to improve health outcomes for Medicaid recipients through education of practitioners, patients, and family members, as well as quality assurance in the delivery of asthma care (see [http://www.health.state.ny.us/health\\_care/medicaid/index.htm](http://www.health.state.ny.us/health_care/medicaid/index.htm)).
- **Quality Assurance Reporting Requirements (QARR) Report:** The QARR report measures the effectiveness of Medicaid managed care plans in treating asthma. The most recent version (2006) of this report identifies how Medicaid managed care plans and commercial insurance plans perform on specific health measures, including asthma. The report represents one of the most comprehensive report cards for managed care in the nation (see [http://nyhealth.gov/health\\_care/managed\\_care/reports/eqarr/2006/index.htm](http://nyhealth.gov/health_care/managed_care/reports/eqarr/2006/index.htm)).
- **NYS Asthma Guideline:** Based on national standards, an expert panel produced a decision support tool that established a common standard of care for providers and health plans. The resultant guideline tool entitled,

*Clinical Guideline for the Diagnosis, Evaluation, and Management of Adults and Children with Asthma – 2005*, has been endorsed by professional societies, associations and health plans and distributed to over 20,000 physicians in NYS (see [http://www.health.state.ny.us/diseases/asthma/pdf/2005\\_asthma\\_guidelines.pdf](http://www.health.state.ny.us/diseases/asthma/pdf/2005_asthma_guidelines.pdf)). New national recommendations are anticipated in 2007 at which time the asthma guideline will be updated.

- **Asthma Model Benefit Package:** An assessment of public (Medicaid, Family Health Plus and Child Health Plus) health insurance benefit coverage for asthma care is currently being conducted. The assessment includes how the benefit packages differ and in what ways they could be aligned to support good asthma care. Recommendations will be made for changes in asthma care health insurance coverage policy for public insurers.

## Community-Based Initiatives

- **Asthma Website:** The NYSDOH launched an asthma website (see <http://www.health.state.ny.us/diseases/asthma/index.htm>) for all New Yorkers to obtain current information on asthma surveillance, interventions, asthma care and educational materials.
- **Treatment of Students with Asthma:** The 1998 legislation (Education Law 16, Article 19, Section 916) requires schools and BOCES to allow students who have been diagnosed by a physician with a severe asthmatic condition to carry and use prescribed inhalers during the school day.
- **School-Based Health Centers (SBHCs):** There are 197 school-based health centers in NYS that play a critical role in providing primary and preventive care to children, including quality asthma care and management (see <http://www.health.state.ny.us/nysdoh/school/index.htm>).
- **School-Based Health Center Asthma Learning Collaborative:** An Asthma Learning Collaborative pilot program with a focus on improving asthma care is being conducted in five school-based health centers located in East and Central Harlem. The aim of this initiative is to improve the system of care within the centers to provide better care and improve outcomes for all children with asthma, especially among children with poorly controlled asthma. This 18-month initiative uses the Breakthrough Series methodology developed by the Institute for Healthcare Improvement.<sup>5</sup>

- **Regional Asthma Coalitions:** Eleven regional asthma coalitions work to mobilize community resources to reduce morbidity and mortality through advocacy, education, partnerships and interventions. Program results indicate this is an effective mechanism for addressing asthma regionally (see <http://www.health.state.ny.us/diseases/asthma/contact.htm>).
- **NYS Asthma Outcomes Learning Network:** The NYSDOH Asthma Program has partnered with the National Initiative for Children's Health Care Quality and the 11 regional asthma coalitions for the purpose of improving the quality of asthma care among children in New York. Each year, 11 asthma improvement teams receive training in quality improvement practices, then apply these methods locally and share key learning principles through this Network.
- **School Nurse Asthma Management Program:** The NYSDOH asthma program has partnered with the National Association of School Nurses Asthma Management Program and the NYS Regional Asthma Coalitions to provide comprehensive asthma education and resources to school nurses in NYS. A school nurse trainer is located in most asthma coalition regions; since 2006 more than 500 school nurses have been trained.

### ***Environmental and Occupational Health***

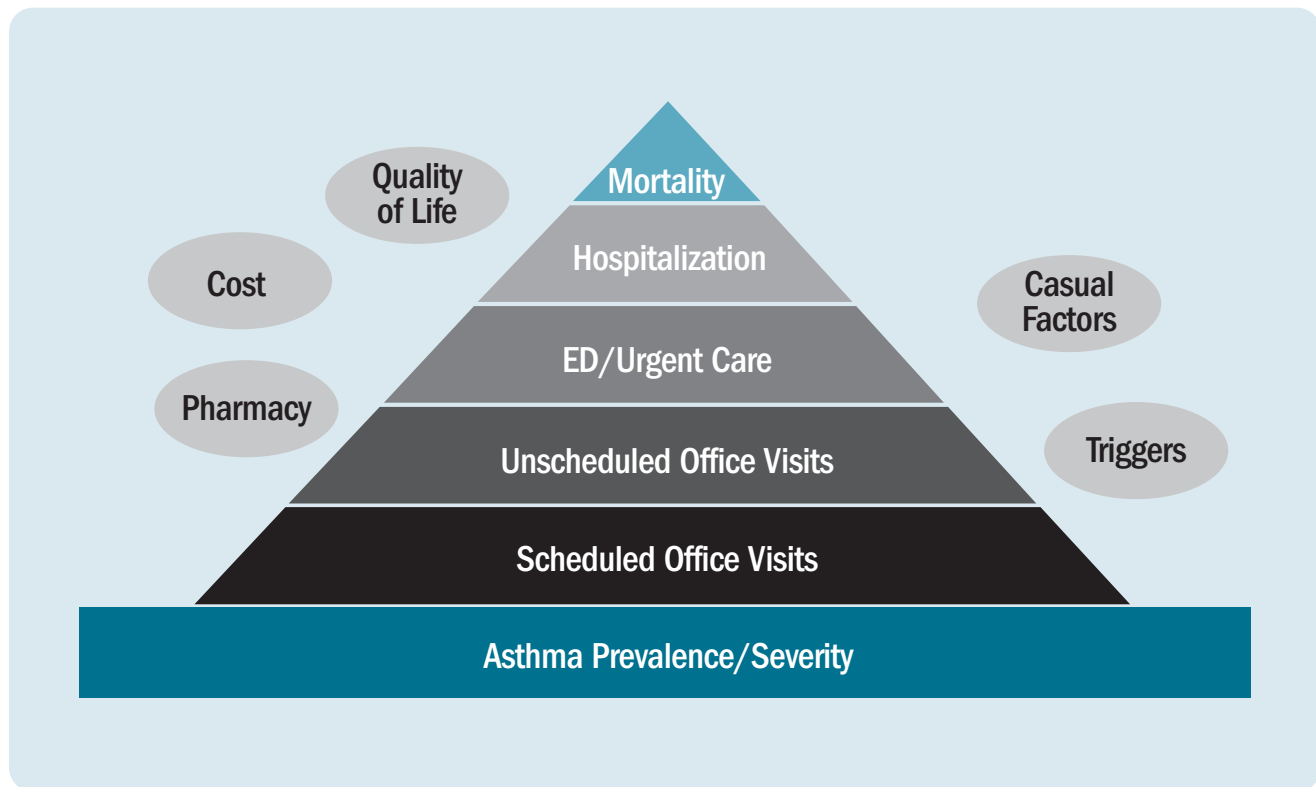
- **Healthy Neighborhoods Program:** The Healthy Neighborhoods Program provides in-home assessments and interventions for asthma, tobacco cessation, indoor air quality, lead, and fire safety in 13 NYS counties. Interventions may include, among others, asthma trigger education; dust, mold, and pest control measures; distribution of pillow and mattress covers; and smoking control and cessation education. An evaluation of this program during 1997 to 2000 found that it reduced hospitalizations and was cost-effective (see [http://www.health.state.ny.us/diseases/asthma/ny\\_action.htm](http://www.health.state.ny.us/diseases/asthma/ny_action.htm)).
- **Healthy Home Environments for New Yorkers with Asthma (HHENYA):** The Erie County Healthy Neighborhood Program (HNP) is collaborating with the NYS Asthma Program and regional managed care plans to design and implement a pilot project to integrate home environmental management into routine asthma care. Under this program regional managed care plans and providers in Erie County refer selected patients with asthma to the HNP for an in-home environmental assessment and targeted intervention to

reduce exposure to environmental conditions that have the potential to affect asthma. The HNP works with referred patients and provides feedback to providers to support the integration of environmental management into each patient's asthma self-management plan. The program will be evaluated and refined based on lessons learned. If substantiated by evaluation findings, NYSDOH will work to support the spread of this approach to other areas in NYS.

- **Occupational Lung Disease Toolkit:** A health care provider toolkit for improving the recognition and reporting of occupational lung diseases, including work-related asthma, has been developed and distributed (see [http://www.health.state.ny.us/environmental/workplace/lung\\_disease\\_registry/toolkit/toolkit.htm](http://www.health.state.ny.us/environmental/workplace/lung_disease_registry/toolkit/toolkit.htm)). A new brochure, *Is Your Asthma Work-Related?*, has been developed to help workers identify whether they have work-related asthma.
- **Environmental Education and Outreach Project:** A statewide asthma educational needs assessment was conducted to determine key messages and best practice educational materials on environmental and occupational triggers of asthma. The assessment found persistent problems in communication between providers and their patients. Three new brochures were developed and intended as a shared communication tool for patients and their providers. In addition, easy reading versions were created for patients with lower literacy skills (see <http://www.health.state.ny.us/diseases/asthma/brochures.htm>).
- **School Environmental Assessment Project:** The influence of the school environment on childhood asthma was examined by conducting surveys of school nurses, custodians, and district facilities managers to understand how the school environment may increase asthma risk. Ongoing analysis of data from the NYS Education Department's 2005 Building Condition Survey provides additional information about the overall condition of NYS school buildings, the condition of building systems (e.g., ventilation, plumbing), the presence of potential environmental asthma triggers and actions schools are taking to improve indoor air quality. Finally, hospitalization data are being analyzed to identify patterns that may be linked to particular schools. The purpose of this project is to better understand the problem of asthma in the school setting, and to develop and implement targeted, evidence-based interventions.

- **Overcoming Barriers to Implementation of School Indoor Air Quality Management Programs:** Many resources are available to help schools identify and fix indoor air quality problems that may affect students and staff with asthma, but these resources are not always used. Findings suggest that even when policies or practices do exist, they are not always enforced or fully implemented. During the 2007-2008 school year, NYSDOH will facilitate a series of discussions with personnel from 5-10 schools in the Capital District to learn more about potential barriers to implementation of indoor air quality (IAQ) improvement programs in the school setting. NYSDOH will provide guidance and support to school-based teams in order to identify and prioritize their issues, and then develop practical strategies to overcome barriers. Technical assistance for implementing strategies and tracking progress may also be provided to pilot schools. Successful strategies will be noted and refined to develop a set of practices that schools can customize to implement and sustain an IAQ program. The last step of this pilot project will be to convene regional workshops with non-pilot schools to learn how these strategies might be adapted for use on a broader scale.
- **Air Quality Health Advisories:** The Commissioners of NYSDOH and the NYS Department of Environmental Conservation (NYSDEC) have agreed to issue a joint press release when ozone or fine particle air pollution levels are of concern, especially for people with health conditions such as asthma. Local health units and media outlets are notified of advisories in their region and are directed to the NYSDOH website which provides advice on ways to reduce exposure and offers steps that citizens can take to reduce air pollution (see [http://www.health.state.ny.us/environmental/air\\_quality/index.htm#outdoor\\_air](http://www.health.state.ny.us/environmental/air_quality/index.htm#outdoor_air)).
- **Environmental Public Health Tracking (EPHT):** Environmental public health tracking (EPHT) is the ongoing collection, integration, analysis, and interpretation of data on environmental hazards and potential health effects related to exposures to these hazards. The NYSDOH received a 5-year grant from the Centers for Disease Control and Prevention (CDC) in 2006 to develop an EPHT network that is tracking a core set of nationally consistent data, including asthma, ambient air concentrations of ozone, and fine particles. The NYS EPHT program is collaborating with the NYSDOH Asthma program, the NYSDEC, CDC and the U.S. Environmental Protection Agency to disseminate coherent public health messages from the analyses of these data (see [http://www.nyhealth.gov/statistics/environmental/public\\_health\\_tracking/](http://www.nyhealth.gov/statistics/environmental/public_health_tracking/)).
- **Environmental Health Research:** NYSDOH supports continuing analysis and exploration of which environmental factors are important contributors to asthma development and morbidity. Recent and ongoing research efforts include various studies of the potential health effects associated with ambient air contaminants; a study of the potential health impact of residential proximity to large NYS airports; a study of meteorological conditions and health outcomes; assessment of asthma and contributing factors in the school and home environments; and follow-up health studies of World Trade Center responders and community residents. NYSDOH builds upon information from environmental asthma research to develop more effective public health programs aimed at reducing or eliminating exposure to environmental factors.

**Figure 3-1**  
The Asthma Surveillance Pyramid



Source: Centers for Disease Control and Prevention. "A Public Health Response to Asthma," PHTN Satellite Broadcast, Course Materials 2001.

### Asthma Surveillance in New York State

CDC defines surveillance as the "ongoing, systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control." There are various existing and new databases that are being utilized for surveillance of asthma in NYS. The NYSDOH is striving to acquire information on all aspects of asthma as depicted in the surveillance pyramid.

#### **Asthma Prevalence/Severity**

Asthma prevalence and severity are being assessed through the Behavioral Risk Factor Surveillance System (BRFSS), Youth Risk Behavior Survey (YRBS), New York State Youth Tobacco Survey (NYS YTS), BRFSS Asthma Call-back, and program-based data including Medicaid fee-for-service, Medicaid managed care, Occupational Clinics and the Occupational Lung Disease Registry.

#### **Scheduled and Unscheduled Office Visits**

The Medicaid managed care Quality Assurance Reporting Requirements (QARR) consist of measures from the National Committee for Quality Assurance's Health Plan Employer Data Information Set (HEDIS®) and NYS-specific measures. This version of QARR incorporates measures from HEDIS®. The major areas of performance included in 2005 QARR are: Effectiveness of Care, Access to/Availability of Care, Satisfaction with the Experience of Care, Health Plan Stability, Use of Services, and Health Plan Descriptive Information. The BRFSS Asthma Call-back also has information on scheduled and unscheduled office visits.

#### **Emergency Department (ED)/Urgent Care**

Information about asthma-related ED visits is obtained from required reporting from all NYS hospitals beginning in January 2005, as well as from the Medicaid fee-for-service data that includes ED visits. The BRFSS Asthma Call-back Survey also has self-reported information on ED and urgent care visits.

**Hospital Discharges**

Hospital discharge data are available through the Statewide Planning and Research Cooperative System (SPARCS) database. Medicaid fee-for-service data include information about hospital discharges. The BRFSS Asthma Call-back also has self-reported information on hospitalizations.

**Mortality**

Information on asthma mortality is available through the NYS Vital Statistics database.

**Quality of Life**

BRFSS is used to assess the quality of life of adults suffering from asthma. The BRFSS Asthma Call-back Survey also collects data for several quality of life measures in both children and adults with asthma.

**Cost**

Hospital billing data are available through the SPARCS database. Medicaid fee-for-service has detailed cost information for ED visits, hospitalizations, office visits and pharmacy use.

**Pharmacy**

Medicaid fee-for-service has detailed information about pharmacy use and costs. The BRFSS Asthma Call-back Survey also collects information about asthma medication used by both children and adults with asthma.

**Triggers**

The BRFSS Asthma Call-back Survey collects information about the household environment for people with asthma.

## Healthy People 2010 Objectives

Sponsored by the United States (U.S.) Department of Health and Human Services, the *Healthy People 2010* initiative is a comprehensive set of disease prevention and health promotion objectives for the nation to achieve over the first decade of this century. Created by scientists both inside and outside of government, it identifies a wide range of public health priorities that can be used by many individuals, states, communities, and professional organizations to develop health improvement programs.<sup>6</sup>

The *Healthy People 2010* objectives are national benchmarks. Asthma-specific objectives can guide New York State (NYS) in advancing asthma prevention and control efforts, comparing its progress with other states, and ultimately documenting New York's contribution towards achieving national objectives.

This section provides the *Healthy People 2010* national objectives and updated data of asthma emergency department visits, asthma hospitalizations and asthma mortality for NYS and the U.S.<sup>7</sup>

Some of the *Healthy People 2010* national objectives for asthma have changed since the publication of the 2005 New York State Asthma Surveillance Summary Report. Additional information is provided in DATA 2010, an interactive database system developed by staff of the Division of Health Promotion Statistics at the National Center for Health Statistics.<sup>8</sup>

### Asthma Emergency Department Visits

**Table 4-1**

Emergency Department Visit Rate per 10,000 Residents by Age Group Compared to Healthy People 2010 Objectives for Asthma, New York State (2005) and United States (2003)

Age Group	New York (2005)	United States (2003)	Healthy People 2010
0-4	181.4	153.7	80
5-64	72.8	59.6	50
65+	21.1	30.9	15

Compared to the nation, NYS asthma emergency department (ED) visit rates were higher for all groups with the exception of the population aged 65 years and older.

NYS asthma ED visit rates were higher than the *Healthy People 2010* objectives for all age groups, especially among children aged 0-4 years (Table 4-1).

## Asthma Hospital Discharges

**Table 4-2**

Asthma Hospital Discharge Rate per 10,000 Residents by Age Group Compared to Healthy People 2010 Objectives for Asthma, New York State (1997–2005) and United States (2003)

Age Group	New York				United States 2003	Healthy People 2010
	1997–1999	1999–2001	2001–2003	2003–2005		
0–4	79.0	71.9	69.7	67.0	59.0	25.0
0–17	40.6	35.0	33.7	34.1	22.6	17.3
5–64	19.9	17.6	16.8	17.2	12.4	7.7
65+	25.6	25.4	26.4	30.0	22.4	11.0

Compared to the 1999–2001 period, the most recent data for NYS (2003–2005) showed a reduction (3–7%) for asthma hospital discharge rates for all age groups with the exception of the population aged 65 years and older. However, compared to the nation, NYS asthma hospital

discharge rates were higher for all age groups. The 2003–2005 figures show that New York rates were still roughly two to three times higher than the *Healthy People 2010* objectives for each age group (Table 4-2).

## Asthma Mortality

**Table 4-3**

Asthma Mortality Rate per 1,000,000 Residents by Age Group Compared to Healthy People 2010 Objectives for Asthma, New York State (1999–2005) and United States (2004)

Age Group	New York			United States 2004	Healthy People 2010
	1999–2001	2001–2003	2003–2005		
0–4	2.4	3.5	2.7	1.8	0.9
5–14	5.0	5.6	4.6	2.6	0.9
15–34	7.1	5.9	5.5	4.4	1.9
35–64	23.1	21.4	17.8	12.7	8.0
65+	55.5	50.7	50.7	51.3	47.0

Compared to the nation, NYS mortality rates due to asthma were lower for the 65 year and older age group. However, these rates were higher for all other age groups. Asthma mortality rates in NYS were lower during the

2003–2005 period compared to 2001–2003. NYS is close to meeting the *Healthy People 2010* objective for the 65 year and older age group. NYS mortality rates, however, were two to five times higher for all other age groups (Table 4-3).

# Asthma Survey Data

## Introduction

There are a number of different sources for prevalence data. However, population-based surveys are among the sources most commonly used for asthma prevalence. The wording of questions may differ between surveys, or can change from year to year.<sup>9</sup> Asthma survey data from child and adult populations in New York State (NYS) and/or the United States (U.S.) are presented in this chapter. The following surveys are included:

- Behavioral Risk Factor Surveillance System (BRFSS), 1996-2006
- BRFSS Adult Asthma Module, 2004-2005
- National Asthma Survey – New York State (NAS-NYS), 2002-2003
- New York State Youth Tobacco Survey (NYS YTS), 2006
- Youth Risk Behavior Survey (YRBS), 2005



### **Behavioral Risk Factor Surveillance System (BRFSS), 1996–2006**

#### **Trends in Prevalence of Current Asthma, 1996–2006**

- In 2006, approximately 1.3 million adult New Yorkers (8.5%) had self-reported current diagnosed asthma.
- There has been an upward trend in the prevalence of current asthma for New York State residents from 1996 through 2005. However, prevalence of current asthma declined in 2006.

#### **Asthma Prevalence and Risk Behaviors in Adults (BRFSS), 2005–2006**

- Rest of State residents had a higher current asthma prevalence rate (9.3%) compared to New York City residents (8.1%) in 2005-2006.
- The 2005-2006 prevalence of current asthma among New York State women (10.6%) was 50% higher than the prevalence in men (7.0%).
- In 2005-2006, young adults ages 18-24 years had the highest current asthma prevalence (12.6%), while adults 65+ years had the lowest (7.8%).
- In 2005-2006, non-Hispanic Black (9.2%) and non-Hispanic White (9.2%) New Yorkers had higher prevalence compared to Hispanic (8.0%) residents.
- Current asthma prevalence in 2005-2006 was highest in adults who had not graduated from high school (10.9%), while college graduates had the lowest prevalence (7.3%).
- Current asthma prevalence in 2005-2006 was highest for adults with annual household income levels <\$15,000 (12.3%). Adults in households with incomes of \$75,000 or more had the lowest prevalence (7.2%).
- In 2005-2006, the prevalence of current smoking was significantly higher for adult New Yorkers with asthma (23.3%) compared to those without asthma (19.0%).
- In 2005-2006, 31.2% of adult New Yorkers with asthma reported no leisure time activity during the past month compared to 26.1% of those without asthma.
- In 2005-2006, 31.0% of adults with asthma were considered obese compared to 20.4% of adults without asthma in New York State.

### **Asthma Healthcare Utilization in Adults (BRFSS), 2004–2005**

- During 2004-2005, according to the National Heart, Lung, and Blood Institute criteria for asthma severity, almost 70% of New York adults with asthma were classified at the mild intermittent level while 30% were classified at the persistent level.
- Among adult New Yorkers with asthma, 37.3% did not have a routine asthma checkup in the past year.
- Among adults with asthma, 21.0% utilized the emergency department due to asthma and 14.2% visited the emergency department two or more times in the past year.
- Among New York adults with asthma, 11.0% missed more than a week of work or were unable to carry out their normal activities due to asthma in the past year for an estimated 9.5 million days.

### **National Asthma Survey – New York State (NAS-NYS), 2002–2003**

- Approximately 368,000 children (8.4%) had self-reported current diagnosed asthma.
- Current asthma prevalence varied by region. New York City children had higher prevalence (9.7%) compared to children residing in the Rest of State (7.4%).
- Current asthma prevalence was significantly higher for male children (9.8%) compared to female children (6.8%).
- Current asthma prevalence varied by race. Black children had the highest prevalence at 10.0% compared to White (7.2%) and Asian (4.3%) children.
- Hispanic children (10.9%) had higher current asthma prevalence than non-Hispanic children (7.4%).

### **New York State Youth Tobacco Survey (NYS YTS), 2006**

#### **Asthma Prevalence and Asthma Episodes/Attacks in Middle and High School Students**

- In 2006, current asthma prevalence was 16.9% for middle school students and 19.5% for high school students.
- In 2006, current asthma prevalence was 18.1% for middle school students in New York City and 16.3% for middle school students in the Rest of State. Among high school students, current asthma prevalence for those in New York City was 17.5%, and 20.4% for students in the Rest of State.
- Male and female middle school students had essentially the same current asthma prevalence (16.8% and 16.9%, respectively). Similarly, the prevalence rate among high school males was 20.3% compared to 18.9% among females, with no significant statistical difference.
- There were no significant differences in prevalence rates of current asthma by race/ethnicity among middle school or high school students. Prevalence for middle school non-Hispanic White, non-Hispanic Black and Hispanic students were 16.1%, 20.0%, and 20.1%, respectively. Among high school students, prevalence of current asthma among non-Hispanic Whites was 20.2%, among non-Hispanic Blacks was 19.7%, and among Hispanics was 19.4%.
- Among New York State middle school students with current asthma, 44.3% reported having had an asthma episode/attack in the past 12 months. The prevalence was 34.6% among high school students with current asthma.

### **Youth Risk Behavior Survey (YRBS), 2005**

#### **Asthma Prevalence and Asthma Episodes/Attacks in High School Students**

- Current asthma prevalence for New York State high school students in 2005 was 16.7%, which was higher than the national prevalence of 14.5%.
- Students from the Rest of State had a higher current asthma prevalence (17.3%) compared to New York City high school students (15.5%).
- The prevalence of current asthma was higher among male (17.0%) than female (16.4%) high school students. Both New York male and female current asthma prevalence rates were higher than the gender-specific national prevalence rates.
- Current asthma prevalence varied slightly by race/ethnicity for New York high school students in 2005. Non-Hispanic Black students had the highest current asthma prevalence (18.0%), followed by Hispanic (17.5%) and non-Hispanic White (17.1%) high school students. All of New York State's race/ethnicity-specific current asthma prevalence rates were higher than the corresponding national prevalence rates.
- Among high school students in New York State with current asthma, 35.8% had reported having an asthma episode/attack in the past 12 months. This was slightly lower than the nationwide prevalence of having an asthma episode/attack (37.9%).
- Current asthma prevalence rates among high school students were similar for the New York State Youth Tobacco Survey and the Youth Risk Behavior Survey.

### Methodology

The Behavioral Risk Factor Surveillance System (BRFSS) is a statewide random-digit-dialing telephone survey of the non-institutionalized adult population aged 18 years and older. The BRFSS began in New York State (NYS) in 1983 and has been conducted annually since 1985 following procedures established by the Centers for Disease Control and Prevention (CDC). Data are collected from a representative sample of about 5,000 adults each year, and then weighted to adjust for the selection probabilities and estimates of the age-sex-race distribution of adults in NYS for each calendar year. This survey provides information on behaviors and risk factors for chronic diseases, infectious diseases, and other health conditions for NYS adults.

The 1996 and 1997 NYS BRFSS surveys 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?” In the 1998 BRFSS survey, this question was not included.

The 1999 and 2000 NYS BRFSS survey included two questions for assessing both lifetime prevalence and current prevalence of asthma: “Did a doctor ever tell you that you have asthma?” and [If Yes] “Do you still have asthma?”

In the 2001 through 2005 and 2006 surveys, those two questions were modified to: “Have you ever been told by a doctor, nurse, or other health professional that you had asthma?” and [If Yes] “Do you still have asthma?”

From responses to these questions, weighted prevalence estimates for current asthma were determined for each survey year. In addition, successive years of data were combined to permit the calculation of two-year averages and more stable estimates for subgroup comparisons. The 95% confidence intervals (CIs) for these estimates are provided. Estimates are considered “significantly different” from each other when they do not have overlapping CIs.

In addition to the asthma questions on the NYS BRFSS, an Optional Adult Asthma Module was administered in some survey years. In 2004 and 2005, the NYS BRFSS surveys included this module which contained eight asthma related questions that assessed asthma symptoms, health care utilization and medication use among adults with current asthma. Furthermore, the NYS BRFSS surveys included an asthma related question in this module for assessing asthma emergency department (ED) visits in 1996, 1997, 1999, 2004 and 2005.

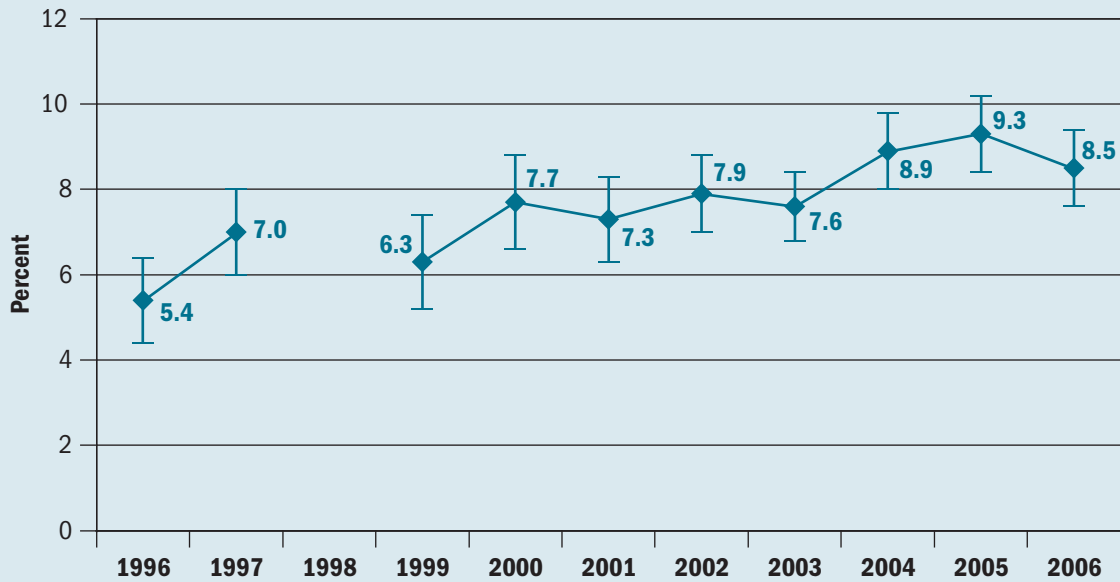
The Optional Adult Asthma Module data for 2004 and 2005 were combined to generate more stable estimates for subgroup comparisons, resulting in a total of 1,246 adult respondents (542 from 2004 and 704 from 2005).

For this report, asthma severity was classified using the National Heart, Lung, and Blood Institute (NHLBI) (see Appendix 2) criteria, based on the frequency of the reported asthma daytime and nighttime symptoms. Other questions that were analyzed for adults with current asthma included: number of asthma routine visits, number of asthma urgent outpatient visits, number of asthma ED visits, and number of days unable to work or otherwise carry out usual activities because of asthma.

Weighted percentages and 95% CIs for the responses to the Optional Adult Asthma Module questions were generated.

Limitations of the BRFSS data include the following: (1) information about an asthma diagnosis was obtained by self-report; (2) households that did not have a telephone were not represented in this survey; (3) data were not available at the county level; and (4) the CASRO (Council of American Survey Research Organizations) Rate,<sup>10</sup> which provides an overall measure of response, was approximately 38% for year 2005 and 42% for year 2006.

**Figure 5-1**  
Prevalence\* of Current Asthma Among Adults, New York State BRFSS, 1996–2006



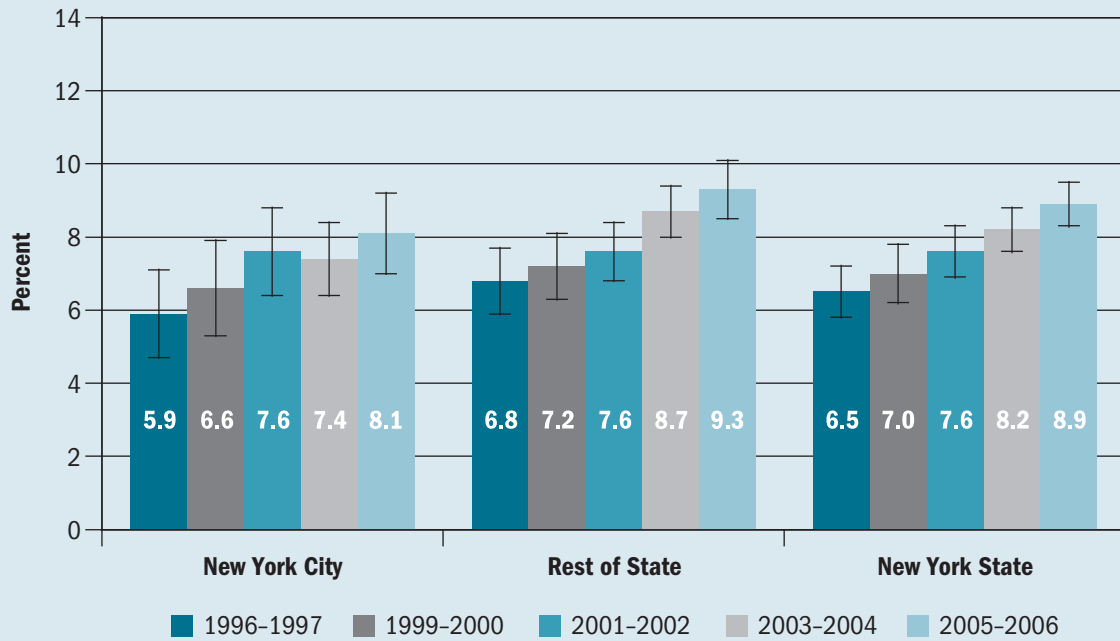
\*Prevalence rates are presented with 95% Confidence Intervals.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
New York State	5.4	7.0	—	6.3	7.7	7.3	7.9	7.6	8.9	9.3	8.5
United States	—	—	—	—	7.5	7.6	7.8	7.5	8.3	8.0	8.4

Among adult New Yorkers, current asthma prevalence increased from 1996-2005. Current asthma prevalence was highest in 2005 at 9.3%. In 2006, current asthma prevalence decreased to 8.5%.

Current asthma prevalence for NYS was higher than the U.S. prevalence for every year except 2001 (Figure 5-1).

**Figure 5-2**  
**Prevalence\* of Current Asthma Among Adults by Region and Combined Survey Years, New York State BRFSS, 1996–2006**



\*Prevalence rates are presented with 95% Confidence Intervals.

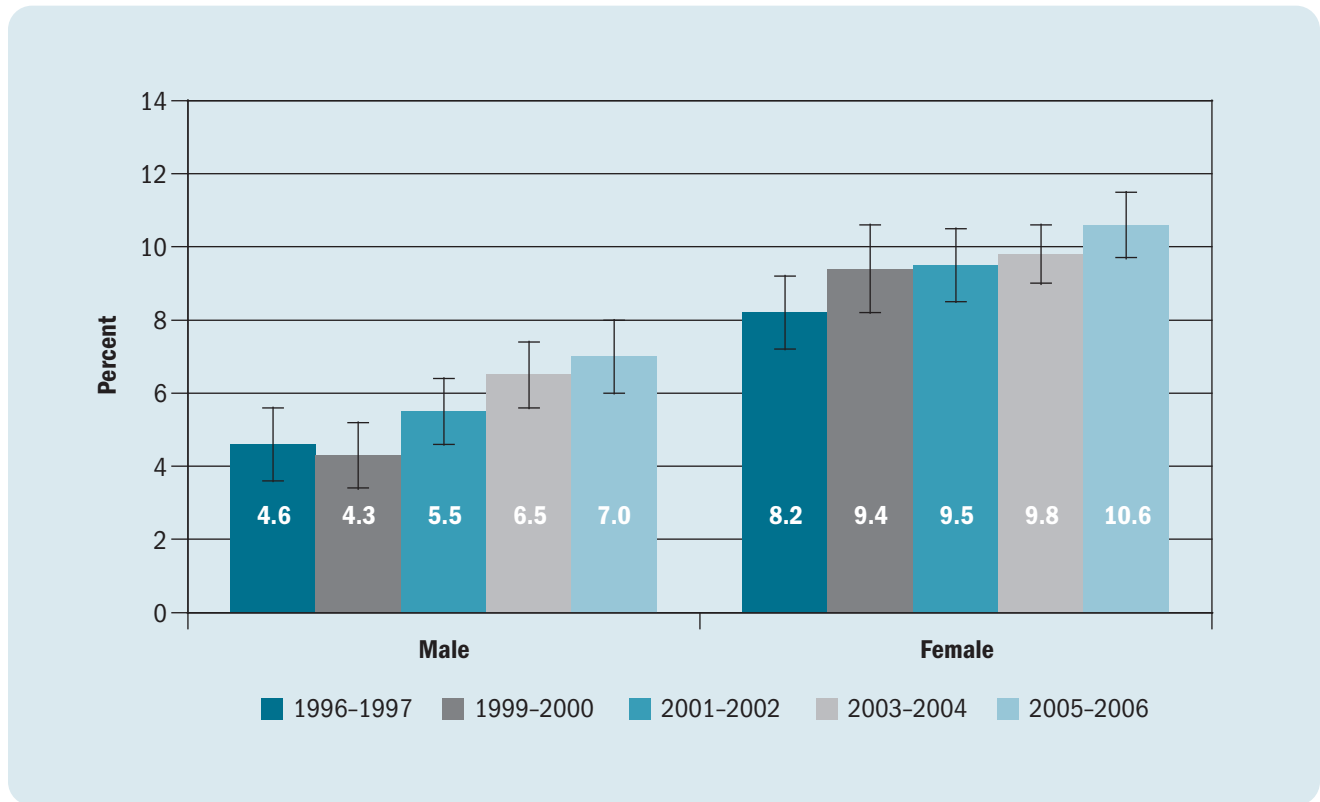
Region	1996-1997		1999-2000		2001-2002		2003-2004		2005-2006	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
New York City	5.9	4.7-7.1	6.6	5.3-7.9	7.6	6.4-8.8	7.4	6.4-8.5	8.1	7.0-9.2
Rest of State	6.8	5.9-7.7	7.2	6.3-8.1	7.6	6.8-8.4	8.7	8.0-9.4	9.3	8.5-10.1
New York State	6.5	5.8-7.2	7.0	6.2-7.8	7.6	6.9-8.3	8.2	7.6-8.8	8.9	8.3-9.5

Among NYS adults, an estimated 1.3 million (8.9%) had self-reported current asthma for 2005-2006, which was higher than the corresponding national rate of 8.0%.

Current asthma prevalence increased over time for residents of New York City and the Rest of State.

In 2005-2006, Rest of State residents had higher current asthma prevalence (9.3%) compared to New York City residents (8.1%) (Figure 5-2).

**Figure 5-3**  
**Prevalence\* of Current Asthma Among Adults by Gender and Combined Survey Years, New York State BRFSS, 1996–2006**



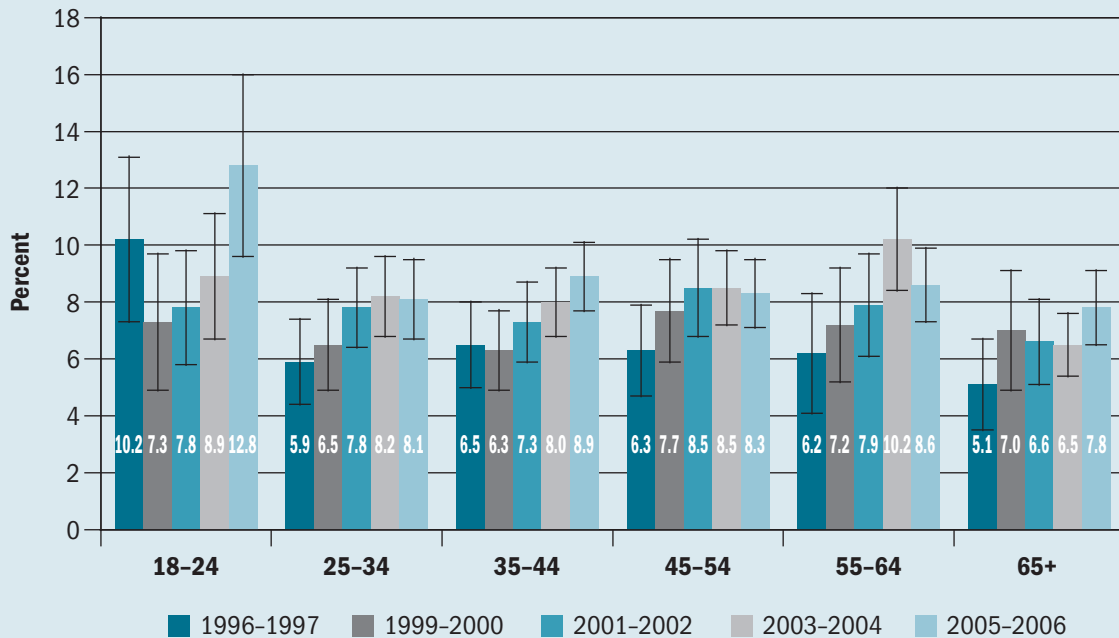
\*Prevalence rates are presented with 95% Confidence Intervals.

Gender	1996-1997		1999-2000		2001-2002		2003-2004		2005-2006	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
Male	4.6	3.6-5.6	4.3	3.4-5.2	5.5	4.6-6.4	6.5	5.6-7.4	7.0	6.0-8.0
Female	8.2	7.2-9.2	9.4	8.2-10.6	9.5	8.5-10.5	9.8	9.0-10.6	10.6	9.7-11.5

The NYS current adult asthma prevalence was higher in females than in males for all time periods. In general, prevalence increased over time for both genders.

In 2005-2006, the prevalence among females (10.6%) was 50% higher than the male prevalence (7.0%) (Figure 5-3).

**Figure 5-4**  
Prevalence\* of Current Asthma Among Adults by Age Group and Combined Survey Years, New York State BRFSS, 1996–2006



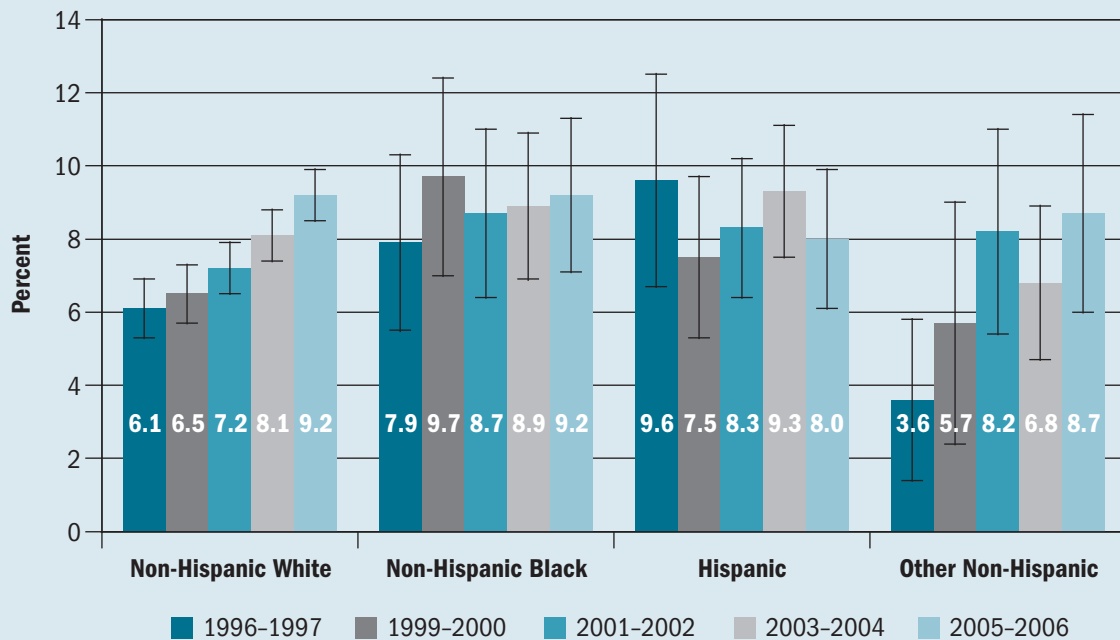
\*Prevalence rates are presented with 95% Confidence Intervals.

Age Group	1996-1997		1999-2000		2001-2002		2003-2004		2005-2006	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
18-24	10.2	7.3-13.1	7.3	4.9-9.7	7.8	5.8-9.8	8.9	6.7-11.1	12.8	9.6-16.0
25-34	5.9	4.4-7.4	6.5	4.9-8.1	7.8	6.4-9.2	8.2	6.8-9.6	8.1	6.7-9.5
35-44	6.5	5.0-8.0	6.3	4.9-7.7	7.3	5.9-8.7	8.0	6.8-9.2	8.9	7.7-10.1
45-54	6.3	4.7-7.9	7.7	5.9-9.5	8.5	6.8-10.2	8.5	7.2-9.8	8.3	7.1-9.5
55-64	6.2	4.1-8.3	7.2	5.2-9.2	7.9	6.1-9.7	10.2	8.4-12.0	8.6	7.3-9.9
65+	5.1	3.5-6.7	7.0	4.9-9.1	6.6	5.1-8.1	6.5	5.4-7.6	7.8	6.5-9.1

During 1996-2006, current asthma prevalence varied by age group and fluctuated over time. In 2005-2006, adults aged 65+ years had the lowest current asthma

prevalence at 7.8%, while young adults age 18-24 years had the highest current asthma prevalence at 12.8% (Figure 5-4).

**Figure 5-5**  
Prevalence\* of Current Asthma Among Adults by Race/Ethnicity and Combined Survey Years, New York State BRFSS, 1996–2006



\*Prevalence rates are presented with 95% Confidence Intervals.

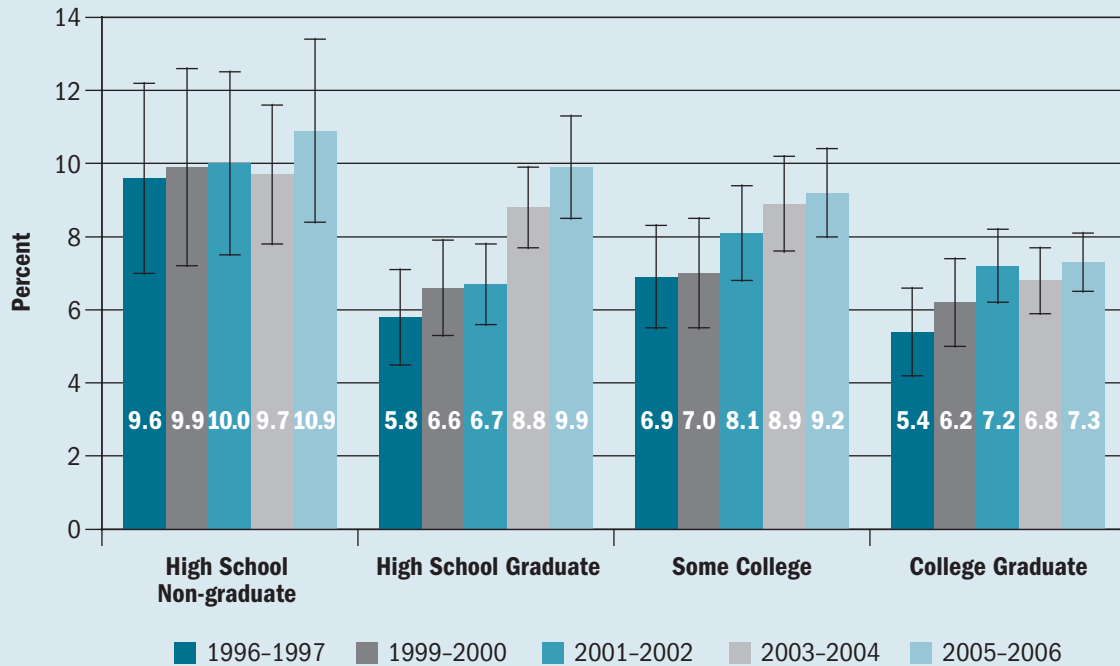
Race/Ethnicity	1996-1997		1999-2000		2001-2002		2003-2004		2005-2006	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
Non-Hispanic White	6.1	5.3-6.9	6.5	5.7-7.3	7.2	6.5-7.9	8.1	7.4-8.7	9.2	8.5-9.9
Non-Hispanic Black	7.9	5.5-10.3	9.7	7.0-12.4	8.7	6.4-11.0	8.9	6.9-10.9	9.2	7.1-11.3
Hispanic	9.6	6.7-12.5	7.5	5.3-9.7	8.3	6.4-10.2	9.3	7.5-11.1	8.0	6.1-9.9
Other Non-Hispanic	3.6	1.4-5.8	5.7	2.4-9.0	8.2	5.4-11.0	6.8	4.7-8.9	8.7	6.0-11.4

During 1996-2006, current asthma prevalence varied by race/ethnicity. Current asthma prevalence increased slightly over time for non-Hispanic Whites but prevalence fluctuated for non-Hispanic Blacks and Hispanic adults during the 10-year period.

The prevalence of current asthma was higher in both non-Hispanic Black and non-Hispanic White adults in 2005-2006 at 9.2% compared to Hispanic New Yorkers at 8.0% (Figure 5-5).



**Figure 5-6**  
**Prevalence\* of Current Asthma Among Adults by Educational Attainment**  
**and Combined Survey Years, New York State BRFS, 1996-2006**



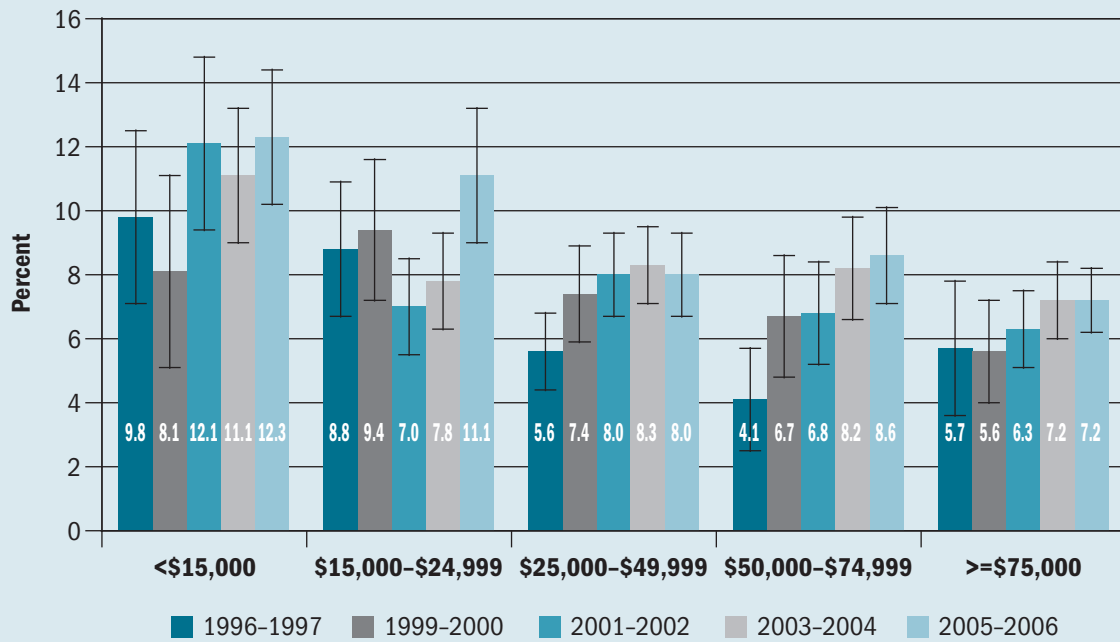
\*Prevalence rates are presented with 95% Confidence Intervals.

Educational Attainment	1996-1997		1999-2000		2001-2002		2003-2004		2005-2006	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
High School Non-graduate	9.6	7.0-12.2	9.9	7.2-12.6	10.0	7.5-12.5	9.7	7.8-11.6	10.9	8.4-13.4
High School Graduate	5.8	4.5-7.1	6.6	5.3-7.9	6.7	5.6-7.8	8.8	7.7-9.9	9.9	8.5-11.3
Some College	6.9	5.5-8.3	7.0	5.5-8.5	8.1	6.8-9.4	8.9	7.6-10.2	9.2	8.0-10.4
College Graduate	5.4	4.2-6.6	6.2	5.0-7.4	7.2	6.2-8.2	6.8	5.9-7.7	7.3	6.5-8.1

During 1996-2006, current asthma prevalence varied by reported educational attainment. Prevalence remained steady over time for adults who reported that they had not graduated from high school. However, prevalence of current asthma increased over time for adults who graduated from high school and who had some college education.

In 2005-2006, adults with less than a high school education had the highest current asthma prevalence at 10.9%, while adults with a college education had the lowest current asthma prevalence at 7.3% (Figure 5-6).

**Figure 5-7**  
**Prevalence\* of Current Asthma Among Adults by Household Income**  
**and Combined Survey Years, New York State BRFS, 1996–2006**



\*Prevalence rates are presented with 95% Confidence Intervals.

Household Income	1996-1997		1999-2000		2001-2002		2003-2004		2005-2006	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
<\$15,000	9.8	7.1-12.5	8.1	5.1-11.1	12.1	9.4-14.8	11.1	9.0-13.2	12.3	10.1-14.4
\$15,000-\$24,999	8.8	6.7-10.9	9.4	7.2-11.6	7.0	5.5-8.5	7.8	6.3-9.3	11.1	9.0-13.2
\$25,000-\$49,999	5.6	4.4-6.8	7.4	5.9-8.9	8.0	6.7-9.3	8.3	7.1-9.5	8.0	6.7-9.3
\$50,000-\$74,999	4.1	2.5-5.7	6.7	4.8-8.6	6.8	5.2-8.4	8.2	6.6-9.8	8.6	7.1-10.1
>=\$75,000	5.7	3.6-7.8	5.6	4.0-7.2	6.3	5.1-7.5	7.2	6.0-8.4	7.2	6.2-8.2

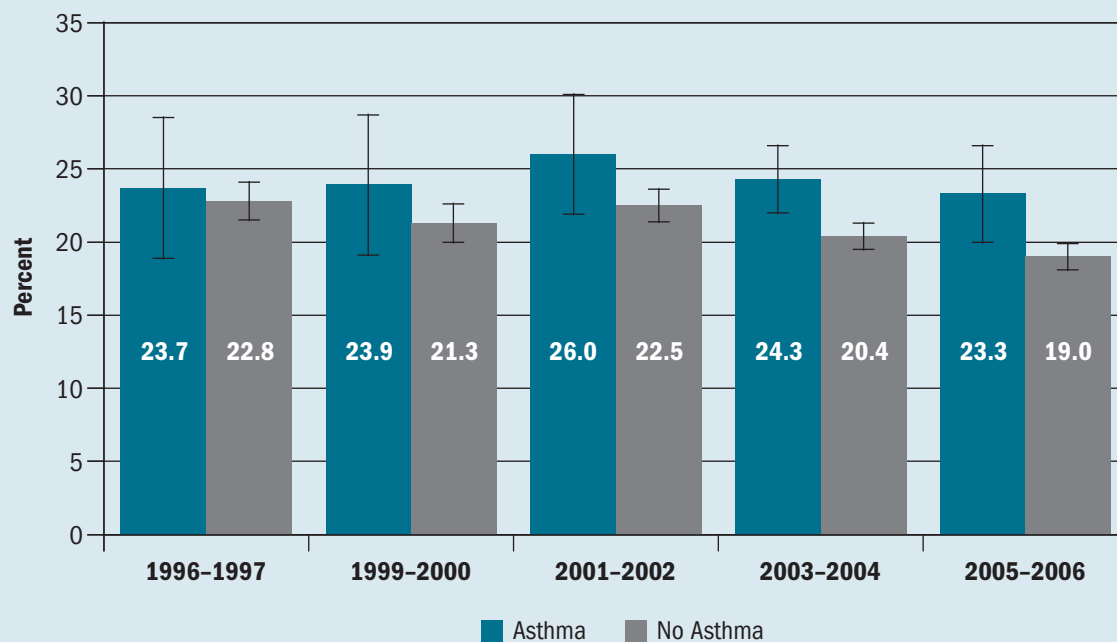
During 1996-2006, current asthma prevalence was inversely proportional to annual household income. In general, prevalence increased over time for adults with annual household income levels of \$25,000 and higher.

In 2005-2006, adults whose annual household income was <\$15,000 had the highest current asthma

prevalence at 12.3%, while adults whose annual household income was ≥\$75,000 had the lowest current asthma prevalence at 7.2%.

Income was not adjusted for inflation, therefore comparisons of annual income categories across years should be made with caution (Figure 5-7).

**Figure 5-8**  
**Percent\* of Adult New Yorkers Who Currently Smoke\*\* by Asthma Status**  
**and Combined Survey Years, New York State BRFSS, 1996–2006**



\*Percentages are presented with 95% Confidence Intervals.

\*\*A person who has smoked at least 100 cigarettes in his/her lifetime and now smokes everyday or some days.

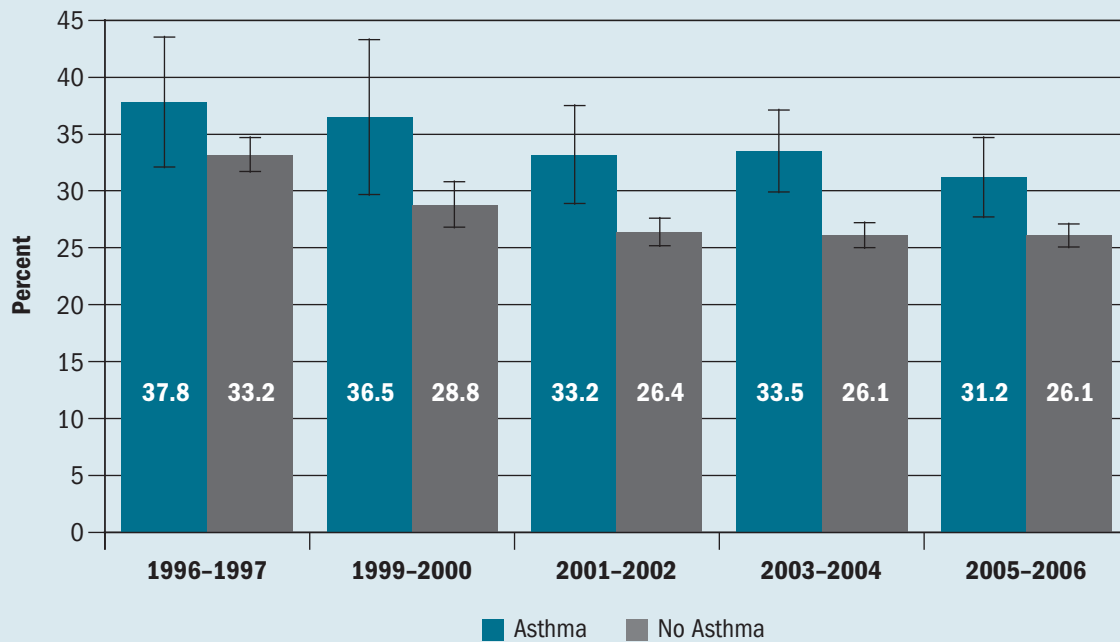
Year	Asthma		No Asthma	
	Weighted Percentage (%)	95% CI	Weighted Percentage (%)	95% CI
1996-1997	23.7	18.9-28.5	22.8	21.5-24.1
1999-2000	23.9	19.1-28.7	21.3	20.0-22.6
2001-2002	26.0	21.9-30.1	22.5	21.4-23.6
2003-2004	24.3	22.0-26.6	20.4	19.5-21.3
2005-2006	23.3	20.0-26.6	19.0	18.1-19.9

Overall, the prevalence of smoking was significantly higher for asthmatics compared to non-asthmatics for years 2003-2004 and 2005-2006.

In 2005-2006, 23.3% of adults with asthma reported that they were current cigarette smokers, compared to 19.0% of those without asthma (Figure 5-8).

**Figure 5-9**

**Percent\* of Adult New Yorkers Who Have Not Participated in Recent (Past Month) Leisure Time Physical Activity\*\* by Asthma Status and Combined Survey Years, New York State BRFSS, 1996–2006**



\*Percentages are presented with 95% Confidence Intervals.

\*\*A respondent who answered “no” when asked “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?”

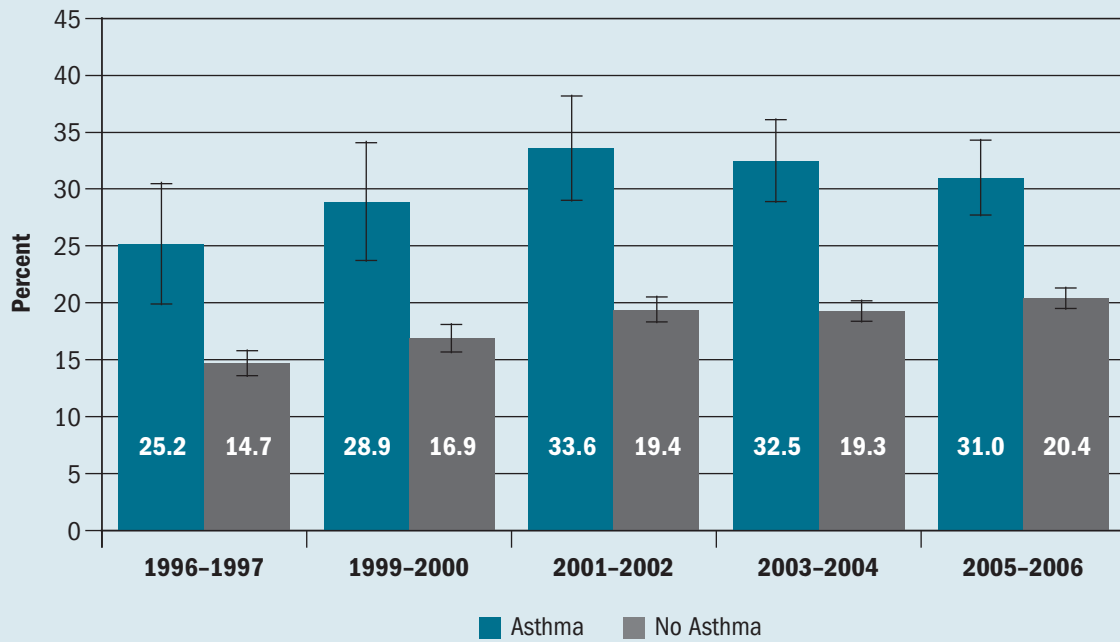
Year	Asthma		No Asthma	
	Weighted Percentage (%)	95% CI	Weighted Percentage (%)	95% CI
1996-1997	37.8	32.1-43.5	33.2	31.7-34.7
1999-2000	36.5	29.7-43.3	28.8	26.8-30.8
2001-2002	33.2	28.9-37.5	26.4	25.2-27.6
2003-2004	33.5	29.9-37.1	26.1	25.0-27.2
2005-2006	31.2	27.7-34.7	26.1	25.1-27.1

Overall, for 2001-2002, 2003-2004, and 2005-2006, persons with asthma were significantly more likely than those without asthma to report no leisure-time physical activity in the past month. In 2005-2006, 31.2% of adults with asthma reported no leisure time physical activity compared to 26.1% for those without asthma.

During 1996-2006, the percent of adults who reported no leisure time physical activity during the past month steadily decreased in both adults with and without asthma (Figure 5-9).

**Figure 5-10**

Percent\* of Adult New Yorkers Who Are Obese (BMI  $\geq 30.0$  kg/m<sup>2</sup>) by Asthma Status and Combined Survey Years, New York State BRFSS, 1996–2006



\*Percentages are presented with 95% Confidence Intervals.

Year	Asthma		No Asthma	
	Weighted Percentage (%)	95% CI	Weighted Percentage (%)	95% CI
1996-1997	25.2	19.9-30.5	14.7	13.6-15.8
1999-2000	28.9	23.7-34.1	16.9	15.7-18.1
2001-2002	33.6	29.0-38.2	19.4	18.3-20.5
2003-2004	32.5	28.9-36.1	19.3	18.4-20.2
2005-2006	31.0	27.7-34.3	20.4	19.5-21.3

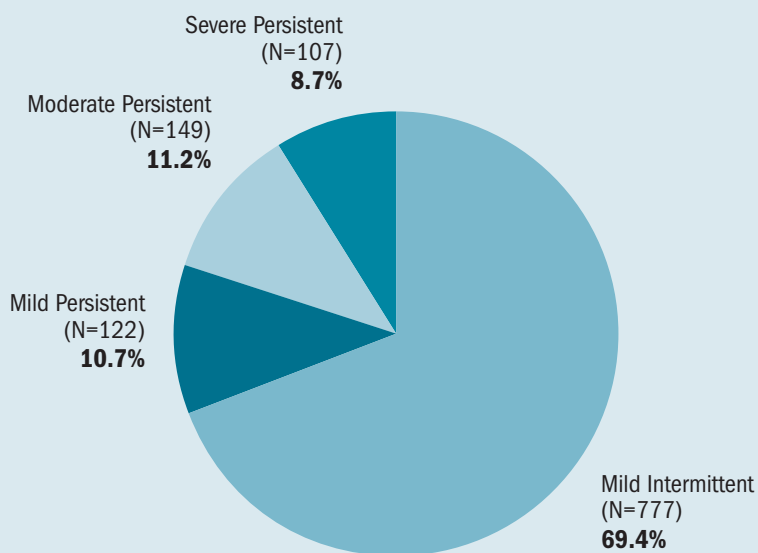
For all time periods, the percent of respondents who reported that they were obese was significantly greater among adults with asthma than adults without asthma.

In 2005-2006, 31.0% of adult New Yorkers with asthma were obese, compared to 20.4% of those without asthma.

During 1996-2006, the percent of respondents who were obese increased in adult New Yorkers with asthma

until 2003-2004 when obesity among asthmatics declined slightly. However, the percent of adults who were obese steadily increased in adult New Yorkers without asthma (Figure 5-10).

**Figure 5-11**  
**Asthma Severity Classification\* Among Adults, New York State BRFSS, 2004–2005**



Percentages are presented with 95% Confidence Intervals.

\*Asthma severity was classified according to NHLBI criteria, based on two questions asked of the respondent: “Symptoms of asthma include cough, wheezing, shortness of breath, chest tightness and phlegm production when you do not have a cold or respiratory infection. During the past 30 days, how often did you have any symptoms of asthma?” and “During the past 30 days, how many days did symptoms of asthma make it difficult for you to stay asleep?”

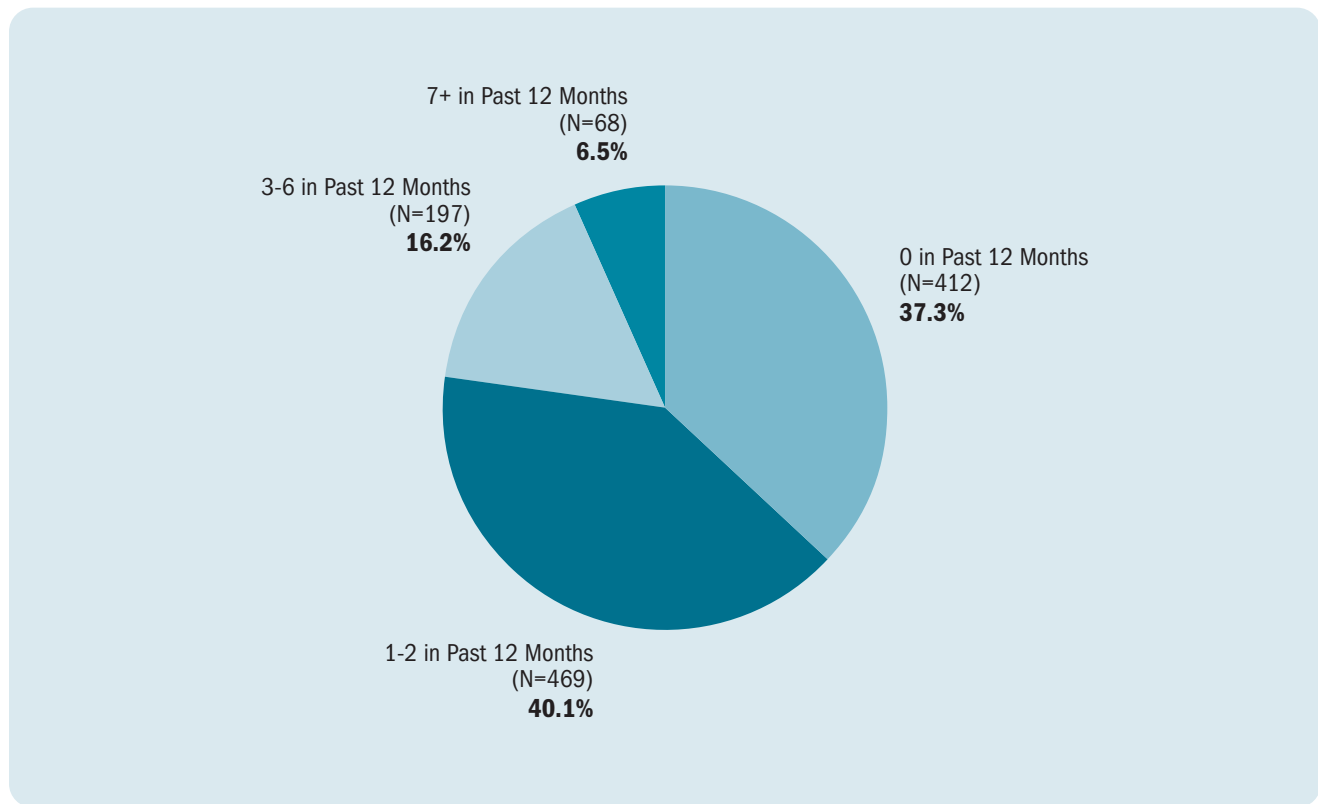
Severity	Weighted Percentage (%)	95% CI
Mild Intermittent	69.4	65.9–72.8
Mild Persistent	10.7	8.3–13.1
Moderate Persistent	11.2	8.9–13.4
Severe Persistent	8.7	6.8–10.8

During 2004-2005, among adults with current asthma, 69.4% experienced mild intermittent symptoms; 10.7% experienced mild persistent symptoms; 11.2% experienced

moderate persistent symptoms; and 8.7% experienced severe persistent symptoms (Figure 5-11).

**Figure 5-12**

**Asthma Routine Visits\* in the Past 12 Months Among Adults, New York State BRFS, 2004–2005**



Percentages are presented with 95% Confidence Intervals.

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

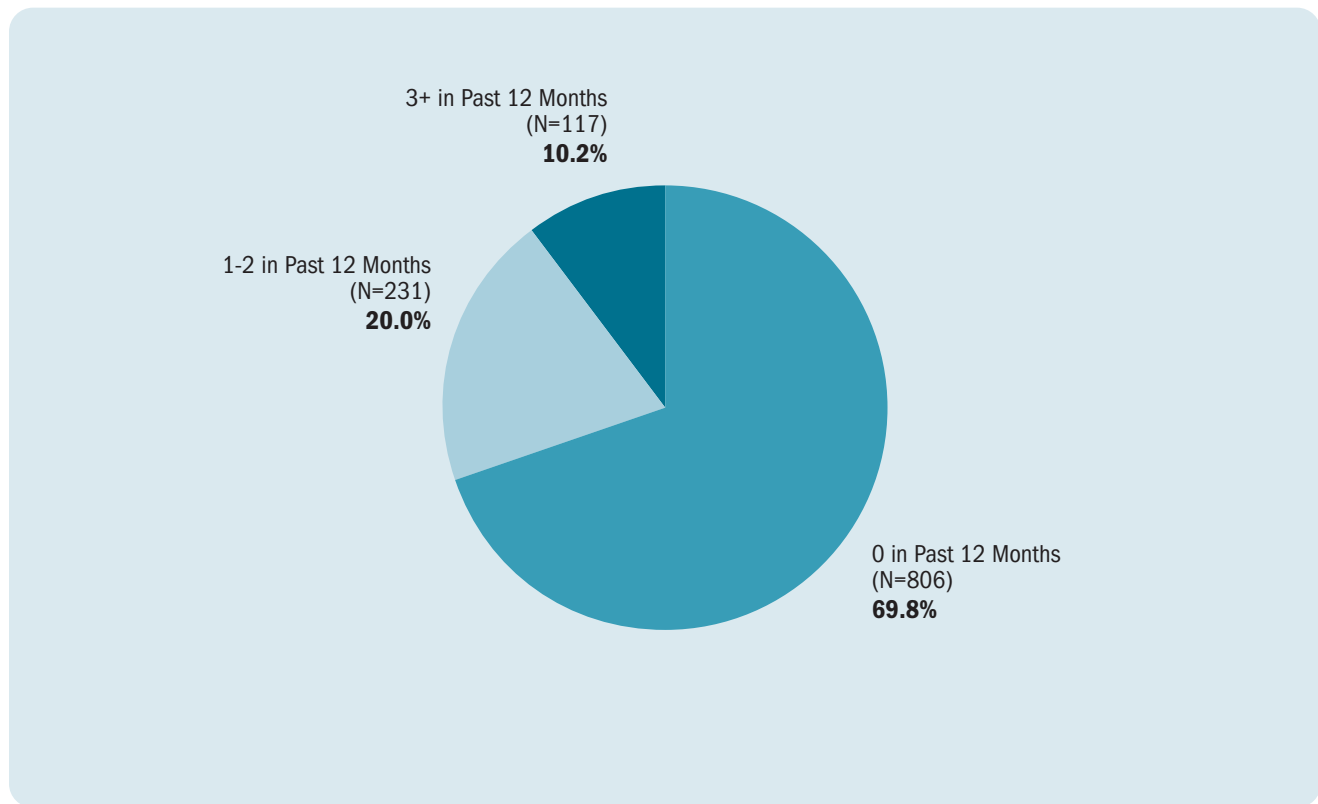
Asthma Routine Visits	Weighted Percentage (%)	95% CI
0 in Past 12 Months	37.3	33.6–41.0
1–2 in Past 12 Months	40.1	36.4–43.7
3–6 in Past 12 Months	16.2	13.6–18.7
7+ in Past 12 Months	6.5	4.2–8.7

During 2004-2005, among adults with current asthma, 37.3% had no asthma routine visits in the past 12 months; 40.1% had 1-2 asthma routine visits in the past 12 months;

16.2% had 3-6 asthma routine visits in the past 12 months; and 6.5% had seven or more asthma routine visits in the past 12 months (Figure 5-12).

**Figure 5-13**

**Asthma Urgent Visits\* in the Past 12 Months Among Adults, New York State BRFSS, 2004–2005**



Percentages are presented with 95% Confidence Intervals.

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

Asthma Urgent Visits	Weighted Percentage (%)	95% CI
0 in Past 12 Months	69.8	66.3–73.4
1–2 in Past 12 Months	20.0	17.0–23.1
3+ in Past 12 Months	10.2	7.7–12.6

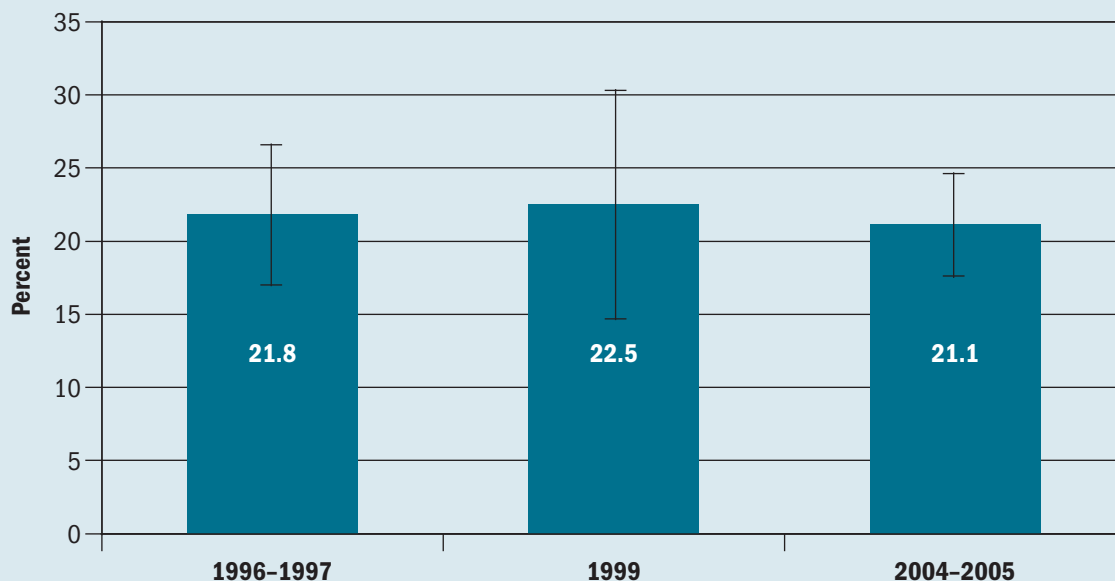
During the period 2004-2005, among adults with current asthma, 69.8% did not require an asthma urgent visit in the past 12 months; 20.0% had 1-2 asthma

urgent visits in the past 12 months; and 10.2% had three or more urgent visits in the past 12 months (Figure 5-13).



**Figure 5-14**

**Percent\* of Asthmatic Adults Who Had an Asthma Emergency Department or Urgent Care Visit\*\* in the Past 12 Months by Combined Survey Years, New York State BRFSS, 1996-1997, 1999, 2004-2005**



\*Percentages are presented with 95% Confidence Intervals.

\*\*The question asked of the respondent was: "During the past 12 months, how many times did you visit an emergency room or urgent care center because of your asthma?"

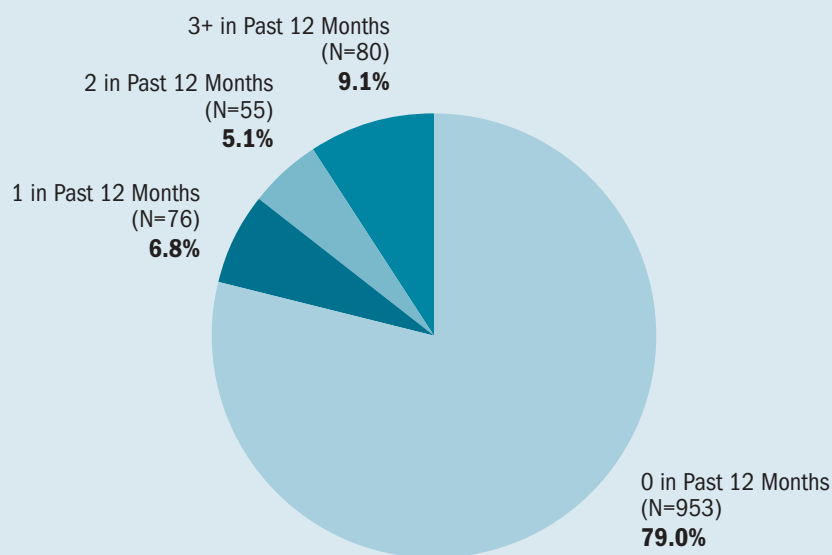
Year	Weighted Percentage (%)	95% CI
1996-1997	21.8	16.9-26.6
1999	22.5	14.7-30.3
2004-2005	21.1	17.6-24.5

In 2004-2005, among adults with current asthma, 21.1% had at least one visit to an ED or urgent care center due to asthma in the past 12 months. This estimate was

consistent with results for both 1996-1997 and 1999, at 21.8% and 22.5%, respectively (Figure 5-14).

**Figure 5-15**

**Asthma Emergency Department or Urgent Care Visits\* in the Past 12 Months Among Adults, New York State BRFSS, 2004–2005**



Percentages are presented with 95% Confidence Intervals.

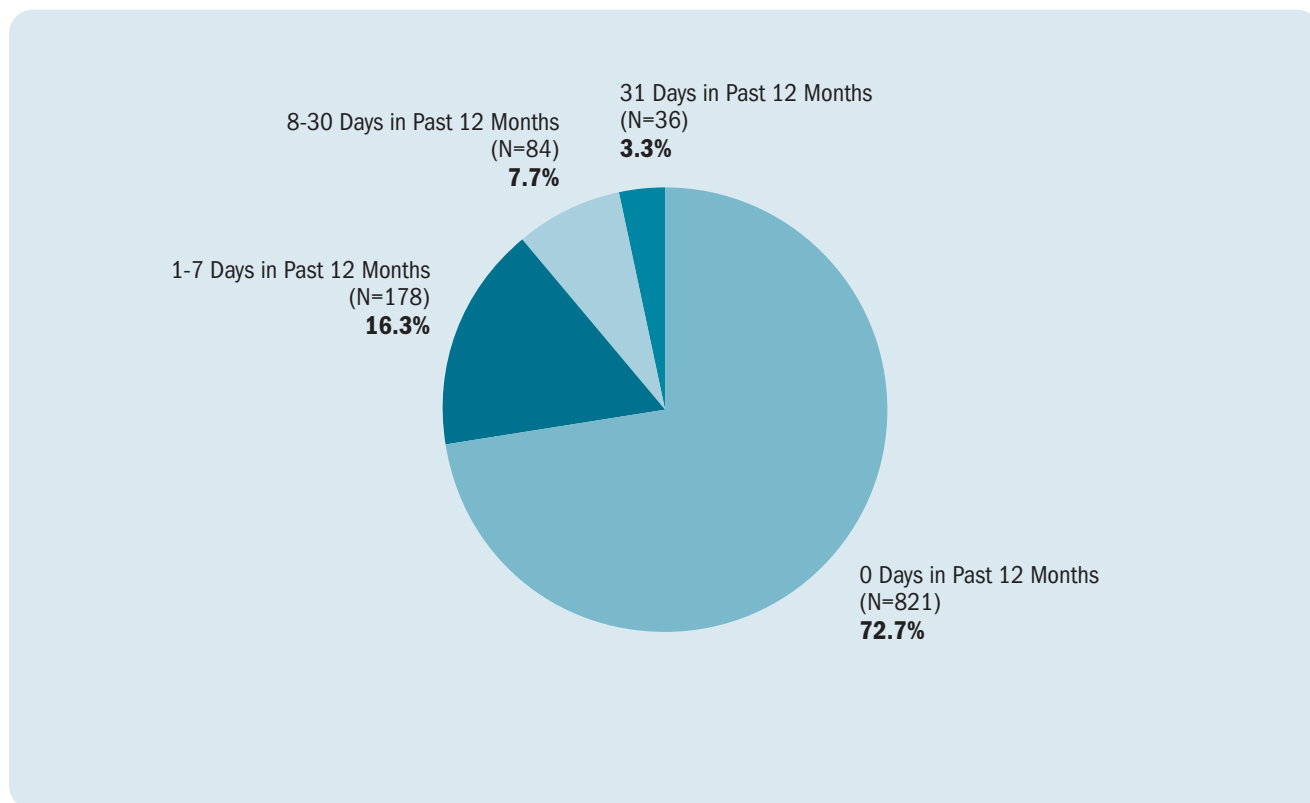
\*The question asked of the respondent was: “During the past 12 months, how many times did you visit an emergency room or urgent care center because of your asthma?”

Asthma ED/Urgent Visits	Weighted Percentage (%)	95% CI
0 in Past 12 Months	79.0	75.5–82.4
1 in Past 12 Months	6.8	5.1–8.6
2 in Past 12 Months	5.1	3.2–7.0
3+ in Past 12 Months	9.1	6.4–11.9

During 2004-2005, among adults with current asthma, 79.0% did not visit the ED or urgent care center in the past 12 months due to asthma; 6.8% had one asthma

ED visit in the past 12 months; 5.1% had two asthma ED visits in the past 12 months, and 9.1% had three or more asthma ED visits in the past 12 months (Figure 5-15).

**Figure 5-16**  
**Days Missed Work or Unable to Carry Out Usual Activities\* in the Past 12 Months**  
**Among Adults Due to Asthma, New York State BRFSS, 2004–2005**



Percentages are presented with 95% Confidence Intervals.

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

Days Missed Work or Unable to Carry Out Usual Activities	Weighted Percentage (%)	95% CI
0 Days in Past 12 Months	72.7	69.2–76.2
1–7 Days in Past 12 Months	16.3	13.4–19.2
8–30 Days in Past 12 Months	7.7	5.4–10.0
31+ Days in Past 12 Months	3.3	2.0–4.6

Among adults with current asthma, 16.3% missed 1-7 days of work or were unable to carry out their usual activities because of asthma in the past year; 7.7% missed 8-30 days; and 3.3% missed more than 30 days of work or were unable to carry out their usual activities because of asthma in the past year.

During 2004-2005, because of their asthma, adults missed work or were unable to carry out their normal activities for an estimated annual average of 9.5 million days (Figure 5-16).

**Methodology**

Current asthma prevalence in children is presented in the previously published National Asthma Survey – New York State (NAS-NYS) Summary Report and is available at the NYSDOH Asthma Surveillance website at: [http://www.health.state.ny.us/statistics/ny\\_asthma/pdf/national\\_asthma\\_survey\\_nys.pdf](http://www.health.state.ny.us/statistics/ny_asthma/pdf/national_asthma_survey_nys.pdf)

The NAS-NYS collected information from July 2002 through August 2003 from a representative sample of NYS children and adults. Overall, 31,090 individuals from 11,713 households were screened for asthma, which included a total of 7,714 children 0-17 years of age. Of these households, 1,970 detailed asthma interviews were completed, 647 were for children.

The NAS-NYS survey included two questions that were comparable to BRFSS for assessing both lifetime and current prevalence of asthma in children: “Have you ever been told by

a doctor or other health care professional that your child has asthma?” and [If Yes] “Does your child still have asthma?”

This report provides a brief summary of weighted estimates of current asthma prevalence for NYS children (0-17 years) by selected sociodemographic characteristics. The 95% confidence intervals (CIs) for these estimates are provided. Estimates are considered “significantly different” from each other when they do not have overlapping CIs.

The NAS-NYS Summary Report was produced in the Fall of 2006. In addition to current and lifetime asthma prevalence for children and adults, results from the detailed asthma interviews were included in the report for asthma symptoms, asthma attacks, health care utilization, missed school and work days due to asthma, quality of life, and knowledge of asthma management.

**Table 5-1**

Prevalence of Current Asthma Among Children\* (0–17 Years) by Sociodemographic Characteristics, National Asthma Survey–New York State, July 2002–August 2003

		Weighted Current Prevalence (%)	95% CI
Region	New York City	9.7	8.2–11.2
	Rest of State	7.4	6.4–8.4
	New York State	8.4	7.6–9.2
Gender	Male	9.8	8.6–11.0
	Female	6.8	5.8–7.8
Age Group (Years)	0–4	6.7	5.2–8.2
	5–9	9.4	8.0–10.8
	10–14	8.8	7.4–10.3
	15–17	8.3	6.4–10.2
Race	White	7.2	6.2–8.2
	Black	10.0	7.8–12.2
	Asian	4.3	1.5–7.2
	Other	8.8	5.2–12.4
Ethnicity	Hispanic	10.9	8.5–13.4
	Non-Hispanic	7.4	6.5–8.2
Household Educational Attainment	Less than High School	9.4	6.4–12.3
	High School	7.7	6.0–9.5
	Greater than High School	7.9	6.9–8.8

\*Parent/Guardian is self-reported proxy for children.

Overall, children who resided in New York City (9.7%) had higher current asthma prevalence than children who resided in the Rest of State (7.4%). Prevalence was higher for male children (9.8%) than female children (6.8%) and varied slightly by age. Children aged 0–4 had the lowest current asthma prevalence (6.7%), while children aged 5–9 had the highest current asthma prevalence (9.4%).

Asian children had the lowest prevalence (4.3%) while Black children had the highest rate (10.0%). Hispanic children (10.9%) had significantly higher current asthma prevalence than non-Hispanic children (7.4%). In general, current asthma prevalence for children decreased as the highest level of household educational attainment increased (Table 5-1).

### **Methodology**

The New York State Youth Tobacco Survey (NYS YTS) collects self-reported information about the prevalence of current cigarette smoking, behaviors and attitudes toward smoking, and several health related issues including asthma.

The NYS YTS is administered on a biennial basis to students in grades 6 through 12. For the 2006 survey, there were a total of 8,259 students from 72 schools across the state. Middle school surveys included students who reported they were in grades 6, 7 or 8 while high school surveys included students who reported they were in grades 9, 10, 11 or 12.

The 2006 NYS YTS included two questions for assessing lifetime and current prevalence of asthma: “Did a doctor ever tell you that you have asthma?” and “During the past 12 months, have you had an episode of asthma or an asthma attack?”

Possible responses to the second question were as follows: (a) “I do not have asthma” (b) “No, I have asthma but I have not had an episode of asthma or an asthma attack during the past 12 months” (c) “Yes, I have had an episode of asthma or an asthma attack during the past 12 months” (d) “Not sure.” This question allowed for the estimation

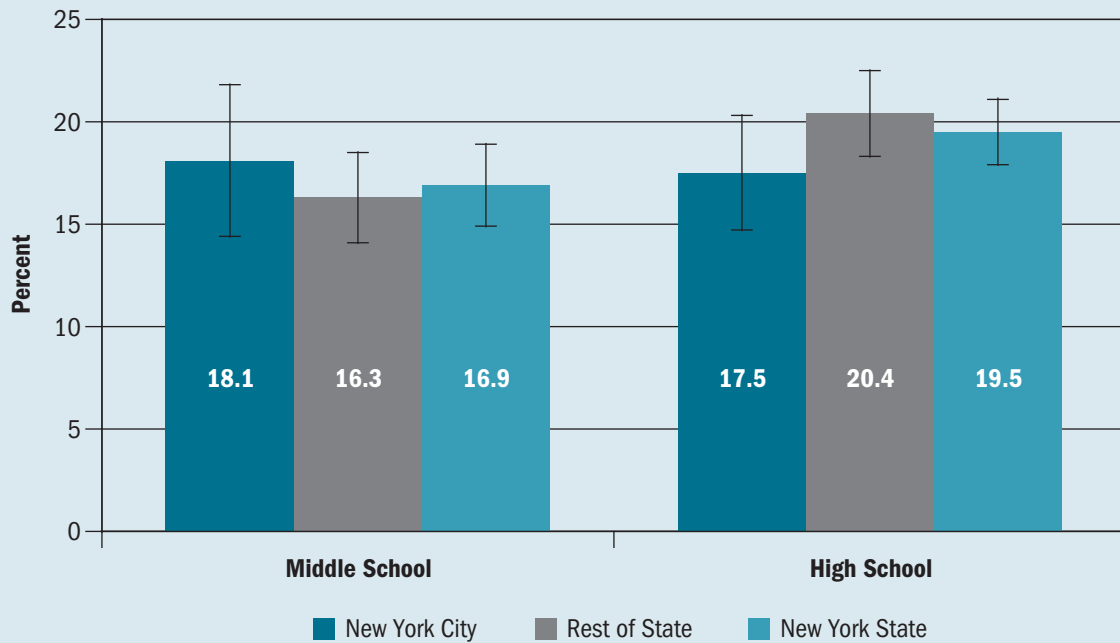
of current asthma prevalence (sum of responses b and c divided by the sum of a, b, and c) as well as the prevalence of having an asthma episode or attack among children with current asthma (response c divided by the sum of responses b and c). Unknown or missing values were not included in the sample size or analyses.

This report provides 2006 weighted estimates of current asthma prevalence separately for middle and high school students for the total population and by geographic region (New York City, Rest of State), gender, and race/ethnicity. In addition, weighted estimates for asthma episodes/attacks in the past year among students with current asthma were generated. The 95% confidence intervals (CIs) for these estimates are provided. Estimates are considered “significantly different” from each other when they do not have overlapping CIs.

Current asthma prevalence rates from the NYS YTS are much higher compared to the prevalence from NAS-NYS. However, the latter survey was collected by adult proxy via telephone interview while the NYS YTS (and YRBS) are collected via self-completed paper-based survey and use a different question to identify current asthma.

**Figure 5-17**

Prevalence\* of Current Asthma Among Middle and High School Students by Region, New York State YTS, 2006



\*Prevalence rates are presented with 95% Confidence Intervals.

	Region	Weighted Prevalence (%)	95% CI
Middle School	New York City	18.1	14.5–21.8
	Rest of State	16.3	14.0–18.5
	New York State	16.9	15.0–18.9
High School	New York City	17.5	14.6–20.3
	Rest of State	20.4	18.4–22.5
	New York State	19.5	17.8–21.1

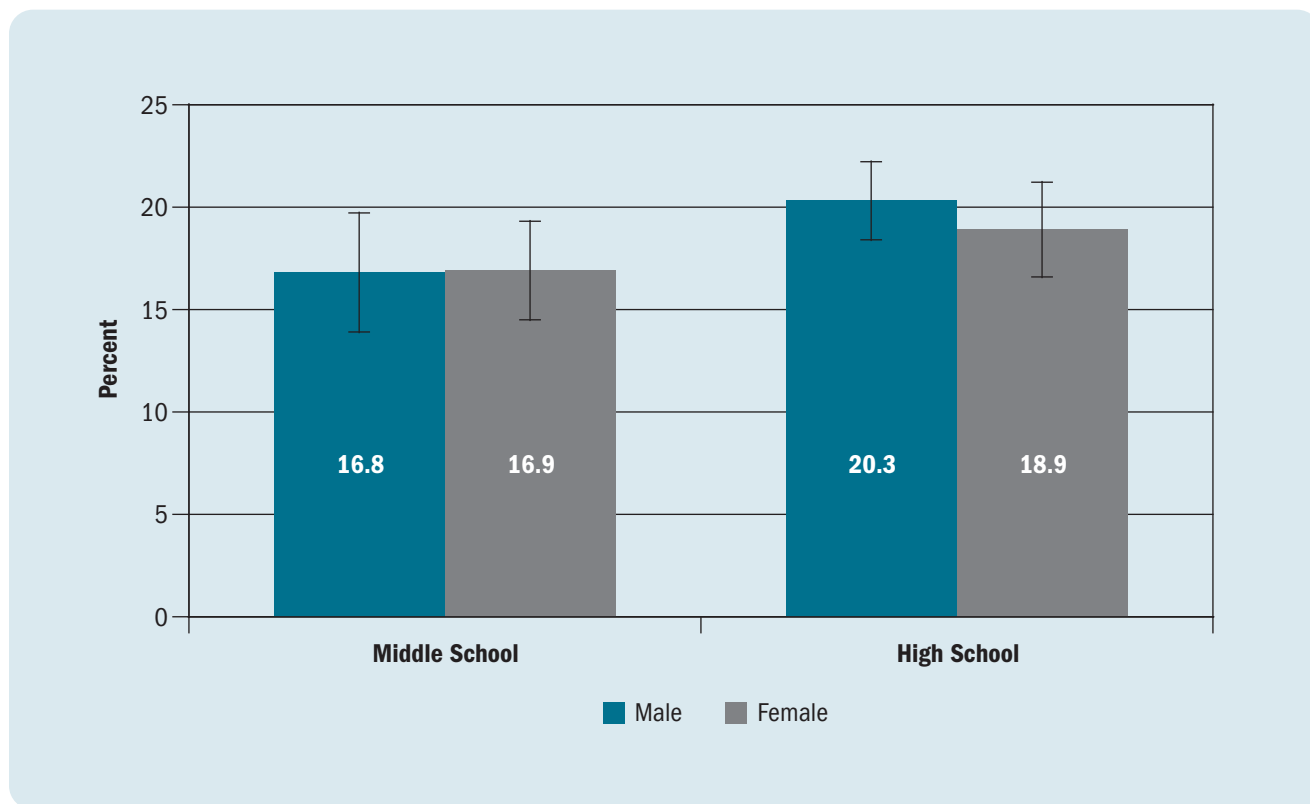
In 2006, the current asthma prevalence was 16.9% for NYS middle school students and 19.5% for high school students.

Current asthma prevalence was 18.1% for New York City middle school students compared to 16.3% for those in

the Rest of State. Among high school students, prevalence of current asthma for New York City students was 17.5% and 20.4% for those in the Rest of State (Figure 5-17).

**Figure 5-18**

Prevalence\* of Current Asthma Among Middle and High School Students by Gender, New York State YTS, 2006



\*Prevalence rates are presented with 95% Confidence Intervals.

	Gender	Weighted Prevalence (%)	95% CI
Middle School	Male	16.8	13.8-19.7
	Female	16.9	14.4-19.3
High School	Male	20.3	18.4-22.2
	Female	18.9	16.1-21.2

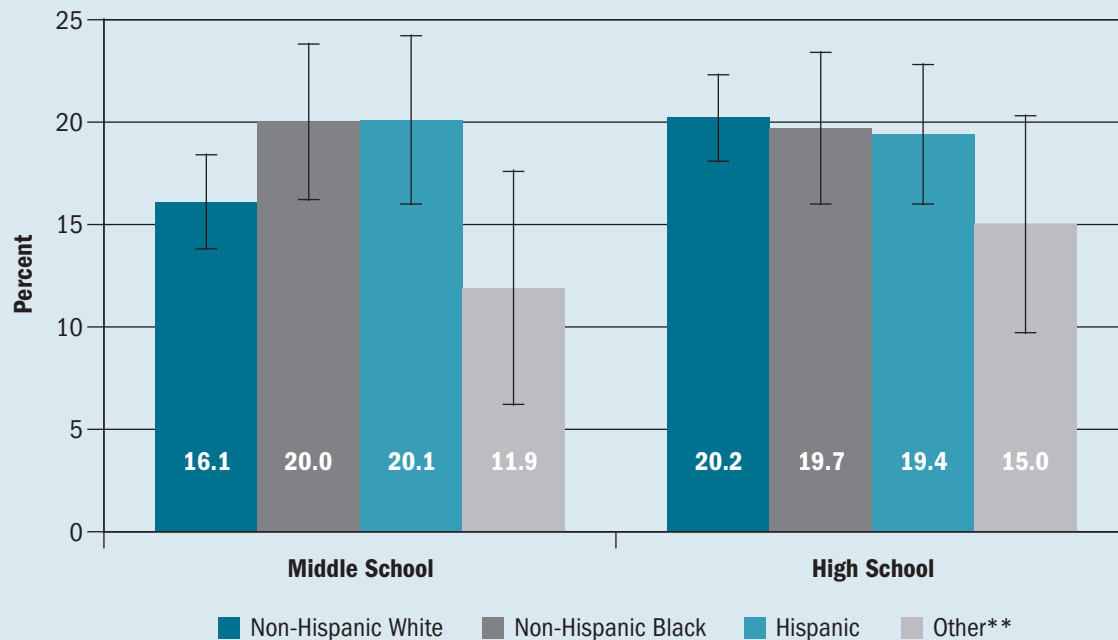
In 2006, NYS male and female NYS middle school students had essentially the same current asthma prevalence (16.8% and 16.9%, respectively). Similarly, the rate among

high school males was 20.3% compared to 18.9% among females, with no significant statistical difference (Figure 5-18).



**Figure 5-19**

Prevalence\* of Current Asthma Among Middle and High School Students by Race/Ethnicity, New York State YTS, 2006



\*Prevalence rates are presented with 95% Confidence Intervals.

\*\*Other race included American Indian/Alaskan Native, Asian, and Native Hawaiian/Pacific Islander.

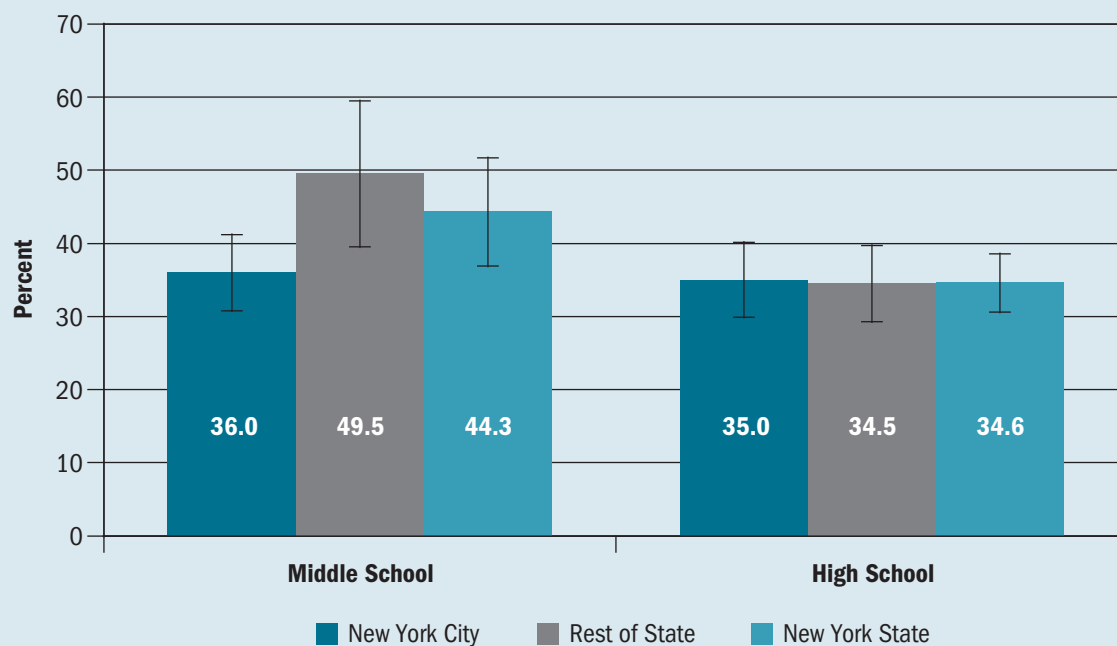
	Race/Ethnicity	Weighted Prevalence (%)	95% CI
Middle School	Non-Hispanic White	16.1	13.4–18.4
	Non-Hispanic Black	20.0	16.3–23.8
	Hispanic	20.1	16.0–24.2
	Other**	11.9	6.2–17.6
High School	Non-Hispanic White	20.2	18.1–22.3
	Non-Hispanic Black	19.7	16.0–23.4
	Hispanic	19.4	16.0–22.8
	Other**	15.0	9.7–20.3

There were no significant differences in prevalence rates of current asthma by race/ethnicity among NYS middle school or high school students. Prevalence for NYS middle school non-Hispanic White, non-Hispanic Black and Hispanic students were 16.1%, 20.0%, and 20.1%,

respectively. In NYS high school students, prevalence of current asthma among non-Hispanic Whites was 20.2%, among non-Hispanic Blacks was 19.7%, and among Hispanics was 19.4% (Figure 5-19).

**Figure 5-20**

Prevalence\* of Asthma Episodes/Attacks\*\* During the Past 12 Months Among Middle and High School Students with Current Asthma by Region, New York State YTS, 2006



\*Prevalence of having had an asthma episode/attack is presented with 95% Confidence Intervals.

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

	Region	Weighted Prevalence (%)	95% CI
Middle School	New York City	36.0	30.8–41.2
	Rest of State	49.5	39.4–59.5
	New York State	44.3	37.0–51.7
High School	New York City	35.0	29.9–40.1
	Rest of State	34.5	29.3–39.7
	New York State	34.6	30.7–38.6

Among NYS middle school students with current asthma, 44.3% reported having had an asthma episode/attack in the past 12 months.

Among NYS high school students with current asthma, 34.6% reported having an asthma episode/attack in the past 12 months.

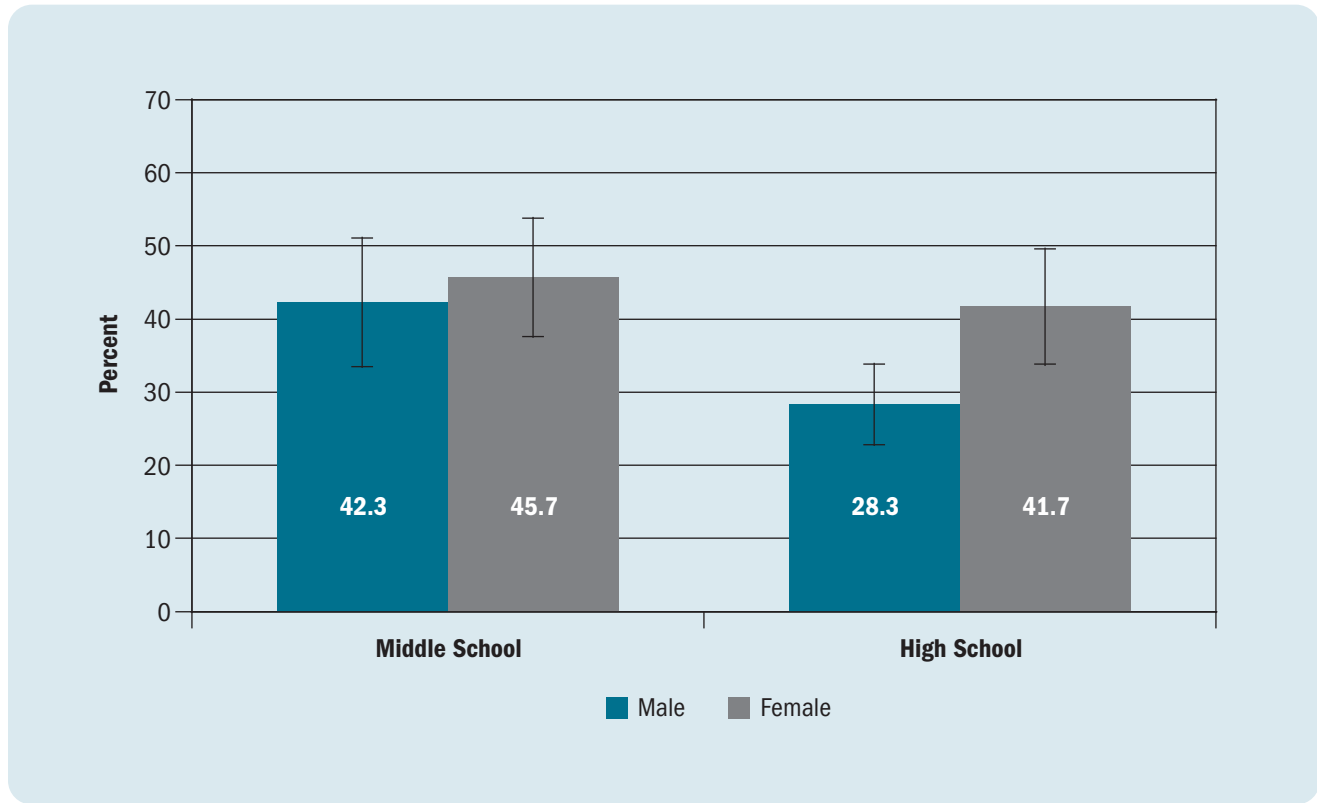
Thirty-six percent of New York City middle school students with current asthma reported having had an asthma

episode/attack during the past 12 months, and 49.5% of Rest of State middle schools students with current asthma reported having had an asthma episode/attack during the past 12 months.

The proportion of high school students with current asthma who reported having an asthma episode/attack was similar among New York City and Rest of State students (35.0% and 34.5%, respectively) (Figure 5-20).

**Figure 5-21**

**Prevalence\* of Asthma Episodes/Attacks\*\* During the Past 12 Months Among Middle and High School Students with Current Asthma by Gender, New York State YTS, 2006**



\*Prevalence of having had an asthma episode/attack is presented with 95% Confidence Intervals.

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

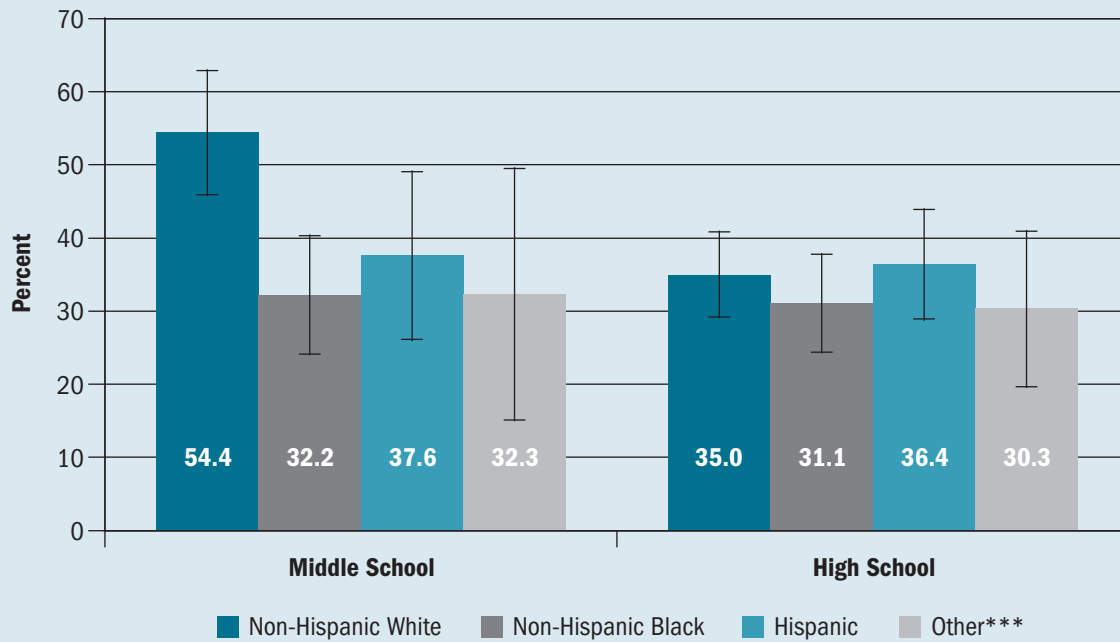
	Gender	Weighted Prevalence (%)	95% CI
Middle School	Male	42.3	33.5-51.1
	Female	45.7	37.6-53.8
High School	Male	28.3	22.9-33.8
	Female	41.7	33.8-49.6

There was no significant gender difference in the prevalence of asthma attacks among middle school students with current asthma. Among female NYS middle school students with current asthma, 45.7% reported having had an asthma episode/attack compared to 42.3% among male middle school students.

In contrast, more female NYS high school students with current asthma (41.7%) reported having an asthma attack in the past 12 months compared to 28.3% of males (Figure 5-21).

**Figure 5-22**

**Prevalence\* of Asthma Episodes/Attacks\*\* During the Past 12 Months Among Middle and High School Students with Current Asthma by Race/Ethnicity, New York State YTS, 2006**



\*Prevalence of having had an asthma episode/attack is presented with 95% Confidence Intervals.

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

\*\*\*Other race included American Indian/Alaskan Native, Asian, and Native Hawaiian/Pacific Islander.

	Race/Ethnicity	Weighted Prevalence (%)	95% CI
Middle School	Non-Hispanic White	54.4	45.9–62.9
	Non-Hispanic Black	32.2	24.2–40.3
	Hispanic	37.6	26.1–49.1
	Other***	32.3	15.1–49.5
High School	Non-Hispanic White	35.0	29.2–40.8
	Non-Hispanic Black	31.1	24.4–37.8
	Hispanic	36.4	28.9–43.9
	Other***	30.3	19.7–40.9

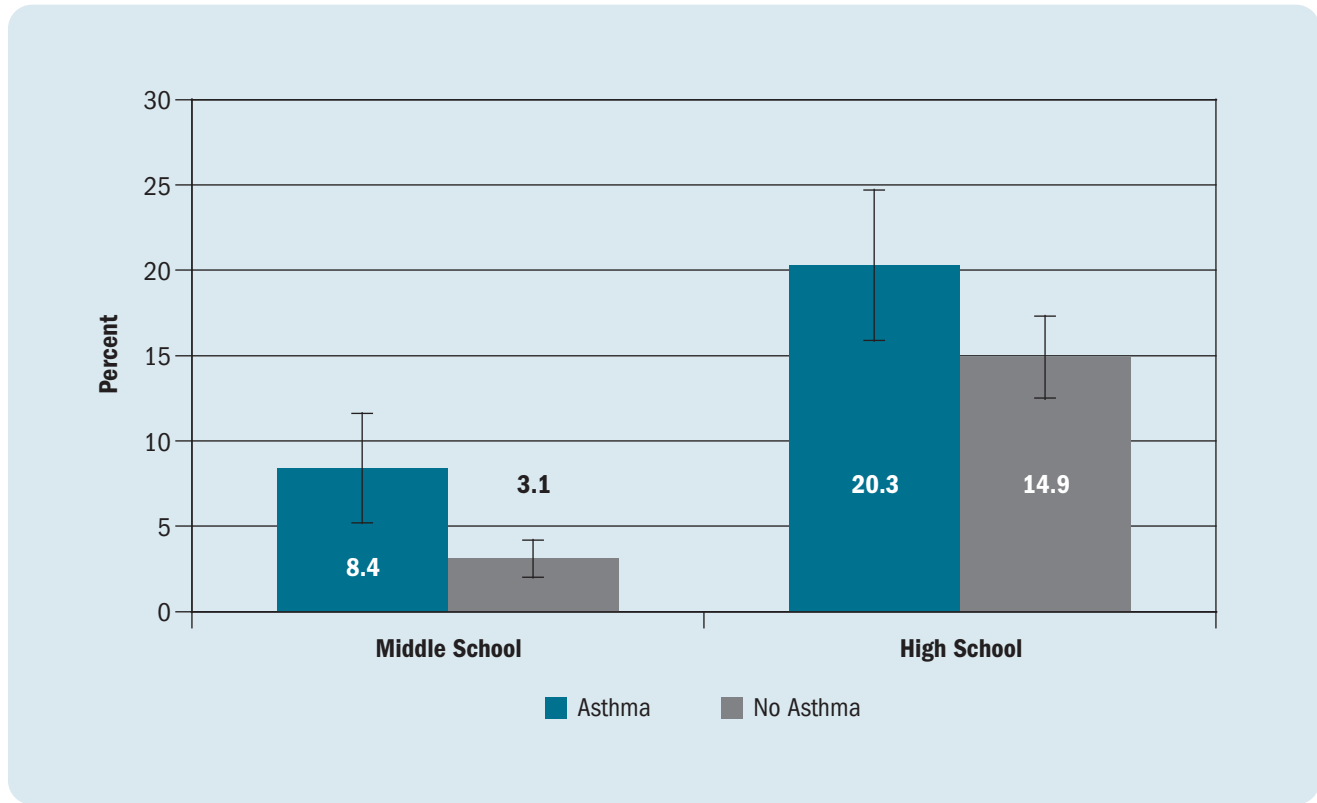
In NYS, non-Hispanic White middle school students with current asthma reported a significantly higher prevalence of having had an asthma episode/attack in the past 12 months (54.4%) compared to Hispanic (37.6%) and non-Hispanic Black middle school students (32.2%).

There were no significant differences in the prevalence of asthma episodes/attacks among NYS high school students

with asthma by race/ethnicity. Hispanic and non-Hispanic White high school students with current asthma reported similar prevalence of having had an asthma episode/attack in the past 12 months (36.4% and 35.0%, respectively). These prevalence rates were not significantly different than those reported by non-Hispanic Black high school students (31.1%) with current asthma (Figure 5-22).

**Figure 5-23**

Percent\* of Middle and High School Students Who Smoked\*\* During the Past 30 Days by Asthma Status, New York State YTS, 2006



\*Percentages are presented with 95% Confidence Intervals.

\*\*A respondent who answered 1 through 30 when asked: “During the past 30 days, on how many days did you smoke cigarettes?”

	Asthma		No Asthma	
	Weighted Percentage (%)	95% CI	Weighted Percentage (%)	95% CI
Middle School	8.4	5.2-11.6	3.1	2.0-4.2
High School	20.3	15.9-24.7	14.9	12.5-17.3

Overall, the prevalence of adolescent smoking was higher for asthmatics compared to non-asthmatics. In 2006, 8.4% of NYS middle school students with asthma reported that they smoked cigarettes during the past 30 days, compared to 3.1% of those without asthma. This difference was statistically significant.

The percent of NYS high school students who reported that they smoked cigarettes during the past 30 days was greater among asthmatics (20.3%) than non-asthmatics (14.9%). However, this difference was not statistically significant (Figure 5-23).

### Methodology

The Youth Risk Behavior Survey (YRBS) is a survey of public high school (grades 9-12) students developed by the Centers for Disease Control and Prevention (CDC) and administered every other year in NYS by the State Department of Education. The self-completed survey includes questions about many health-related behaviors. Questions about asthma were added to the YRBS in 2005.

The 2005 YRBS included two asthma related questions that were similar to the NYS YTS for assessing both lifetime and current prevalence of asthma: "Has a doctor or nurse ever told you that you have asthma?" and "During the past 12 months, have you had an episode of asthma or an asthma attack?"

Possible responses to the second question were as follows: (a) "I do not have asthma." (b) "No, I have asthma but I have not had an episode of asthma or an asthma attack during the past 12 months." (c) "Yes, I have had an episode of asthma or an asthma attack during the past 12 months." (d) "Not sure." This question allowed the estimation of current asthma prevalence (sum of responses

b and c divided by the sum of a, b, and c), as well as the prevalence of having an asthma episode or attack among children with current asthma (response c divided by the sum of responses b and c). Unknown or missing values were not included in the sample size or analyses.

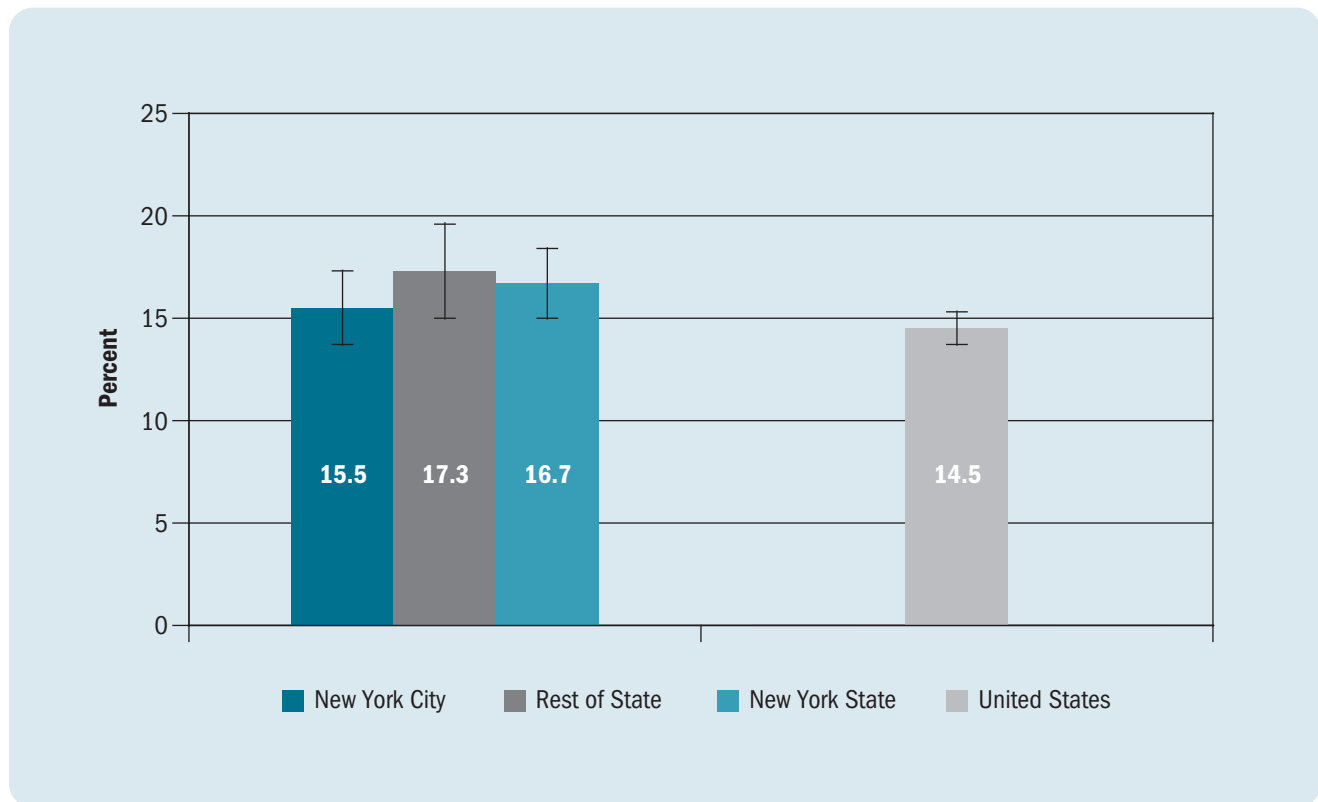
The survey results presented in this report were obtained directly from the published biennial report in CDC's *Morbidity and Mortality Weekly Report (MMWR) Surveillance Summaries, Youth Risk Behavior Surveillance - United States, 2005*.<sup>11</sup>

This report includes weighted estimates for current asthma prevalence for NYS and the U.S., as well as weighted estimates for asthma episodes/attacks in the past year among students with current asthma. These estimates are presented by total population and gender. The 95% confidence intervals (CIs) for these estimates are provided. Estimates are considered "significantly different" from each other when they do not have overlapping CIs.

There were 9,708 NYS high school students who participated in the 2005 YRBS. The YRBS data were obtained from youth who attend public high school only and, therefore, are not representative of all persons in this age group.

**Figure 5-24**

Prevalence\* of Current Asthma Among High School Students by Region for New York State and the United States, YRBS, 2005



\*Prevalence rates are presented with 95% Confidence Intervals.

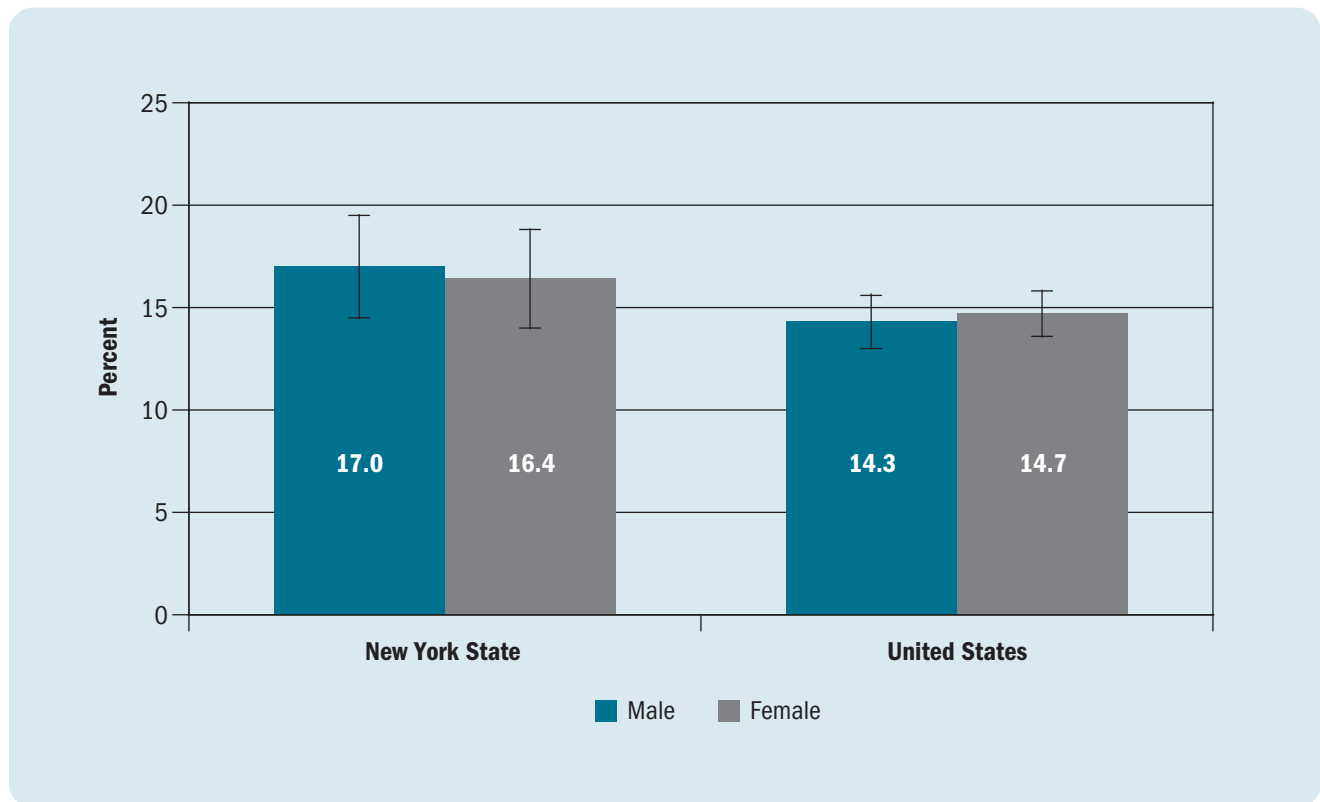
Region	Weighted Percentage (%)	95% CI
New York City	15.5	13.7-17.3
Rest of State	17.3	15.0-19.6
New York State	16.7	15.0-18.4
United States	14.5	13.7-15.3

The 2005 current asthma prevalence for NYS high school students was 16.7%, which was higher than the national prevalence of 14.5%.

The prevalence was 17.3% for students in the Rest of State compared to 15.5% for New York City students (Figure 5-24).

**Figure 5-25**

Prevalence\* of Current Asthma Among High School Students by Gender for New York State and the United States, YRBS, 2005



\*Prevalence rates are presented with 95% Confidence Intervals.

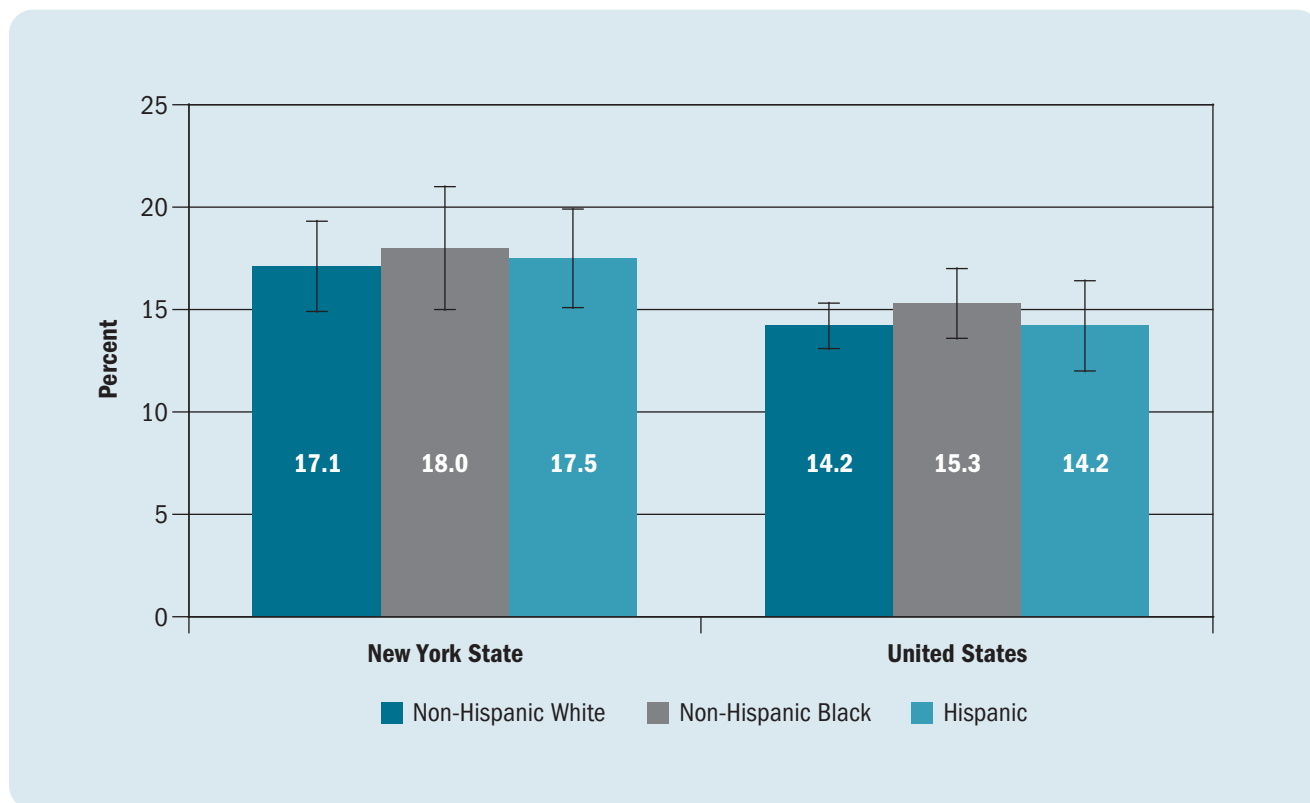
	Gender	Weighted Prevalence (%)	95% CI
New York State	Male	17.0	14.5–19.5
	Female	16.4	14.0–18.8
United States	Male	14.3	13.0–15.6
	Female	14.7	13.6–15.8

In NYS, males had slightly higher current asthma prevalence (17.0%) compared to female high school students

(16.4%). Both were higher than the national gender-specific asthma prevalence rates (Figure 5-25).



**Figure 5-26**  
**Prevalence\* of Current Asthma Among High School Students by Race/Ethnicity**  
**for New York State and the United States, YRBS, 2005**



\*Prevalence rates are presented with 95% Confidence Intervals.

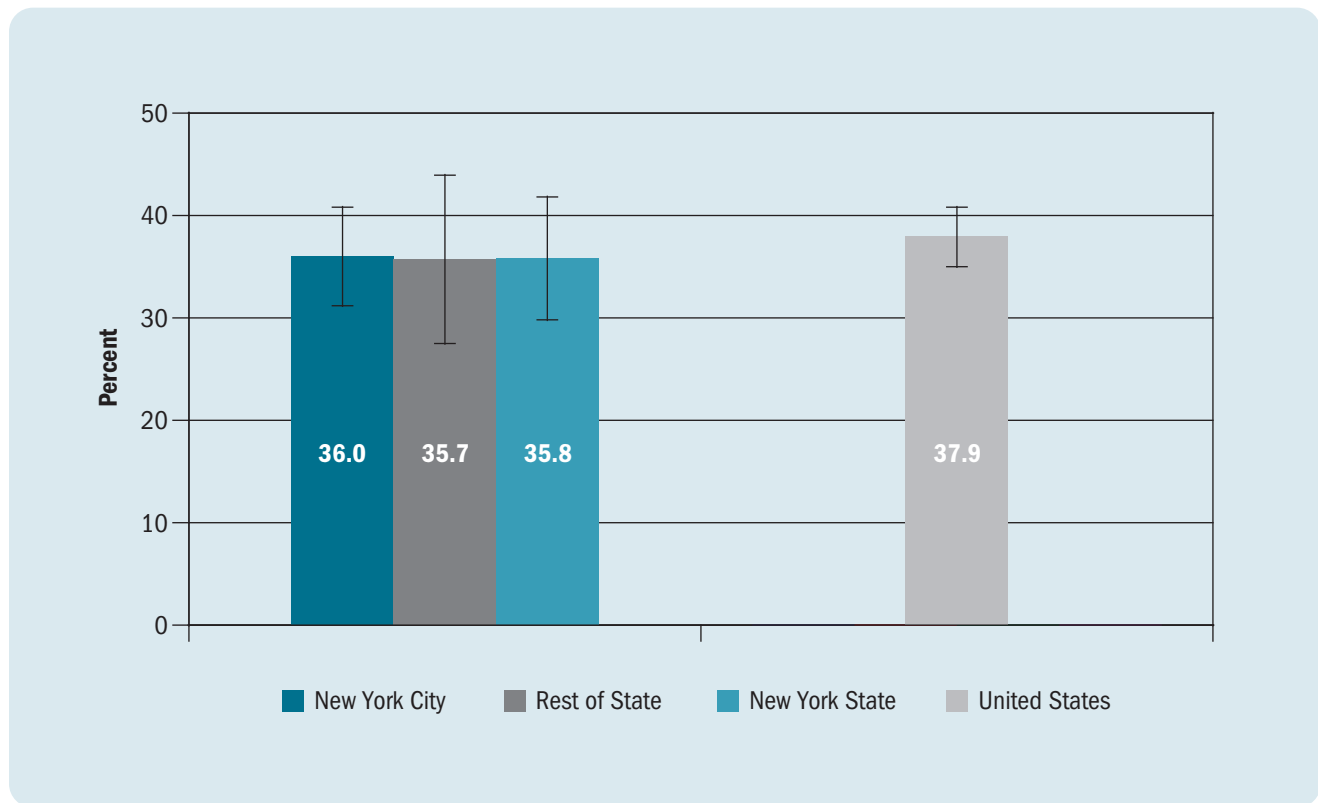
	Race/Ethnicity	Weighted Prevalence (%)	95% CI
New York State	Non-Hispanic White	17.1	14.9–19.4
	Non-Hispanic Black	18.0	15.0–21.0
	Hispanic	17.5	15.1–19.9
United States	Non-Hispanic White	14.2	13.1–15.3
	Non-Hispanic Black	15.3	13.6–17.0
	Hispanic	14.2	12.0–16.4

Overall, current asthma prevalence varied slightly by race/ethnicity among NYS high school students. In 2005, non-Hispanic Black students had the highest current asthma prevalence (18.0%), followed by Hispanic (17.5%)

and non-Hispanic White high school students (17.1%). New York’s race/ethnicity-specific current asthma prevalence rates were all higher than the corresponding national prevalence rates (Figure 5-26).

**Figure 5-27**

**Percent of High School Students with Current Asthma Who Experienced an Asthma Episode or Attack\* During the 12 Months Preceding the Survey by Region for New York State and the United States, YRBS, 2005**



\*Prevalence rates are presented with 95% Confidence Intervals.

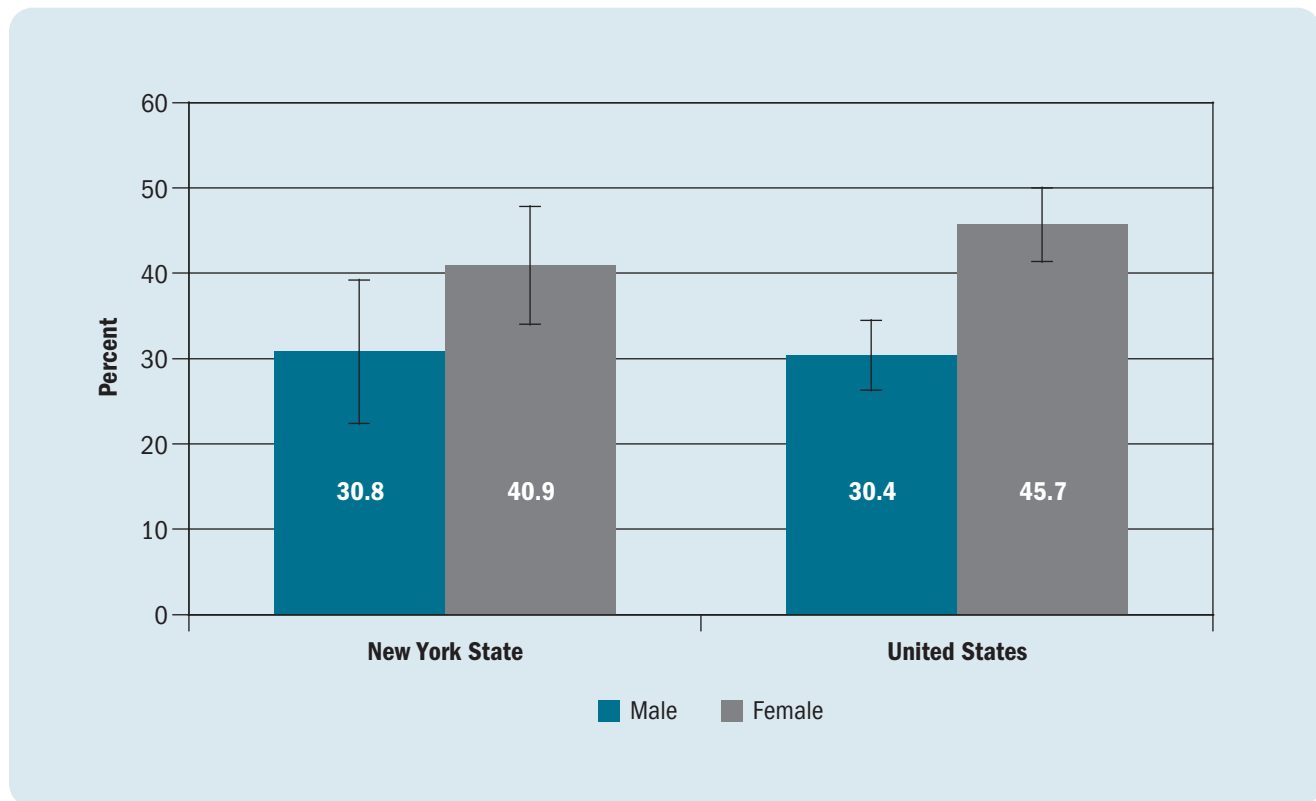
Region	Weighted Percentage (%)	95% CI
New York City	36.0	31.3-40.8
Rest of State	35.7	27.4-43.9
New York State	35.8	29.8-41.8
United States	37.9	35.0-40.8

The proportion of high school students with current asthma who reported having an episode/attack during the past 12 months was lower for NYS (35.8%) than the U.S. (37.9%).

New York City and Rest of State students with current asthma reported similarly on having an asthma episode/attack during the past 12 months (36.0% and 35.7%, respectively) (Figure 5-27).

**Figure 5-28**

Percent of High School Students with Current Asthma Who Reported Having an Asthma Episode or Attack\* During the 12 Months Preceding the Survey by Gender for New York State and the United States, YRBS, 2005



\*Prevalence rates are presented with 95% Confidence Intervals.

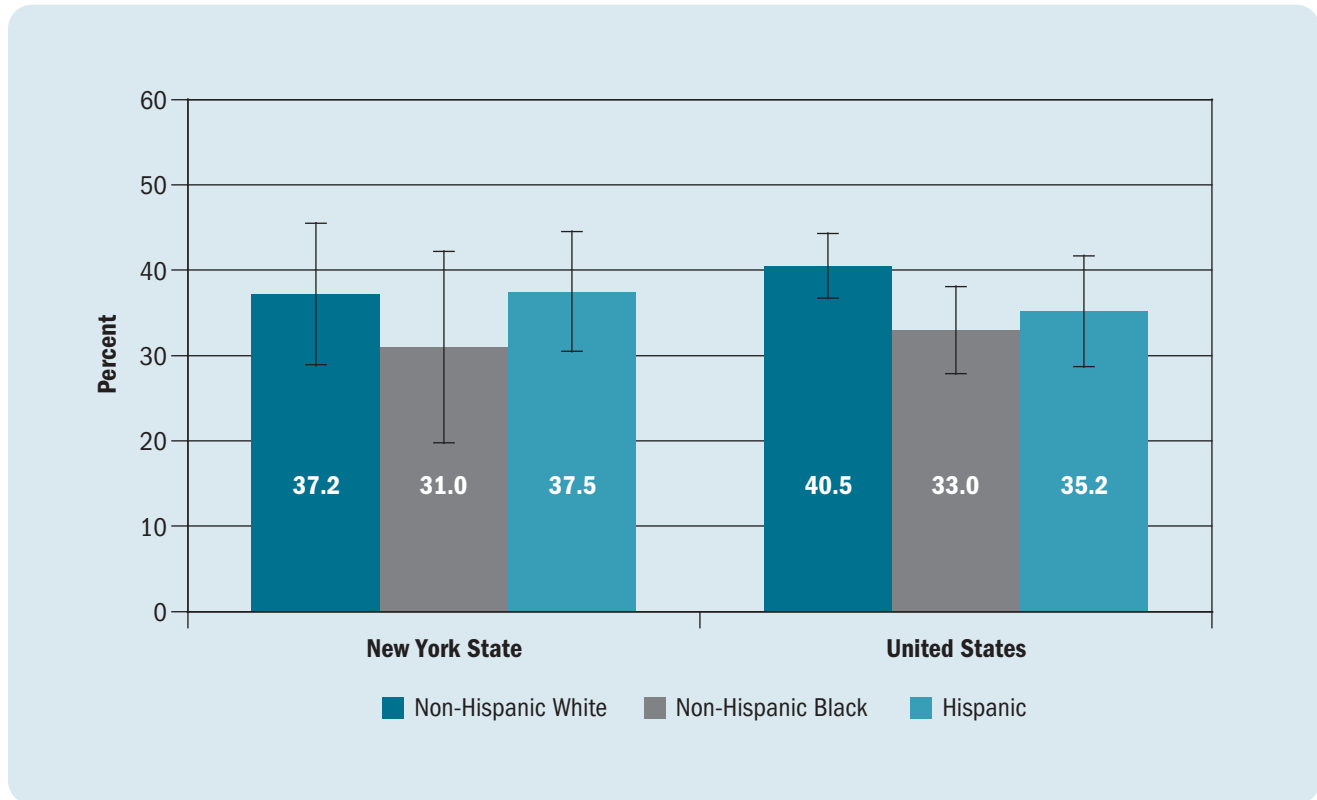
	Gender	Weighted Prevalence (%)	95% CI
New York State	Male	30.8	22.4–39.2
	Female	40.9	34.0–47.8
United States	Male	30.4	26.3–34.5
	Female	45.7	41.4–50.0

In NYS and nationwide, a higher percentage of female high school students with current asthma reported having an asthma episode/attack (40.9% and 45.7%,

respectively) compared to their male counterparts (30.8% and 30.4%, respectively) (Figure 5-28).

**Figure 5-29**

**Percent of High School Students with Current Asthma Who Reported Having an Asthma Episode or Attack\* During the 12 Months Preceding the Survey by Race/Ethnicity for New York State and the United States, YRBS, 2005**



\*Prevalence rates are presented with 95% Confidence Intervals.

	Race/Ethnicity	Weighted Prevalence (%)	95% CI
New York State	Non-Hispanic White	37.2	28.9-45.5
	Non-Hispanic Black	31.0	19.8-42.2
	Hispanic	37.5	30.4-44.5
United States	Non-Hispanic White	40.5	36.7-44.3
	Non-Hispanic Black	33.0	27.9-38.1
	Hispanic	35.2	12.0-41.7

The proportion of NYS high school students with current asthma who reported having an asthma episode/attack in the past 12 months was higher among Hispanics (37.5%) and non-Hispanic Whites (37.2%) than among non-Hispanic Blacks (31.0%).

In the U.S., Non-Hispanic White high school students with current asthma reported a higher prevalence of having had an asthma episode/attack in the past 12 months (40.5%) compared to Hispanic (35.2%) and non-Hispanic Black (33.0%) high school students (Figure 5-29).

# Asthma Emergency Department Outpatient Visits

## Highlights: Asthma Emergency Department Outpatient Visits

- There were 140,539 emergency department visits due to asthma (that did not result in a hospitalization) among New York State residents in 2005, an average of 385 visits per day.
- Children aged 0-4 years had the highest emergency department visit rate compared to all other ages. The asthma emergency department visit rate decreased in older age groups.
- Female New Yorkers had higher crude and age-adjusted asthma emergency department visit rates (74.7/10,000; 77.9/10,000) compared to males (71.2/10,000; 71.7/10,000).
- Males accounted for a higher percentage of asthma emergency department visits compared to females in the 0-4 year (64% versus 36%) and 5-14 year (61% versus 39%) age groups. However, males had lower percentages for all remaining age groups.
- Black New Yorkers had crude and age-adjusted asthma emergency department visit rates (161.4/10,000; 155.7/10,000) that were more than five times higher than White New Yorkers (30.1/10,000; 31.5/10,000).
- New York City residents had crude and age-adjusted asthma emergency department visit rates (112.7/10,000; 114.5/10,000) that were approximately 2.5 times higher than residents of the Rest of State (43.9/10,000; 45.9/10,000).
- Other Third Party/Private insurance payers were the source of payment for 57% of all 2005 New York State asthma-related emergency department visits; Medicaid was the payment source for 22% of the emergency department visits; while Medicare was the source for only 5% of the visits.
- Asthma emergency department visit rates varied across geographic areas in New York State. New York City residents of the Bronx had the highest emergency department visit rate of 212.8/10,000, while Cortland County residents had a rate of only 1.9/10,000.
- During 2005, asthma emergency department visits showed a seasonal pattern with peaks in the fall and spring and a decline in the summer.

**Methodology**

Asthma emergency department (ED) visit information has been generated from the Statewide Planning and Research Cooperative System (SPARCS) database. Since 2005, SPARCS has collected record level detail on patient characteristics, diagnoses, treatments, services, residence location, and charges for every ED visit in New York State (NYS) that did not require a hospitalization. An asthma ED visit was defined as having a principal diagnosis with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code of 493. Population estimates used for computing the asthma ED visit rates were obtained from the United States (U.S.) Census Bureau.

Crude and age-adjusted asthma ED visit rates were calculated per 10,000 residents. The age-adjusted rates were calculated using the 2000 U.S. Standard Population (see Appendix 2).

This report provides NYS asthma ED data for 2005. Asthma ED visit rates were calculated by dividing the number of asthma ED visits for 2005 by the population of this year and then multiplying by 10,000.

Asthma ED visit data for 2005 are presented as tables, maps and graphs at the state and geographic region level.

## Trends in Asthma Emergency Department Visits

**Figure 6-1**  
Asthma Emergency Department Visits by Month, New York State, 2005

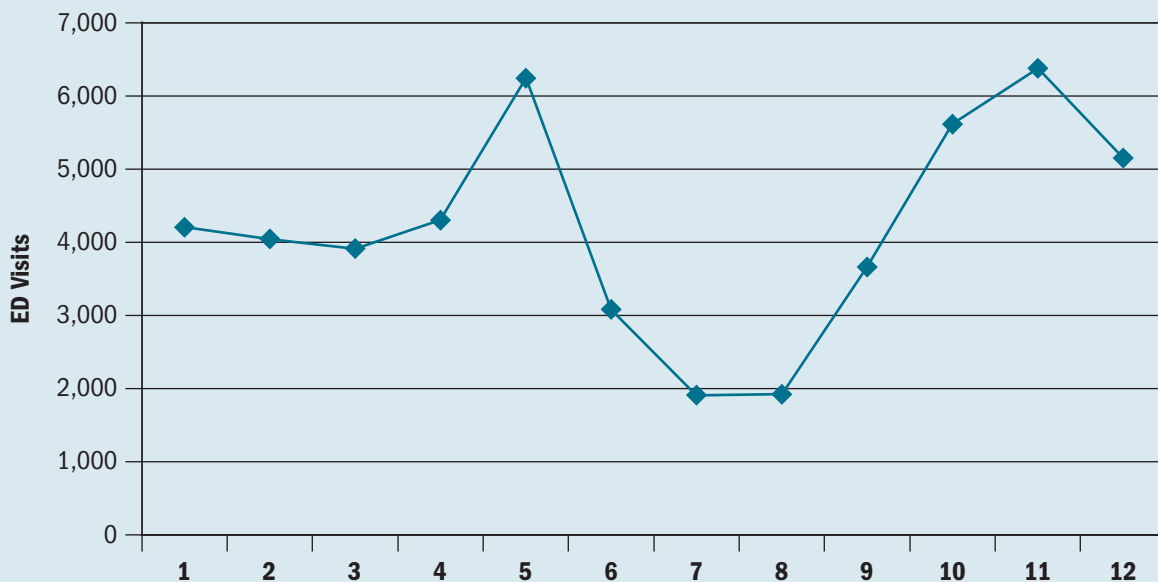


Month	1	2	3	4	5	6	7	8	9	10	11	12
Asthma ED Visits	13,108	10,962	11,203	11,468	16,466	10,138	7,554	7,687	10,397	14,207	14,555	12,794

There were 140,539 ED visits due to asthma (that did not result in a hospitalization) for NYS residents in 2005.

During 2005, asthma ED visits showed a seasonal pattern with peaks in the spring and fall and a decline in the summer (Figure 6-1).

**Figure 6-2**  
**Asthma Emergency Department Visits by Month, New York State, Ages 0-14 Years, 2005**



Month	1	2	3	4	5	6	7	8	9	10	11	12
Asthma ED Visits	4,203	4,044	3,913	4,300	6,241	3,081	1,909	1,920	3,660	5,613	6,377	5,150

When reviewed by month of visit, asthma ED visits for those aged 0-14 years showed a similar seasonal pattern

with peaks in the spring and fall and a decline in the summer (Figure 6-2).



## Asthma Emergency Department Visits by Sociodemographic Characteristics

**Table 6-1**

Crude and Age-Adjusted\* Emergency Department Visit Rate per 10,000 Residents by Gender, Race, Ethnicity and Region, New York State, 2005

		Crude	Age-Adjusted
Gender	Male	71.2	71.7
	Female	74.7	77.9
Race	White	30.1	31.5
	Black	161.4	155.7
	Other	283.4	288.7
Ethnicity	Hispanic	92.6	88.1
	Non-Hispanic	55.3	58.3
Region	New York City	112.7	114.5
	Rest of State	43.9	45.9
	New York State	73.0	75.1

\*The 2000 United States Standard Population was used to calculate age-adjusted asthma ED visit rates.

In 2005, female New Yorkers had higher crude and age-adjusted ED visit rates (74.7/10,000; 77.9/10,000) compared to males (71.2/10,000; 71.7/10,000).

Black New Yorkers had crude and age-adjusted asthma ED visit rates (161.4/10,000; 155.7/10,000) that were more than five times higher than ED visit rates for White New Yorkers (30.1/10,000; 31.5/10,000).

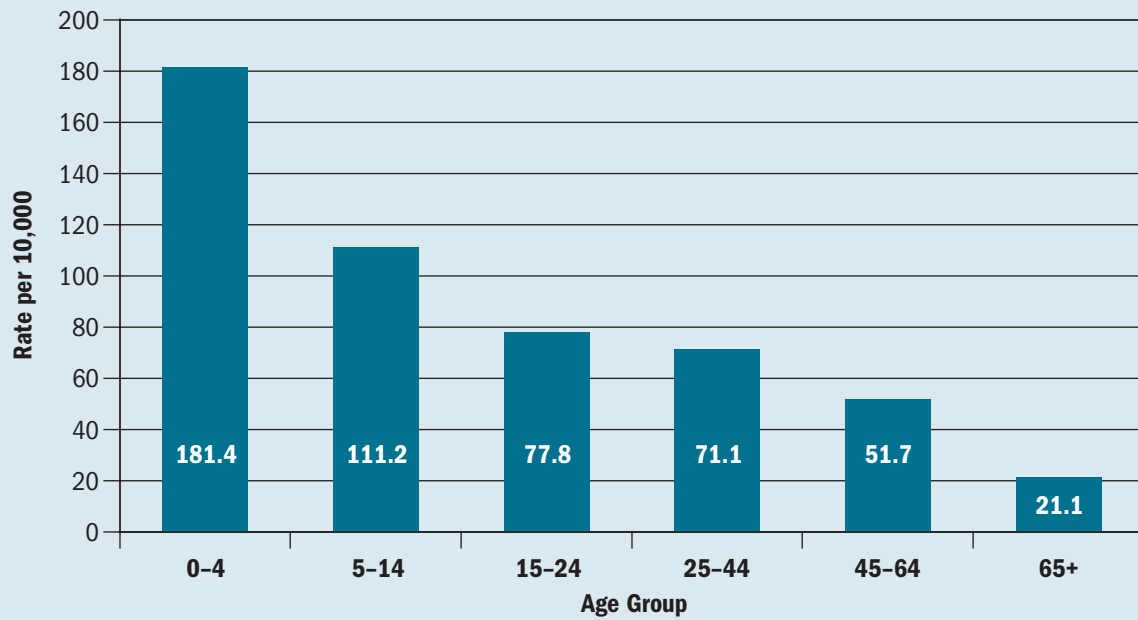
Hispanic New Yorkers had higher crude and age-adjusted asthma ED visit rates (92.6/10,000;

88.1/10,000) compared to their non-Hispanic counterparts (55.3/10,000; 58.3/10,000).

New York City residents had crude and age-adjusted asthma ED visit rates (112.7/10,000; 114.5/10,000) that were approximately 2.5 times higher than residents in the Rest of State (43.9/10,000; 45.9/10,000) in 2005 (Table 6-1).

**Figure 6-3**

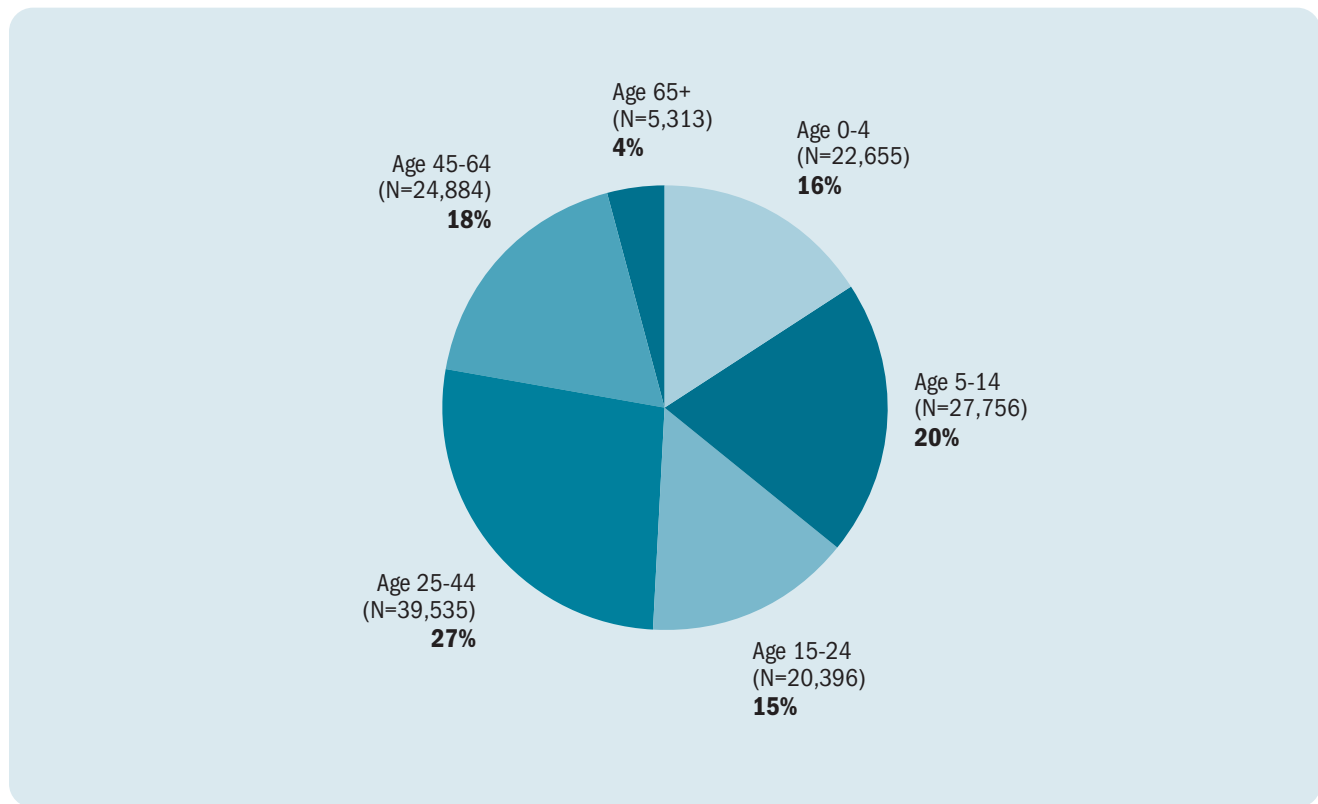
Asthma Emergency Department Visit Rate per 10,000 Residents by Age Group, New York State, 2005



In 2005, children aged 0-4 years had the highest asthma ED visit rate compared to all other age groups.

Among New Yorkers, the asthma ED visit rate decreased in older age groups (Figure 6-3).

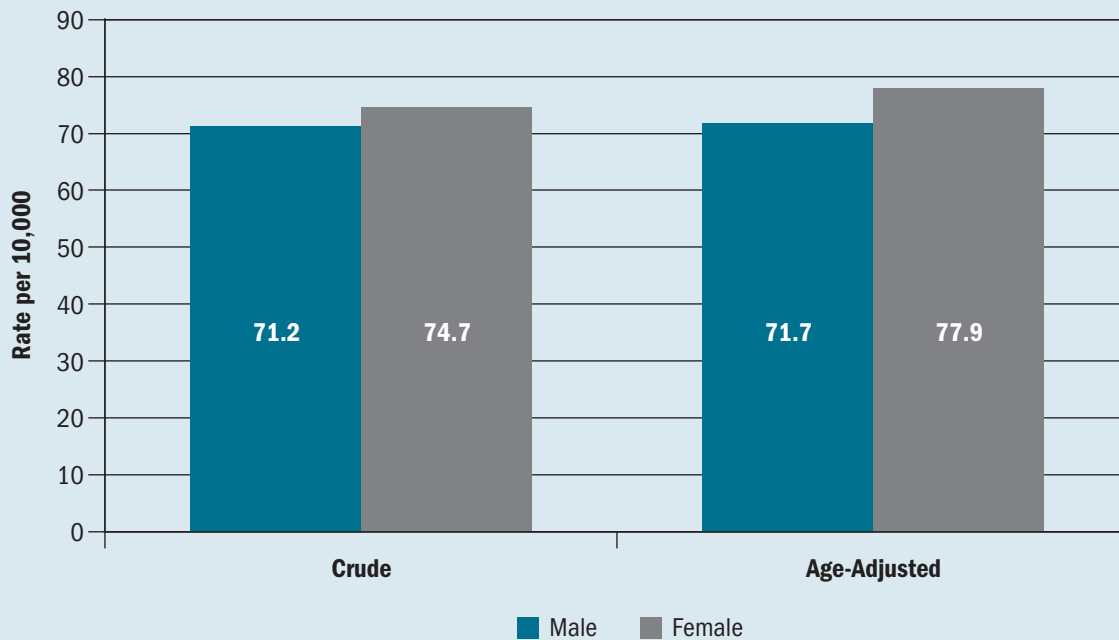
**Figure 6-4**  
**Asthma Emergency Department Visits by Age Group, New York State, 2005**



In 2005, 36% of the asthma ED visits in NYS were for children aged 0-14 years; 4% of the ED visits were for the 65 and older age group (Figure 6-4).

**Figure 6-5**

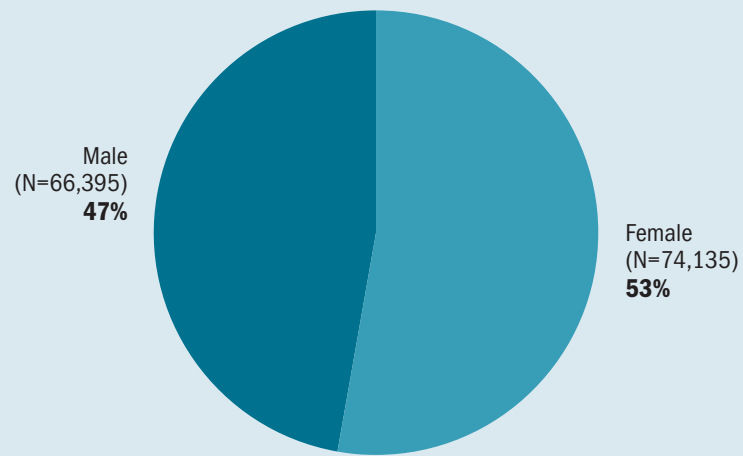
Asthma Emergency Department Visit Rate per 10,000 Residents by Gender, New York State, 2005



The asthma crude and age-adjusted ED visit rates for females (74.7/10,000;77.9/10,000) were higher than

their male counterparts (71.2/10,000;71.7/10,000) in 2005 (Figure 6-5).

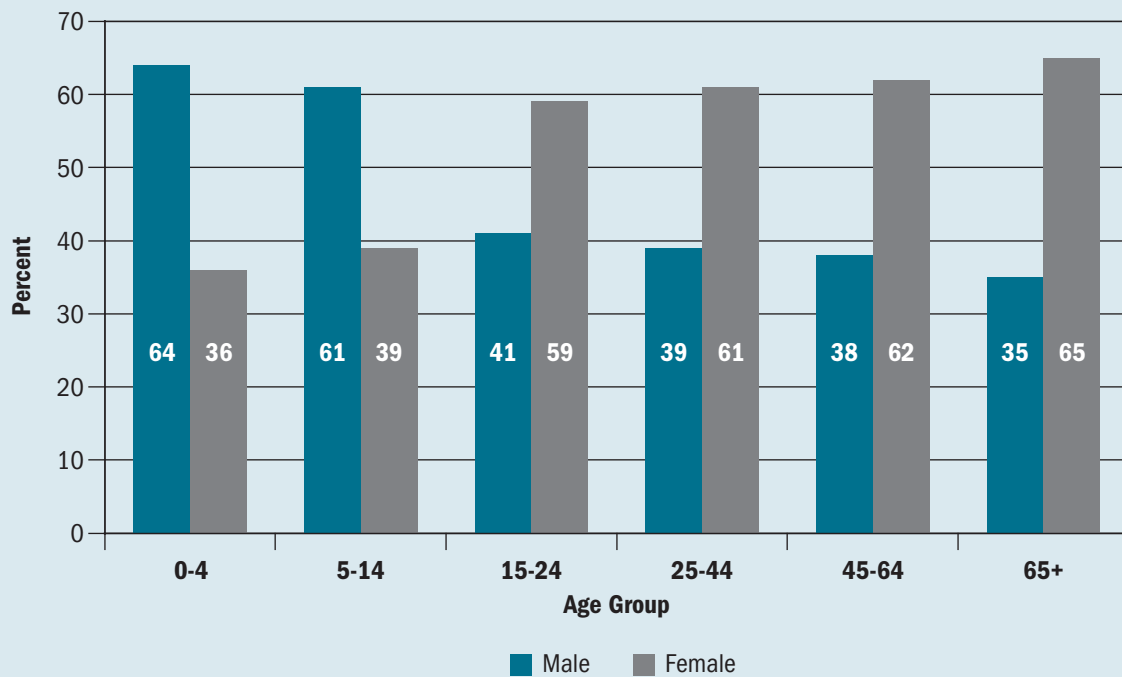
**Figure 6-6**  
Asthma Emergency Department Visits by Gender, New York State, 2005



In 2005, female New Yorkers accounted for 53% of all asthma ED visits (Figure 6-6).

**Figure 6-7**

Percent of Asthma Emergency Department Visits by Age Group and Gender, New York State, 2005



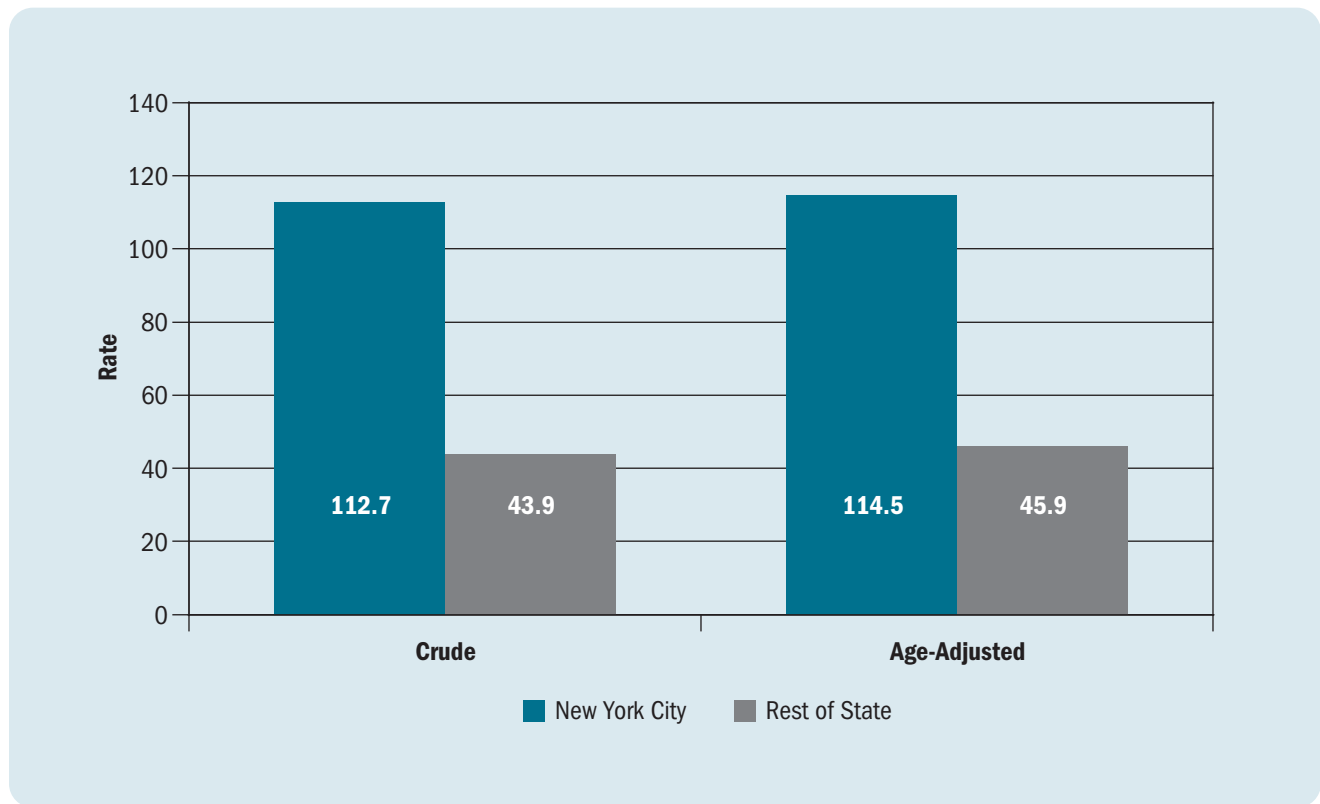
Males younger than 14 years of age comprised a higher percentage of the 2005 asthma ED visits when compared to females (0-4 years: males 64%, females 36%; 5-14 years: males 61%, females 39%).

For those aged 15 years and older, New York females had a higher percentage of asthma ED visits compared

to males (15-24 years: males 41%, females 59%; 25-44 years: males 39%, females 61%; 45-64 years: males 38%, females 62%; 65+ years: males 35%, females 65%) (Figure 6-7).

**Figure 6-8**

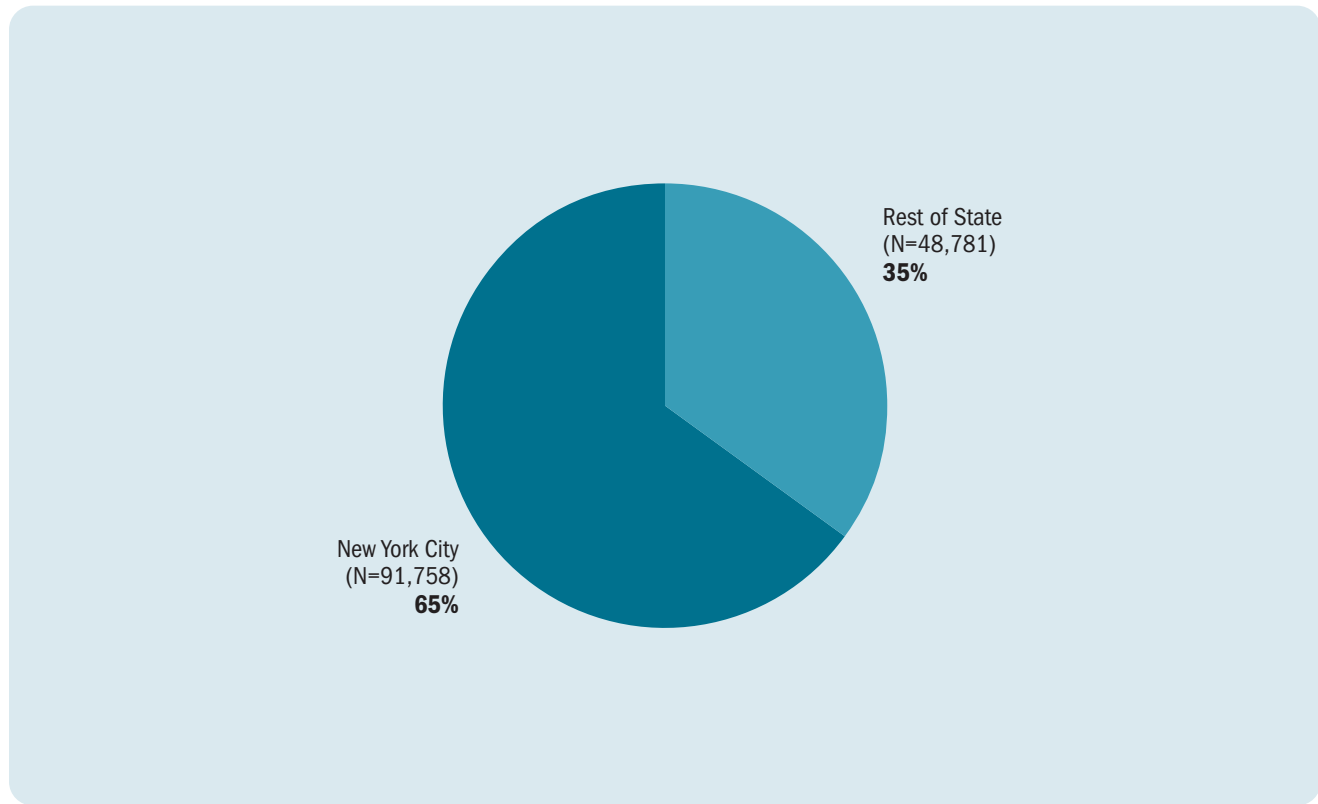
Asthma Emergency Department Visit Rate per 10,000 Residents by Region, New York State, 2005



The crude and age-adjusted 2005 asthma ED visit rates for New York City residents (112.7/10,000; 114.5/10,000) were more than 2.5 times higher than the crude and

age-adjusted ED visit rates for Rest of State residents (43.9/10,000; 45.9/10,000) (Figure 6-8).

**Figure 6-9**  
Asthma Emergency Department Visits by Region, New York State, 2005

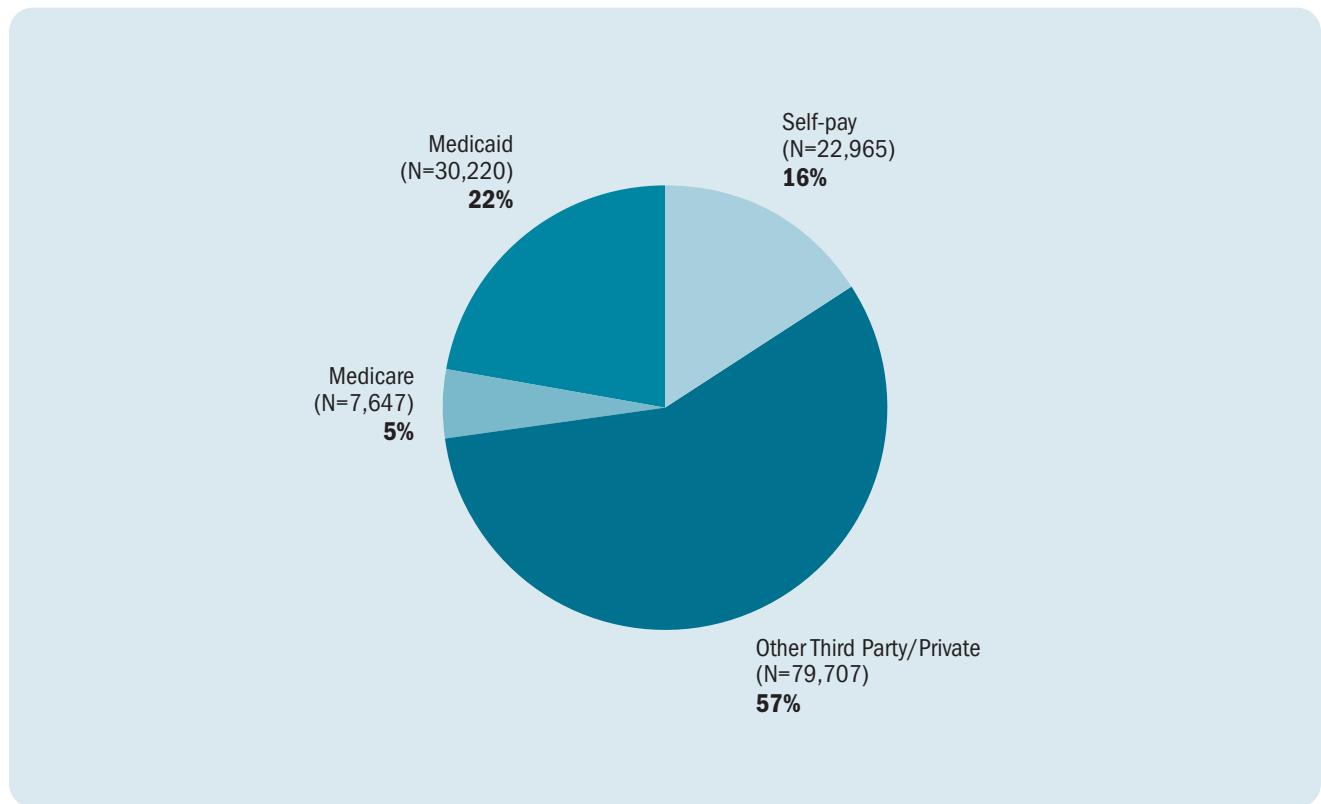


In 2005, New York City residents accounted for 65% of all asthma ED visits in NYS (Figure 6-9).



**Figure 6-10**

**Asthma Emergency Department Visits by Source of Payment, New York State, 2005**



Other Third Party/Private insurance was the source of payment for 57% of all 2005 NYS asthma-related ED visits, while Medicare was the source for only 5% of the visits (Figure 6-10).

Medicaid was the payment source for 22% of the

## Asthma Emergency Department Visit Rates by County

**Table 6-2**

Asthma Emergency Department Visit Rate per 10,000 Residents by Region and County, New York State, 2005

Region/County	ED Visits	Population	Rate
<b>REGION 1: WESTERN NEW YORK</b>			
Allegany	149	50,602	29.4
Cattaraugus	322	82,502	39.0
Chautauqua	908	136,409	66.6
Erie	4,581	930,703	49.2
Genesee	271	59,257	45.7
Niagara	1,038	217,008	47.8
Orleans	154	43,387	35.5
Wyoming	143	42,693	33.5
<i>Region Total</i>	7,566	1,562,561	48.4
<b>REGION 2: FINGER LAKES</b>			
Chemung	719	89,512	80.3
Livingston	239	64,205	37.2
Monroe	3,085	733,366	42.1
Ontario	509	104,461	48.7
Schuyler	134	19,342	69.3
Seneca	104	34,855	29.8
Steuben	440	98,632	44.6
Wayne	314	93,609	33.5
Yates	122	24,756	49.3
<i>Region Total</i>	5,666	1,262,738	44.9
<b>REGION 3: CENTRAL NEW YORK</b>			
Cayuga	311	81,454	38.2
Cortland	9	48,622	1.9
Herkimer	186	63,780	29.2
Jefferson	516	116,384	44.3
Lewis	128	26,571	48.2
Madison	320	70,337	45.5
Oneida	1,005	234,105	42.9
Onondaga	1,988	458,053	43.4
Oswego	411	123,373	33.3
St. Lawrence	723	111,380	64.9
Tompkins	251	100,018	25.1
<i>Region Total</i>	5,848	1,434,077	40.8

Source: 2005 Emergency Department Outpatient data as of January 2007.

**Table 6-2 continued****Asthma Emergency Department Visit Rate per 10,000 Residents by Region and County, New York State, 2005**

Region/County	ED Visits	Population	Rate
<b>REGION 4: NEW YORK-PENNSYLVANIA</b>			
Broome	932	196,947	47.3
Chenango	203	51,755	39.2
Tioga	72	51,475	14.0
<i>Region Total</i>	<i>1,207</i>	<i>300,177</i>	<i>40.2</i>
<b>REGION 5: NORTHEASTERN NEW YORK</b>			
Albany	1,720	297,414	57.8
Clinton	805	82,047	98.1
Columbia	244	63,622	38.4
Delaware	141	47,534	29.7
Essex	148	38,676	38.3
Franklin	333	51,033	65.3
Fulton	59	55,625	10.6
Greene	174	49,682	35.0
Hamilton	2	5,228	3.8
Montgomery	296	48,968	60.4
Otsego	155	62,746	24.7
Rensselaer	693	155,251	44.6
Saratoga	613	214,859	28.5
Schenectady	950	149,078	63.7
Schoharie	140	32,277	43.4
Warren	257	65,548	39.2
Washington	222	63,024	35.2
<i>Region Total</i>	<i>6,952</i>	<i>1,482,612</i>	<i>46.9</i>
<b>REGION 6: HUDSON VALLEY</b>			
Dutchess	1,347	294,849	45.7
Orange	2,163	372,893	58.0
Putnam	273	100,507	27.2
Rockland	818	292,916	27.9
Sullivan	501	76,539	65.5
Ulster	867	182,693	47.5
Westchester	5,132	940,807	54.5
<i>Region Total</i>	<i>11,101</i>	<i>2,261,204</i>	<i>49.1</i>

Source: 2005 Emergency Department Outpatient data as of January 2007.

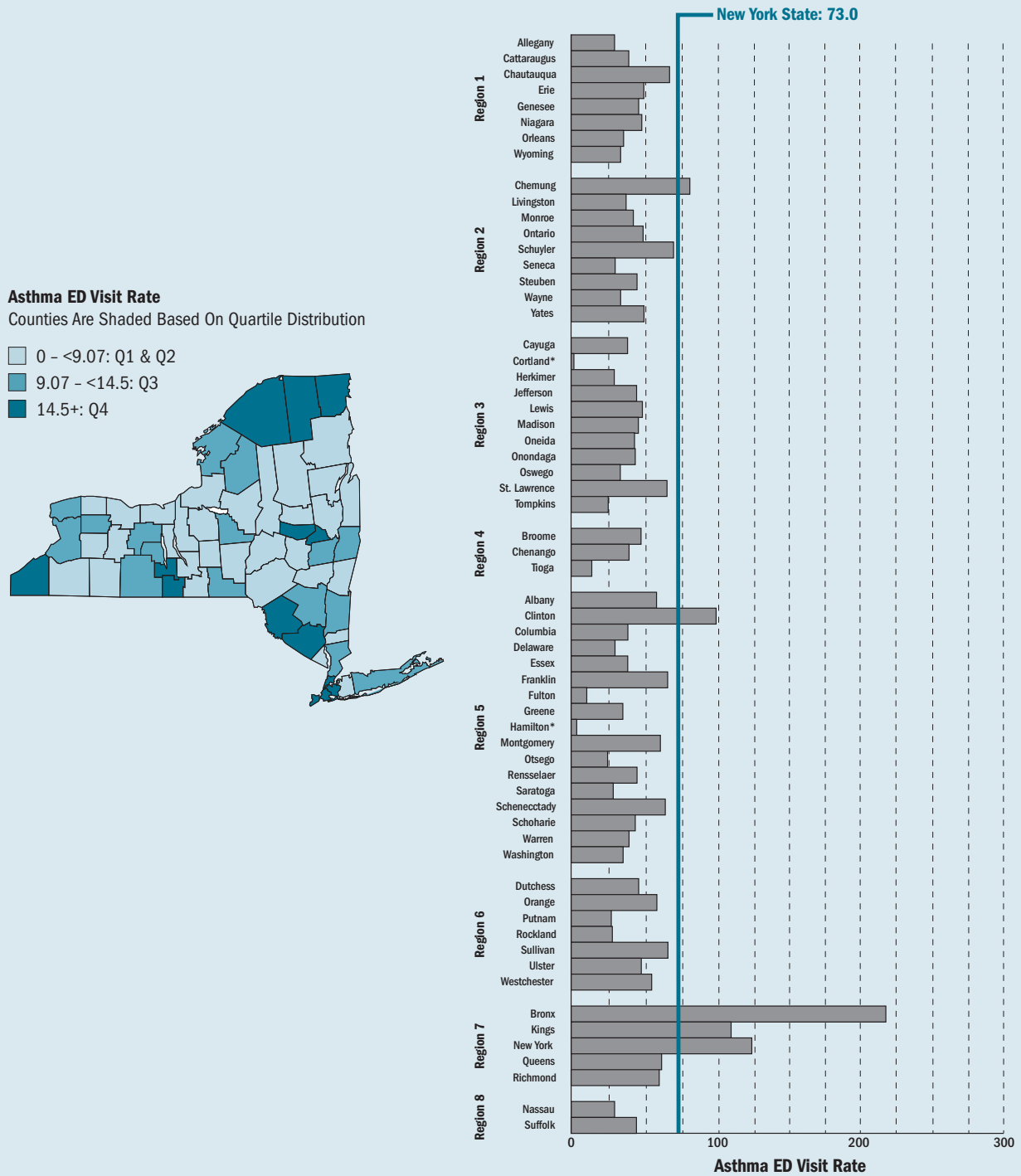
**Table 6-2 continued****Asthma Emergency Department Visit Rate per 10,000 Residents by Region and County, New York State, 2005**

<b>Region/County</b>	<b>ED Visits</b>	<b>Population</b>	<b>Rate</b>
<b>REGION 7: NEW YORK CITY</b>			
Bronx	28,894	1,357,589	212.8
Kings	26,907	2,486,235	108.2
New York	19,469	1,593,200	122.2
Queens	13,718	2,241,600	61.2
Richmond	2,770	464,573	59.6
<i>Region Total</i>	<i>91,758</i>	<i>8,143,197</i>	<i>112.7</i>
<b>REGION 8: NASSAU-SUFFOLK</b>			
Nassau	3,924	1,333,137	29.4
Suffolk	6,517	1,474,927	44.2
<i>Region Total</i>	<i>10,441</i>	<i>2,808,064</i>	<i>37.2</i>
<i>New York State Total</i>	<i>140,539</i>	<i>19,254,630</i>	<i>73.0</i>

Source: 2005 Emergency Department Outpatient data as of January 2007.

**Figure 6-11**

**Asthma Emergency Department Visit Rate per 10,000 Residents by County, New York State, 2005**



Source: 2005 Emergency Department Outpatient data as of January 2007.

\*Indicates rate is based on fewer than 10 cases.

Table 6-2 and Figure 6-11 present county-specific asthma ED visit rates for NYS residents in 2005.

The asthma ED visit rate in 2005 for NYS was 73.0 per 10,000 residents. There was variation by region and county. For New York City, Bronx had the highest asthma ED visit rate of 212.8 per 10,000 residents followed by New York

County with a rate of 122.2 per 10,000 residents. For counties in the Rest of State, rates range from highs of 98.1 per 10,000 residents (Clinton) and 80.3 per 10,000 residents (Chemung) to 1.9 per 10,000 residents (Cortland) and 3.8 per 10,000 residents (Hamilton).

# Asthma Hospital Discharges

## Highlights: Asthma Hospital Discharges

- During 1996-2005, the 0-4 year age group had the highest hospital discharge rate compared to all other age groups. Each age group showed a downward trend over time with the exception of the 65 year and older age group.
- For 2003-2005, 35% of asthma hospital discharges were for children aged 0-14 years; and 18% were for adults 65 years of age and older. In addition, 59% of asthma hospital discharges were for females; and 67% were for New York City residents.
- Males had a higher percentage of asthma hospital discharges compared to females in the 0-4 year (64% vs. 36%) and 5-14 year (60% vs. 40%) age groups. However, males had lower percentages for all remaining age groups.
- During 2003-2005, female New Yorkers had higher crude and age-adjusted asthma hospital discharge rates (25.1/10,000; 24.6/10,000) compared to males (18.8/10,000; 19.1/10,000).
- For the period 2003-2005, Black New Yorkers had higher crude and age-adjusted asthma hospital discharge rates (40.7/10,000; 40.9/10,000) compared to White New Yorkers (10.5/10,000; 10.3/10,000).
- New York City residents had higher crude and age-adjusted asthma hospital discharge rates (35.0/10,000; 35.4/10,000) in 2003-2005 compared to residents of the Rest of State (12.6/10,000; 12.7/10,000).
- Medicaid was the source of payment for 45% of the 2003-2005 asthma hospital discharges in New York. Other Third Party/Private insurance payers were the payment source for 27% of asthma hospital discharges; while Medicare was the payment source for 20% of the asthma hospital discharges.
- Asthma hospital discharge rates for 2003-2005 varied across New York State. New York City residents of the Bronx had a rate of 67.5/10,000, while Tioga County residents had a rate of 2.3/10,000.
- The number of hospital discharges due to asthma in New York State has gone down approximately 23% in the last decade from 51,080 in 1996 to 39,518 in 2005.
- Asthma hospital discharge rates showed a 25% decline from 27.5 per 10,000 in 1996 to 20.5 in 2005.
- Overall, asthma hospital discharges showed a seasonal pattern with peaks in the spring and fall and a decline in the summer.

## **Methodology**

Asthma hospital discharge information for New York State (NYS) has been generated from the Statewide Planning and Research Cooperative System (SPARCS) database. SPARCS currently collects record level detail on patient characteristics, diagnoses and treatments, services, residence location, and charges for every hospital discharge in NYS. An asthma hospital discharge was defined as having a principal diagnosis with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code of 493. Population estimates used for computing the asthma hospital discharge rates were obtained from the United States (U.S.) Census Bureau.

Crude and age-adjusted asthma hospital discharge rates were calculated per 10,000 residents. The age-adjusted rates were calculated using the 2000 U.S. Standard Population (see Appendix 2).

Ten-year trends of asthma hospital discharge data (1996-2005) are presented by state total, age, gender

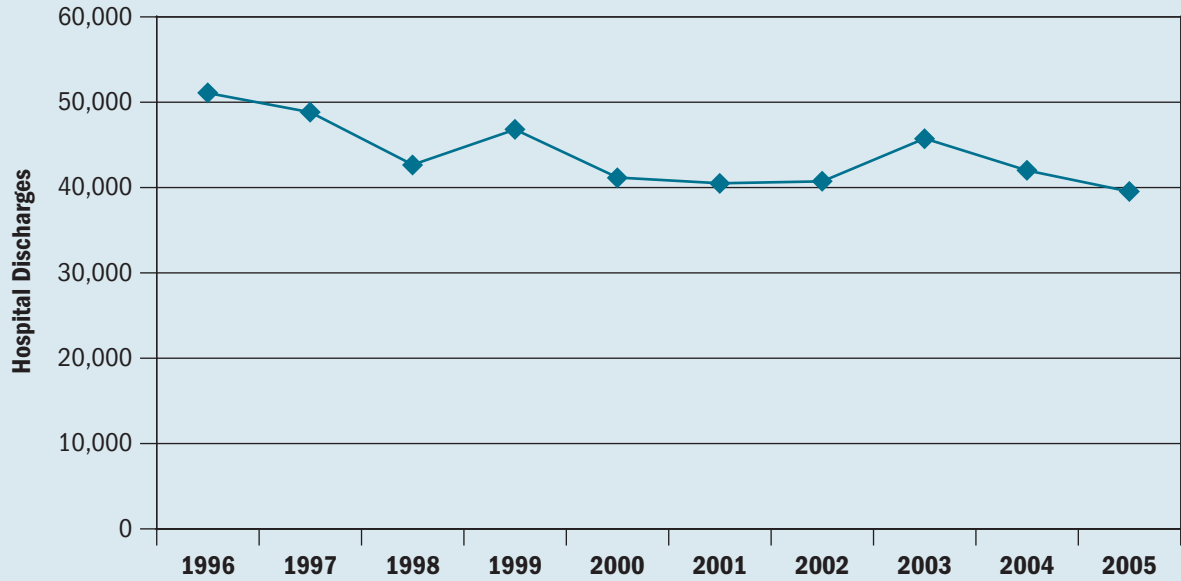
and geographic region. Asthma hospital discharge rates for a specific year were calculated by dividing the number of asthma hospital discharges by the population of that year and then multiplying by 10,000.

Asthma hospital discharges for 2003-2005 were computed by age, gender, race, and geographic region. The average annual asthma hospital discharge rates for 2003-2005 were calculated as follows: the total number of asthma hospital discharges for the three-year period was divided by three to get the average number of asthma hospital discharges per year. The average number of asthma hospital discharges was then divided by the middle year population (2004) and multiplied by 10,000.

Asthma hospital discharge data for 2003-2005 are also presented as tables, maps and graphs at the state and county level. An example of asthma hospital discharge ZIP code level data for counties is also included.

## Trends in Asthma Hospital Discharges

**Figure 7-1**  
Annual Asthma Hospital Discharges, New York State Residents, 1996–2005



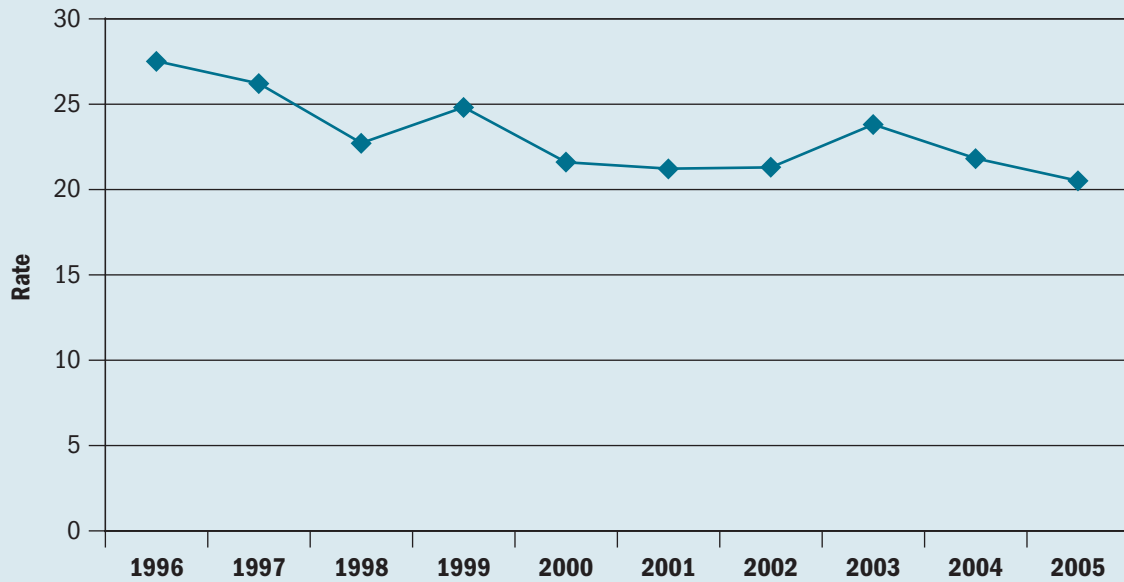
Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Asthma Hospital Discharges	51,080	48,814	42,624	46,799	41,121	40,463	40,719	45,700	42,001	39,518

From 1996 to 2005, the number of annual asthma hospital discharges among NYS residents decreased approximately 23% from 51,080 to 39,518 (Figure 7-1).



**Figure 7-2**

**Annual Asthma Hospital Discharge Rate per 10,000 Residents, New York State, 1996–2005**

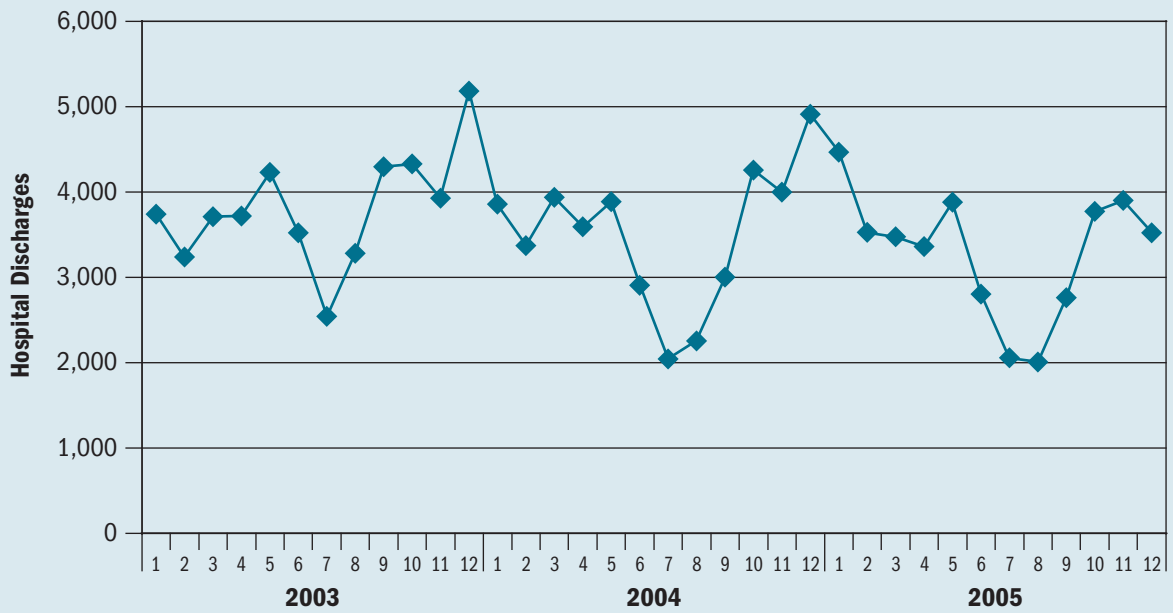


Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Rate	27.5	26.2	22.7	24.8	21.6	21.2	21.3	23.8	21.8	20.5

The annual asthma hospital discharge rate in NYS decreased 25% from 27.5 hospital discharges per 10,000

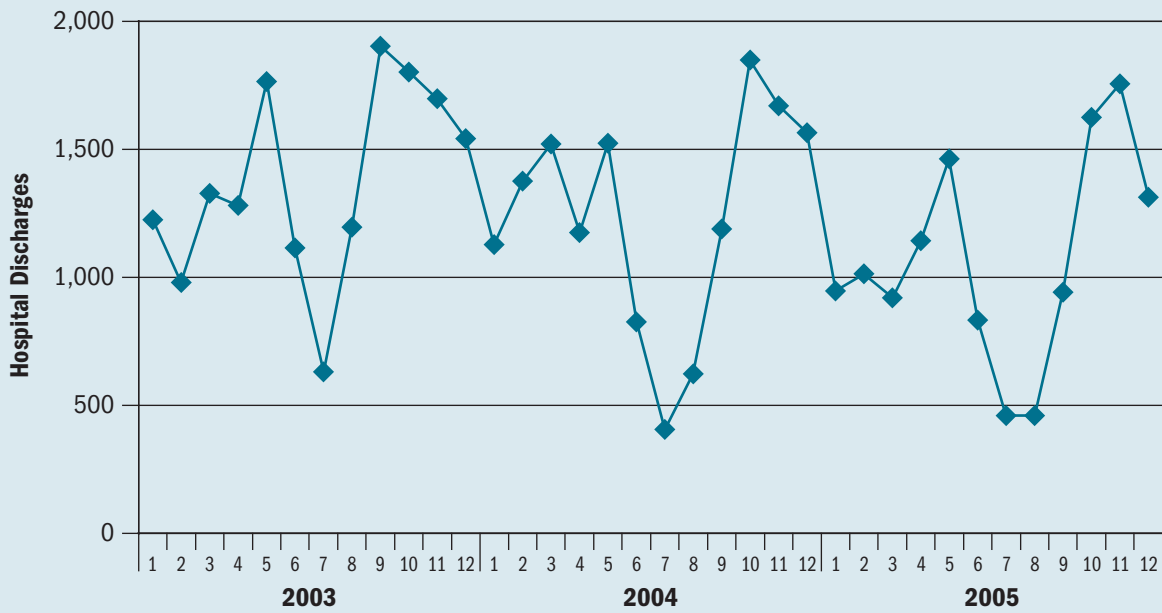
residents in 1996 to 20.5 hospital discharges per 10,000 residents in 2005 (Figure 7-2).

**Figure 7-3**  
Asthma Hospital Discharges by Month, New York State Residents, 2003-2005



During 2003-2005, asthma hospital discharges showed a seasonal pattern with peaks in the spring and fall and a decline in the summer (Figure 7-3).

**Figure 7-4**  
**Asthma Hospital Discharges by Month, Ages 0-14 Years, New York State Residents, 2003-2005**



When reviewed by month of admission, asthma hospital discharges for those aged 0-14 years showed a similar

seasonal pattern with peaks in the spring and fall and a decline in the summer (Figure 7-4).

## Asthma Hospital Discharges by Sociodemographic Characteristics

**Table 7-1**

Crude and Age-Adjusted\* Asthma Hospital Discharge Rate per 10,000 Residents by Gender, Race, Ethnicity and Region, New York State, 2003–2005

		Crude	Age-Adjusted
Gender	Male	18.8	19.1
	Female	25.1	24.6
Race	White	10.5	10.3
	Black	40.7	40.9
	Other	24.0	27.1
Ethnicity	Hispanic	30.9	34.2
	Non-Hispanic	17.0	17.1
Region	New York City	35.0	35.4
	Rest of State	12.6	12.7
	New York State	22.1	22.2

\*The 2000 United States Standard Population was used to calculate age-adjusted asthma hospital discharge rates.

During 2003-2005, female New Yorkers had higher crude and age-adjusted asthma hospital discharge rates (25.1/10,000; 24.6/10,000) compared to males (18.8/10,000; 19.1/10,000).

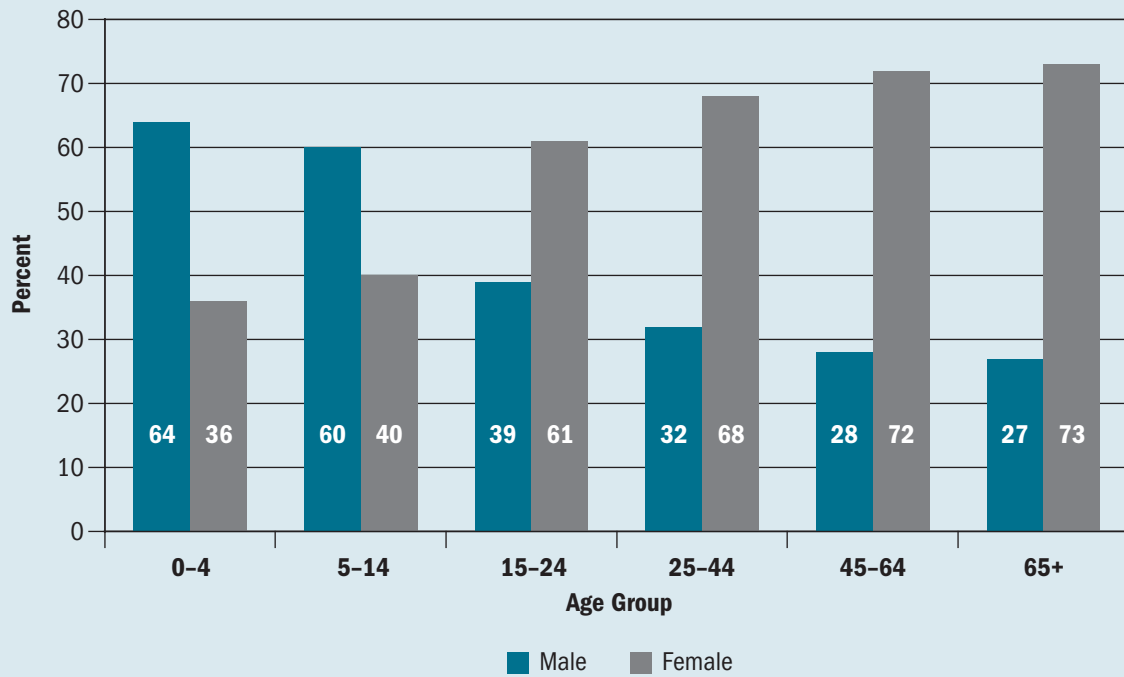
Black New Yorkers had higher crude and age-adjusted asthma hospital discharge rates (40.7/10,000; 40.9/10,000) compared to White New Yorkers (10.5/10,000; 10.3/10,000).

Hispanic New Yorkers had higher crude and age-adjusted rates (30.9/10,000; 34.2/10,000) compared to their non-Hispanic counterparts (17.0/10,000; 17.1/10,000).

New York City residents had higher crude and age-adjusted asthma hospital discharge rates (35.0/10,000; 35.4/10,000) in 2003-2005 compared to residents of the Rest of State (12.6/10,000; 12.7/10,000) (Table 7-1).

**Figure 7-5**

Percent of Asthma Hospital Discharges by Age Group and Gender, New York State Residents, 2003–2005

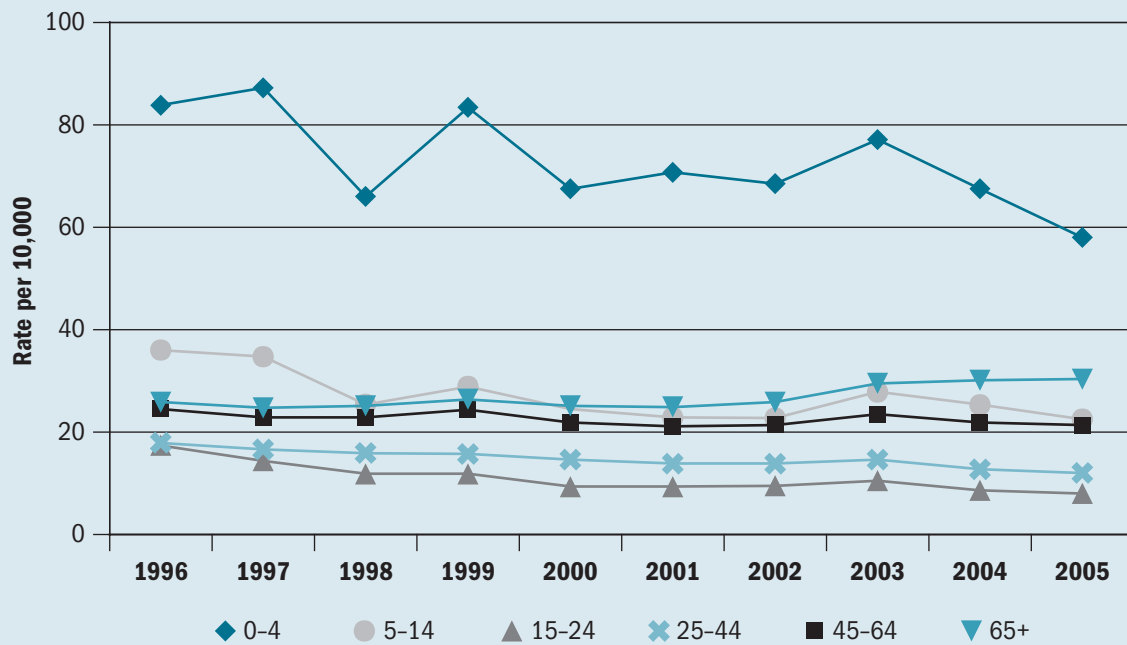


There was a higher proportion of asthma hospital discharges for males than females among those aged 0-14 years (0-4 years: males 64%, females 36%; 5-14 years: males 60%, females 40%).

In contrast, for those aged 15 years and older, females had a higher proportion of asthma hospital discharges

compared to males (15-24 years: males 39%, females 61%; 25-44 years: males 32%, females 68%; 45-64 years: males 28%, females 72%; 65+ years: males 27%, females 73%) (Figure 7-5).

**Figure 7-6**  
**Asthma Hospital Discharge Rate per 10,000 Residents by Age Group, New York State, 1996–2005**

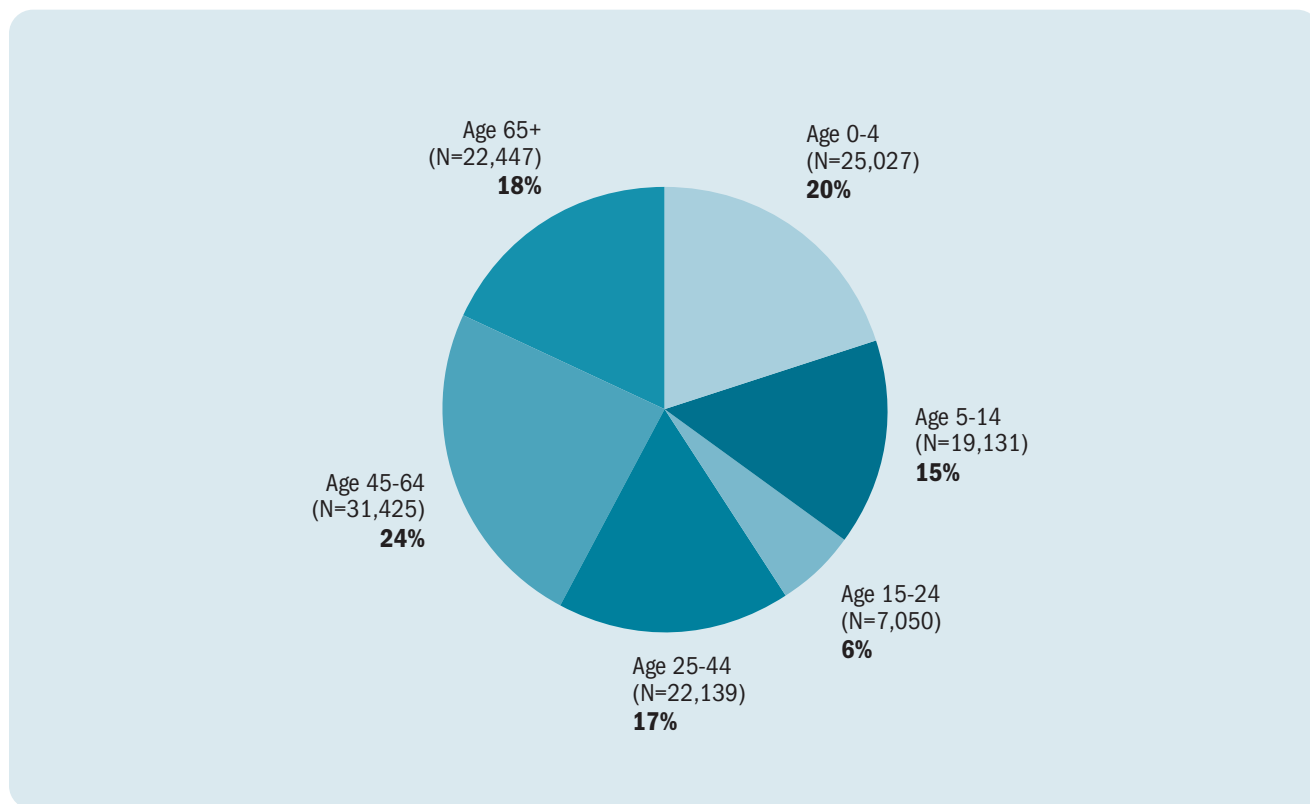


Age Group	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0-4	83.8	87.2	66.0	83.4	67.5	70.7	68.5	77.1	67.5	58.0
5-14	36.0	34.7	25.4	28.9	24.5	22.8	22.7	27.8	25.3	22.5
15-24	17.4	14.4	11.8	11.8	9.3	9.3	9.5	10.5	8.6	8.0
25-44	17.9	16.6	15.9	15.7	14.6	13.8	13.8	14.6	12.7	12.0
45-64	24.5	22.9	22.8	24.4	21.8	21.1	21.4	23.5	21.8	21.3
65+	25.8	24.7	25.1	26.4	25.1	24.9	25.8	29.5	30.1	30.3

During 1996-2005, the 0-4 year age group had the highest hospital discharge rate compared to all other age groups in NYS. Each age group showed a downward

trend over time with the exception of the 65 year and older age group (Figure 7-6).

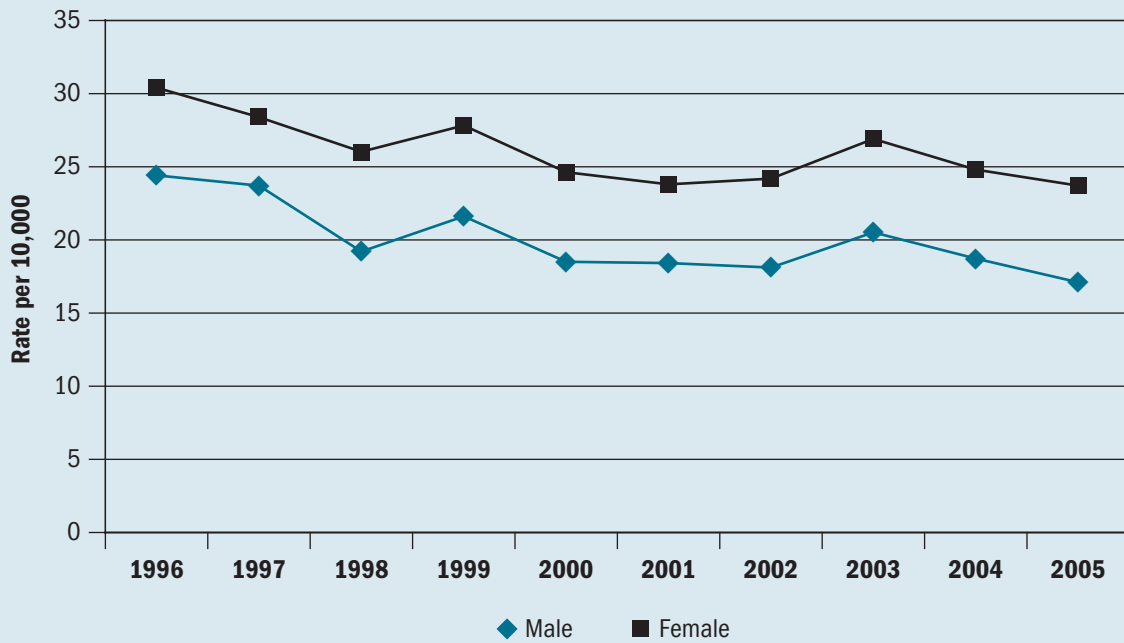
**Figure 7-7**  
Asthma Hospital Discharges by Age Group, New York State Residents, 2003–2005



During 2003-2005, 35% of the asthma hospital discharges were for children aged 0-14 years; 18% of the

hospital discharges were for the 65 and older age group (Figure 7-7).

**Figure 7-8**  
**Asthma Hospital Discharge Rate per 10,000 Residents by Gender, New York State, 1996–2005**

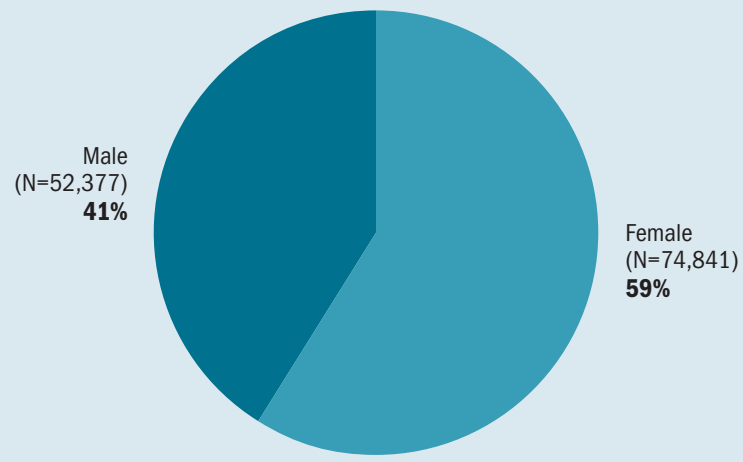


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Male	24.4	23.7	19.2	21.6	18.5	18.4	18.1	20.5	18.7	17.1
Female	30.4	28.4	26.0	27.8	24.6	23.8	24.2	26.9	24.8	23.7

There was a decline of asthma hospital discharge rates during 1996-2005 for both males (30%) and females (22%) (Figure 7-8).



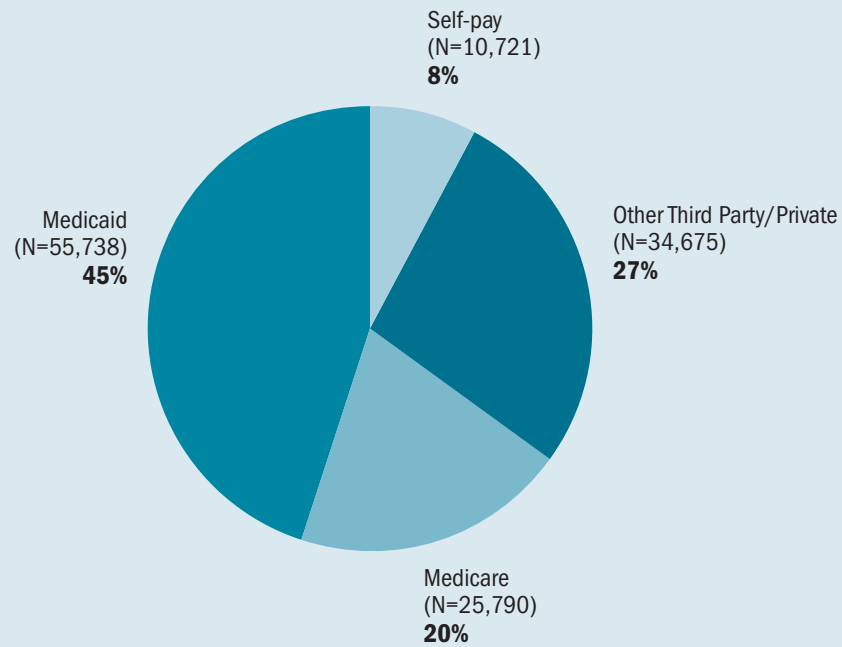
**Figure 7-9**  
Asthma Hospital Discharges by Gender, New York State Residents, 2003-2005



During 2003-2005, 59% of asthma hospital discharges were for female New Yorkers (Figure 7-9).

**Figure 7-10**

**Asthma Hospital Discharges by Source of Payment, New York State Residents, 2003–2005**

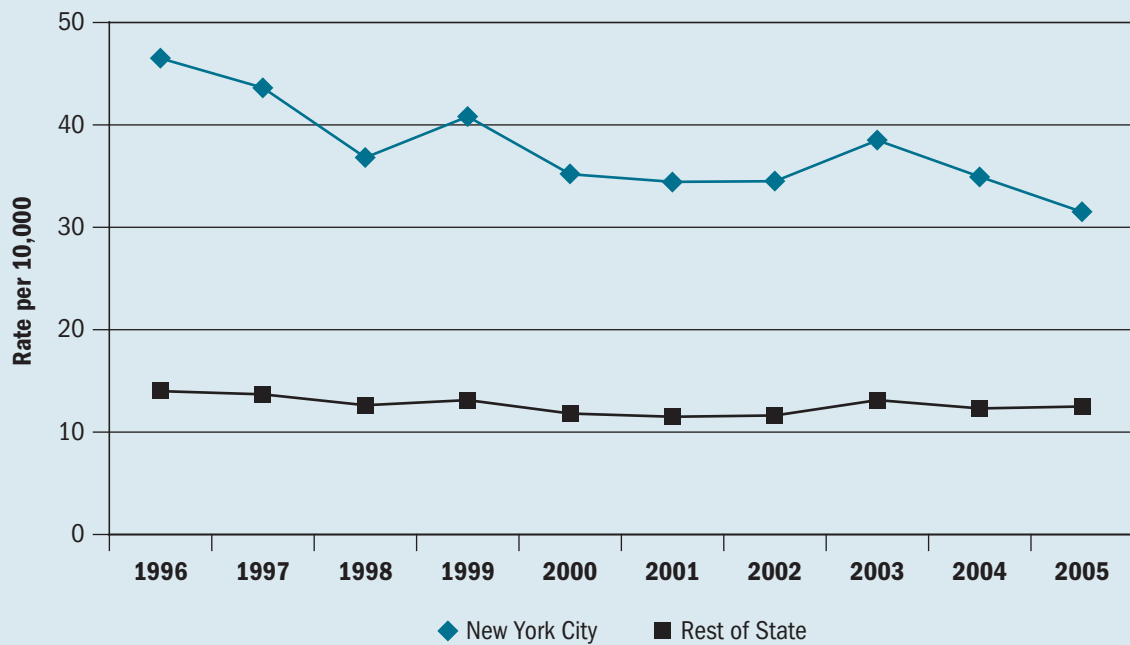


Medicaid was the source of payment for 45% of the 2003-2005 asthma hospital discharges in New York State. Other Third Party/Private insurance payers were the

payment source for 27% of asthma hospital discharges; while Medicare was the payment source for 20% of the asthma hospital discharges (Figure 7-10).

**Figure 7-11**

**Asthma Hospital Discharge Rate per 10,000 Residents by Region, New York State, 1996-2005**

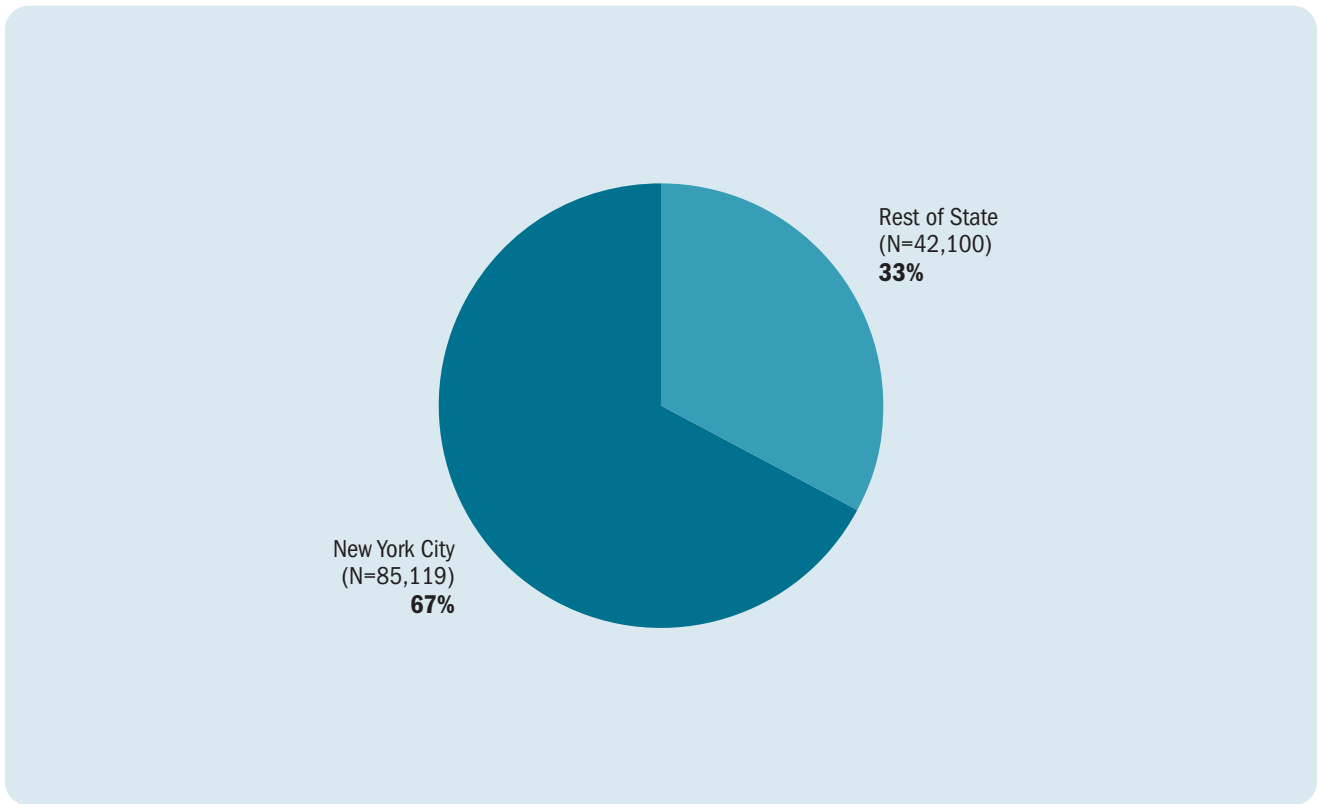


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New York City	46.5	43.6	36.8	40.8	35.2	34.4	34.5	38.5	34.9	31.5
Rest of State	14.0	13.7	12.6	13.1	11.8	11.5	11.6	13.1	12.3	12.5

There was a 32% decline in asthma hospital discharge rates for residents in New York City and an 11% decline among Rest of State residents during 1996-2005.

New York City residents had consistently higher asthma hospital discharge rates when compared to residents in the Rest of State (Figure 7-11).

**Figure 7-12**  
Asthma Hospital Discharges by Region, New York State Residents, 2003-2005



During 2003-2005, New York City residents accounted for 67% of all asthma hospital discharges in NYS (Figure 7-12).

## Asthma Hospital Discharge Rates by County

**Table 7-2**

Asthma Hospital Discharge Rate per 10,000 Residents by Region and County, New York State, 2003–2005

Region/County	Discharges				Population 2004	Rate
	2003	2004	2005	Total		
<b>REGION 1: WESTERN NEW YORK</b>						
Allegany	55	56	65	176	50,575	11.6
Cattaraugus	75	99	93	267	83,179	10.7
Chautauqua	159	170	176	505	137,267	12.3
Erie	1,210	1,162	1,297	3,669	936,318	13.1
Genesee	55	58	92	205	59,689	11.4
Niagara	232	222	281	735	218,060	11.2
Orleans	36	44	38	118	44,138	8.9
Wyoming	52	66	59	177	42,986	13.7
<i>Region Total</i>	<i>1,874</i>	<i>1,877</i>	<i>2,101</i>	<i>5,852</i>	<i>1,572,212</i>	<i>12.4</i>
<b>REGION 2: FINGER LAKES</b>						
Chemung	146	133	135	414	89,984	15.3
Livingston	55	44	49	148	64,819	7.6
Monroe	879	784	841	2,504	735,177	11.4
Ontario	84	87	88	259	103,504	8.3
Schuyler	29	15	18	62	19,505	10.6
Seneca	25	18	23	66	35,075	6.3
Steuben	174	141	130	445	98,814	15.0
Wayne	55	75	72	202	93,861	7.2
Yates	28	20	19	67	24,669	9.1
<i>Region Total</i>	<i>1,475</i>	<i>1,317</i>	<i>1,375</i>	<i>4,167</i>	<i>1,265,408</i>	<i>11.0</i>
<b>REGION 3: CENTRAL NEW YORK</b>						
Cayuga	114	108	100	322	81,916	13.1
Cortland	56	31	39	126	49,006	8.6
Herkimer	60	79	62	201	63,858	10.5
Jefferson	145	121	100	366	111,467	10.9
Lewis	38	28	18	84	26,564	10.5
Madison	95	70	66	231	70,407	10.9
Oneida	471	421	390	1,282	234,962	18.2
Onondaga	385	391	405	1,181	459,805	8.6
Oswego	141	117	109	367	123,776	9.9
St. Lawrence	190	194	194	578	111,306	17.3
Tompkins	74	66	45	185	100,135	6.2
<i>Region Total</i>	<i>1,769</i>	<i>1,626</i>	<i>1,528</i>	<i>4,923</i>	<i>1,433,202</i>	<i>11.4</i>

Source: 2003-2005 SPARCS data as of January 2007.

**Table 7-2 continued**

**Asthma Hospital Discharge Rate per 10,000 Residents by Region and County, New York State, 2003–2005**

Region/County	Discharges				Population 2004	Rate
	2003	2004	2005	Total		
<b>REGION 4: NEW YORK-PENNSYLVANIA</b>						
Broome	185	160	149	494	197,696	8.3
Chenango	48	42	34	124	51,861	8.0
Tioga	17	6	13	36	51,535	2.3
<i>Region Total</i>	250	208	196	654	301,092	7.2
<b>REGION 5: NORTHEASTERN NEW YORK</b>						
Albany	354	404	407	1,165	298,432	13.0
Clinton	111	128	173	412	81,875	16.8
Columbia	49	36	48	133	63,668	7.0
Delaware	71	55	57	183	47,328	12.9
Essex	33	27	24	84	38,901	7.2
Franklin	60	37	46	143	51,009	9.3
Fulton	102	94	105	301	55,463	18.1
Greene	49	29	51	129	49,195	8.7
Hamilton	2	1	5	8	5,227	5.1
Montgomery	74	60	60	194	49,283	13.1
Otsego	98	87	72	257	62,518	13.7
Rensselaer	184	179	253	616	154,077	13.3
Saratoga	177	130	159	466	212,706	7.3
Schenectady	217	195	248	660	148,042	14.9
Schoharie	15	24	22	61	32,012	6.4
Warren	64	73	78	215	65,147	11.0
Washington	47	54	44	145	62,807	7.7
<i>Region Total</i>	1,707	1,613	1,852	5,172	1,477,690	11.7
<b>REGION 6: HUDSON VALLEY</b>						
Dutchess	320	370	321	1,011	293,395	11.5
Orange	774	611	569	1,954	370,352	17.6
Putnam	90	82	89	261	100,570	8.7
Rockland	355	290	275	920	293,626	10.4
Sullivan	117	141	135	393	76,110	17.2
Ulster	249	187	202	638	181,779	11.7
Westchester	1,269	1,309	1,250	3,828	942,444	13.5
<i>Region Total</i>	3,174	2,990	2,841	9,005	2,258,276	13.3

Source: 2003-2005 SPARCS data as of January 2007.

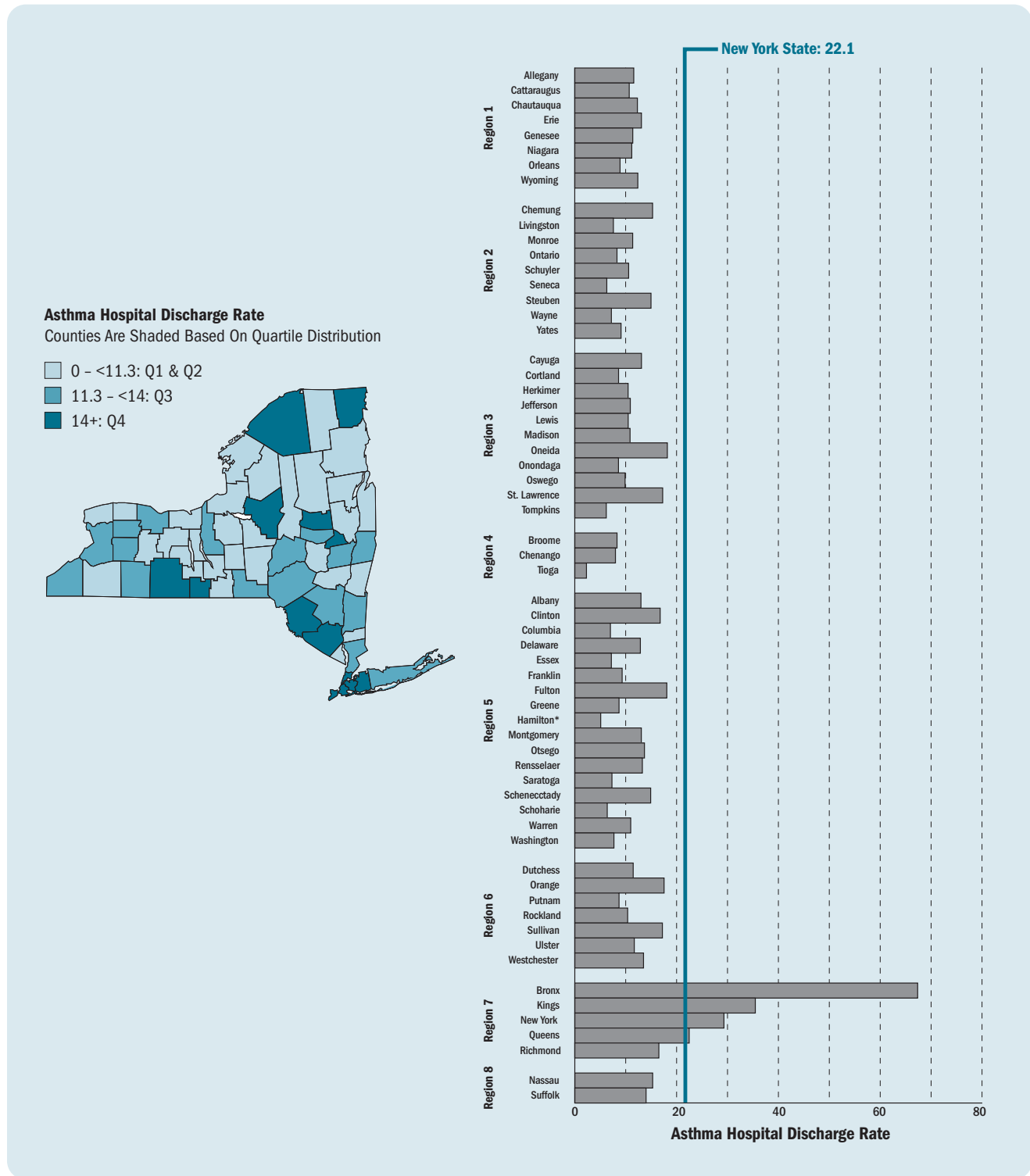
**Table 7-2 continued****Asthma Hospital Discharge Rate per 10,000 Residents by Region and County, New York State, 2003–2005**

Region/County	Discharges				Population 2004	Rate
	2003	2004	2005	Total		
<b>REGION 7: NEW YORK CITY</b>						
Bronx	10,028	9,350	8,255	27,633	1,365,536	67.5
Kings	9,656	8,643	8,062	26,361	2,475,290	35.5
New York	5,084	4,580	4,075	13,739	1,562,723	29.3
Queens	5,541	5,024	4,526	15,091	2,237,216	22.5
Richmond	817	716	762	2,295	463,314	16.5
<i>Region Total</i>	<i>31,126</i>	<i>28,313</i>	<i>25,680</i>	<i>85,119</i>	<i>8,104,079</i>	<i>35.0</i>
<b>REGION 8: NASSAU-SUFFOLK</b>						
Nassau	2,155	2,039	1,941	6,135	1,339,641	15.3
Suffolk	2,170	2,018	2,004	6,192	1,475,488	14.0
<i>Region Total</i>	<i>4,325</i>	<i>4,057</i>	<i>3,945</i>	<i>12,327</i>	<i>2,815,129</i>	<i>14.6</i>
<i>New York State Total</i>	<i>45,700</i>	<i>42,001</i>	<i>39,518</i>	<i>127,219</i>	<i>19,227,088</i>	<i>22.1</i>

Source: 2003-2005 SPARCS data as of January 2007.

**Figure 7-13**

**Asthma Hospital Discharge Rate per 10,000 Residents by County, New York State, 2003-2005**



Source: 2003-2005 SPARCS data as of January 2007.

\*Indicates rate is based on fewer than 10 cases.

Table 7-2 and Figure 7-13 present county-specific total asthma hospital discharge rates for 2003-2005. Similar data for specific age groups (e.g., 0-4 years, 0-14 years, 0-17

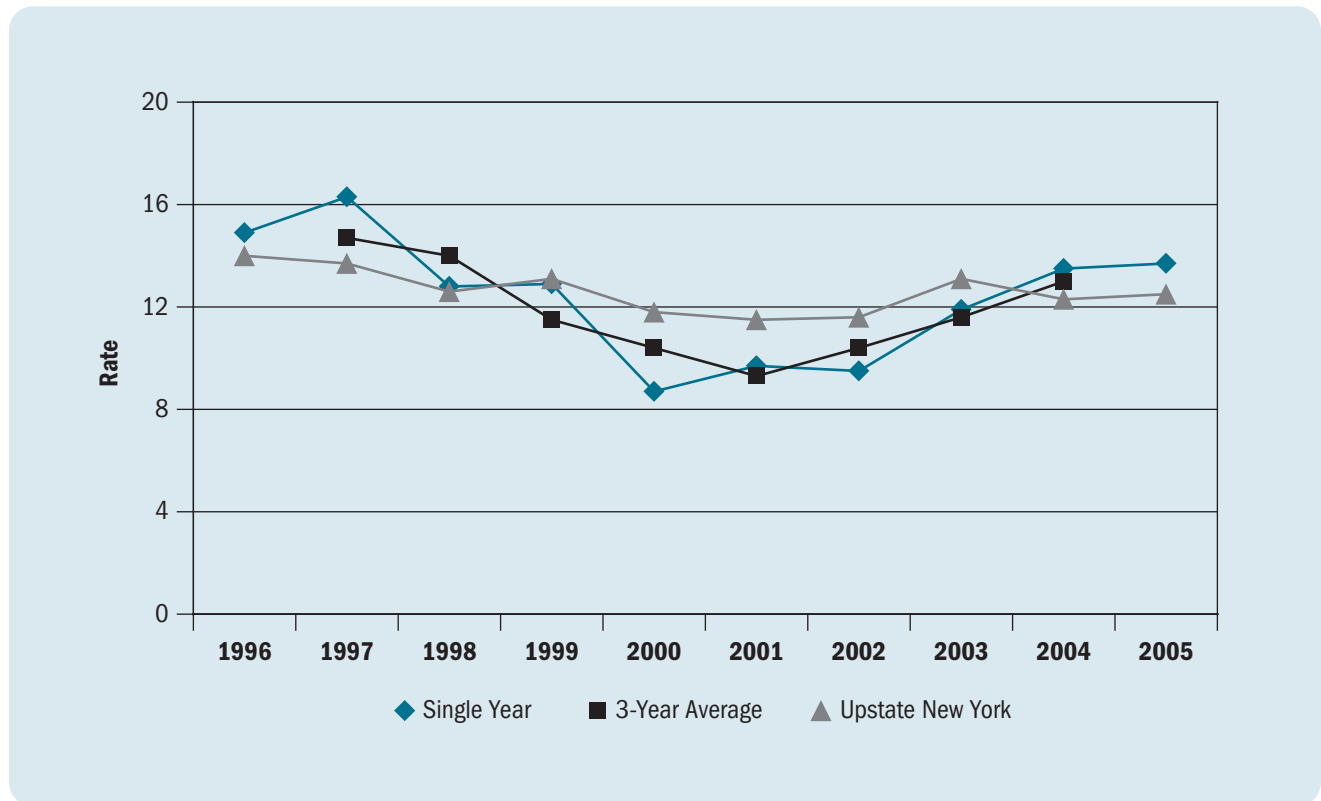
years, 18-64 years, 65+ years) are available at the NYSDOH Asthma Surveillance website at: [http://www.health.state.ny.us/statistics/ny\\_asthma/index.htm](http://www.health.state.ny.us/statistics/ny_asthma/index.htm)



The 2003-2005 asthma hospital discharge rate for NYS residents was 22.1 per 10,000 residents. There was variation by region and county. For New York City residents, Bronx had the highest asthma hospital discharge rate of 67.5 per 10,000 residents followed by Kings County with

a rate of 35.5 per 10,000 residents. For counties in the Rest of State, rates range from highs of 18.2 per 10,000 residents (Oneida) and 18.1 per 10,000 residents (Fulton) to 2.3 per 10,000 residents (Tioga) and 5.1 per 10,000 residents (Hamilton) (Table 7-2 and Figure 7-13).

**Figure 7-14**  
Albany County: Asthma Hospital Discharge Rate per 10,000 Residents, 1996-2005



**Table 7-3**

Albany County: Asthma Hospital Discharge Rate per 10,000 Residents, 1996–2005

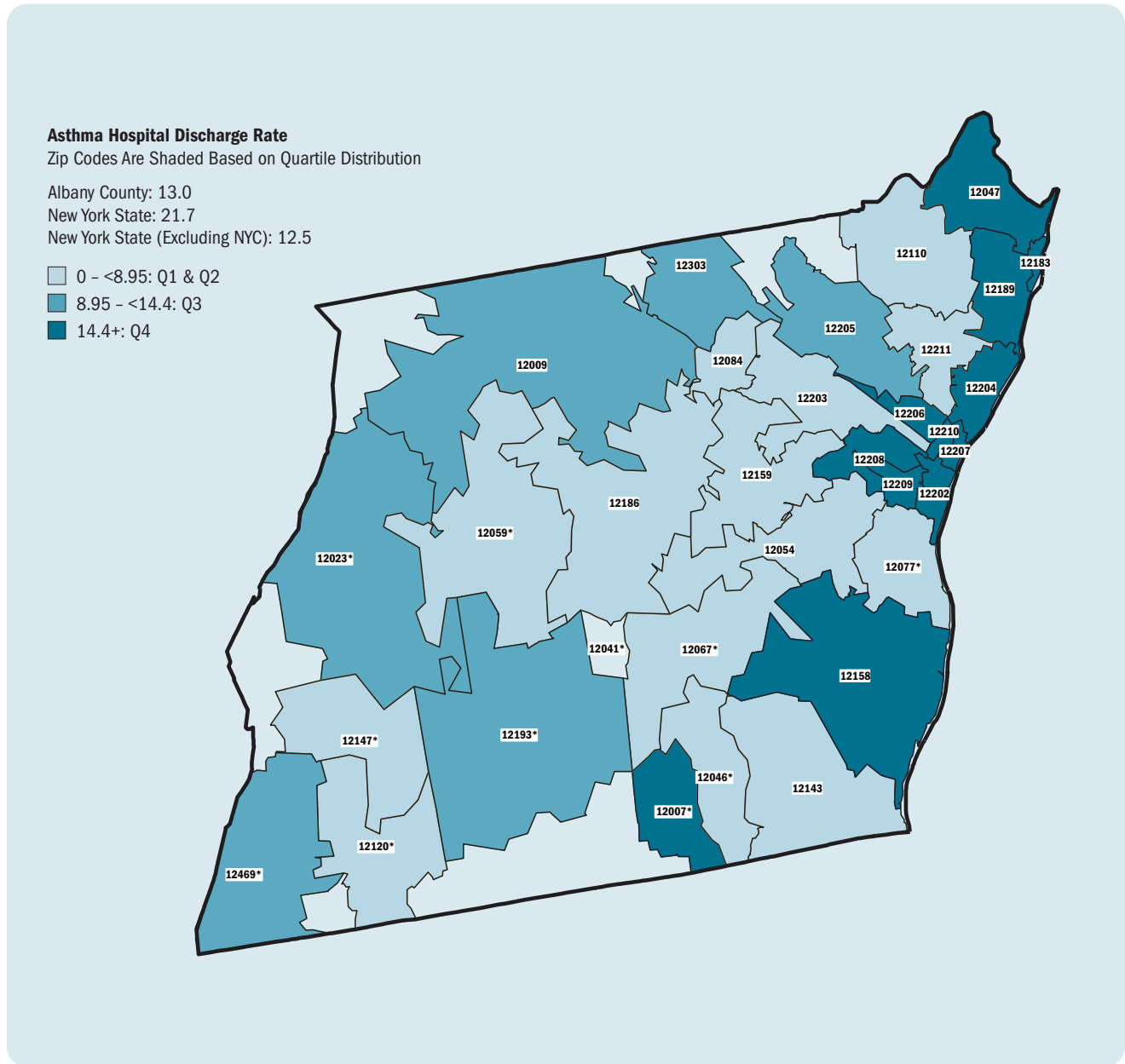
Year	Single Year	3-Year Average	Upstate New York
1996	14.9	—	14.0
1997	16.3	14.7	13.7
1998	12.8	14.0	12.6
1999	12.9	11.5	13.1
2000	8.7	10.4	11.8
2001	9.7	9.3	11.5
2002	9.5	10.4	11.6
2003	11.9	11.6	13.1
2004	13.5	13.0	12.3
2005	13.7	—	12.5

Figure 7-14 and Table 7-3 are examples of 10-year trend data for total asthma hospital discharge rates for Albany County. Data for specific age groups (e.g., 0-4 years, 0-14 years, 0-17 years, 15-24 years, 25-44 years, 45-64

years, 18-64 years, 65+ years) for Albany County, as well as for every other county, are available at the NYSDOH Asthma Surveillance website at [http://www.health.state.ny.us/statistics/ny\\_asthma/index.htm](http://www.health.state.ny.us/statistics/ny_asthma/index.htm)

**Figure 7-15**

**Albany County: Total Asthma Hospital Discharge Rate per 10,000 Residents by ZIP Code, 2003-2005**



**Table 7-4**

Albany County: Total Asthma Hospital Discharge Rate per 10,000 Residents by ZIP Code, Three-Year Average 2003–2005

ZIP Code	Discharges 2003–2005	Population 2004	Discharge Rate
12007**	—	187	—
12009	29	7,479	12.9
12023*	5	1,853	9.0
12041**	—	100	—
12046**	—	615	—
12047	107	18,032	19.8
12054	33	16,033	6.9
12059*	3	1,952	5.1
12067*	0	1,728	0.0
12077*	5	6,150	2.7
12084	11	4,319	8.5
12110	35	19,305	6.0
12120*	0	556	0.0
12143	14	6,224	7.5
12147*	0	490	0.0
12158	32	6,399	16.7
12159	18	8,319	7.2
12183	14	3,029	15.4
12186	14	6,584	7.1
12189	83	16,767	16.5
12193*	8	2,213	12.1
12202	124	9,762	42.3
12203	65	33,413	6.5
12204	32	6,627	16.1
12205	92	26,312	11.7
12206	180	15,644	38.4
12207	25	1,954	42.6
12208	103	20,677	16.6
12209	51	10,063	16.9
12210	50	9,430	17.7
12211	18	12,733	4.7
12303	98	27,725	11.8
12469**	—	715	—

\*Less than or equal to 10 discharges, therefore rate may not be stable (Relative Standard Error &gt;30%).

\*\*Data suppressed for confidentiality purposes.

Figure 7-15 and Table 7-4 are examples of three-year average data for total asthma hospital discharge rates for Albany County ZIP codes. Data for specific age groups (e.g., 0-4 years, 0-14 years, 0-17 years, 18-64 years,

65+ years) for Albany County, as well as for every other county, are available at the NYSDOH Asthma Surveillance website at: [http://www.health.state.ny.us/statistics/ny\\_asthma/index.htm](http://www.health.state.ny.us/statistics/ny_asthma/index.htm)

# Asthma Mortality

## Highlights: Asthma Mortality

- An annual average of 300 deaths were due to asthma in New York during 2003-2005, for a rate of 15.6 deaths per 1,000,000 residents.
- Asthma mortality increased with age. New York State children aged 0-14 years had a 2003-2005 asthma mortality rate of 3.9 per 1,000,000 residents, while New Yorkers 65 years of age and older had a mortality rate of 49.9 per 1,000,000 residents.
- New York State women had a higher 2003-2005 age-adjusted asthma mortality rate of 16.5 per 1,000,000 residents compared to males at 12.6 per 1,000,000 residents.
- Non-Hispanic Black (36.3 per 1,000,000) and Hispanic (30.0 per 1,000,000) New York State residents had much higher age-adjusted mortality rates compared to non-Hispanic White residents (7.9 per 1,000,000).
- In the past ten years, the New York State asthma mortality rate decreased 39% from 24.4 per 1,000,000 residents in 1996 to 14.9 per 1,000,000 residents in 2005. Similar decreases were seen for residents of the Rest of State and New York City.

## Methodology

The source of the asthma mortality data is the New York State Department of Health's (NYSDOH) Bureau of Biometrics and Health Statistics death files. Until 1998, asthma deaths were defined as having a primary cause of death with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code of 493. Since 1999, asthma deaths were defined as having a primary cause of death with ICD-10 of J45 to J46. Population estimates used for computing the asthma mortality rates were obtained from the United States (U.S.) Census Bureau.

Crude and age-adjusted asthma mortality rates were calculated per 1,000,000 residents. The age-adjusted asthma mortality rates were calculated using the 2000 U.S. Standard Population (see Appendix 2).

Ten-year trend data for asthma mortality (1996-2005) are presented for New York State (NYS), New York City and the Rest of State (NYS excluding New York City).

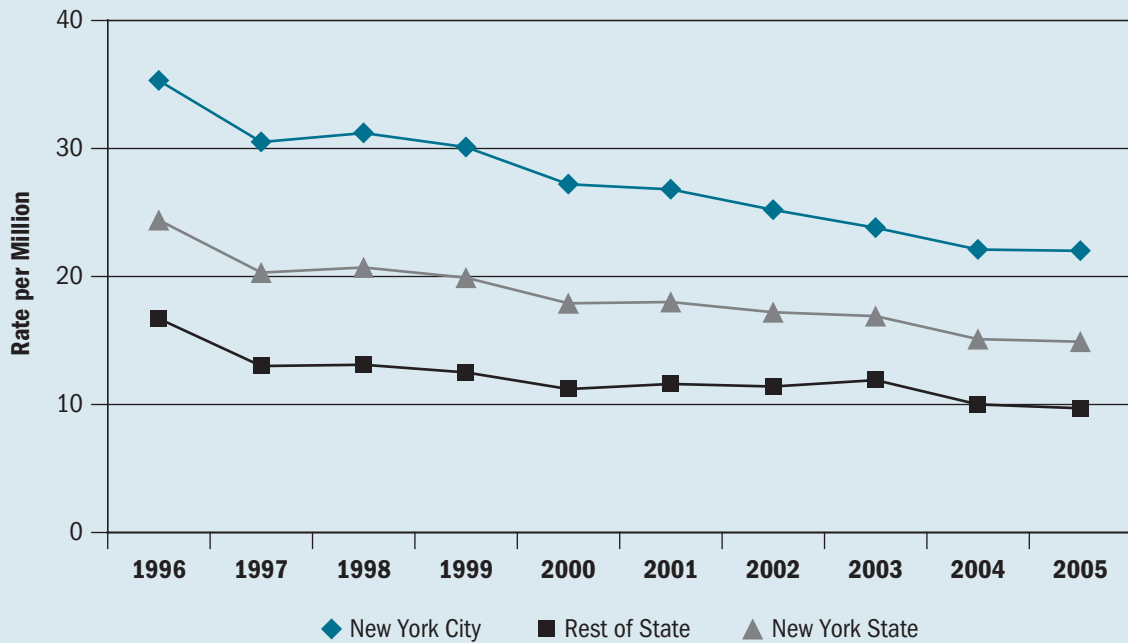
Asthma mortality rates for a specific year were calculated by dividing the number of asthma deaths by the population of that year and then multiplying by 1,000,000.

Asthma mortality data for 2003-2005 were generated by age, gender, race/ethnicity, and geographic region. For the period 2003-2005, the three-year average annual asthma mortality rates per 1,000,000 residents were generated as follows: the total number of asthma deaths for the three-year period was divided by three to get the average number of asthma deaths per year. The average number of asthma deaths was then divided by the middle year population (2004) and multiplied by 1,000,000.

Asthma mortality data for 2003-2005 are presented as tables, maps and graphs at the state and county level. An example of asthma mortality data for counties is also presented.

## Trends in Asthma Mortality

**Figure 8-1**  
Asthma Mortality Rate per 1,000,000 Residents by Region, New York State, 1996–2005



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New York City	35.3	30.5	31.2	30.1	27.1	26.8	25.2	23.9	22.1	22.0
Rest of State	16.7	13.0	13.1	12.5	11.1	11.6	11.4	11.9	10.0	9.7
New York State	24.4	20.3	20.7	19.9	17.8	18.0	17.2	16.9	15.1	14.9

In the past decade, the NYS asthma mortality rate decreased 39% from 24.4 per 1,000,000 residents in 1996 to 14.9 per 1,000,000 in 2005. Similar decreases

were seen for residents of the Rest of State and New York City (Figure 8-1).

## Asthma Mortality by Sociodemographic Characteristics

**Table 8-1**

Asthma Mortality Rate per 1,000,000 Residents by Age Group, New York State, 2003–2005

Age Group	Number	Rate
0-14	44	3.9
15-34	82	5.2
35-64	401	17.4
65+	373	49.9
<i>Total</i>	900	15.6

There was an annual average of 300 deaths due to asthma in New York during 2003-2005, for a rate of 15.6 per 1,000,000 residents. Asthma mortality rates increased with age among NYS residents (Table 8-1).

During 2003-2005, NYS children aged 0-14 years had an asthma mortality rate of 3.9 per 1,000,000 residents, while New Yorkers 65 years of age and older had a mortality rate of 49.9 per 1,000,000 residents.

**Table 8-2**

Crude and Age-Adjusted Asthma Mortality Rate per 1,000,000 Residents by Gender, Race/Ethnicity, and Region, New York State, 2003–2005

		Crude	Age-Adjusted
Gender	Male	12.2	12.6
	Female	18.8	16.5
Race/Ethnicity	Non-Hispanic White	9.8	7.9
	Non-Hispanic Black	33.1	36.3
	Hispanic	22.8	30.0
Region	New York City	22.7	22.5
	Rest of State	10.5	9.6
	New York State	15.6	14.9

NYS women had a higher age-adjusted asthma mortality rate during 2003-2005 (16.5 per 1,000,000 residents) compared to males (12.6 per 1,000,000 residents) (Table 8-2).

Non-Hispanic Black New Yorkers had an age-adjusted mortality rate of 36.3 per 1,000,000 which was more than 4.5 times the non-Hispanic White mortality rate (7.9 per

1,000,000). Hispanic New Yorkers had an age-adjusted asthma mortality rate of 30.0 per 1,000,000, which was almost four times higher than non-Hispanic White residents.

New York City's age-adjusted asthma mortality rate for 2003-2005 was nearly 2.5 times higher than the Rest of State (Table 8-2).



## Asthma Mortality Rates by County

**Table 8-3**

Crude and Age-Adjusted\* Asthma Mortality Rates per 1,000,000 Residents by Region and County, New York State, 2003–2005

Region/County	Deaths				Population 2004	Crude Rate	Adjusted Rate
	2003	2004	2005	Total			
<b>REGION 1: WESTERN NEW YORK</b>							
Allegany	0	0	0	0	50,575	0.0	0.0
Cattaraugus	3	2	2	7	83,179	28.1	23.3
Chautauqua	0	1	0	1	137,267	2.4	3.0
Erie	11	7	10	28	936,318	10.0	8.7
Genesee	0	0	0	0	59,689	0.0	0.0
Niagara	2	5	1	8	218,060	12.2	10.1
Orleans	0	0	1	1	44,138	7.6	7.5
Wyoming	0	0	0	0	42,986	0.0	0.0
<i>Region Total</i>	<i>16</i>	<i>15</i>	<i>14</i>	<i>45</i>	<i>1,572,212</i>	<i>9.5</i>	<i>8.2</i>
<b>REGION 2: FINGER LAKES</b>							
Chemung	3	0	0	3	89,984	11.1	8.2
Livingston	1	1	4	6	64,819	30.9	32.3
Monroe	7	7	6	20	735,177	9.1	8.4
Ontario	1	2	0	3	103,504	9.7	7.7
Schuyler	0	0	0	0	19,505	0.0	0.0
Seneca	0	0	1	1	35,075	9.5	7.8
Steuben	0	0	1	1	98,814	3.4	3.0
Wayne	0	0	0	0	93,861	0.0	0.0
Yates	2	2	1	5	24,669	67.6	54.6
<i>Region Total</i>	<i>14</i>	<i>12</i>	<i>13</i>	<i>39</i>	<i>1,265,408</i>	<i>10.3</i>	<i>8.9</i>
<b>REGION 3: CENTRAL NEW YORK</b>							
Cayuga	4	0	0	4	81,916	16.3	11.5
Cortland	1	0	0	1	49,006	6.8	5.9
Herkimer	2	1	0	3	63,858	15.7	17.3
Jefferson	0	0	0	0	111,467	0.0	0.0
Lewis	1	0	0	1	26,564	12.5	10.3
Madison	2	3	0	5	70,407	23.7	22.3
Oneida	3	2	7	12	234,962	17.0	13.7
Onondaga	4	7	6	17	459,805	12.3	11.8
Oswego	2	1	0	3	123,776	8.1	8.6
St. Lawrence	4	0	1	5	111,306	15.0	14.2
Tompkins	0	0	0	0	100,135	0.0	0.0
<i>Region Total</i>	<i>23</i>	<i>14</i>	<i>14</i>	<i>51</i>	<i>1,433,202</i>	<i>11.9</i>	<i>10.8</i>

Source: 2003–2005 Vital Statistics Data as of February 2007.

\*Adjusted rates are age-adjusted to the 2000 United States population.

**Table 8-3 continued**

**Crude and Age-Adjusted\* Asthma Mortality Rates per 1,000,000 Residents by Region and County, New York State, 2003-2005**

Region/County	Deaths				Population 2004	Crude Rate	Adjusted Rate
	2003	2004	2005	Total			
<b>REGION 4: NEW YORK-PENNSYLVANIA</b>							
Broome	2	4	4	10	197,696	16.9	12.8
Chenango	0	0	0	0	51,861	0.0	0.0
Tioga	1	2	1	4	51,535	25.9	23.5
<i>Region Total</i>	3	6	5	14	301,092	15.5	12.3
<b>REGION 5: NORTHEASTERN NEW YORK</b>							
Albany	5	6	5	16	298,432	17.9	15.5
Clinton	1	2	1	4	81,875	16.3	17.6
Columbia	1	1	0	2	63,668	10.5	14.3
Delaware	0	0	1	1	47,328	7.0	9.0
Essex	1	3	0	4	38,901	34.3	26.6
Franklin	1	0	1	2	51,009	13.1	13.4
Fulton	1	1	0	2	55,463	12.0	12.9
Greene	0	2	1	3	49,195	20.3	19.0
Hamilton	0	0	0	0	5,227	0.0	0.0
Montgomery	1	0	0	1	49,283	6.8	6.2
Otsego	0	0	0	0	62,518	0.0	0.0
Rensselaer	3	1	1	5	154,077	10.8	10.4
Saratoga	1	2	2	5	212,706	7.8	8.3
Schenectady	2	2	1	5	148,042	11.3	9.4
Schoharie	0	0	0	0	32,012	0.0	0.0
Warren	1	0	0	1	65,147	5.1	4.5
Washington	0	2	0	2	62,807	10.6	9.8
<i>Region Total</i>	18	22	13	53	1,477,690	12.0	10.9
<b>REGION 6: HUDSON VALLEY</b>							
Dutchess	2	5	2	9	293,395	10.2	10.1
Orange	7	6	7	20	370,352	18.0	19.6
Putnam	0	1	0	1	100,570	3.3	2.5
Rockland	5	3	2	10	293,626	11.4	10.4
Sullivan	1	1	0	2	76,110	8.8	8.9
Ulster	0	1	4	5	181,779	9.2	8.1
Westchester	10	7	15	32	942,444	11.3	10.4
<i>Region Total</i>	25	24	30	79	2,258,276	11.7	11.2

Source: 2003-2005 Vital Statistics Data as of February 2007.

\*Adjusted rates are age-adjusted to the 2000 United States population.

**Table 8-3 continued**

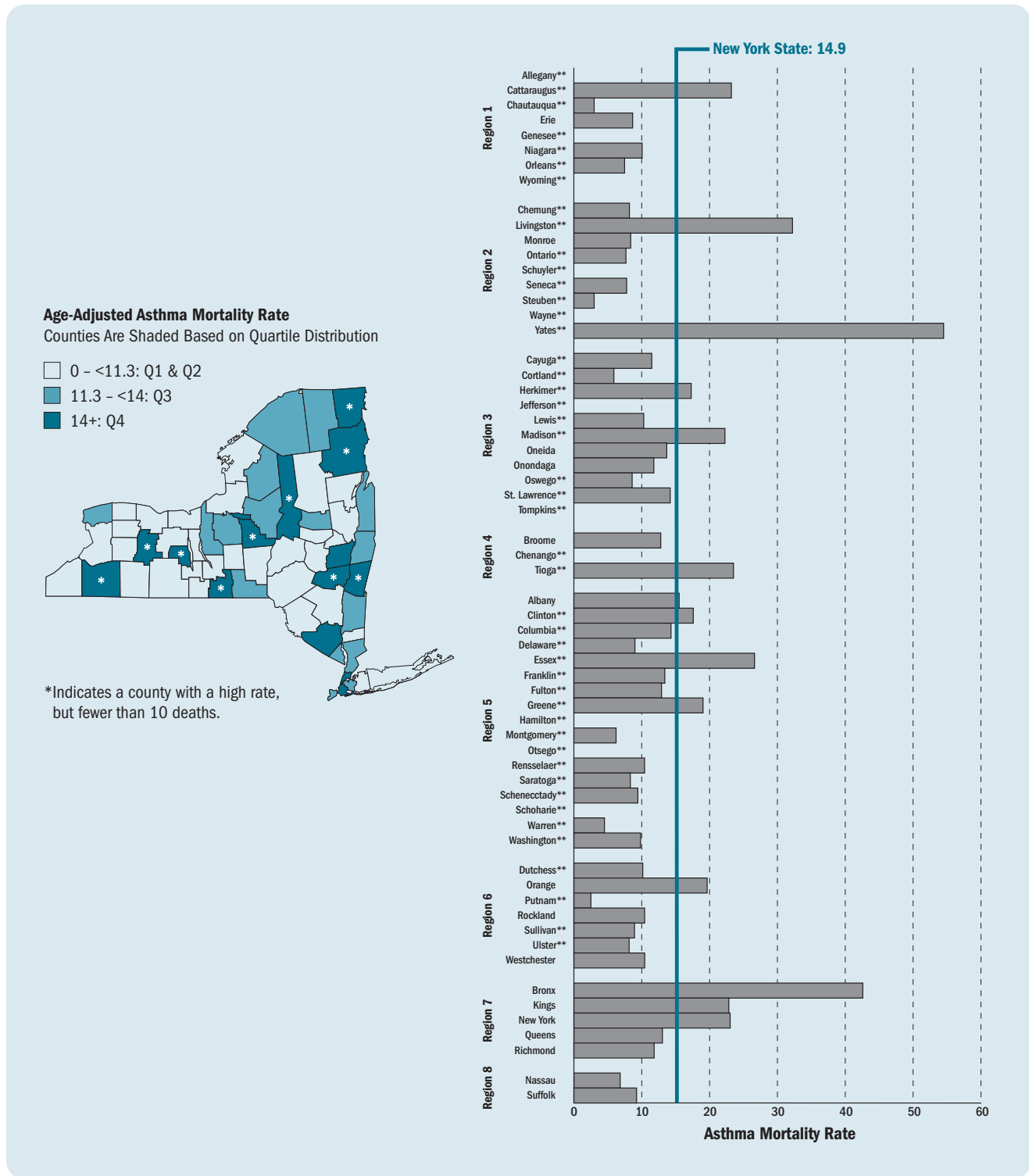
Crude and Age-Adjusted\* Asthma Mortality Rates per 1,000,000 Residents by Region and County, New York State, 2003-2005

Region/County	Deaths				Population 2004	Crude Rate	Adjusted Rate
	2003	2004	2005	Total			
<b>REGION 7: NEW YORK CITY</b>							
Bronx	54	59	46	159	1,365,536	38.8	42.4
Kings	63	53	53	169	2,475,290	22.8	23.0
New York	36	38	41	115	1,562,723	24.5	22.9
Queens	38	24	29	91	2,237,216	13.6	13.0
Richmond	2	5	10	17	463,314	12.2	11.8
<i>Region Total</i>	193	179	179	551	8,104,079	22.7	22.5
<b>REGION 8: NASSAU-SUFFOLK</b>							
Nassau	11	12	7	30	1,339,641	7.5	6.8
Suffolk	22	6	12	40	1,475,488	9.0	9.2
<i>Region Total</i>	33	18	19	70	2,815,129	8.3	7.9
<i>New York State Total</i>	325	290	287	902	19,227,088	15.6	14.9

Source: 2003-2005 Vital Statistics Data as of February 2007.

\*Adjusted rates are age-adjusted to the 2000 United States population.

**Figure 8-2**  
**Age-Adjusted Asthma Mortality Rate per 1,000,000 Residents, New York State, 2003-2005**



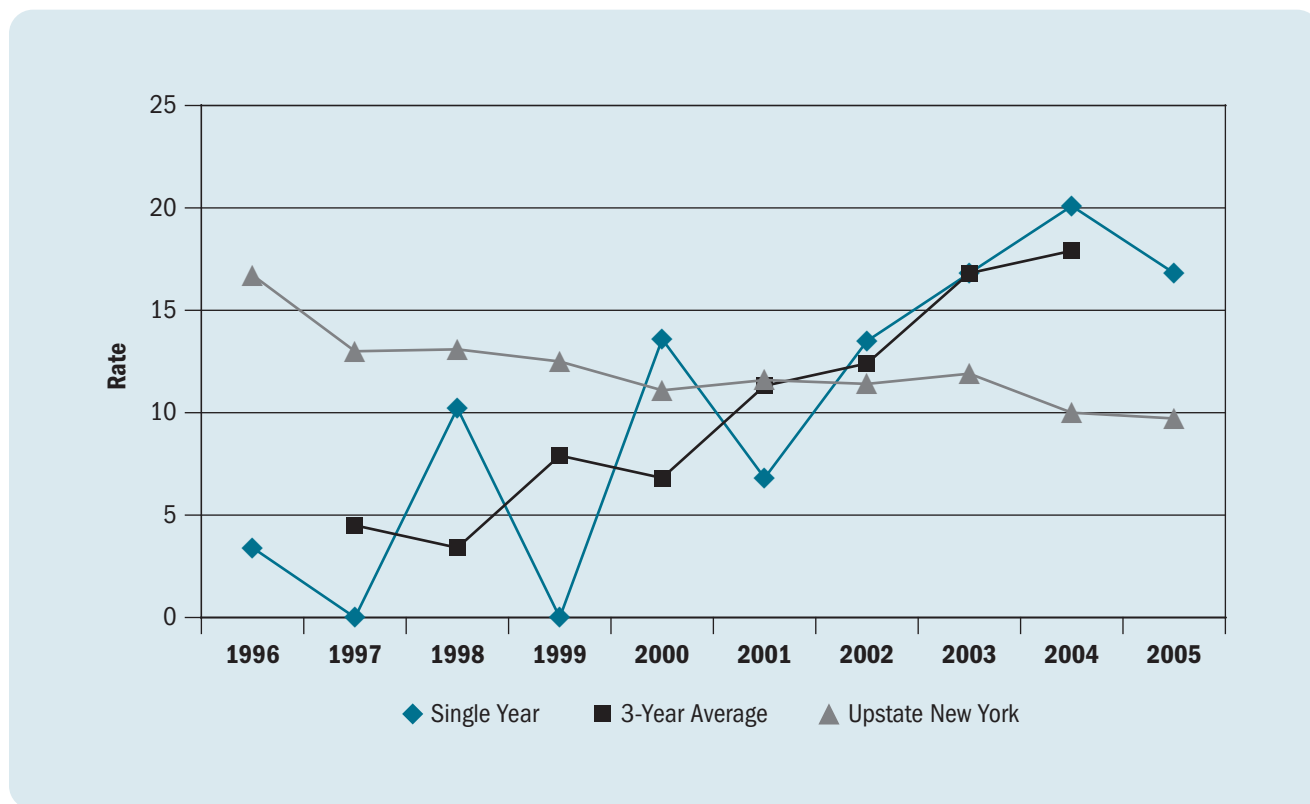
Source: Vital Statistics

\*\*Indicates rate is based on fewer than 10 deaths.

Table 8-3 presents both the crude and age-adjusted county-specific asthma mortality rates for 2003-2005. For NYS, the crude asthma mortality rate was 15.6 and the age-adjusted mortality rate was 14.9 per 1,000,000 residents. Figures 8-2 presents the age-adjusted county-specific asthma mortality in bar chart and map formats.

Asthma mortality rates varied by region and county of residence. The Nassau-Suffolk region had the lowest crude (8.3) and age-adjusted (7.9) mortality rate. New York City had the highest crude (22.7) and age-adjusted (22.5) asthma mortality rate.

**Figure 8-3**  
**Albany County: Asthma Mortality Rate per 1,000,000 Residents, 1996–2005**



**Table 8-4**  
**Albany County: Asthma Mortality Rate per 1,000,000 Residents, 1996–2005**

Year	Single Year	3-Year Average	Upstate New York
1996	3.4	—	16.7
1997	0.0	4.5	13.0
1998	10.2	3.4	13.1
1999	0.0	7.9	12.5
2000	13.6	6.8	11.1
2001	6.8	11.3	11.6
2002	13.5	12.4	11.4
2003	16.8	16.8	11.9
2004	20.1	17.9	10.0
2005	16.8	—	9.7

Figure 8-3 and Table 8-4 are examples of 10-year trend data for asthma mortality rates for Albany County. These data are available for every county in NYS at

the NYSDOH Asthma Surveillance website at: [http://www.health.state.ny.us/statistics/ny\\_asthma/index.htm](http://www.health.state.ny.us/statistics/ny_asthma/index.htm)

# Program-Based Asthma Surveillance

## Highlights: Program-Based Asthma Surveillance

### *Asthma Prevalence Among the Medicaid Population, 2005*

- In 2005, nearly 140,000 (8.7%) Medicaid managed care enrollees were classified as asthma universe (see definition on page 110). The asthma universe prevalence varied by age group. Enrollees aged 0-4 years and 5-9 years had the highest prevalence of asthma universe (12.5% and 12.1%, respectively). Adult enrollees aged 18-56 had the lowest prevalence at 6.7%.
- More than 64,000 (9.2%) Medicaid fee-for-service enrollees were classified as asthma universe. Enrollees aged 57-64 years had the highest prevalence of asthma universe (10.9%). The lowest prevalence was for enrollees aged 10-17 years (7.2%).
- During 2005, 28,720 (2.9%) Medicaid managed care enrollees were classified as persistent asthmatics (see definition on page 110). Enrollees aged 57-64 years had the highest prevalence of persistent asthma (4.8%). The lowest prevalence was 2.3% for enrollees aged 10-17 years.
- Among Medicaid fee-for-service enrollees, more than 15,000 (2.7%) were persistent asthmatics. Enrollees aged 57-64 years had the highest prevalence of persistent asthma (3.4%), followed by enrollees aged 18-56 years (2.9%). The lowest prevalence was 1.8% for enrollees aged 10-17 years.

### *Utilization of Health Services by Medicaid Fee-for-Service Asthma Universe Population, 2005*

- During 2005, there were 32,159 doctor visits, 54,614 outpatient visits, 28,814 emergency department visits and 6,660 hospital discharges due to asthma among the Medicaid fee-for-service asthma universe population. During the same time period, 402,745 asthma related pharmacy claims were filled.

- The number of doctor visits per 100 enrollees was highest among adults aged 57-64 years (59 per 100) and lowest among children aged 5-9 years (30 per 100).
- Outpatient asthma visits were higher in younger age groups, with the highest rate seen in children aged 0-4 years and 5-9 years (105 per 100) and the lowest rate seen in adults aged 18-56 years (79 per 100).
- Asthma emergency department visit rates varied by age group with the highest rate among adults aged 18-56 years (48 per 100) and children aged 0-4 years (47 per 100).
- Hospitalization rates due to asthma were highest among very young children aged 0-4 years (14 per 100) and in adults aged 57-64 years (13 per 100).
- Asthma-related pharmacy claim rates increased with age. The highest rate was among adults aged 57-64 years (892 claims per 100).

### *Managed Care Quality Assurance Reporting Requirement (QARR) Asthma-Specific Indicator*

- Among Commercial and Child Health Plus plans, 94% of children with persistent asthma received appropriate medications for asthma, compared to 90% for children with persistent asthma in Medicaid managed care plans. The proportion of adults receiving appropriate asthma medications was similar among Commercial and Medicaid managed care plan enrollees (90% and 89%, respectively).

## Methodology

### Asthma Prevalence Among Medicaid Enrollees

The information in this chapter represents New York State (NYS) residents served by Medicaid managed care (MMC) and Medicaid fee-for-service (FFS) programs. The majority of Medicaid enrollees are enrolled in MMC, with those in FFS largely composed of institutionalized individuals and those receiving Supplemental Security Income.

Whether enrolled in MMC or Medicaid FFS, enrollees are entitled to preventive and primary care, inpatient care, eye care, as well as additional health services.

Program-based surveillance is not representative of the general population. Approximately 22% of the NYS population is served by Medicaid health care programs. However, these data provide useful information about asthmatics, including the burden of asthma and the use of health care services and medications among this population.

Asthma Medicaid FFS information was collected by the NYS Department of Health (DOH) Office of Health Insurance Programs (OHIP) Audit, Fiscal and Program Planning Data Mart. Asthma MMC information was obtained from the NYSDOH OHIP Medicaid Encounter Data System (MEDS).

This report provides Medicaid asthma universe and persistent asthma prevalence data for Medicaid FFS and MMC populations. Prevalence for MMC and Medicaid FFS data are presented for asthma universe and persistent asthma by age group and total.

Definitions for the asthma universe and persistent asthma are based on the technical specifications for the National Committee for Quality Assurance's (NCQA) Health Plan Employer Data and Information Set (HEDIS®) 2006.<sup>12</sup>

**Asthma Universe:** Individuals were identified as having asthma if during 12 months of 2005 they had at least:

- one outpatient asthma visit with asthma (ICD-9 code 493.XX) as one of the listed diagnoses; or
- one emergency department (ED) visit with asthma (ICD-9 code 493.XX) as the principal diagnosis; or

- one acute inpatient discharge with asthma (ICD-9 code 493.XX) as the principal diagnosis; or
- four asthma medication dispensing events\* (i.e., an asthma medication was dispensed on four occasions).

Asthma universe prevalence was generated for individuals aged 0 to 64 years who were continuously enrolled in Medicaid FFS or MMC for 12 or more months as of December 2005.

**Persistent Asthma:** Individuals are identified as having persistent asthma if they had at least:

- four outpatient asthma visits with asthma (ICD-9 code 493.XX) as one of the listed diagnoses, and at least two asthma medication dispensing events during a specified 12-month period of time; or
- one ED visit with asthma (ICD-9 code 493.XX) as the principal diagnosis during a specified 12-month period of time; or
- one acute inpatient discharge with asthma (ICD-9 code 493.XX) as the principal diagnosis during a specified 12-month period of time; or
- four asthma medication dispensing events\*\* (i.e., an asthma medication was dispensed on four occasions) during a specified 12-month period of time.

Persistent asthma individuals must meet one of four criteria during both the measurement year (2005) and the prior year (criteria need not be the same across years).

Persistent asthma prevalence was generated for individuals aged 0 to 64 years who were continuously enrolled in Medicaid FFS or MMC for 24 or more months as of December 2005.

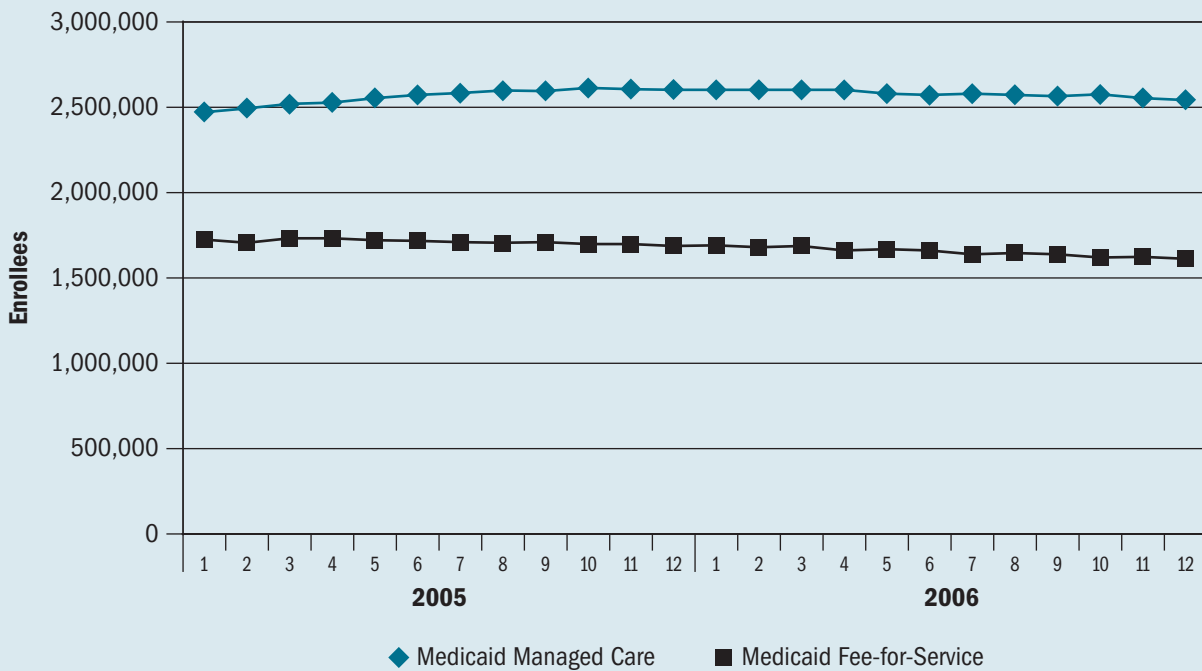
\*A dispensing event is one prescription of an amount lasting 30 days or less; multiple inhalers of the same medication filed on the same date of service should be counted as one dispensing event. There is also a restriction regarding leukotriene dispensing events: for an individual identified as a universe asthmatic due to at least four asthma medication dispensing events, and leukotriene modifiers being the sole asthma medication dispensed, the individual must meet any one of the other three criteria for inclusion in the asthma universe population, or have at least one diagnosis of asthma in any setting.

\*\*A dispensing event is one prescription of an amount lasting 30 days or less; multiple inhalers of the same medication filed on the same date of service should be counted as one dispensing event. There is also a restriction regarding leukotriene dispensing events: for an individual identified as having persistent asthma due to at least four asthma medication dispensing events, and leukotriene modifiers being the sole asthma medication dispensed, the individual must meet any one of the other three criteria for inclusion in the persistent asthma population; or have at least one diagnosis of asthma in any setting in the same year that the leukotriene modifier was dispensed.

## New York State Medicaid Population

**Figure 9-1**

New York State Medicaid Managed Care and Medicaid Fee-for-Service Enrollees by Month, January 2005–December 2006



In presenting asthma surveillance information for MMC and Medicaid FFS, it is important to recognize the trends of enrollment from those two populations. Figure 9-1 presents number of enrollees by month for MMC and Medicaid FFS from January 2005 to December 2006. Enrollment has become relatively stable for the two populations. The MMC

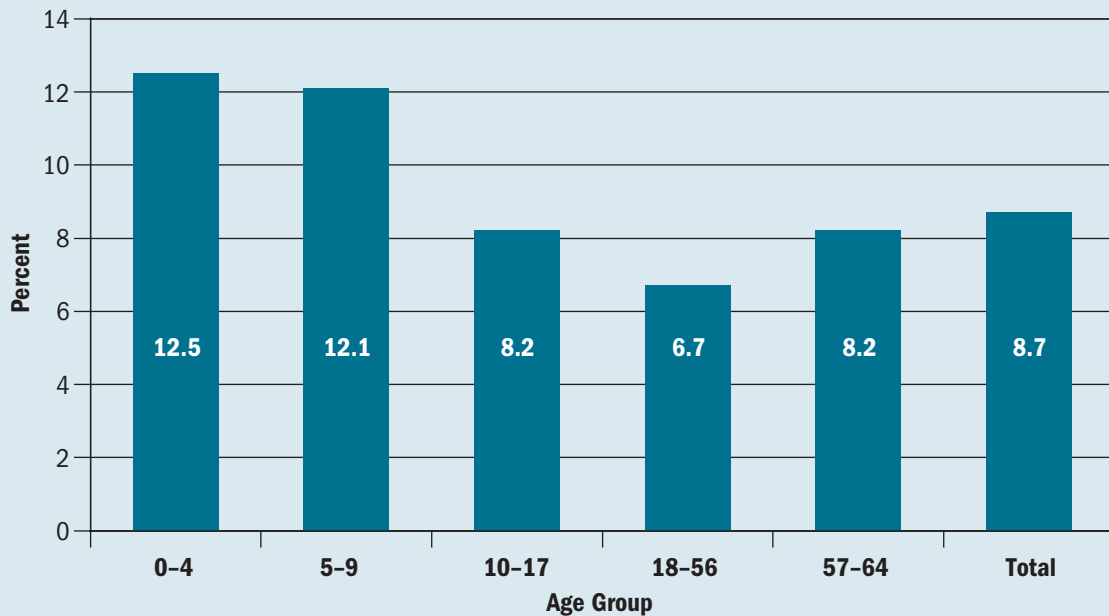
population fluctuated between nearly 2.5 to 2.6 million while Medicaid FFS population varied between 1.6 to 1.7 million per month, during this time period. There was a slight reduction (6.4%) in enrollment among the Medicaid FFS population between January 2005 and December 2006.



## Asthma Prevalence Among the Medicaid Population

**Figure 9-2**

Asthma Universe Prevalence\* by Age Group, Medicaid Managed Care Population, New York State, 2005



\*12 months continuous enrollment.

**Table 9-1**

Asthma Universe Prevalence\* by Age Group, Medicaid Managed Care Population, New York State, 2005

Age Group	Asthma Universe	Medicaid Managed Care Enrollees	Asthma Universe Prevalence Rate per 100
0-4	28,504	227,715	12.5
5-9	28,841	237,939	12.1
10-17	27,408	336,289	8.2
18-56	48,704	727,876	6.7
57-64	6,135	75,133	8.2
Total	139,592	1,604,952	8.7

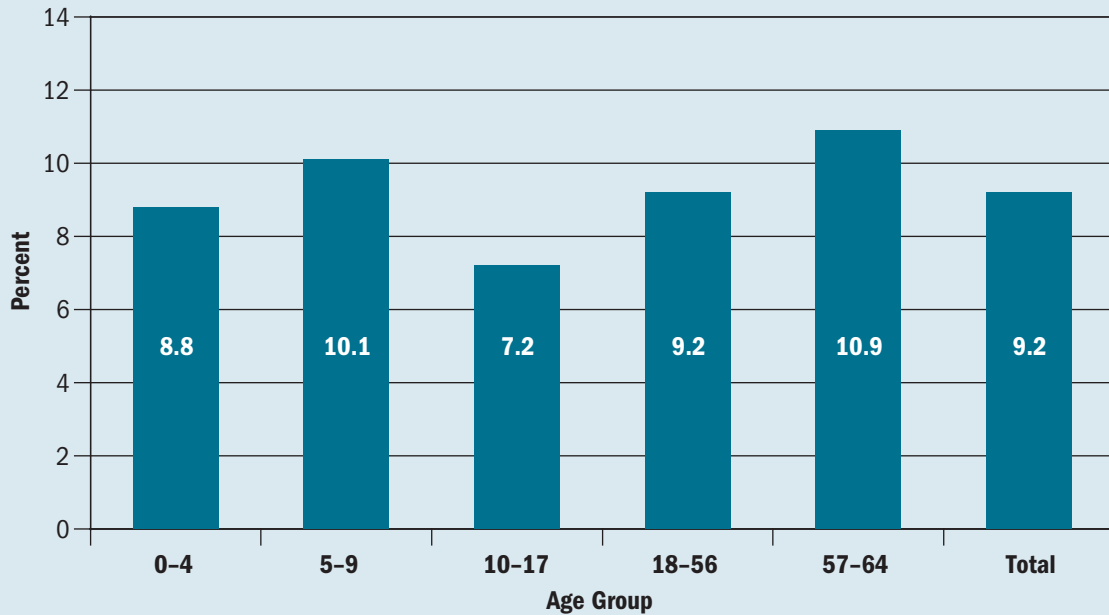
\*12 months continuous enrollment.

There were nearly 140,000 (8.7%) people with asthma among the more than 1.6 million MMC enrollees in 2005. Asthma universe prevalence in MMC enrollees varied by age. Enrollees aged 0-4 years and 5-9 years had the highest

prevalence rate of asthma universe (12.5% and 12.1%, respectively), followed by enrollees aged 10-17 years (8.2%). Adult enrollees aged 18-56 years had the lowest prevalence rate at 6.7% (Figure 9-2, Table 9-1).

**Figure 9-3**

Asthma Universe Prevalence\* by Age Group, Medicaid Fee-for-Service Population, New York State, 2005



\*12 months continuous enrollment.

**Table 9-2**

Asthma Universe Prevalence\* by Age Group, Medicaid Fee-for-Service Population, New York State, 2005

Age Group	Asthma Universe	Medicaid Fee-for-Service Enrollees	Asthma Universe Prevalence Rate per 100
0-4	4,614	52,311	8.8
5-9	5,215	51,833	10.1
10-17	7,458	103,282	7.2
18-56	36,908	399,525	9.2
57-64	10,048	92,359	10.9
Total	64,243	699,310	9.2

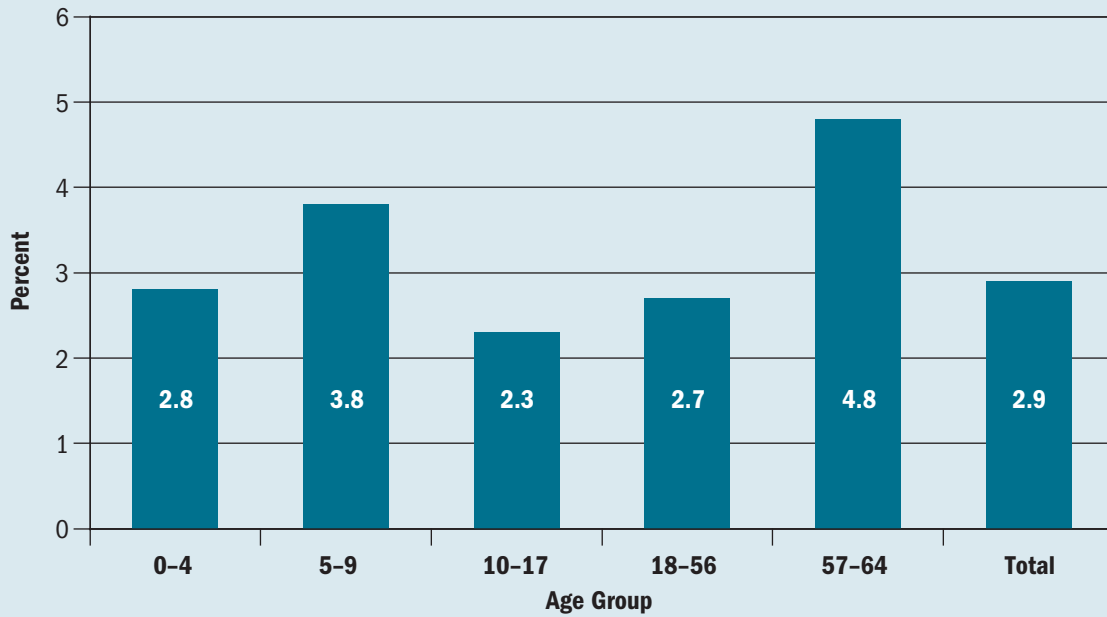
\*12 months continuous enrollment.

Among the approximately 700,000 Medicaid FFS enrollees in 2005, more than 64,000 (9.2%) had asthma. This was 6% higher than MMC asthma universe prevalence. Asthma universe prevalence also varied by age group among FFS enrollees. In contrast to MMC, FFS enrollees

aged 57-64 years had the highest prevalence of asthma universe (10.9%), followed by enrollees aged 5-9 years (10.1%). The lowest prevalence was for enrollees aged 10-17 years (7.2%) (Figure 9-3, Table 9-2).

**Figure 9-4**

Persistent Asthmatic Prevalence\* by Age Group, Medicaid Managed Care Population, New York State, 2005



\*24 months continuous enrollment.

**Table 9-3**

Persistent Asthmatic Prevalence\* by Age Group, Medicaid Managed Care Population, New York State, 2005

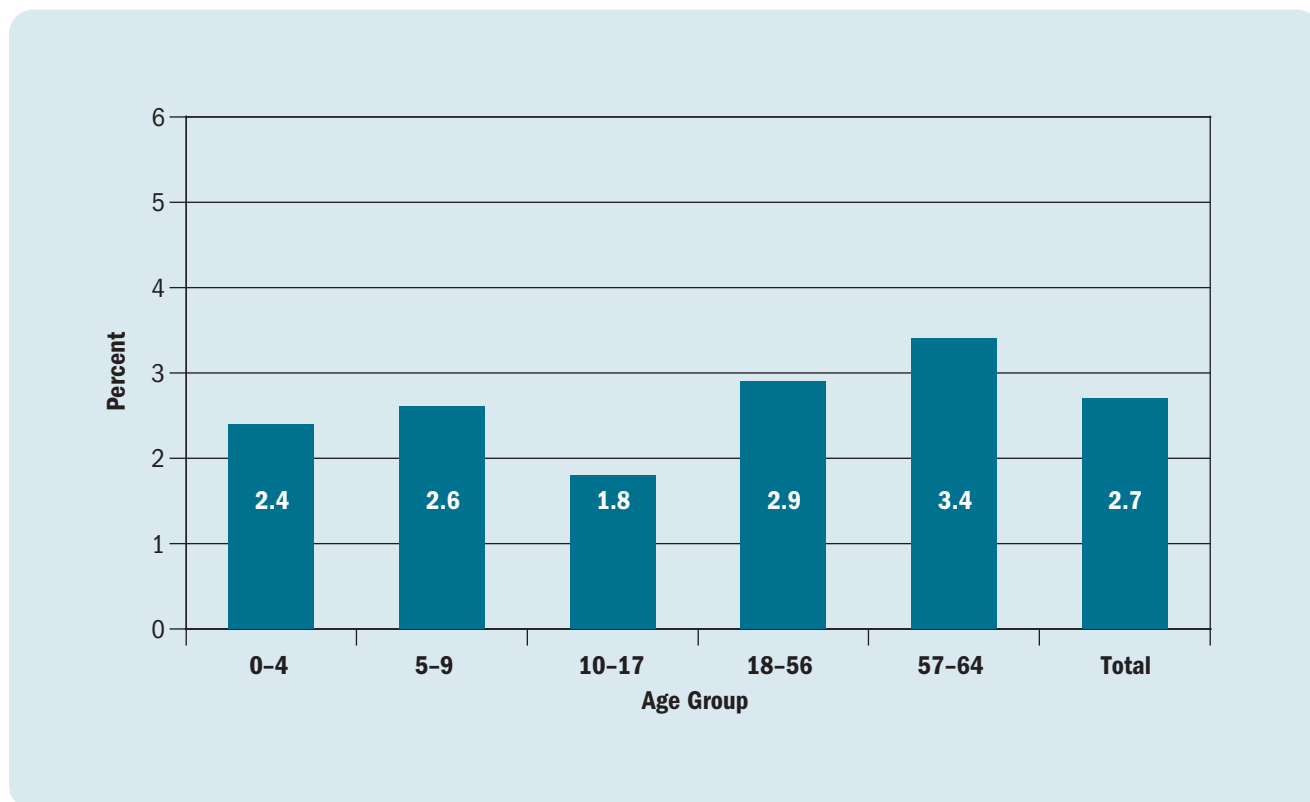
Age Group	Persistent Asthmatics	Medicaid Managed Care Enrollees	Persistent Asthmatic Prevalence per 100
0-4	3,011	109,078	2.8
5-9	6,477	170,082	3.8
10-17	5,612	245,493	2.3
18-56	11,303	425,240	2.7
57-64	2,317	48,151	4.8
Total	28,720	998,044	2.9

\*24 months continuous enrollment.

Among the MMC enrollees with 24 months continuous enrollment by the end of 2005, 28,720 (2.9%) were persistent asthmatics. Prevalence varied by age group among MMC enrollees. Enrollees aged 57-64 years had the

highest prevalence of persistent asthma (4.8%), followed by enrollees aged 5-9 years (3.8%). The lowest prevalence was 2.3% for enrollees aged 10-17 years (Figure 9-4, Table 9-3).

**Figure 9-5**  
**Persistent Asthmatic Prevalence\* by Age Group, Medicaid Fee-for-Service Population, New York State, 2005**



\*24 months continuous enrollment.

**Table 9-4**  
**Persistent Asthmatic Prevalence\* by Age Group, Medicaid Fee-for-Service Population, New York State, 2005**

Age Group	Persistent Asthmatics	Medicaid Fee-for-Service Enrollees	Persistent Asthmatic Prevalence per 100
0-4	658	27,290	2.4
5-9	1,101	41,784	2.6
10-17	1,544	86,726	1.8
18-56	9,494	328,810	2.9
57-64	2,861	84,835	3.4
Total	15,658	569,445	2.7

\*24 months continuous enrollment.

Among Medicaid FFS enrollees with 24 months continuous enrollment by the end of 2005, more than 15,000 (2.7%) were persistent asthmatics. This was 7% lower than MMC persistent asthma prevalence. Persistent asthma prevalence also varied by age group among FFS enrollees.

Enrollees aged 57-64 years had the highest prevalence of persistent asthma (3.4%), followed by enrollees aged 18-56 years (2.9%). The lowest prevalence was 1.8% for enrollees aged 10-17 years (Figure 9-5, Table 9-4).

## Utilization of Health Services by Medicaid Fee-for-Service Asthma Universe Population

### Methodology

Information about the utilization of health services was generated for the NYS Medicaid FFS asthmatic population, who were not enrolled at any time in MMC during 2005. This information corresponds to universe asthmatics (see definition on page 110), aged 0-64 years, who were continuously enrolled in Medicaid FFS during 2005.

The total number of services/claims associated with asthma that were covered by Medicaid FFS was generated based on primary diagnosis with an International classification of Diseases, 9th Revision, Clinical Modification

(ICD-9-CM) code of 493 for physician, outpatient, and emergency department (ED) visits; inpatient hospital services; and drug formulary code for pharmacy claims. The numbers of these services/claims per 100 asthma universe population are also provided. Results are presented for total population and by age group. Utilization of asthma-related health services was not available for the MMC population.

Health care utilization information was only available for the Medicaid FFS population. This information is presented by type of health care service in the following tables:

**Table 9-5**  
Asthma-Related Utilization by Type of Health Care Service by Age Group, Medicaid Fee-for-Service Asthma Universe Population, New York State, 2005

Age Group	Asthma Universe Population	MD Visits	Outpatient Visits	ED Visits	Hospitalizations	Pharmacy Claims
0-4	4,614	1,807	4,832	2,189	623	13,700
5-9	5,215	1,562	5,495	2,042	330	27,813
10-17	7,458	2,290	7,110	2,905	446	36,890
18-56	36,908	20,570	29,083	17,759	3,970	234,711
57-64	10,048	5,930	8,094	3,919	1,291	89,631
<i>Total</i>	<i>64,243</i>	<i>32,159</i>	<i>54,614</i>	<i>28,814</i>	<i>6,660</i>	<i>402,745</i>

**Table 9-6**  
Asthma-Related Utilization Rates (per 100 Enrollees) by Type of Health Care Service by Age Group, Medicaid Fee-for-Service Asthma Universe Population, New York State, 2005

Age Group	MD Visits	Outpatient Visits	ED Visits	Hospitalizations	Pharmacy Claims
0-4	39	105	47	14	297
5-9	30	105	39	6	533
10-17	31	95	39	6	495
18-56	56	79	48	11	636
57-64	59	81	39	13	892
<i>Total</i>	<i>50</i>	<i>85</i>	<i>45</i>	<i>10</i>	<i>627</i>

Overall, there were 32,159 doctor visits, 54,614 outpatient visits, 28,814 ED visits and 6,660 hospital discharges due to asthma in the asthma universe population during 2005. During the same time period, 402,745 asthma-related pharmacy claims were filled (Table 9-5).

The service/claim rates per 100 asthma universe individuals in each service category varied by age. The rates for doctor visits were highest among adults aged 57-64 years (59 per 100) and lowest among children aged 5-9 years (30 per 100). Outpatient asthma visit rates were higher in younger age groups, with the highest rate seen in children

aged 0-4 years and 5-9 years (105 per 100) and the lowest rate seen in adults aged 18-56 years (79 per 100). Asthma ED visit rates varied by age group with the highest rate among adults aged 18-56 years (48 per 100) and children aged 0-4 years (47 per 100). Hospitalizations due to asthma were highest among very young children aged 0-4 years (14 per 100) and in adults aged 57-64 years (13 per 100) and 18-56 years (11 per 100). Asthma related pharmacy claim rates increased with age. The highest rate of asthma related pharmacy claims was among adults aged 57-64 years (892 claims per 100 asthma universe individuals) (Table 9-6).

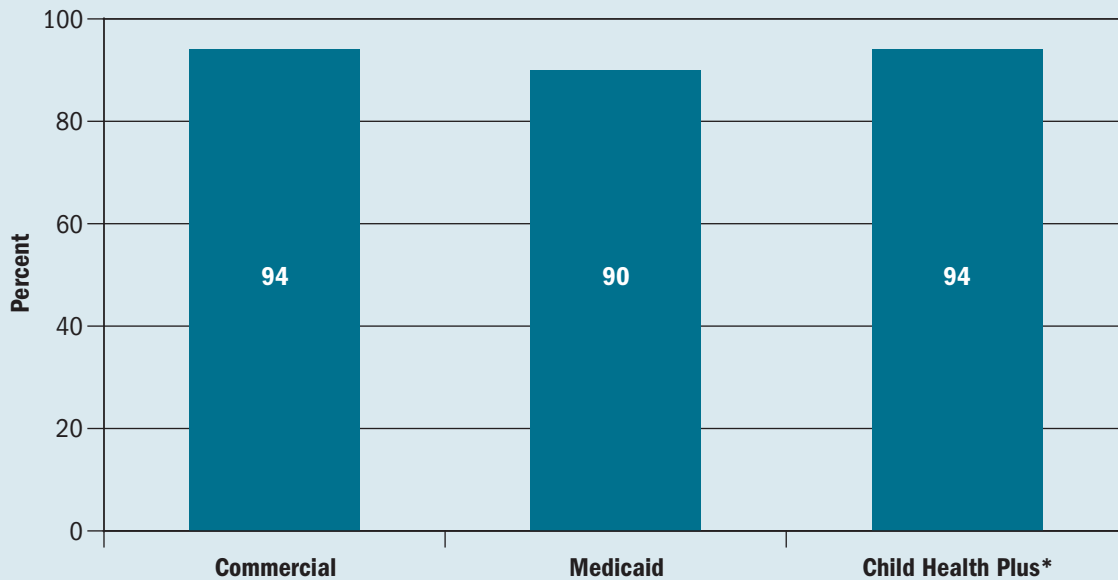
**Methodology**

Quality Assurance Reporting Requirements (QARR) consist of measures from the National Committee for Quality Assurance’s (NCQA) Health Plan Employer Data and Information Set (HEDIS®) 2006 and NYS-specific measures. This report presents a measure for asthma: “Use of Appropriate Medications for People with Asthma” for 2005. The QARR measure is the percentage of enrollees with persistent asthma (see definition page 110) who have received appropriate medications, (i.e., at least one prescription for inhaled corticosteroids, nedocromil, cromolyn sodium, leukotriene modifiers or methylxanthines during the measurement year). The measure was generated for children aged 5-17 years and adults aged 18-56 years.

The QARR measure for asthma in this report contains summary information from 38 managed care plans in NYS. Eighteen plans reported on commercial enrollees; 28 plans reported on Medicaid enrollees; and 28 plans reported on Child Health Plus enrollees.

Figure 9-6 and 9-7 present the proportion of New Yorkers with persistent asthma who are enrolled in managed care plans who received appropriate medications. These proportions were generated by type of plan for children (5-17 years) and adults (18-56 years).

**Figure 9-6**  
Percent of Children Aged 5–17 Years with Persistent Asthma Who Received Appropriate Medications by Type of Plan, New York State, 2005

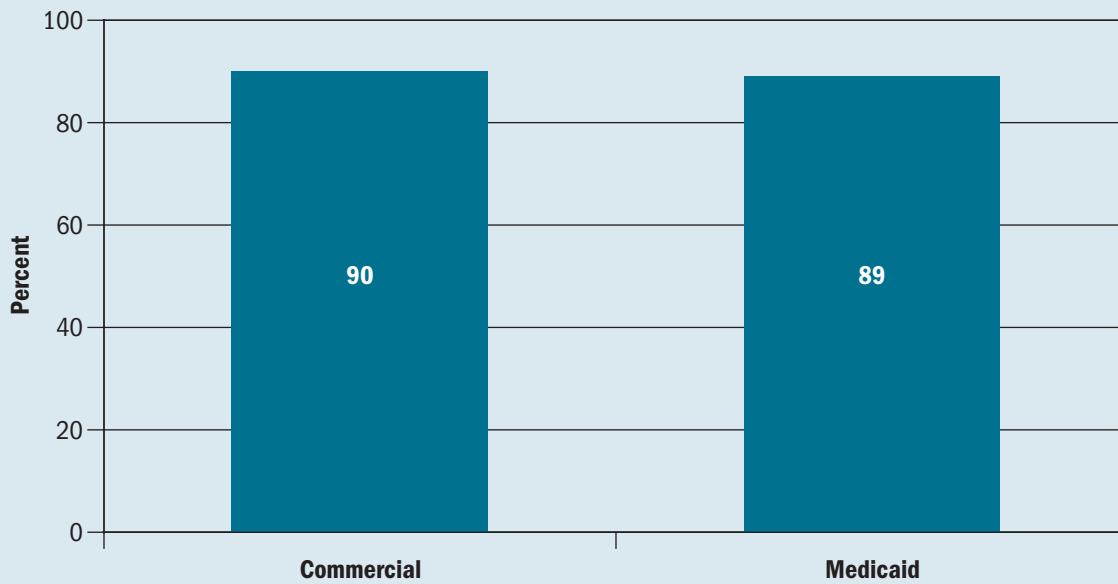


\*Child Health Plus data included children aged 5-18 years.

Among the persistent asthmatic children, 94% enrollees of either Commercial or Child Health Plus plans received appropriated medications for asthma; 90% of persistent

asthmatic children enrolled in MMC plans received appropriate medications (Figure 9-6).

**Figure 9-7**  
Percent of Adults Aged 18–56 Years with Persistent Asthma Who Received Appropriate Medications by Type of Plan, New York State, 2005



Adults with persistent asthma enrolled in Commercial or MMC plans showed similar proportions of receiving appropriate medications (90% and 89%, respectively) (Figure 9-7).

# Work-Related Asthma

## Introduction

In the United States (U.S.), as in other industrialized countries, asthma of occupational etiology causes a largely unrecognized burden of preventable disease and disability.<sup>13</sup> In the last decade, work-related asthma (WRA) has become the most frequently diagnosed occupational respiratory disease in developed countries. Estimates of the proportion of asthma in the adult population that are work-related range from 2% to 26%.<sup>14</sup> It is estimated that in the U.S., there are more than 20 million workers potentially exposed to occupational asthmagens.<sup>15</sup> WRA can present as a *de novo* condition or it can be work-aggravated asthma. It can be

triggered by either irritants or sensitizers, of which more than 350 have been documented.<sup>16,17</sup> Cases identified as WRA most likely represent only a small proportion of all cases of WRA. It can be difficult to distinguish a diagnosis of definitive WRA from asthma of a non-occupational origin.

The prognosis for a case of WRA depends on the severity and duration at the time of diagnosis. The most effective clinical approach is to avoid or modify exposure to the offending agent(s). Optimally, industrial hygiene measures can prevent exposures from occurring in the first place.



## Highlights: Work-Related Asthma

### ***Work-Related Asthma Prevalence***

- During 2005, approximately 11.4% of adult asthmatics in New York State indicated that either a health professional had informed them they had work-related asthma, or they had informed a health professional of such.

### ***Work-Related Asthma Hospital Discharges***

- During 1996-2005, the number of work-related asthma hospital discharges ranged from 50-81 per year in New York State.
- The average length of stay for a work-related asthma hospitalization decreased over time from 5.2 to 3.3 days while the average cost increased during the 1996-2005 time period.

- The 2005 total work-related asthma hospitalization cost was approximately \$600,000.

### ***Work-Related Asthma Incidence***

#### **New York State Occupational Health Clinic Network**

- The number of definite or possible work-related asthma patients seen by the New York State Occupational Health Clinic Network in the past 10 years, by year of first visit, ranged from 73 patients in 1998 to 328 patients in 2004.

#### **New York State Occupational Lung Disease Registry**

- The number of work-related asthma patients reported to the Occupational Lung Disease Registry increased from 48 in 1996 to 150 in 2005.

## Work-Related Asthma Prevalence

### Methodology

The 2005 New York State (NYS) BRFSS survey included two questions for assessing both lifetime prevalence and current prevalence of asthma:

- “Have you ever been told by a doctor, nurse or other health professional that you had asthma?”
- [If “yes”] “Do you still have asthma?”

If an individual responded affirmatively to both of those questions, then two questions were asked to determine if the asthma was work-related:

- “Were you ever told by a doctor, nurse or other health professional that your asthma was related to any job you ever had?”

- “Did you ever tell a doctor, nurse or other health professional that your asthma was related to any job you ever had?”

A positive response to either of these questions was used to classify the respondent as having work-related asthma (WRA). The true prevalence may be underestimated as these totals represent only individuals who have spoken to a health care professional about the potential for an occupational etiology.

### Work-Related Asthma Prevalence

**Table 10-1**

Percent of Adult Asthmatics with Work-Related Asthma by Gender, New York State BRFSS, 2005

	Males		Females		Total	
	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI	Weighted Prevalence (%)	95% CI
Respondent Was Told by a Doctor They Had Work-Related Asthma	6.5	3.4–9.5	6.7	4.2–9.2	6.6	4.7–8.6
Respondent Told a Health Professional They Had Work-Related Asthma	10.1	3.8–16.5	6.6	4.1–9.1	8.0	5.0–10.9
Yes to Either Question	13.1	6.5–19.7	10.2	7.2–13.3	11.4	8.2–14.6

Approximately 11.4% of adult asthmatics in NYS have indicated that either a health professional has informed them they have WRA or they have informed a health

professional of such (Table 10-1). This represents an estimated 140,857 individuals.

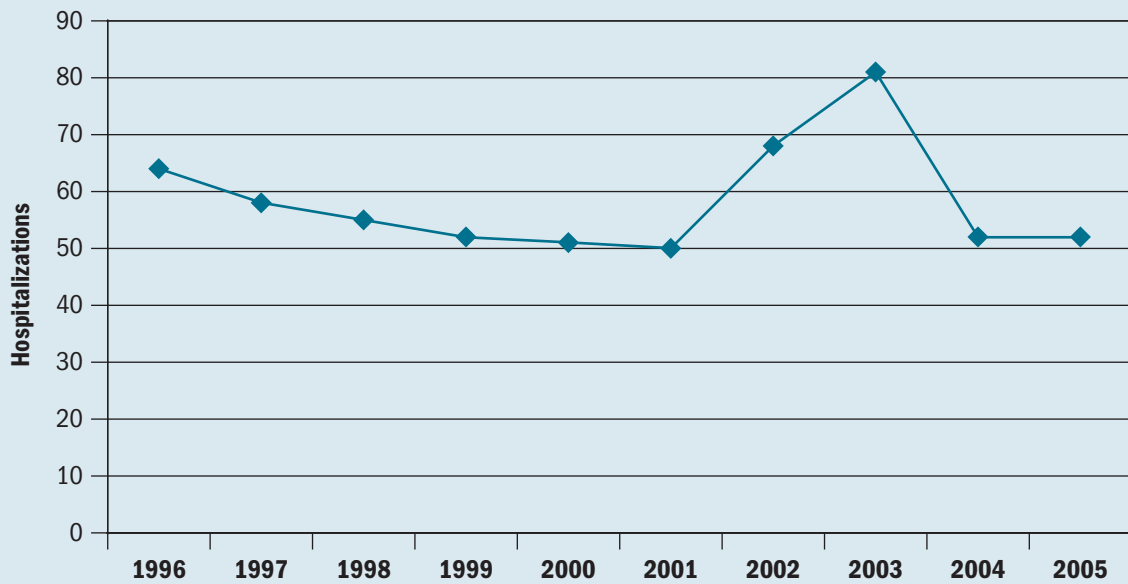
### *Methodology*

Asthma hospital discharge information for New York State (NYS) has been generated from the Statewide Planning and Research Cooperative System (SPARCS) database. Hospital discharge data were reviewed from 1996 through 2005 to identify hospitalizations related to WRA. A WRA hospital discharge was defined as having a principal diagnosis with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code of 493 and having the primary expected payer as Worker's Compensation. The same patient may have been hospitalized for asthma more than once in these data.

The majority of individuals with work-related illnesses do not file for Workers' Compensation. Additionally, self-employed individuals such as farmers, independent contractors, federal employees, and railroad, longshore and maritime workers are not covered by state Worker's Compensation systems. The attribution of payer in the hospital discharge dataset may not be accurate - this represents suspected payer at time of admission and may not actually be the payment source. Therefore, the data are considered an under-representation of the actual number of individuals hospitalized with WRA.

**Figure 10-1**

Annual Work-Related Asthma Hospital Discharges, New York State Residents, 1996–2005



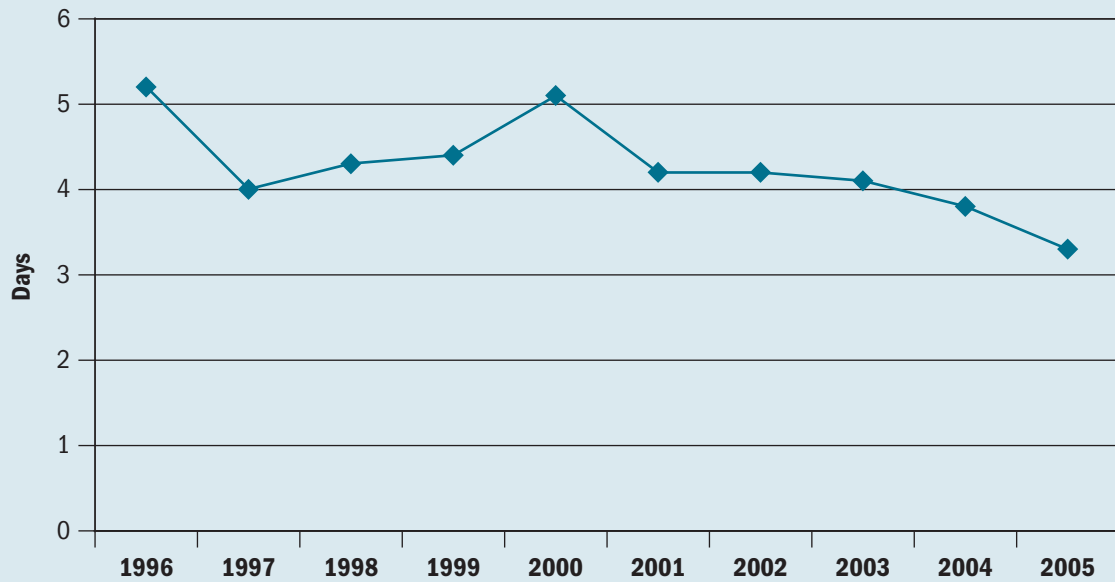
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Discharges	64	58	55	52	51	50	68	81	52	52

From 1996 to 2005, the number of annual WRA hospital discharges among NYS residents decreased

approximately 19% from 64 to 52 with a peak at 81 in 2003 (Figure 10-1).

**Figure 10-2**

Average Length of Stay for Work-Related Asthma Hospital Discharges, New York State Residents, 1996–2005

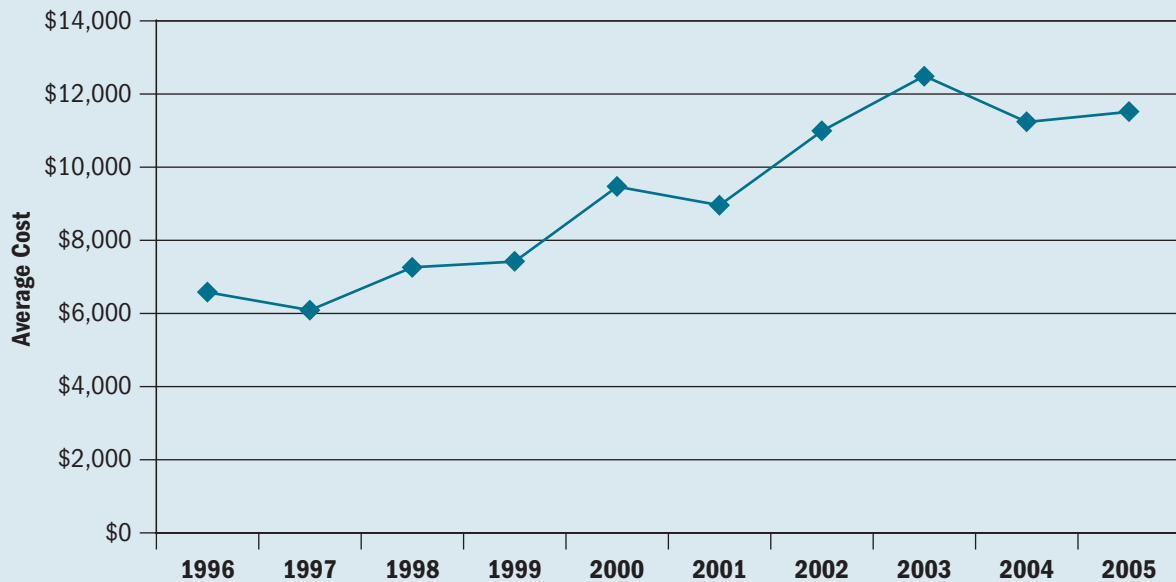


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Average Length of Stay (Days)	5.2	4.0	4.3	4.4	5.1	4.2	4.2	4.1	3.8	3.3

During 1996-2005, the average length of stay for a WRA hospitalization decreased 37% from 5.2 days in 1996 to 3.3 days in 2005 (Figure 10-2).

**Figure 10-3**

**Average Cost per Work-Related Asthma Hospitalizations, New York State Residents, 1996–2005**



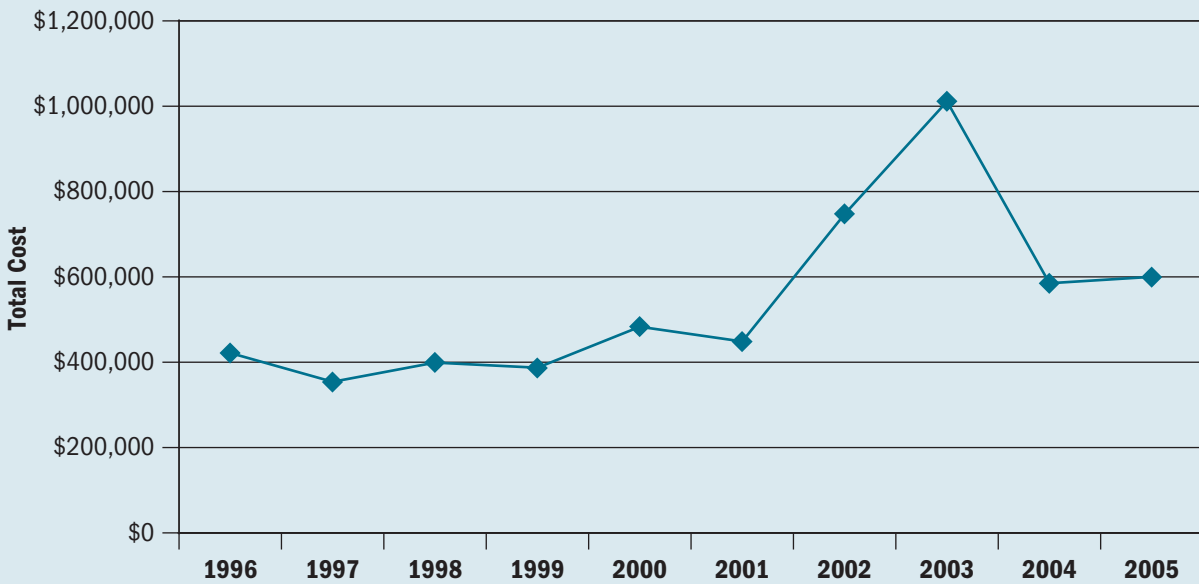
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Average Cost	\$6,580	\$6,086	\$7,255	\$7,422	\$9,470	\$8,956	\$10,990	\$12,482	\$11,238	\$11,516

An increasing trend for average cost per WRA hospitalization was seen between 1996-2005. The average cost per WRA hospitalization increased 75% from \$6,580 in 1996 to \$11,516 in 2005 with a peak at \$12,482 in 2003.

Average cost per WRA hospitalization was not adjusted for inflation, therefore comparisons across years should be made with caution (Figure 10-3).

**Figure 10-4**

**Total Cost of Work-Related Asthma Hospitalizations, New York State Residents, 1996–2005**



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total Cost	\$421,089	\$353,014	\$399,047	\$385,925	\$482,993	\$447,824	\$747,234	\$1,011,056	\$584,367	\$598,856

An increasing trend occurred for total cost of WRA hospitalizations between 1996 and 2005. The total cost of WRA hospitalizations increased 42%, from \$421,089 in 1996 to \$598,856 in 2005 with a peak at \$1,011,056 in 2003.

Total cost per WRA hospitalization was not adjusted for inflation, therefore comparisons across years should be made with caution (Figure 10-4).

### *Methodology*

The NYS Occupational Health Clinic Network is comprised of seven regionally based clinics (plus five satellite locations), as well as one agricultural medicine clinic called the New York Center for Agricultural Medicine and Health in Cooperstown. Each clinic is run independently with partial funding from the State. The clinics are mandated to: provide an objective diagnosis of suspected work-related medical problems; conduct medical screenings for groups of workers who are at increased risk of occupational illness; make referrals for treatment to other medical specialists, if necessary; perform industrial hygiene evaluation of workplaces of concern; and provide education and prevention programs. In aggregate, the eight clinics see approximately 5,000 workers each year, from hundreds of workplaces. The clinics all use the same patient data software. Patient data are collected and maintained in a central database in the NYSDOH Bureau of Occupational Health.

A WRA case was defined if the patient record had a diagnosis of asthma that was determined to be definitely or possibly work-related according to the clinician. This report presents the number of cases seen, by year of the patient's first visit, from all of the clinics during 1996-2005.

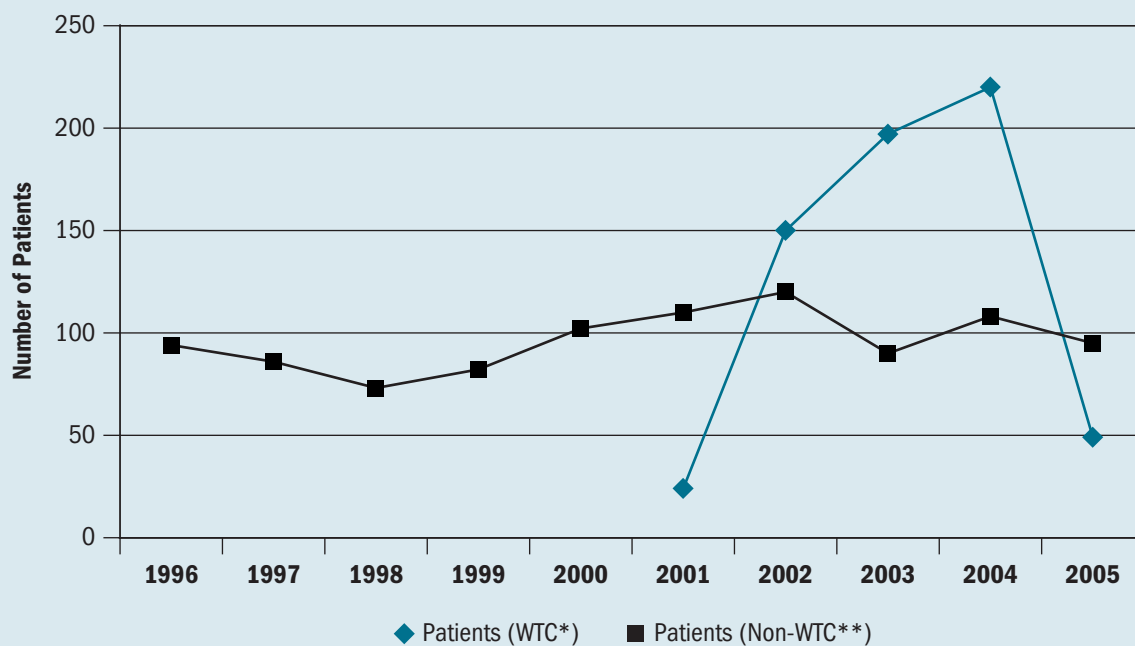
The large increase in the number of patients seen for the first time, between 2002 and 2004, resulted from the World Trade Center disaster. Each clinic independently determined whether the visit was related to the World Trade Center disaster.

It is recognized that clinic-based reporting suffers from problems with referral bias (individuals with a particular exposure or adverse health outcome are more likely to choose certain physicians or health clinics than those who are not similarly affected); therefore, it is unknown whether the patients seen by the clinic network are representative of the State's employed population.



**Figure 10-5**

**Number of Work-Related Asthma Patients Seen by the New York State Occupational Health Clinic Network by Year of First Visit, 1996–2005**



\*Patients that resulted from World Trade Center disaster.

\*\*Patients that did not result from the World Trade Center disaster.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Patients (WTC*)	—	—	—	—	—	24	150	197	220	49
Patients (Non-WTC**)	94	86	73	82	102	110	120	90	108	95
<i>Total Patients</i>	94	86	73	82	102	134	270	287	328	144

The number of patients with a diagnosis of asthma that was definitely or possibly associated with their work environment who were seen by the NYS Occupational Health Clinic Network, by year of first visit, increased 249% from 94 in

1996 to 328 in 2004. The large increase in the number of patients seen for the first time, between 2002 and 2004, resulted from the World Trade Center disaster. The number of patients seen decreased to 144 in 2005 (Figure 10-5).

### *Methodology*

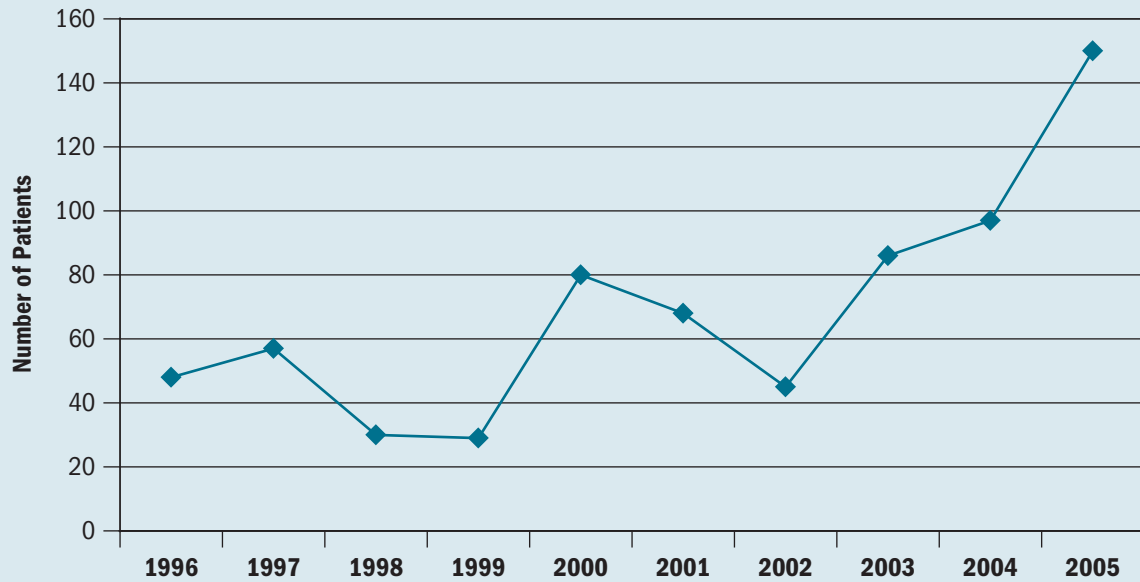
The Occupational Lung Disease Registry (OLDR) was originally established in 1981 in order to assist with the reduction of the morbidity and mortality of New York residents due to exposure to respirable toxic materials in the work environment. All physicians, health facilities and laboratories are required to report any cases of occupational lung disease to NYSDOH.

This section provides the number of work-related asthma patients reported to the New York State OLDR by year of first report during 1996-2005.

The OLDR has had problems with underreporting. From 2003 to 2005, NYS utilized National Institute for Occupational Safety and Health (NIOSH) Core Occupational Health Surveillance funding to enhance reporting to the registry. These efforts have substantially increased reports received by the registry. Patients are not mutually exclusive from the hospital discharge patients or from the NYS Occupational Health Clinic Network.

**Figure 10-6**

Number of Suspected or Confirmed Work-Related Asthma Patients Reported to the New York State Occupational Lung Disease Registry by Year of First Report, 1996-2005



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Patients	48	57	30	29	80	68	45	86	97	150

During 1996-2005, the number of WRA patients reported to the OLDR increased 213% from 48 in 1996 to 150 in 2005 (Figure 10-6).

# Asthma Costs

## Highlights: Asthma Costs

### **Asthma Hospitalization Costs – Total**

- The total cost of asthma hospitalizations in New York State for 2005 was approximately \$502 million, a 62% increase in the cost since 1996 (\$309 million). The Consumer Price Index adjusted asthma hospitalization cost increased 15% from the 1996 adjusted cost of \$437 million.
- The average cost per asthma hospitalization increased 110% from \$6,044 in 1996 to \$12,699 in 2005. The average adjusted asthma hospitalization cost increased 48% over this time period. This occurred despite the average length of stay for an asthma hospitalization decreasing 10% from 4.1 days to 3.7 days during the same time period.

### **Asthma Hospitalization Costs by Sociodemographic Characteristics**

- The average cost per asthma hospitalization increased with age.
- Females had consistently higher average asthma hospitalization costs compared to males throughout 1996-2005.
- Residents of New York City had consistently higher average costs per asthma hospitalization than residents from the Rest of State throughout 1996-2005.
- Medicare had the highest average cost of \$19,343 among all sources of payment for 2005 asthma hospitalizations. This was followed by Third Party/Private insurance (\$11,406), Medicaid (\$10,939), and Self-pay (\$7,675).
- During 2003-2005, Medicaid accounted for 45% of the total asthma hospitalizations and incurred 40% of the total asthma hospitalization costs. Medicare, on the other hand, accounted for 20% of the total asthma hospitalizations and incurred 31% of the total asthma hospitalization costs.

### **Asthma Medicaid Fee-for-Service Costs**

- In 2005, over \$100 million were spent on more than 64,000 asthma universe individuals for asthma-related services for an average cost of \$1,570 per asthma enrollee. This was 5.8% of the Medicaid fee-for-service dollars spent on this population for all services (\$1.7 billion).
- Hospitalizations comprised 43% of the total asthma-related costs, with an average cost of \$6,494 per hospitalization and \$9,813 per recipient. Pharmacy costs comprised 47% of the total, with an average of \$118 per claim and \$1,060 per recipient.
- There was great variation in average asthma hospitalization and pharmacy costs per recipient among age groups of the Medicaid fee-for-service asthma universe population. The average asthma hospitalization costs increased 56% from \$6,855 in the 5-9 year age group to \$10,708 in the 18-56 year age group. The average asthma pharmacy costs nearly doubled from \$703 in the 0-4 year age group to \$1,343 for asthmatics aged 57-64 years.
- About 70% of Medicaid fee-for-service costs was spent on pharmacy for the Rest of State while only 40% of Medicaid fee-for-service costs was spent on pharmacy for New York City. The proportion of costs due to asthma hospitalizations was two times higher for New York City when compared to the Rest of State.
- New York City accounted for 73% of the total New York State Medicaid fee-for-service cost while serving 60% of the state Medicaid fee-for-service population. The overall average cost per asthma universe individual for New York City was 80% higher than the Rest of State.

### *Methodology*

Asthma hospitalization cost information has been generated from the Statewide Planning and Research Cooperative System (SPARCS) database. The cost information from SPARCS represents billing data that were submitted by hospitals in New York State (NYS). An asthma hospitalization was defined as having a principal diagnosis with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code of 493.

The total asthma hospitalization costs included the accommodation charge and the ancillary charge for all patients hospitalized within a given year. The accommodation charge is defined as the accommodation rate charged per day for a specific type of accommodation multiplied by the length of stay in days. The rate charged per day depends on type of room (e.g., private, semi-private or within a ward), type of care (e.g., general, medical, rehabilitation, etc.) and level of care. The ancillary charge is the sum of all ancillary costs (e.g., nursing, pharmacy, laboratory, respiratory therapy, pulmonary function, etc.).

Crude and Consumer Price Index (CPI)-adjusted asthma hospitalization costs and average asthma hospitalization costs were calculated. Adjusted asthma hospitalization costs were calculated using the 2005 CPI<sup>18</sup> to adjust for inflation (see Appendix 2).

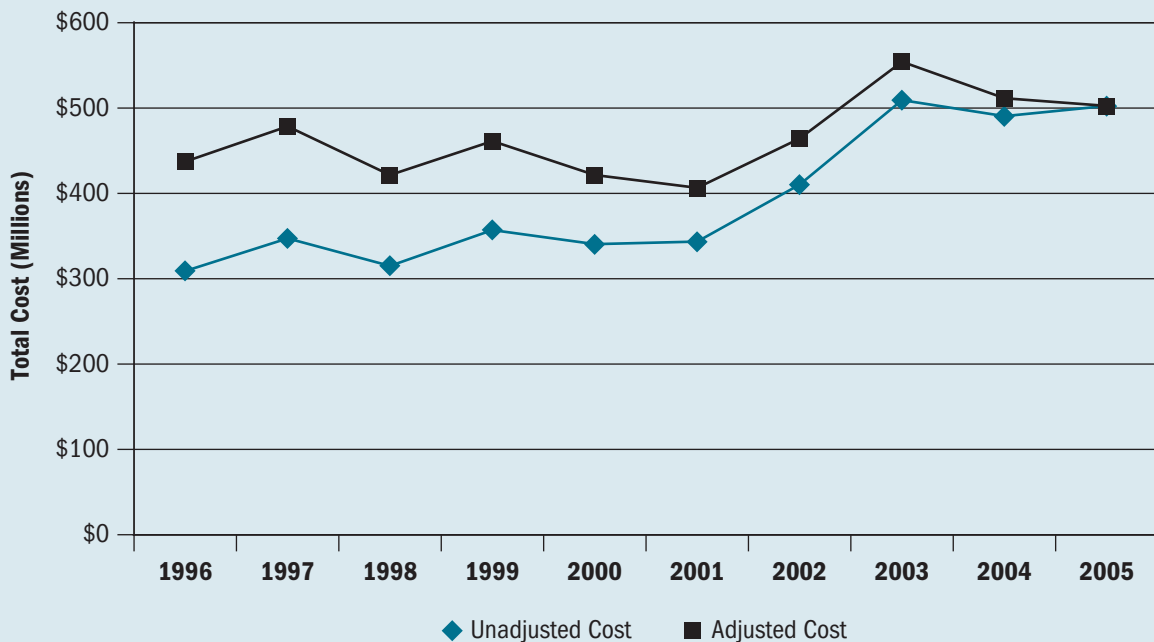
This report provides 10-year (1996-2005) trends for asthma hospitalization cost information: total cost, average cost per asthma hospitalization, and average length of stay per hospitalization. The trends for average cost information were generated by age, gender, source of payment, and geographic region.

Pie charts that compare the number of asthma populations to the cost incurred for NYS residents during 2003-2005 are presented by age, gender, source of payment, and geographic region.

The SPARCS database reflects billing information, therefore the hospitalization costs may overestimate the actual costs that are reimbursed.

**Figure 11-1**

**Total Crude and Adjusted\* Cost of Asthma Hospitalizations, New York State, 1996-2005**



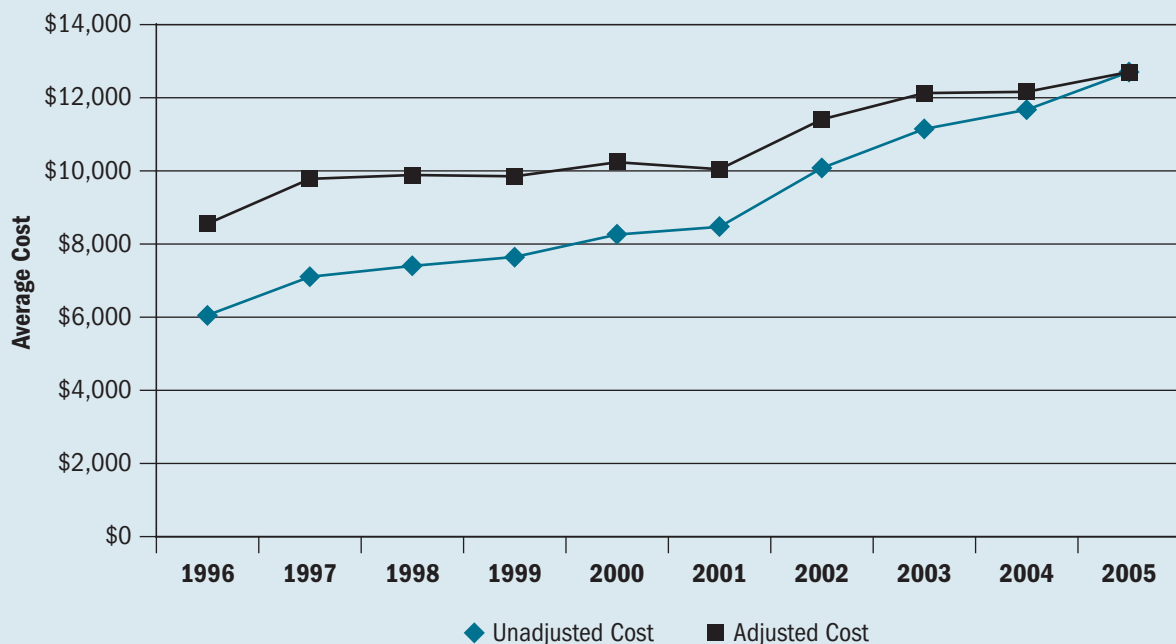
\*Cost-adjusted using the 2005 Consumer Price Index.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total Cost (Millions)	\$309	\$347	\$315	\$357	\$340	\$343	\$410	\$509	\$490	\$502
Adjusted Total Cost (Millions)	\$437	\$478	\$421	\$461	\$421	\$406	\$464	\$554	\$511	\$502

There were increasing trends for both crude and adjusted total cost of asthma hospitalizations between 1996-2005. The crude total cost of asthma hospitalizations increased 62% from \$309 million in 1996 to \$502 million in 2005.

The adjusted total cost of asthma hospitalizations increased 15%, from \$437 million in 1996 to \$502 million in 2005 (Figure 11-1).

**Figure 11-2**  
**Average Crude and Adjusted\* Cost per Asthma Hospitalization, New York State, 1996–2005**



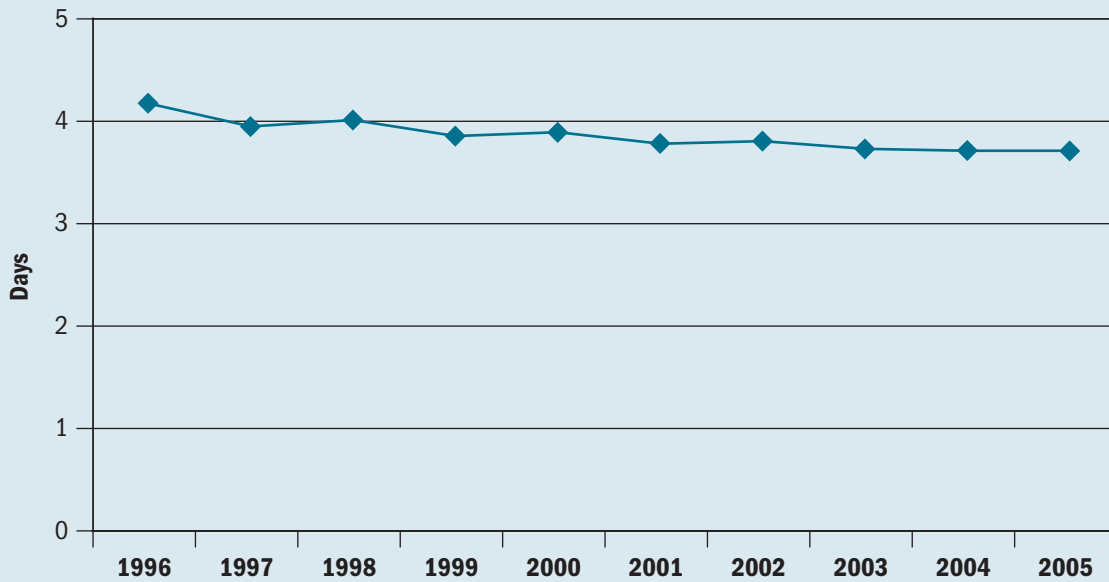
\*Cost-adjusted using the 2005 Consumer Price Index.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Average Cost (Millions)	\$6,044	\$7,102	\$7,402	\$7,636	\$ 8,263	\$ 8,474	\$10,076	\$11,144	\$11,669	\$12,699
Adjusted Average Cost (Millions)	\$8,560	\$9,783	\$9,881	\$9,849	\$10,240	\$10,040	\$11,402	\$12,123	\$12,162	\$12,699

Increasing trends for both crude and adjusted average cost per asthma hospitalization were seen between 1996-2005. The average cost per asthma hospitalization increased 110% from \$6,044 in 1996 to \$12,699

in 2005. The adjusted average cost per asthma hospitalization increased 48% from \$8,560 in 1996 to \$12,699 in 2005 (Figure 11-2).

**Figure 11-3**  
**Average Length of Stay for Asthma Hospitalizations, New York State, 1996-2005**



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Average Length of Stay (Days)	4.1	3.9	4.0	3.8	3.8	3.7	3.8	3.7	3.7	3.7

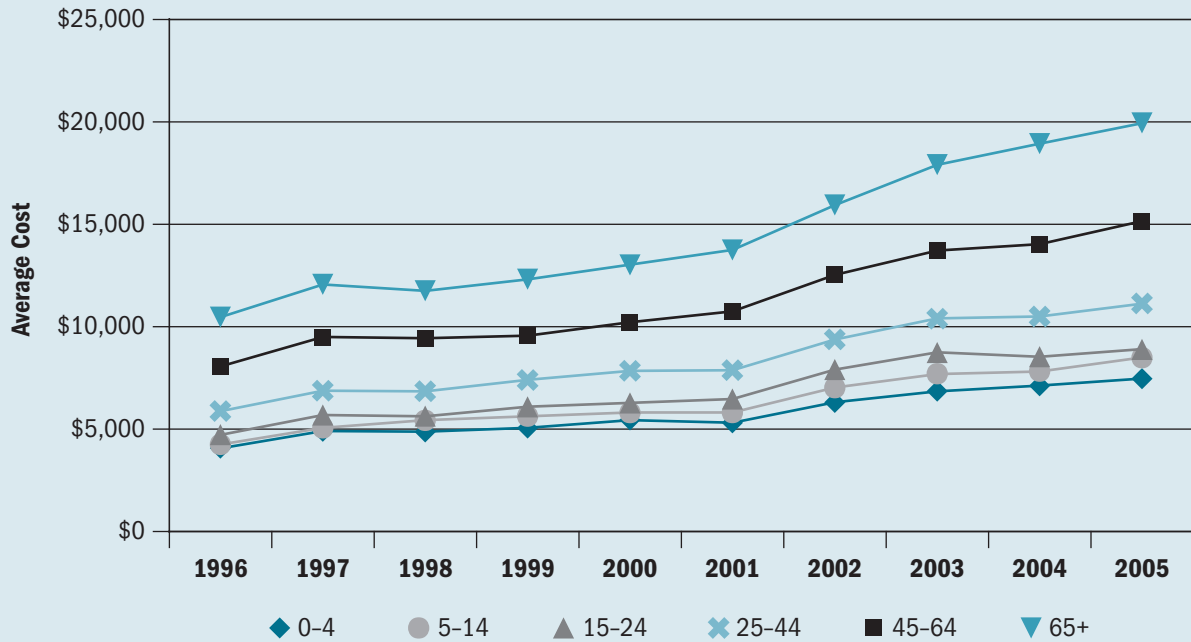
During 1996-2005, the average length of stay for an asthma hospitalization decreased 10% from 4.1 days in

1996 to 3.7 days in 2003 and remained the same during 2003-2005 (Figure 11-3).



## Asthma Hospitalization Costs by Sociodemographic Characteristics

**Figure 11-4**  
Average Cost per Asthma Hospitalization by Age Group, New York State, 1996-2005



Age Group	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0-4	\$ 4,064	\$ 4,887	\$ 4,853	\$ 5,045	\$ 5,440	\$ 5,300	\$ 6,295	\$ 6,847	\$ 7,107	\$ 7,453
5-14	\$ 4,244	\$ 5,052	\$ 5,417	\$ 5,623	\$ 5,796	\$ 5,798	\$ 7,012	\$ 7,694	\$ 7,820	\$ 8,479
15-24	\$ 4,723	\$ 5,680	\$ 5,626	\$ 6,079	\$ 6,268	\$ 6,461	\$ 7,901	\$ 8,731	\$ 8,527	\$ 8,884
25-44	\$ 5,874	\$ 6,867	\$ 6,844	\$ 7,390	\$ 7,838	\$ 7,872	\$ 9,376	\$10,385	\$10,491	\$11,130
45-64	\$ 8,040	\$ 9,486	\$ 9,426	\$ 9,544	\$10,213	\$10,731	\$12,528	\$13,716	\$14,015	\$15,134
65+	\$10,458	\$12,062	\$11,747	\$12,312	\$13,009	\$13,739	\$15,938	\$17,906	\$18,932	\$19,943

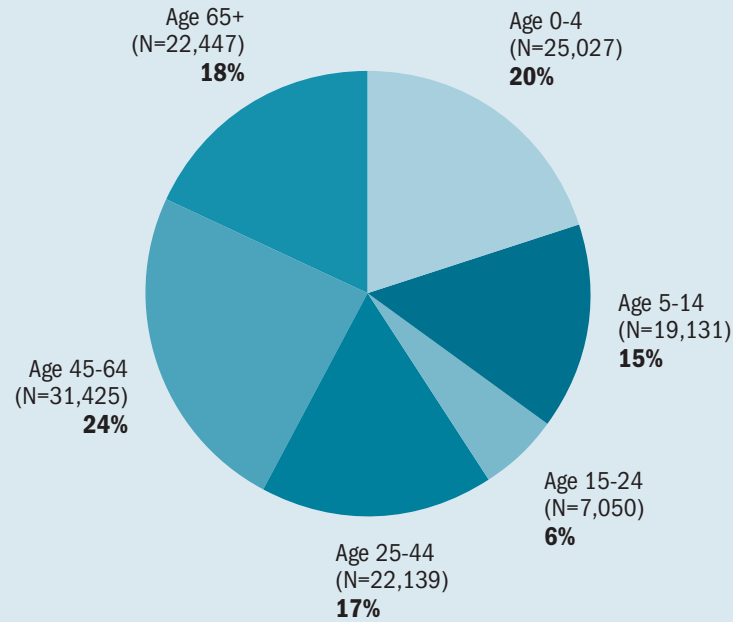
Average cost per asthma hospitalization for all age groups increased between 1996-2005 and the increases were greater among older age groups. In addition, the average cost per asthma hospitalization increased with

age in any given year. In 2005, the average cost for those aged 0-4 years was \$7,453; the 65 and older age group had an average cost of \$19,943 (Figure 11-4).

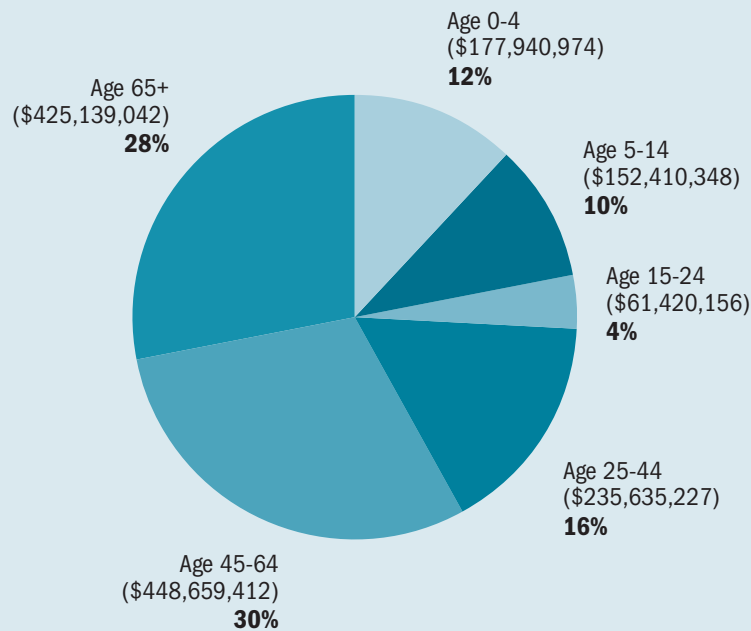
**Figure 11-5**

Comparison of Number of Asthma Hospitalizations to Cost Incurred by Age Group, New York State Residents, 2003–2005

**Total Asthma Hospitalizations by Age Group, New York State Residents, 2003–2005**



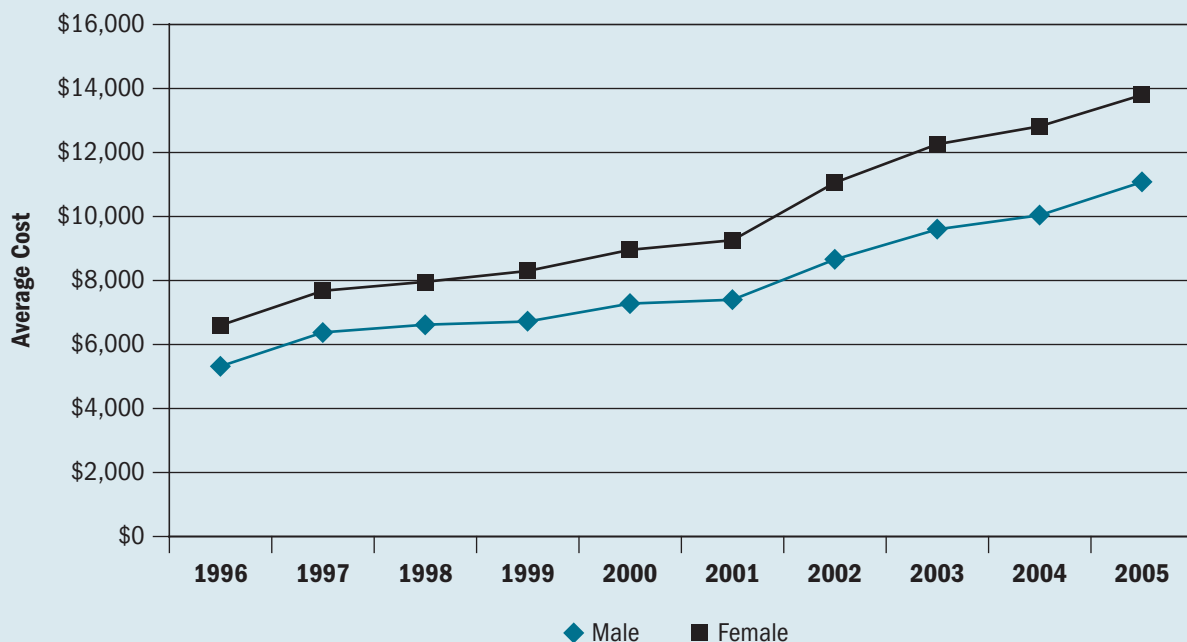
**Total Asthma Hospitalization Cost by Age Group, New York State Residents, 2003–2005**



During 2003-2005, asthma hospital discharges for the 0-4 year age group comprised 20% of all discharges, yet contributed only 12% to the total cost. Conversely, the 65

and older age group comprised 18% of the hospitalizations, yet accounted for 28% of the total cost (Figure 11-5).

**Figure 11-6**  
**Average Cost per Asthma Hospitalization by Gender, New York State Residents, 1996-2005**



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Male	\$5,313	\$6,369	\$6,611	\$6,723	\$7,274	\$7,397	\$ 8,658	\$ 9,601	\$10,040	\$11,078
Female	\$6,588	\$7,669	\$7,947	\$8,298	\$8,955	\$9,253	\$11,063	\$12,246	\$12,815	\$13,800

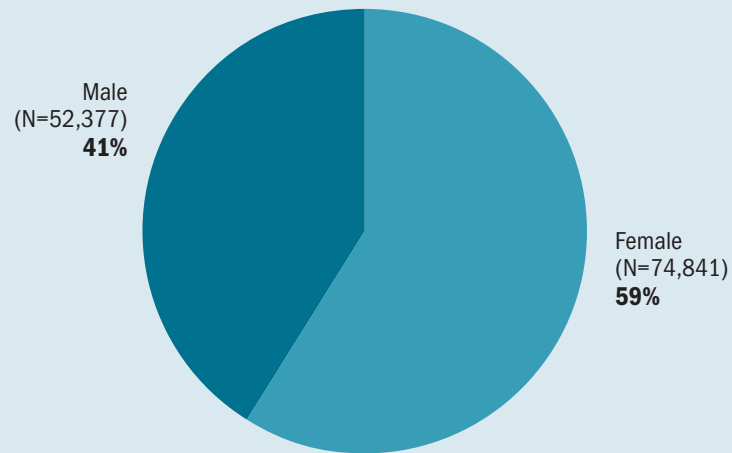
During 1996-2005, females had consistently higher average asthma hospitalization costs compared to males. In 2005, the average female asthma hospitalization cost

of \$13,800 was 25% higher than the male average cost of \$11,078 (Figure 11-6).

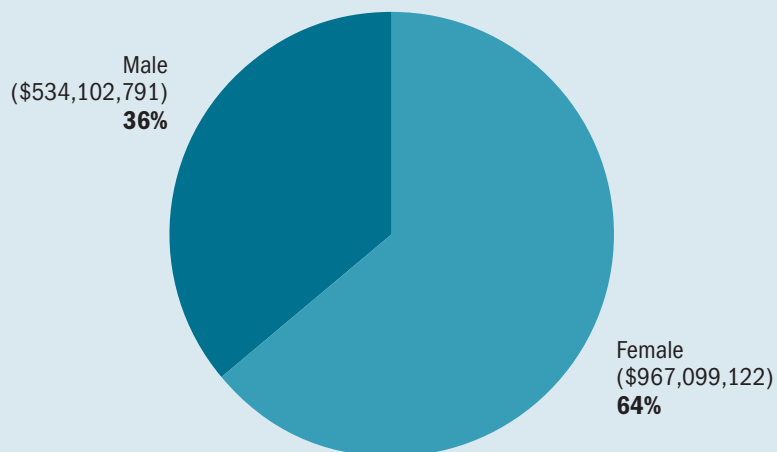
**Figure 11-7**

Comparison of Number of Asthma Hospitalizations to Cost Incurred by Gender, New York State Residents, 2003–2005

**Total Asthma Hospitalizations by Gender, New York State Residents, 2003–2005**



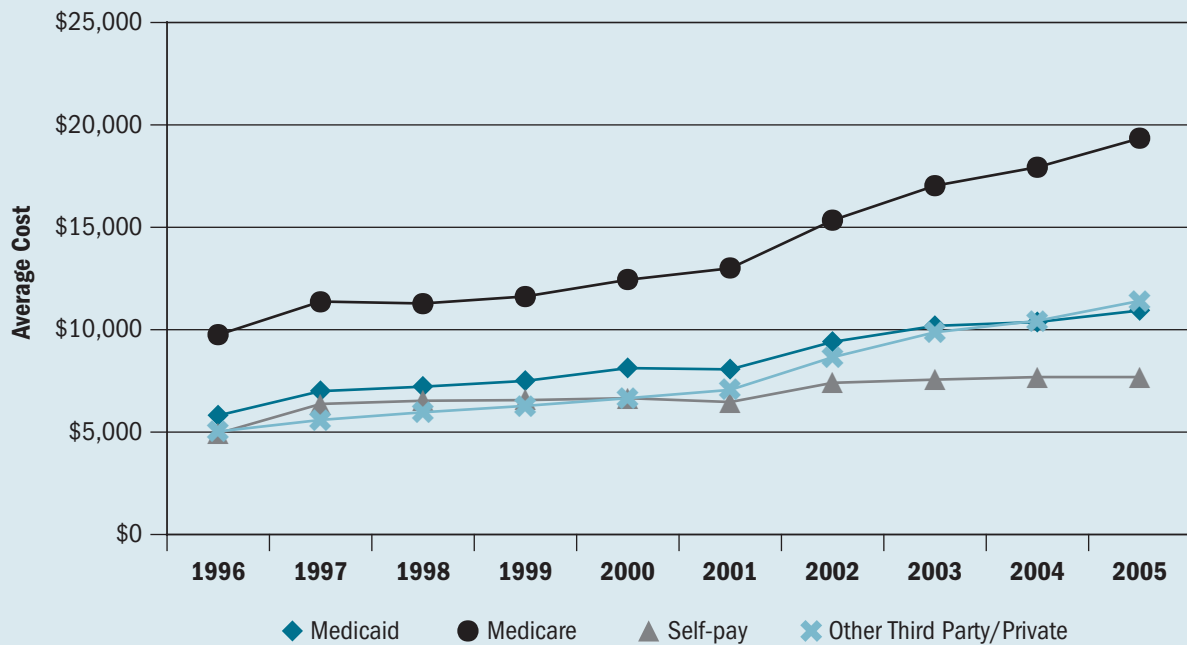
**Total Asthma Hospitalization Cost by Gender, New York State Residents, 2003–2005**



During 2003-2005, females comprised 59% of the asthma hospitalizations and incurred 64% of the total hospitalization costs (Figure 11-7).

**Figure 11-8**

Average Cost per Asthma Hospitalization by Source of Payment, New York State Residents, 1996–2005



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Medicaid	\$5,816	\$ 7,006	\$ 7,221	\$ 7,505	\$ 8,127	\$ 8,068	\$ 9,410	\$10,183	\$10,367	\$10,939
Medicare	\$9,750	\$11,353	\$11,263	\$11,610	\$12,444	\$13,007	\$15,340	\$17,025	\$17,924	\$19,343
Self-pay	\$4,940	\$ 6,352	\$ 6,518	\$ 6,565	\$ 6,658	\$ 6,463	\$ 7,396	\$ 7,548	\$ 7,665	\$ 7,675
Other Third Party/Private	\$5,025	\$ 5,574	\$5,971	\$ 6,280	\$ 6,654	\$ 7,068	\$ 8,649	\$ 9,877	\$10,418	\$11,406

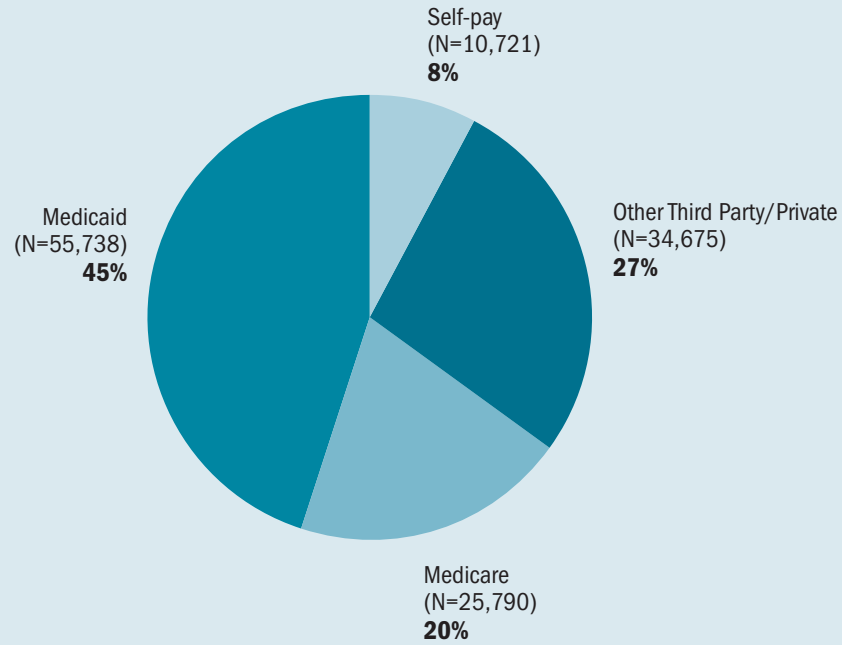
The average asthma hospitalization costs were consistently the highest for the Medicare population. Between 1996 and 2005, the increase in average

cost ranged from 55% for Self-pay patients to 127% for Other Third Party/Private patients (Figure 11-8).

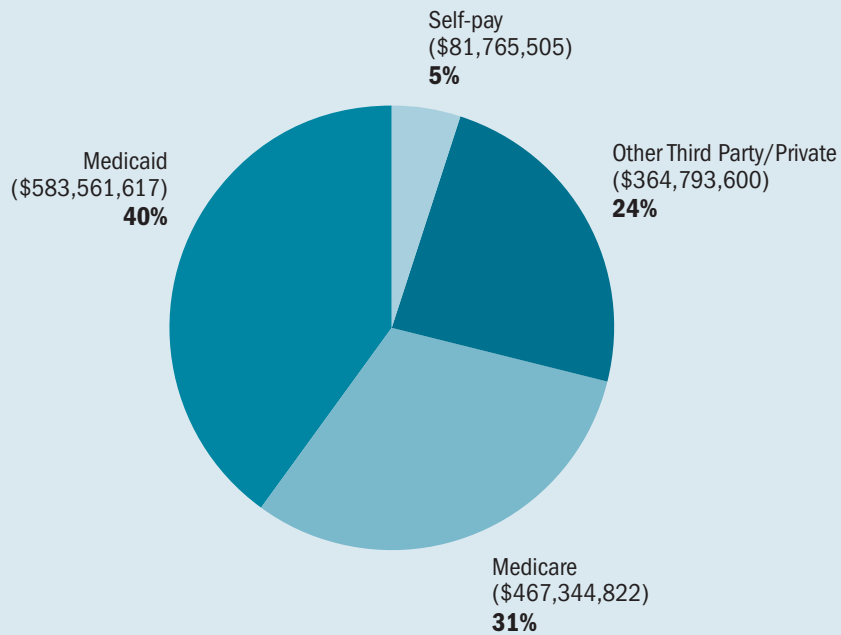
**Figure 11-9**

Comparison of Number of Asthma Hospitalizations to Cost Incurred by Source of Payment, New York State Residents, 2003–2005

**Total Asthma Hospitalizations by Source of Payment, New York State Residents, 2003–2005**



**Total Asthma Hospitalization Cost by Source of Payment, New York State Residents, 2003–2005**

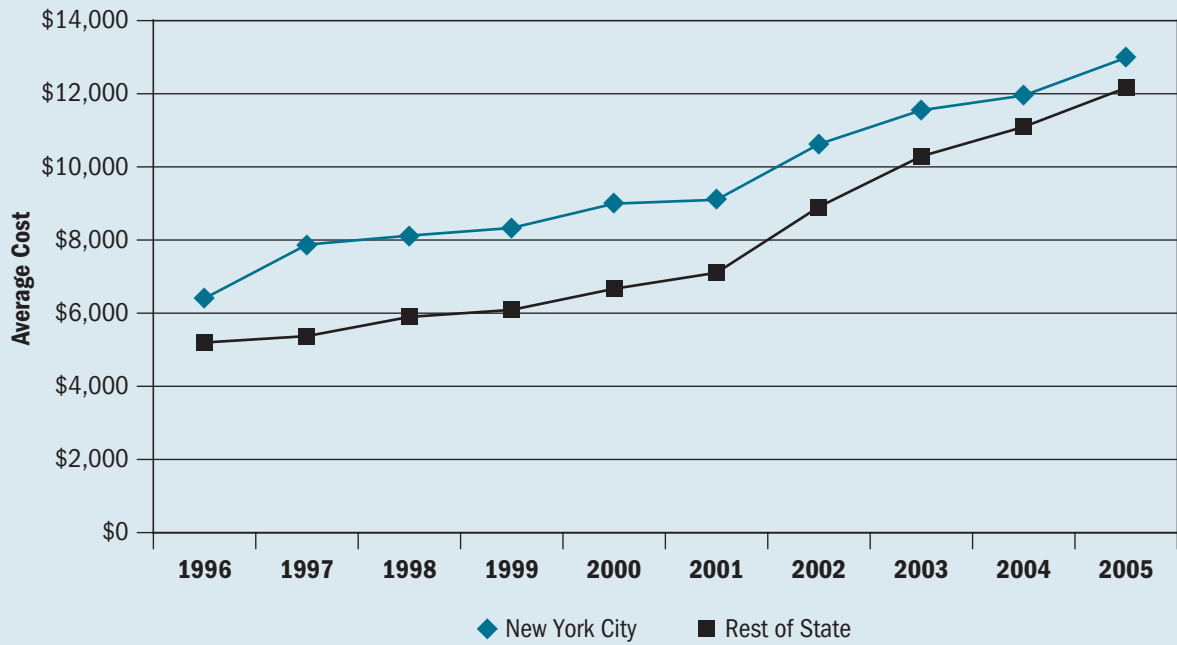


During 2003-2005, Medicaid accounted for 45% of the total asthma hospitalizations and incurred 40% of the total asthma hospitalization costs. Medicare, on the other hand,

accounted for 20% of the total asthma hospitalizations and incurred 31% of the total asthma hospitalization costs (Figure 11-9).

**Figure 11-10**

**Average Cost per Asthma Hospitalization by Region, New York State Residents, 1996-2005**



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New York City	\$6,409	\$7,867	\$8,114	\$8,322	\$8,995	\$9,102	\$10,615	\$11,546	\$11,947	\$12,987
Rest of State	\$5,191	\$5,365	\$5,901	\$6,085	\$6,662	\$7,101	\$8,898	\$10,284	\$11,093	\$12,164

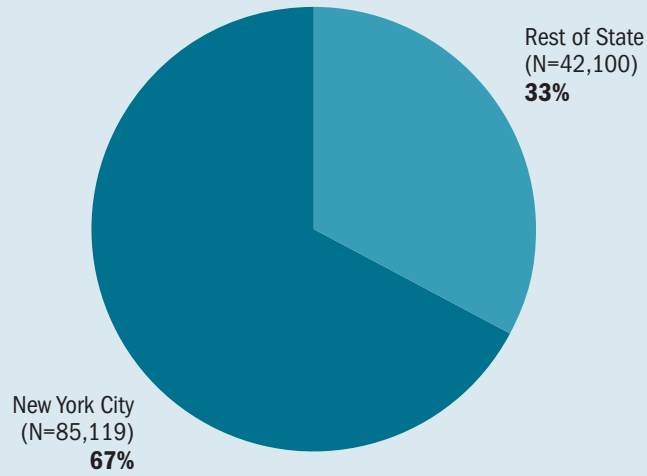
During 1996-2005, the average costs per asthma hospitalization were consistently higher for New York City

(\$12,987 in 2005) than the Rest of State (\$12,164) (Figure 11-10).

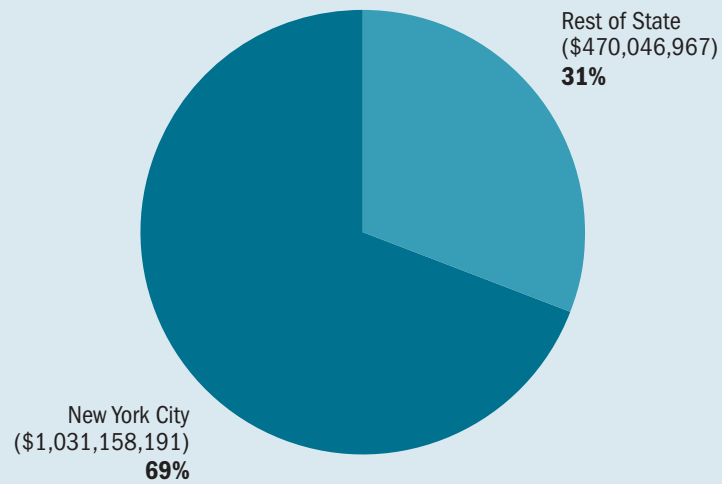
**Figure 11-11**

Comparison of Number of Asthma Hospitalizations to Cost Incurred by Region, New York State Residents, 2003–2005

**Total Asthma Hospitalizations by Region, New York State Residents, 2003–2005**



**Total Asthma Hospitalization Cost by Region, New York State Residents, 2003–2005**



During 2003-2005, New York City contributed 67% of the total number of asthma hospitalizations and incurred 69% of the asthma hospitalization costs (Figure 11-11).



## Asthma Medicaid Fee-for-Service Costs

### Methodology

Asthma Medicaid costs were generated for the NYS Medicaid fee-for-service (FFS) population, who were not enrolled at any time in Medicaid managed care (MMC) during 2005. This information corresponds to universe asthmatics (see definition of universe asthmatic in Chapter 9: Program-Based Asthma Surveillance on page 110), 0-64 years of age, continuously enrolled in Medicaid FFS for all 12 months of 2005.

Statewide Medicaid FFS total and average costs associated with asthma were generated for physician, outpatient, emergency department (ED) visits and inpatient hospital services with primary diagnoses of asthma (ICD-9-CM code of 493.XX); and drug formulary code for pharmacy services. Average asthma-related service costs per recipient were generated by age group. Asthma-specific costs were not available for the MMC population.

**Table 11-1**

Medicaid Fee-for-Service\* Asthma-Related Costs for Asthma Universe Population, New York State, 2005

Total Medicaid FFS Enrollees	Number of Universe Asthmatics	Asthma-Related Cost	Total Cost (Asthma-Related and Unrelated Services)	Percent of Total Cost
699,310	64,243	\$100,892,780	\$1,752,764,604	5.8%

\*12 months continuous enrollment.

Table 11-1 shows that in 2005, over \$100 million were spent on more than 64,000 asthma universe individuals for asthma-related services for an average cost of \$1,570 per

enrollee. This accounted for 5.8% of the Medicaid FFS dollars for all services (\$1,752 million) that were spent on the asthma universe population.

**Table 11-2**

Medicaid Fee-for-Service\* Total Cost, Average Cost per Service and per Recipient by Type of Asthma-Related Service, New York State, 2005

Asthma-Related Service	Total Costs	Percent Total	Number of Services/Claims	Average Cost per Services/Claims	Number of Recipients	Average Cost per Recipient
Doctor Visit	\$ 606,711	0.6%	32,159	\$ 19	13,672	\$ 44
Outpatient	\$ 6,303,900	6.2%	54,614	\$ 115	25,596	\$ 246
ED Visit	\$ 3,019,730	3.0%	28,814	\$ 105	16,428	\$ 184
Hospitalization	\$43,247,904	42.9%	6,660	\$6,494	4,407	\$9,813
Pharmacy	\$47,714,535	47.3%	402,745	\$ 118	45,002	\$1,060

\*12 months continuous enrollment.

Hospitalizations comprised 43% of the total asthma-related costs, with an average cost of \$6,494 per hospitalization and \$9,813 per recipient. Pharmacy

costs comprised 47% of the total, with an average of \$118 per claim and \$1,060 per recipient (Table 11-2).

**Table 11-3**

Medicaid Fee-for-Service\* Average Asthma-Related Service Cost per Recipient by Age Group, New York State, 2005

Asthma-Related Service	0-4	5-9	10-17	18-56	57-64	All Ages
Doctor Visit	\$ 45	\$ 39	\$ 40	\$ 47	\$ 38	\$ 44
Outpatient	\$ 259	\$ 271	\$ 254	\$ 240	\$ 239	\$ 246
ED Visit	\$ 163	\$ 166	\$ 167	\$ 189	\$ 202	\$ 184
Hospitalization	\$7,399	\$6,855	\$7,519	\$10,708	\$10,413	\$9,813
Pharmacy	\$ 703	\$ 806	\$ 803	\$ 1,100	\$ 1,343	\$1,060

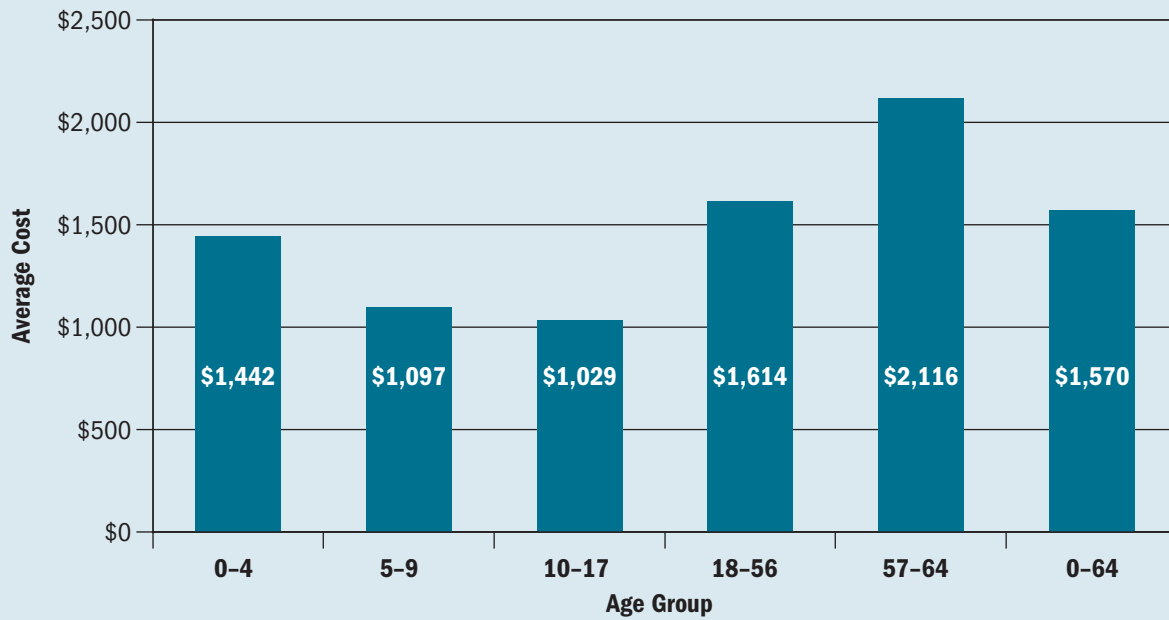
\*12 months continuous enrollment.

There was great variation in average asthma hospitalization and pharmacy costs per recipient among age groups of Medicaid FFS asthma universe population. The average asthma hospitalization costs increased 56% from \$6,855 in the 5-9 year age group to \$10,708 in the 18-56 year age group. The average asthma pharmacy costs increased

almost two times from \$703 in the 0-4 year age group to \$1,343 for asthmatics 57-64 years of age. There were much smaller variations in average asthma costs per recipient for doctor, outpatient and ED visits by age group (Table 11-3).

**Figure 11-12**

Medicaid Fee-for-Service\* Average Asthma-Related Service Cost per Asthma Universe Enrollee by Age Group, New York State, 2005



An average of \$1,570 was spent per asthma universe enrollee among Medicaid FFS population in 2005. The average cost was highest for enrollees aged 57-64 years

(\$2,116) and lowest for enrollees aged 10-17 years (\$1,029) (Figure 11-12).

**Figure 11-13**

Distribution of Asthma Medicaid Fee-for-Service Costs for New York City and the Rest of State, New York State, 2005

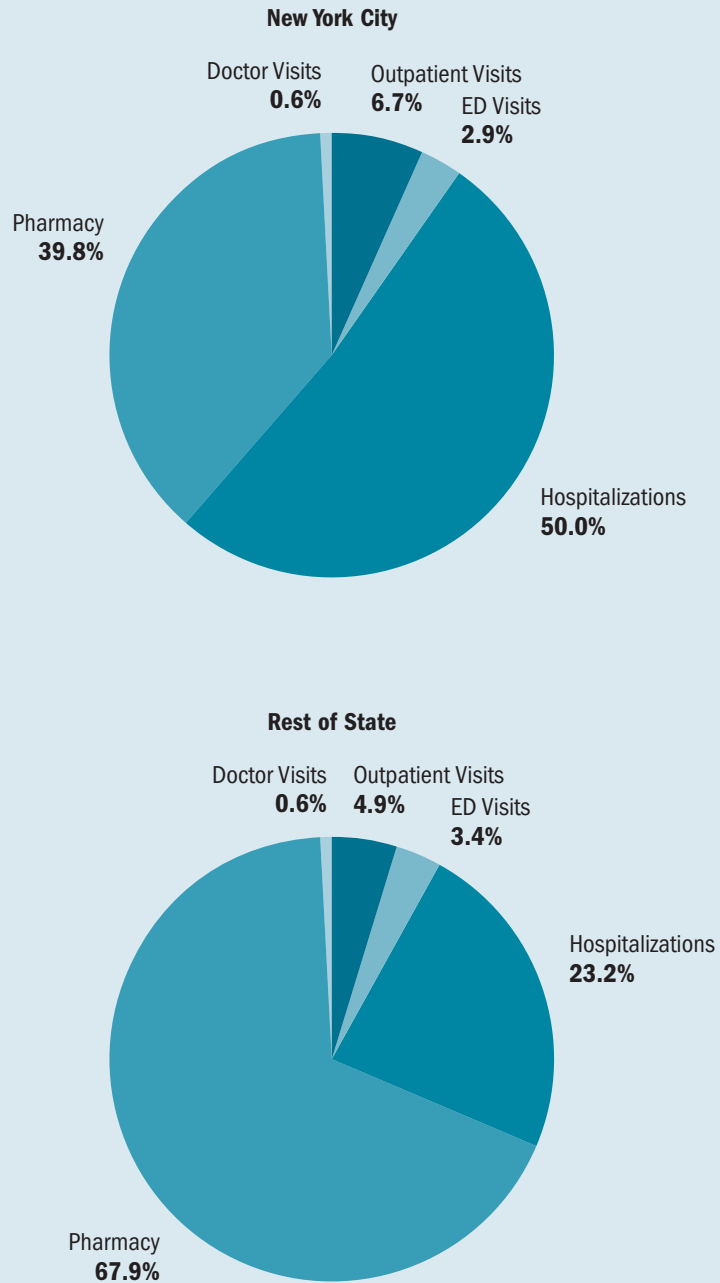


Figure 11-13 is described on the next page.

**Table 11-4****Distribution of Asthma Medicaid Fee-for-Service Costs for New York City and the Rest of State, New York State, 2005**

	New York City	Rest of State
Doctor Visits	\$ 436,441	\$ 170,270
Outpatient Visits	\$ 4,988,835	\$ 1,315,065
ED Visits	\$ 2,111,292	\$ 908,438
Hospitalizations	\$36,999,599	\$ 6,248,305
Pharmacy	\$29,423,119	\$18,291,415
Total Cost	\$73,959,288	\$26,933,493
Number in Asthma Universe	38,833	25,410
Average Cost	\$ 1,905	\$ 1,060

There were different patterns of asthma related costs between New York City and the Rest of State. About 70% of Medicaid FFS costs were spent on pharmacy for the Rest of State while only 40% of Medicaid FFS costs were spent on pharmacy for New York City. The proportion of costs due to asthma hospitalizations was two times higher for New York City when compared to the Rest of State (50% versus 23%, respectively) (Figure 11-13).

New York City accounted for 73% of the total NYS Medicaid FFS cost while serving 60% of the state Medicaid FFS population. The overall average cost per asthma universe individual for New York City was \$1,905, 80% higher than that for the Rest of State (\$1,060) (Table 11-4).

# Asthma and the Environment

## Introduction

The New York State Department of Health's (NYSDOH) environmental efforts to address asthma are focused on understanding which environmental factors are important contributors to asthma development and morbidity, and then using that information to develop effective public health programs aimed at reducing or eliminating exposure to these factors in and around homes, schools and workplaces. Because asthma is a respiratory disease, indoor and outdoor air quality are of particular interest. Contaminants in indoor or outdoor air that are related to asthma include environmental tobacco smoke, dust mites, cockroach allergen, animal dander, cleaning chemicals, pollen, mold, ozone, sulfur dioxide, and fine particles.

In the United States (U.S.), the average person spends up to 90% of each day indoors.<sup>19</sup> For about 20% of the U.S. population, a considerable proportion of this time each day is spent inside elementary and secondary school buildings.<sup>19</sup> In many cases, children and school staff who have asthma may be exposed to conditions inside these buildings that have the potential to exacerbate asthma. Nationally, about a fifth of U.S. schools have poor indoor air quality (IAQ), 27% report poor ventilation, and 60% need major repairs to at least one building system.<sup>20</sup> Potential asthma triggers such as mold, dust mites, cockroach allergen, cleaning chemicals and diesel exhaust can exist in the school environment in quantities sufficient to exacerbate or even cause asthma.<sup>21-26</sup> Therefore, it is important to assess conditions in schools that can promote the existence of these asthma triggers, as well as to identify actions that schools are taking to improve IAQ through use of IAQ management programs or policies.

Factors in the outdoor air can also affect people with asthma. When inhaled, outdoor pollutants such as ozone or fine particles can irritate the lungs and exacerbate an individual's asthma symptoms. These pollutants may vary seasonally or with changes in meteorological conditions such as temperature. In the northeastern U.S., summer ozone pollution has been associated with 10-20% of summertime respiratory hospital visits and admissions.<sup>27</sup> In U.S. and Canadian studies, the ozone-associated increase in daily respiratory hospital admissions ranged from 2-30% with daily ozone increments in the warm season that ranged from 20-40 parts per billion (ppb) for different ozone averaging times.<sup>27</sup> The association between ambient air particulate matter (PM) concentrations and asthma, including increased hospital admissions, is well documented.<sup>28,29</sup> Models demonstrate 5-15% increases in daily respiratory-related hospital admissions per 25  $\mu\text{g}/\text{m}^3$  (micrograms per cubic meter of air) daily increment of fine particles, with the largest effect on asthma admissions.<sup>30</sup> A network of air monitors located throughout NYS provides information about levels of important air pollutants that the NYS Department of Environmental Conservation can use to advise sensitive groups to take precautions on particular days and to keep track of air pollutants over time.

There are many actions individuals and communities can take to reduce exposure to indoor and outdoor air pollutants. See <http://www.health.state.ny.us/diseases/asthma/links.htm#trig> for information, ideas and resources to help monitor and reduce exposure to these indoor and outdoor environmental factors.

## Highlights: Asthma and the Environment

### *New York State School Building Condition Survey, 2005*

- About 12.4% of surveyed school buildings in New York State (exclusive of New York City) were rated as “unsatisfactory,” meaning that at least one building system related to health or safety was not functioning reliably or had exceeded its useful life.
- Fewer than 1% of surveyed school buildings were rated as “failed,” meaning that at least one building system related to health or safety was either not functioning or was unreliable to the point of jeopardizing health or safety.
- Approximately 27% of buildings surveyed did not have a formal indoor air quality program in their school district.

### *Outdoor Air Quality*

- During 2003-2005, there were a few unhealthy ozone days each year at several locations across the state. These days mainly occurred during the “ozone season” from mid-May through mid-September.
- During 2003-2005, the number of days when fine particle concentrations were unhealthy for sensitive groups such as asthmatics was greatest in the New York City area, less in the smaller-sized cities, and smallest in rural areas.

### *Methodology*

Children and staff spend a considerable proportion of their time in and around school buildings where they may be exposed to conditions that exacerbate asthma. Poor condition of the school infrastructure and improper practices can promote the existence of asthma triggers and thus impact students and staff with asthma. However, there are many things that schools can do to minimize the presence of environmental asthma triggers in the school setting, including proper maintenance of buildings and grounds and management of other factors that can impact indoor air quality (IAQ). Therefore, it is important to assess conditions in schools that can promote the existence of these asthma triggers, as well as to identify actions that schools are taking to improve IAQ.

The Building Condition Survey (BCS) is a physical inspection of NYS public school buildings that is performed every five years. It is conducted by a licensed engineer and/or an architect. This inspection is mandated by a 1999 regulation issued by the Commissioner of Education. The first BCS was completed in 2000 and a second, revised, version was conducted in 2005. The BCS can be used to track environmental conditions in NYS public schools over time.

For each building or facility, BCS asked inspectors to rate the overall building condition, as well as the condition of 53 individual building systems (e.g., roof, plumbing, windows). In addition, the Center for Environmental Health worked with the NYS Education Department (NYSED) to incorporate additional items specifically pertaining to school IAQ and program use into the 2005 BCS. The results of the inspection for each school are documented using a standardized form. Following review by the school board, completed forms for each school are submitted to NYSED, which maintains a database of all BCS records. This section describes a preliminary analysis of the results from the 2005 BCS by presenting figures for two items from this survey:

#### *1. The overall condition of the building*

Upon completion of the inspection, the inspection team was asked to rate the overall building condition as excellent, good, satisfactory or unsatisfactory as defined in Table 12-1.

#### *2. Whether the school district has an Indoor Air Quality program*

Schools reported whether their district used a plan or program to manage IAQ. These programs or plans consist of actions and practices that help to improve current school IAQ and to prevent future IAQ problems. Schools were asked whether the district in which the school facility resides was using either the Environmental Protection Agency program called Tools for Schools (TfS) or some other IAQ program. The questions included in the 2005 BCS were: “Does your district use EPA’s Tools for Schools Program?” and “If not, is some other Indoor Air Quality management program used?”

For the purpose of this analysis, only buildings used for the purpose of instructing children were included. These buildings were selected based on building type (e.g., instructional, administrative) and on pre-kindergarten-12th grade enrollment for daytime classes. Ratings for 3,072 NYS school buildings, in 701 non-New York City school districts (more than 99% of all non-New York City public school districts), were available for this analysis.

This survey provides information for non-New York City schools since information for school buildings in New York City was not available at the time of analysis. Efforts to obtain information on school building conditions in New York City are underway. The BCS serves as a useful assessment of building and environmental conditions that have the potential to impact students and staff with asthma, but it is important to note that this is not a direct measurement of exposure to environmental conditions. Rather, the BCS tracks environmental conditions that have the potential to impact the health of students and staff. This relatively new tool is likely to become even more useful over time as methods are more consistently applied and data are available to analyze trends over time.

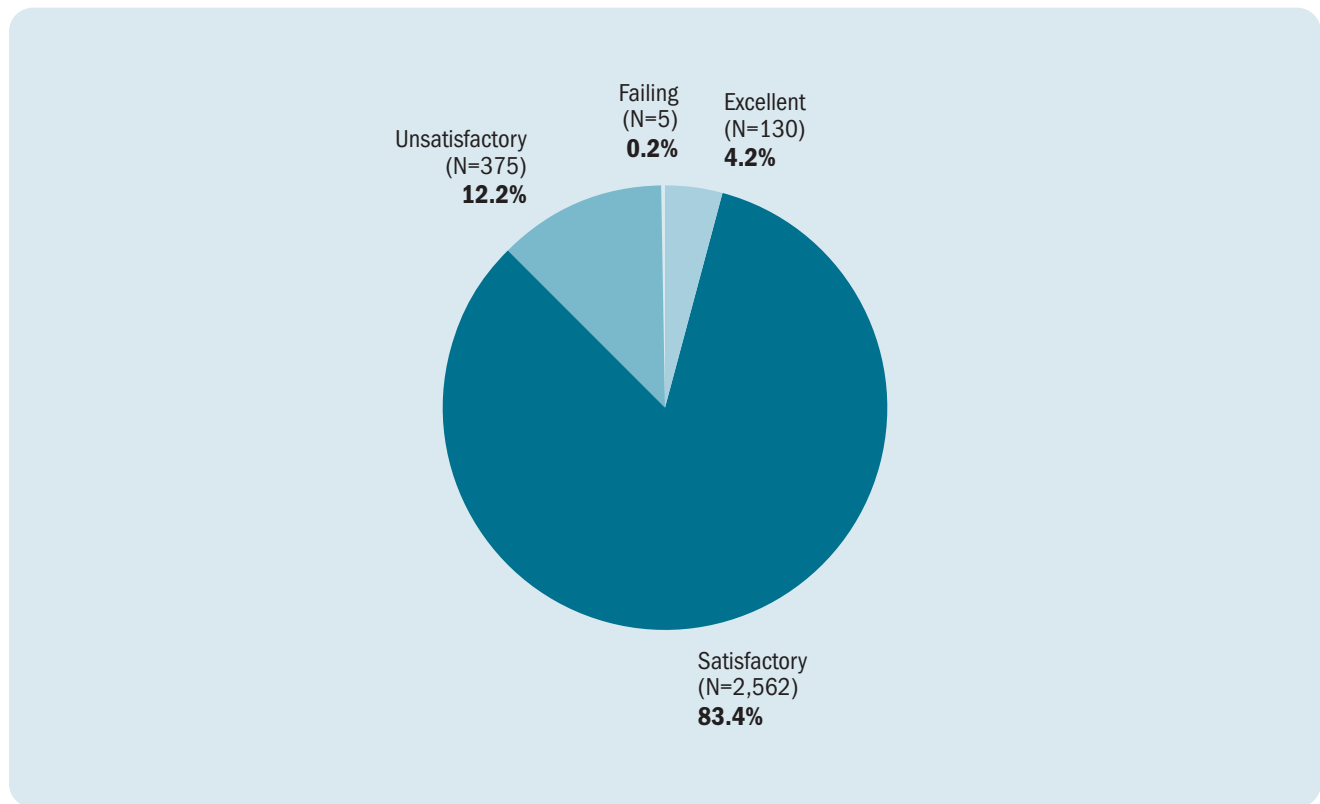


**Table 12-1**  
**Rating System for Overall Building Condition**

Overall Building Rating	Description
Excellent	Systems related to health and safety or structure are rated “excellent,” no systems are rated below “satisfactory” and a preventative maintenance plan is in place.
Satisfactory	Systems related to health and safety or structure are rated “satisfactory” or better. No system is rated “non-functioning” or “critical failure.”
Unsatisfactory	At least one system related to health and safety or structure is rated “unsatisfactory” (meaning that the system is not functioning reliably or has exceeded its useful life). No such systems are rated “non-functioning” or “critical failure.”
Failing	At least one system related to health and safety or structure is rated “non-functioning” (meaning that it is not functioning, not functioning as designed, or is unreliable to the point of endangering health or safety) or is in “critical failure” (meaning that its condition is so poor that the grounds should not be occupied).

**Figure 12-1**

Overall Building Ratings for New York State (Excluding New York City) Public School Buildings, 2005

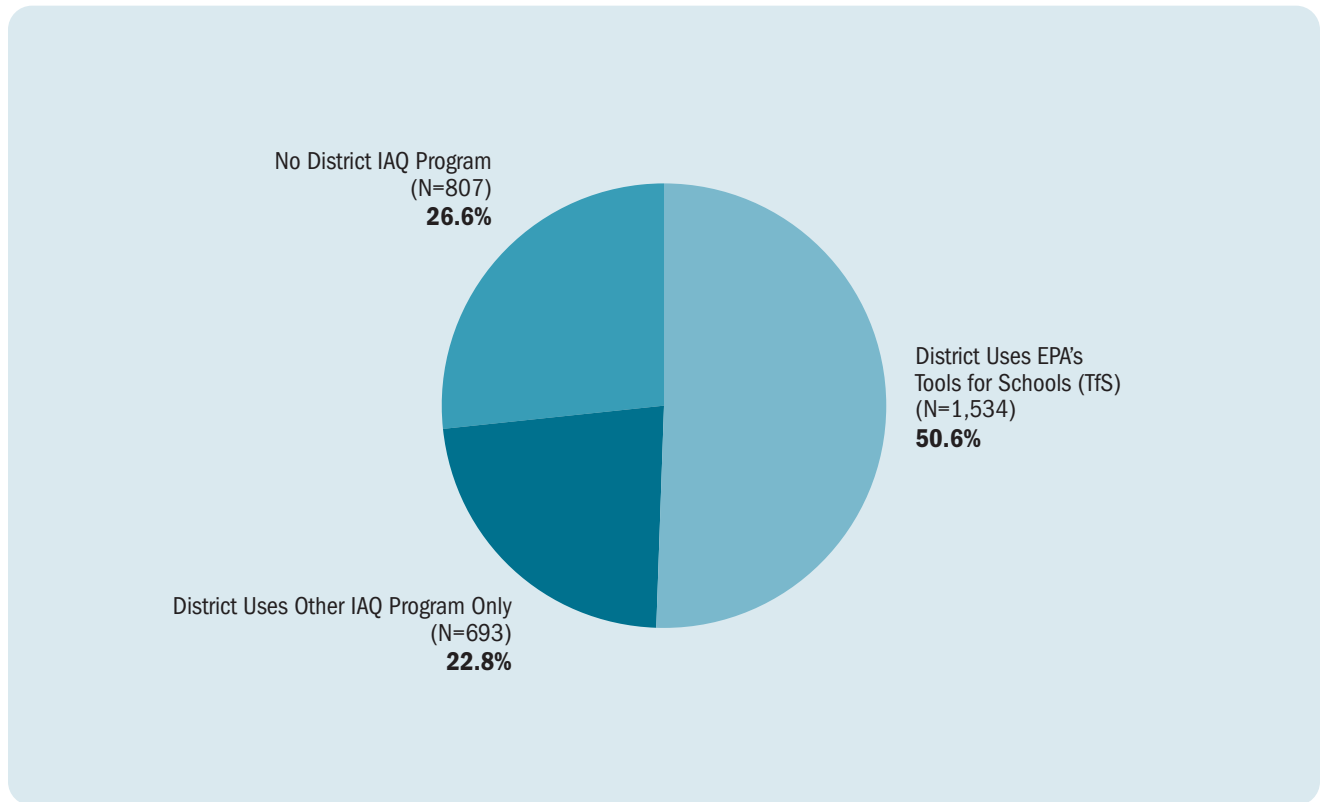


The majority of surveyed school buildings were reported to be in overall “excellent” (4.2%) or “satisfactory” (83.4%) condition. However, approximately 12.4% of school buildings are in less than “satisfactory” condition, meaning that the condition of at least one building system in these

schools could be affecting the health or safety of its occupants. This information serves as a guide on buildings that have potential problems related to school IAQ but is too general to draw any conclusions (Figure 12-1).

**Figure 12-2**

**Use of Indoor Air Quality Management Programs, New York State (Excluding New York City) Public School Buildings, 2005**



\*Missing values=1.3% (N=38).

Nearly three-quarters (73.4%) of NYS public schools reported use of an IAQ plan or program by their district. About half (50.6%) reported use of TfS, either exclusively or in combination with another program, while 22.8% relied entirely on other IAQ plans/programs. More than

one-quarter (26.6%) reported that their district did not have an IAQ management program in place. By comparison, a 2002 national survey of schools (using different methodology) found that about 50% of public schools across the nation reported use of an IAQ program or plan<sup>31</sup> (Figure 12-2).

### Methodology

Two important outdoor air pollutants that can trigger asthma attacks in people with asthma are ozone and fine particulate matter (PM<sub>2.5</sub>). Scientific studies have linked exposure to these pollutants with health effects including eye and respiratory tract irritation, coughing, shortness of breath, reduced lung function, heart attack and premature death.

- *Ozone*, the principal component of smog, is produced from the action of sunlight on air contaminants from automobile exhausts, other combustion sources and industrial emissions. Ozone levels are most likely to be elevated on hot, sunny afternoons. Ozone concentrations are measured in parts per billion (or ppb).
- *Particulate Matter (PM<sub>2.5</sub>)* (also called fine particulate matter) are particles or droplets in the air that are less than 2.5 microns wide (i.e., about thirty times smaller than human hair). Outside, they come primarily from motor vehicle exhausts, power plants, wild fires, and the reaction of gases in the atmosphere. Indoor sources include tobacco smoke, cooking, fireplaces, and candles. Fine particulates are measured in micrograms per cubic meter of air or  $\mu\text{g}/\text{m}^3$

The United States Environmental Protection Agency (USEPA) regulates the levels of both of these pollutants through National Ambient Air Quality Standards (NAAQS) that are designed to protect public health and welfare. Under the federal Clean Air Act, primary NAAQS are set by USEPA at levels “requisite to protect the public health.” The current level of the ozone NAAQS is 84 parts per billion (ppb) measured as a maximum daily 8-hour rolling average. The current level of the PM<sub>2.5</sub> NAAQS is 35  $\mu\text{g}/\text{m}^3$  as a 24-hour average. These values are used below to summarize trends in NYS air quality in terms of potential public health effects. The regulatory framework governing criteria air pollutants such as NAAQS implementation and determining NAAQS attainment involves other factors aside from the level of the NAAQS. The summaries presented below are not intended to address regulatory issues of standards attainment or implementation.

The New York State Department of Environmental Conservation (NYSDEC) measures air pollutants using a network of monitors across the state to track air quality. The monitoring network and full details of monitoring methods for each pollutant, as well as information on regulatory aspects of NAAQS implementation and attainment, are described on the NYSDEC web site<sup>32</sup>: <http://www.dec.ny.gov/chemical/8406.html>

### Ozone

To summarize recent spatial variability in high daily ozone across NYS, a map is presented to show the location of ozone monitors and the average number of days per year from 2003 to 2005 where ambient ozone levels exceeded the 8-hour NAAQS of 84 parts per billion at each monitor. Concentrations above this level are considered unhealthy for sensitive groups.

To summarize the statewide temporal trend in the number of unhealthy ozone days among all monitoring locations, data were analyzed from the 23 ozone monitors that had valid data for at least 75% of all observations for every ozone season between 1997 and 2005. These data are presented in a figure with the temperature data from the same time period. The average number of days per year that ambient ozone levels were unhealthy for asthmatics is derived from information obtained at 23 ozone monitors. The average summer temperature was calculated using data from June–August each year at 12 NYS weather monitors, reported by the National Climatic Data Center.<sup>33</sup>

### Fine Particulate Matter (PM<sub>2.5</sub>)

To summarize recent spatial variability in high daily fine particulate levels across NYS, a map is presented to show the locations of fine particle monitors and the average number of days per year from 2003 to 2005 that would have exceeded the new daily average NAAQS of 35  $\mu\text{g}/\text{m}^3$  at each monitor. Most PM<sub>2.5</sub> monitors collect data on a schedule of once every three days. For consistency across the state, only these scheduled collection days were selected, and the number of unhealthy days per year was multiplied by three to estimate the number of total days in a year that PM<sub>2.5</sub> levels would have been above this new standard. This was done separately for each of the 18 air monitoring locations that measure PM<sub>2.5</sub>.

### Air Quality Health Advisories

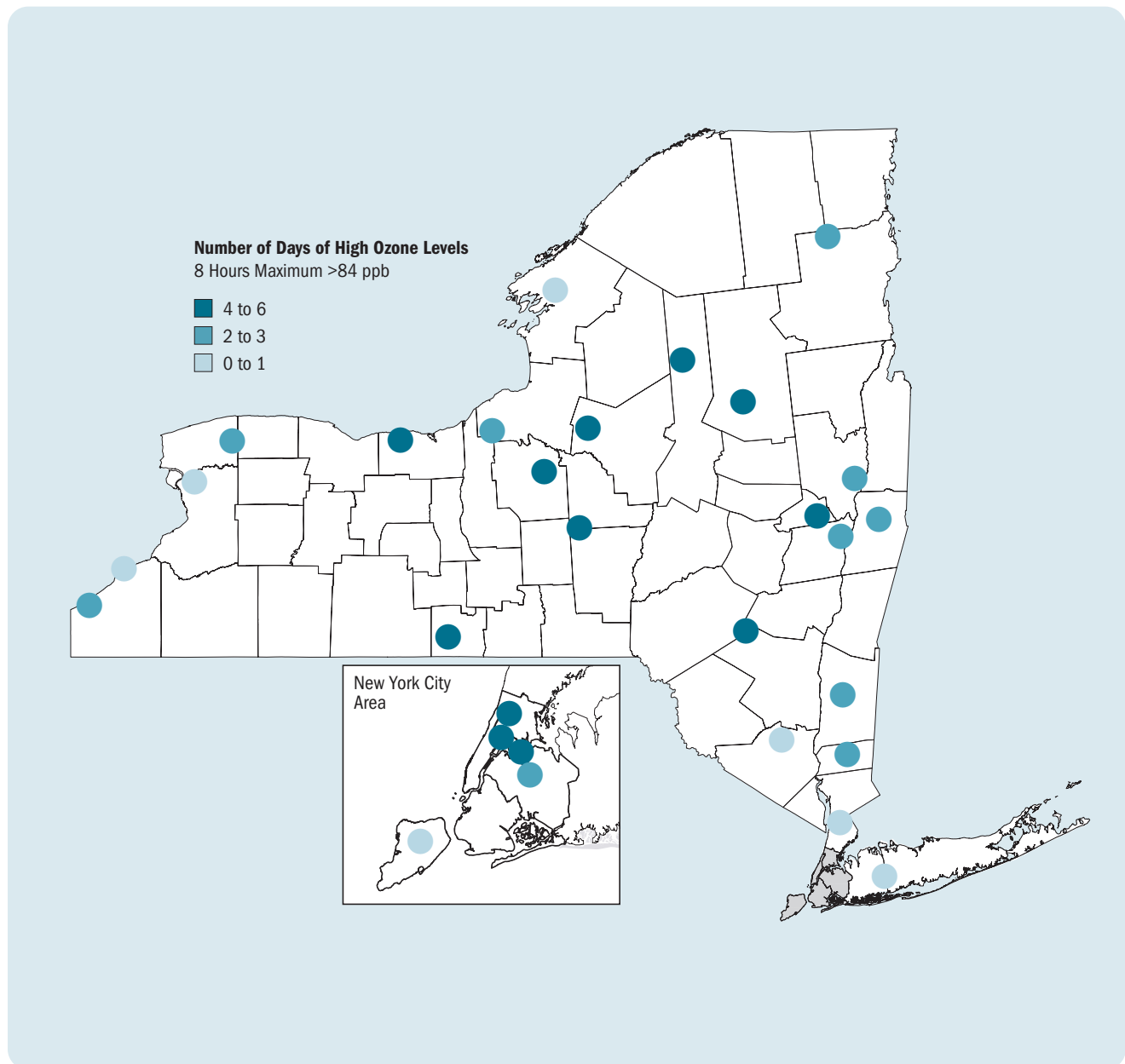
The NYSDEC and NYSDOH issue “Air Quality Health Advisories” when air pollutant concentrations are forecast to increase above levels that pose health risks to sensitive groups such as asthmatics. These levels are similar to the NAAQS for 8-hour ozone and daily PM<sub>2.5</sub> concentrations. Air quality health advisories for ozone and PM<sub>2.5</sub> can occur on the same day, but this has been uncommon, since high ozone levels are confined to the summer season while high particle days can occur at any time of year. On unhealthy ozone days, asthmatics can reduce symptoms by limiting their strenuous outdoor activity during afternoon hours when ozone levels are likely to be the highest, and carefully

following their asthma management plan. On unhealthy fine particle days, staying indoors may reduce exposure, although some outdoor particles will come indoors. If there are significant indoor sources of particles, levels inside may not be lower than outside. Asthmatics can reduce symptoms by limiting indoor and outdoor activities that

produce fine particles, and avoiding strenuous activity in areas where fine particles are high. More information about the health effects of air pollution is available at: <http://www.health.state.ny.us>. Air pollution forecasts and monitoring results, are posted on the NYSDEC's web site available at: <http://www.dec.ny.gov>.

**Figure 12-3**

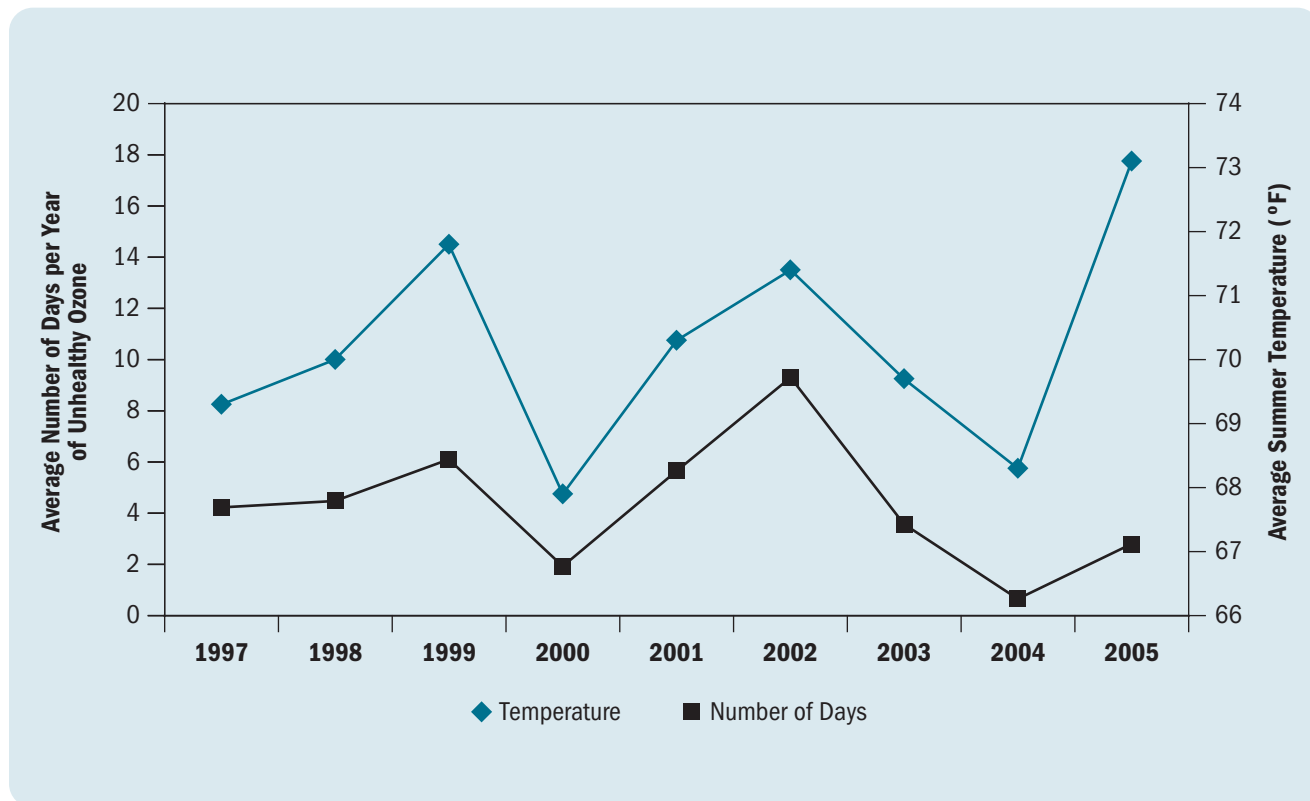
**Average Number of Days per Year That Ozone Levels Were Unhealthy for Asthmatics, New York State, 2003–2005**



There were typically a few unhealthy ozone days each year at several locations across the state. These days mainly occurred during the “ozone season” from mid-May through mid-September. Elevated ozone levels occurred most commonly near and downwind of major cities.

Ozone pollution was also found in remote locations because pollutants that are factors in the ozone formation and ozone itself are carried by the wind, hundreds of miles from their source (Figure 12-3).

**Figure 12-4**  
 Average Summer Temperature and Trend in Average Number of Days per Year That Ambient Ozone Levels Were Unhealthy for Asthmatics, New York State, 1997-2005

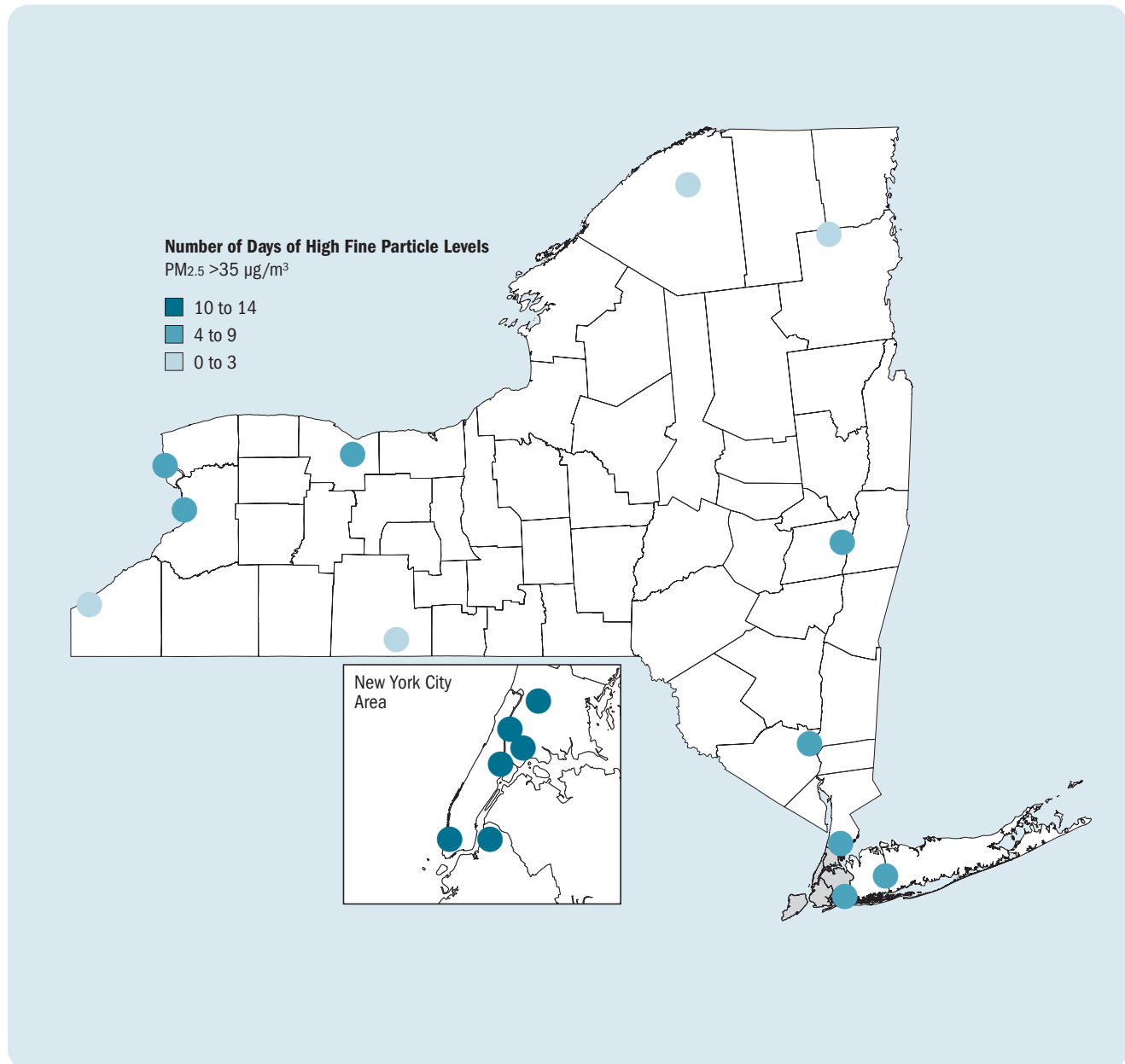


The average number of unhealthy ozone days per year at monitors in NYS ranged from one to nine between 1997 and

2005. There are generally more unhealthy ozone days in years with hotter summers (Figure 12-4).

**Figure 12-5**

Estimated Average Number of Days per Year That Fine Particle Levels Were Unhealthy for Asthmatics, New York State, 2003–2005



The number of days when fine particle concentrations exceeded 35 µg/m<sup>3</sup>\* was greatest in the New York City area, less in the smaller-sized cities, and smallest in rural

areas (Figure 12-5). Average fine particle levels and the number of unhealthy days were relatively constant between 2000 and 2005 (not shown).

\*The National Ambient Air Quality Standards (NAAQS) for daily fine particles was reduced from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> in December 2006.



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# Appendices

**Appendix 1: Glossary of Terms**

**Appendix 2: Technical Notes**

## Appendix 1: Glossary of Terms

### ***Age-adjustment***

A statistical process applied to rates of death, hospitalizations, disease, or other health outcomes which allows areas with different age structures to be compared (see Technical Notes).

### ***Asthma***

A lung disease characterized by airway constriction, mucus secretion, and chronic inflammation, resulting in reduced airflow and wheezing, coughing, chest tightness, and difficulty breathing.

### ***Confidence Interval (95%)***

Range where the true prevalence is likely to fall with a 95% degree of assurance.

### ***Cost-adjustment***

A statistical process applied to the actual costs of a type of health service to adjust for financial inflation over time. This allows cost data from different years to be compared (see technical notes).

### ***HEDIS***

The Health Plan Employer Data and Information Set is the set of measures used by the nation's health plans to measure and report on their performance.

### ***Incidence Rate***

A measure of new cases of a disease/condition that occur in a population in a given time period.

$$\frac{\text{Number of new individuals developing disease/condition in given time period}}{\text{Population at risk during the same time period}}$$

### ***Morbidity***

General term used to refer to illness due to the disease/condition in question.

### ***Mortality***

General term used to refer to death due to the disease/condition in question.

### ***Mortality Rate, Crude***

Total deaths per 1,000,000 population for a specified period. The crude mortality rate represents the average chance of dying during a specified period for persons for the entire population.

### ***Mortality Rate, Age-adjusted***

The death rate used to make comparisons of relative mortality risks across groups and over time. This rate should be viewed as a construct or an index rather than as direct or actual measure of mortality risk. Statistically, it is a weighted average of the age-specific death rates, where the weights represent the fixed population proportions by age.

### ***New York City***

Includes the five counties of Bronx, Kings, New York, Queens, and Richmond.

**Prevalence**

A measure of all cases of a disease/condition at a given point of time. The term “prevalence rate” is often used interchangeably with “prevalence,” although by strict definition, prevalence is a proportion, not a rate. The prevalence proportion is the proportion of people in a population that has a disease.

$$\frac{\text{Number of individuals with disease/condition in given time period}}{\text{Population at risk during the same time period}}$$

**Referral Bias**

Individuals with a particular exposure or adverse health outcome are more likely to choose certain physicians or health clinics than those who are not similarly affected.

**Rest of State (ROS)**

Refers to the 57 counties of New York State exclusive of New York City.

**Surveillance**

The ongoing, systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control (Centers for Disease Control and Prevention)

**Weighted Estimate**

Results that have been adjusted to account for the survey design (including over-sampling), survey non-response, and post-stratification. The weighted estimate represents the population that the sample was drawn from.

### ***Age-adjustment***

Age-adjustment is a statistical process applied to rates of death, hospitalization, disease or other health outcomes which allows areas with different age structures to be compared. Age confounding occurs when the two populations being compared have different age distributions, and the risk of the outcome varies across age groups. The process of age adjustment (Direct Method) used in this report changes the amount that each age group contributes to the average rate in each area, so that the overall rates are based on the same age structure. Rates based on the same age distribution can be compared to each other without the presence of confounding by age. Adjustment was accomplished by first multiplying the age-specific rates of death or hospitalization by age-specific weights. The weights used in the age adjustment of asthma data are the proportion of the Standard Population (the U.S. population as enumerated by the Bureau of the Census, 2000) within each age group. The weighted rates are then summed across the age groups to give the age-adjusted rate.

### ***Cost-adjustment***

Cost-adjustment is a statistical process applied to the actual costs of hospitalizations to adjust for financial inflation over time. This allows cost data from different years to be compared. Data for the Medical Care category (1994-2005) from the Consumer Price Index (CPI) for All Urban Consumers were obtained from the U.S. Department of Labor to use in this adjustment procedure. The 2005 annual average CPI for the Medical Care category was used as the reference year. The cost adjustment factors were calculated by dividing the 2005 annual average CPI by the annual average CPI for each previous year. The cost adjustment factor was then multiplied by the actual hospitalization cost to obtain the CPI-adjusted hospitalization cost for each year.

### ***National Heart, Lung, and Blood Institute Asthma Severity Classification***

Asthma severity is classified by the National Heart, Lung, and Blood Institute (NHLBI) depending on how often a person has symptoms when that person is not taking any medicine or when his or her asthma is not well controlled. Based on symptoms, the four levels of asthma severity classification are:

- **Mild intermittent asthma:** Have asthma symptoms twice a week or less, and/or are bothered by symptoms at night twice a month or less.
- **Mild persistent asthma:** Have asthma symptoms more than twice a week, but no more than once in a single day and/or are bothered by symptoms at night more than twice a month.
- **Moderate persistent asthma:** Have asthma symptoms every day, and/or are bothered by nighttime symptoms more than once a week.
- **Severe persistent asthma:** Have symptoms throughout the day on most days, and/or are bothered by frequent nighttime symptoms.

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