

Introduction

The distribution of a disease in a population cannot be fully appreciated without knowledge of its natural history and the context in which the disease occurs. This report begins with a brief description of what asthma is, its prevalence in the United States and Connecticut, and what can be done to control asthma. Next, so that the burden of asthma in Connecticut may be appreciated in its social context, a brief review of literature on asthma disparities is provided. A sociodemographic profile of Connecticut follows to provide information on population characteristics such as sex, age, marital status, and household income which, in addition to race and ethnicity, are important in depicting health disparities.

Before the asthma surveillance data are presented, brief descriptions of each of data source used in the report and their related legal mandates are given. Next, the burden of asthma in Connecticut is described using information on: asthma prevalence; living with asthma; healthcare utilization and charges; asthma prevalence and asthma care among Medicaid recipients; prevalence of asthma in school-aged children; work-related asthma; and asthma mortality. Comparisons of asthma rates by age group, sex, race/ethnicity, place of residence, and annual household income are presented to highlight the populations which are disproportionately affected by asthma in Connecticut.

The discussion section of this report shows how data analysis findings inform Connecticut asthma control, prevention, and education initiatives. Also included in this report are appendices containing important acronyms, technical notes, and detailed tables of the data presented in each of the data sections. This report will be useful to epidemiologists, policy makers, advocates, and others who are interested in decreasing the burden of asthma in Connecticut.

Asthma is a burden, not just on the individual sufferer, but on families, communities, and society. Since 2000, the Connecticut Department of Public Health Asthma Program has worked to monitor and decrease the burden of asthma in Connecticut through asthma surveillance, education, prevention, and control initiatives. This report is the fifth in a series summarizing the available asthma surveillance data for the state of Connecticut. It describes the burden of asthma in Connecticut by providing information on asthma prevalence, morbidity, mortality, disproportionately affected populations, and healthcare utilization.

What is Asthma?

Asthma is a chronic respiratory disease that affects the lives of millions of Americans. Asthma encroaches on the ability of children and adults to perform and enjoy daily activities. It is characterized by reversible obstruction of the passages or airways (bronchi) that take air into the lungs. Blockage of the airways results from chronic inflammation associated with hyper-responsiveness to a variety of stimuli (e.g., pollen, mold, tobacco smoke). Constriction of the airways results in recurrent episodes of wheezing, shortness of breath, chest pain or tightness, and/or coughing. Edema and excess mucus production of the airway membranes can also limit airflow (National Heart, Lung, and Blood Institute [NHLBI], 2007). While the exact cause of asthma is unknown, research demonstrates that asthma susceptibility (Su et al., 2012; Liu et al., 2011) and response to medication (Jin et al., 2010; Leung & Searing 2010) are related to the interaction of host genes with environmental factors. Currently, there is no cure for asthma, but asthma symptoms can be controlled. Disease symptoms are reversible with treatment for the vast majority of persons with asthma.

Asthma in the United States

In 2010, 8.2% or 18.7 million adults (U.S. Department of Health and Human Services, 2012) and 9.4% or 7 million children (Bloom, Cohen, & Freeman, 2011) in the United States had asthma.¹ Despite public health initiatives aimed at asthma prevention and control, asthma prevalence is increasing nationally. According to the findings of a Centers for Disease Control and Prevention (CDC) analysis of Behavioral Risk Factor Surveillance System (BRFSS) and National Health Information Survey (NHIS) data, asthma prevalence in the United States increased from 7.3% (20.3 million persons) in 2001 to 8.2% (24.6 million persons) in 2009 (Zahran, Bailey, & Garbe, 2011).

Some members of the population are disproportionately affected by asthma. Nationally, asthma prevalence is highest among children, women, non-Hispanic Blacks, the poor, multiracial persons, and Puerto Rican Hispanics (Moorman, Zahran, Truman, & Molla, 2011). These disparities are increasing. Between 2001 and 2009, a rising trend in asthma prevalence was observed for: non-Hispanic Black children (11.4% to 17.0%); non-Hispanic White women (8.9% to 10.1%); and non-Hispanic Black men (4.7% to 6.4%) (Zahran et al., 2011, p. 548).

Left uncontrolled or poorly-managed, asthma can lead to emergency department (ED) visits, hospitalization, or death. There were an estimated 1.75 million asthma-related ED visits and 456,000 asthma hospitalizations nationwide in 2007 (Akinbami, Moorman, & Liu, 2011). In 2008, there were 3,397 deaths caused by asthma in the United States (Miniño, Murphy, Xu, & Kochanek, 2011).

¹ These are crude rates.

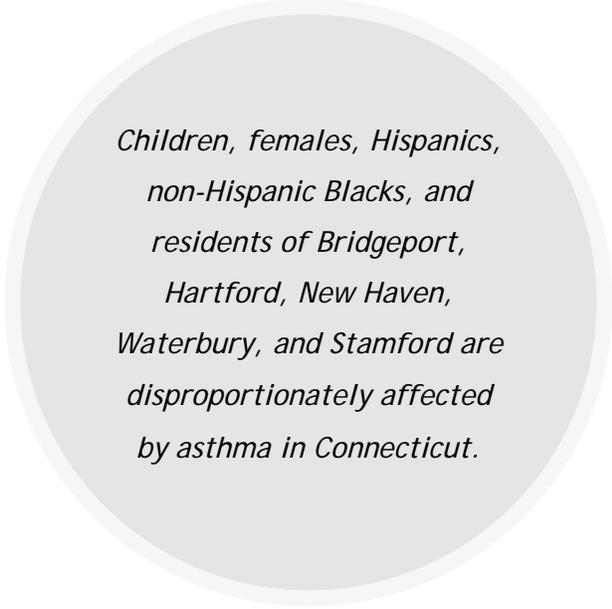
Asthma-related losses of productivity and health care costs add to the economic burden on society. Data from the 2008 NHIS demonstrate that because of asthma attacks, 10.5 million school days among children 5 - 17 years old, 14.2 million work days among employed adults, and 22 million days of housework or similar activities among adults not currently employed, were missed (Akinbami et al., 2011).

From their study of Medical Expenditure Panel Survey data for the period 2002-2007, Barnett and Nurmagambetov (2011) estimated that the total cost of asthma in the U.S. (productivity losses and incremental direct medical costs combined) was 56 billion dollars in 2007. The asthma morbidity- and mortality-related productivity losses in 2007 were estimated at 3.76 and 2.15 billion dollars, respectively (p. 149). Between 2002 - 2007, the estimated incremental direct cost of asthma per person per year was \$3,259 (p. 148).

Asthma in Connecticut

The Connecticut Department of Public Health (DPH) Asthma Program conducts asthma surveillance activities to identify at-risk populations and monitor trends in asthma rates across the state. In 2010, approximately 89,300 (11.3%) of children and 246,100 (9.2%) of adults in Connecticut suffered from asthma.² Between 2000 and 2010, the current prevalence of asthma in Connecticut adults increased 17.9% (7.8% to 9.2%). From 2005 to 2010, the current prevalence of asthma in Connecticut children increased 7.6% (10.5% to 11.3%). Since the year 2000, asthma prevalence in Connecticut adults and children has been higher than national prevalence rates. Children, females, Hispanics, non-Hispanic Blacks, and residents of Connecticut's five largest cities are disproportionately affected by asthma.

In 2009, there were 5,146 hospitalizations and 24,239 ED visits attributed to asthma. In that same year, there were 50 asthma deaths. According to 2007 - 2009 BRFSS data, Connecticut adults with asthma were unable to work or do their usual activities for approximately 303,366.5 days annually because of asthma. School-aged children in Connecticut missed approximately 59,814 days from school or day care each year due to asthma. Connecticut hospital



Children, females, Hispanics, non-Hispanic Blacks, and residents of Bridgeport, Hartford, New Haven, Waterbury, and Stamford are disproportionately affected by asthma in Connecticut.

² These estimates of current asthma prevalence are based on 2008 - 2010 BRFSS data.

discharge data reveal that in 2009, the cost of hospital (inpatient and ED) care for asthma in Connecticut was \$112,854,345.

Asthma Management

Successful asthma management relies on the actions of individuals, communities, and health care providers. Asthma can be managed with patient education, appropriate medication, avoidance of environmental triggers, and use of an asthma action plan (AAP). Asthma medications include: bronchodilators which ease the constriction of muscles that surround the airways; anti-inflammatories which reduce airway swelling and mucus production; and formulations that combine a bronchodilator with an anti-inflammatory agent. Asthma control medications are used regularly to decrease airway inflammation and mucus production. Asthma rescue medications are used during attacks or before exercise.

Asthma triggers include air pollution, tobacco smoke, pet dander, dust mites, and exposure to mold, rodents, and cockroaches. Because of the nature of the triggers, both individual-level and community-level action must be taken to reduce exposures to triggers. Asthma education addresses individual-level strategies (e.g., no tobacco smoke inside the home, keep pets outside of the bedroom) that persons with asthma or their caregivers can use to reduce the persistence of allergens in their environment. At the community level, enforcement of housing regulations can help to decrease the presence of certain triggers that are associated with inadequate housing (e.g., mold, rodents, cockroaches).

The AAP is a key component of asthma management. The National Asthma Education and Prevention Program (NAEPP) Expert Panel recommends that the health care provider for a person with moderate, severe, or poorly controlled asthma develop a written AAP for the patient. Having an AAP has been associated with decreased risk of death among persons with severe asthma exacerbations (NHLBI, 2007, p. 120). The components of an AAP are:

- Patient's emergency contact information;
- Health care provider's contact information;
- Asthma severity classification;
- Triggers that may cause an asthma attack;
- Special instructions for what to do when the patient is feeling good, not good, and awful;
- Information about medication dosage and use; and
- What to do in the case of an emergency.