

Living with Asthma

The Asthma Call-back Survey (ACBS), an optional Behavioral Risk Factor Surveillance System (BRFSS) module, is conducted annually in Connecticut. The ACBS yields information regarding asthma control status, comorbid conditions, medication, healthcare utilization, and quality of life. Most of the information presented in this section is the result of analyses of 2007 - 2009 ACBS data that were collected from a random sample of Connecticut residents. Refer to Appendix D for tables of estimates and their 95% confidence intervals.

Health Risk Profile of Persons with Current Asthma

The 2008 - 2010 BRFSS survey collected information on the status of health risk factors among Connecticut adults and children. Current asthma prevalence estimates among Connecticut adults by risk factor status are listed in the table below. The 2008 - 2010 BRFSS data show that current asthma prevalence among Connecticut children with no health care coverage was 9.4% compared to 11% among children with health care coverage. Current asthma prevalence among obese children in Connecticut was 14.1% compared to 14.4% for the overweight, 11.7% for children of healthy weight, and 10.4% for underweight children.

Table 4. Current Adult Asthma Prevalence by Selected BRFSS Risk Factors Status, Connecticut, 2008 – 2010, with 95% Confidence Intervals

Risk Factor Status	Current Asthma Prevalence (%)	95% CI lower limit	95% CI upper limit
Health care coverage			
No	9.8	8.3	9.6
Yes	8.9	7	12.7
Weight			
Underweight	11.7	4.7	18.6
Healthy weight	7.1	6.1	8.2
Overweight	8.5	7.5	9.5
Obese	12.8	11.4	14.2
General Health			
Excellent	5.5	4.3	6.7
Very Good	8.5	7.4	9.6
Good	9.8	8.5	11
Fair	15.6	13.2	18
Poor	24.3	19.6	29.1
Smoking			
Current Smoker	10.2	8.3	12.1
Former Smoker	9.1	8.1	10.2
Never Smoked	8.8	7.9	9.7

Asthma Symptoms

In 2009, approximately 9.4% (250,900) of Connecticut adults and 11.9% (94,900) children aged zero to 17 years old had current asthma. ACBS data from 2007 to 2009 showed that more than two-thirds (70.1%) of current asthma sufferers reported experiencing symptoms within the past three months. Another 14.2% had symptoms in the previous 3 months to one year. Adults (31.1%) were more likely than children (12.4%) to report that asthma symptoms occurred less than one day ago. Males reported experiencing asthma symptoms less than one day ago more often than females (31.3% versus 22.3%).

The occurrence of asthma symptoms varied by race/ethnicity classification. Among non-Hispanic Whites, asthma symptom occurrence less than one day ago was most frequent (28.4%) followed by occurrence one week to less than three months ago (24.4%). Among non-Hispanic Blacks, asthma symptoms were reported one week to less than three months ago for 6,200 (43%) of those with current asthma. Approximately 12,000 (39.7%) Hispanics reported last having asthma symptoms one to six days ago, and 3,200 (28.3%) non-Hispanic Others reported experiencing asthma symptoms one week to less than three months ago.

Among persons with current asthma, approximately 206,100 (62.7%) experienced asthma symptoms within the past 30 days. Among children with current asthma, 42,900 (49.7%) had asthma symptoms within the past 30 days compared to 163,200 (67.3%) adults. Approximately 43,300 (50.2%) children with current asthma had no asthma symptoms in the past 30 days. Among persons with current asthma, there was little difference between males and females in the report of recent asthma symptoms. With respect to race/ethnicity, 23,100 (76.2%) Hispanics reported having asthma symptoms in the past month compared to 10,000 (69.5%) non-Hispanic Blacks, 163,200 (61.3%) non-Hispanic Whites, and 5,500 (48.9%) Other non-Hispanics.

The majority of persons with current asthma (76.5%) reported no days of asthma-related difficulty staying asleep. Among the persons who reported asthma-related difficulty staying asleep within the past month, a higher percentage of children than adults experienced 1-10 days of difficulty staying asleep due to asthma (19.9% versus 14.6%). With respect to sleep difficulty, there was little difference between males and females with current asthma (24.9% versus 22.5%). Relative to non-Hispanic Whites and non-Hispanic Others, non-Hispanic Blacks and Hispanics with current asthma had more days of asthma-related sleep problems within the past 30 days. The percentages of asthma-related sleep difficulty for one to ten days in the past month among Non-Hispanic Blacks and Hispanics with current asthma were 2.2 and 1.9 times that of non-Hispanic Whites, respectively.

Half (50.4%) of persons with current asthma had an asthma attack within the past year. Asthma attack within the past 12 months was reported for 54.7% (47,200) of children and 48.9% (119,800) of adults with current asthma. Females with current asthma more frequently reported having had an asthma attack within the past year compared to males, with 53.6% of females having attacks compared to 46.4% of males. During 2007 - 2009, non-Hispanic Whites with current asthma

experienced the least number of asthma attacks compared to other groups while non-Hispanic Blacks had the most. Approximately 8,100 (57.1%) non-Hispanic Blacks with current asthma had an asthma attack within the past 12 months compared to 134,100 (49.8%) non-Hispanic Whites, 5,900 (52.9%) non-Hispanic Others, and 15,600 (51.4%) Hispanics.

Among all persons with current asthma, approximately 128,500 (39.1%) experienced at least one asthma episode or attack within the past 3 months. A higher proportion of children (43.8%) than adults (37.4%) with current asthma had at least one episode/attack during the last three months. However, while children experienced a greater proportion of single episodes or attacks, adults experienced a slightly higher proportion of three or more asthma attacks or episodes. There was little difference in the overall occurrence of asthma attacks between males and females (38.7% for males compared to 39.2% for females); however, 11.4% of females compared to 6.3% of males experienced four or more asthma attacks/episodes in the last three months. A single asthma episode or attack within the last three months was most common in non-Hispanic Blacks (31.8%) compared to other race/ethnic groups with current asthma; however, two or more attacks were most frequent among non-Hispanic Others (29.8%) and Hispanics (27.6%).

Among the persons with current asthma who reported having an asthma attack/episode within the past 12 months, 12,100 (7.4%) reported that it lasted weeks while 79,300 (48.6%) reported an attack/episode that lasted minutes. Almost half of adults (49.3%) and children (46.8%) with current asthma had an asthma episode/attack within the last year that lasted minutes. Overall, during 2007 to 2009, females with current asthma experienced asthma episodes/attacks of longer duration than did males with current asthma. Males who had recent episodes/attacks experienced shorter events than females, with 62.4% of males reporting an episode/attack lasting minutes compared to 39.3% of females. The reported length of the most recent asthma episode/attack for persons with current asthma was greatest among non-Hispanic Blacks. This group experienced a higher proportion of episodes/attacks that lasted hours, days, or weeks compared to other race/ethnicity groups. Specifically, 92.2% of non-Hispanic Blacks with current asthma had episodes lasting hours, days or weeks compared to 50.2% of Hispanics, 48.4% of non-Hispanic Others, and 49.5% of non-Hispanic Whites.

Comorbid Conditions

2007 - 2009 ACBS respondents were asked, using four separate questions, if they had ever been told by a doctor or health professional that they had chronic obstructive pulmonary disease (COPD), emphysema, chronic bronchitis, and/or depression.¹⁸ Based on the self-reported survey responses, it was estimated that among adults with current asthma: 21,300 (8.8%) had COPD; 11,100 (4.5%) had

¹⁸ Responses were not mutually exclusive.

emphysema; and 52,600 (21.5%) had chronic bronchitis.¹⁹ Approximately 61,400 (25.5%) had one to three respiratory conditions in addition to asthma. The respiratory score for an individual is measured by assigning a value of one for each comorbid condition that person has, and the score can range from zero to three. The average respiratory score (which simply is the average of all individual respiratory scores) of Connecticut adults with current asthma was 0.346, indicating that the respiratory distress of most adults with asthma was very mild. Depression was present for 69,100 (28.2%) of adults with current asthma.

Environmental Exposures

Among Connecticut residents with current asthma, approximately 45,700 (13.9%) were in households with a current tobacco smoker. Approximately 27,400 (8.2%) persons with current asthma were exposed to smoking in the home within the past week. Environmental tobacco smoke (ETS) is a well-known asthma trigger and the effects of third-hand smoke (THS) on human health are being investigated (Sleiman, Gundel, Pankow, et al., 2010; Matt, Quintana, Destailats et al., 2011). Among children with current asthma in Connecticut, approximately 22.3% lived in a household with at least one adult smoker. That almost a quarter of Connecticut children with current asthma are exposed in their dwellings to ETS and potential THS is of great concern.

In addition to ETS, the ACBS also assessed exposure to: gas used for cooking; mold in the past 30 days; domestic pets; cockroaches in the past 30 days; mice or rats in the past 30 days; wood burning heating equipment; unvented heating equipment; and carpeting or rugs. The percentage estimates for these exposures are in Appendix D.

The BRFSS survey and the ACBS assess the presence or absence of ten environmental exposures in the home that may exacerbate asthma symptoms. The average proportion of environmental exposures measures the relative number of exposures reported by survey respondents in the home environment. It is calculated by dividing the number of reported exposures (excluding missing values) by the total number of exposures. The average proportions of environmental exposures for children and adults with current asthma were almost equal (0.225 for children and 0.232 for adults). For females, the average proportion of environmental exposures was 0.236 compared to 0.223 for males. The average proportion for environmental exposures was highest among non-Hispanic Blacks (0.274) and lowest among non-Hispanic Others (0.222).

Approximately 147,100 (44.4%) people with current asthma received medical advice to change things in their home, school, or work environments to improve their asthma. The ACBS inquires about eight potential modifications that can be made to the household living environment that may help to minimize asthma symptoms. The modifications that people made included regular use of: an air cleaner/purifier (25.8%); dehumidifier (40.1%); kitchen exhaust fan (55.8%); and bathroom exhaust fan

¹⁹ Diagnosis of COPD can include chronic obstructive bronchitis, chronic obstructive asthma, or chronic emphysematous bronchitis.

(57%). People with current asthma also used mattress covers (40.5%) and pillow covers (36.3%), and washed sheets/pillowcases in hot water (42.7%). Among the estimated 212, 100 persons with current asthma who own pets, 28.5% did not allow pets in the bedroom.

The proportion of actions to reduce exposures measures the relative number of actions which reduce exposures in the home environment. It is calculated by dividing the number of reported actions (excluding missing values) by the total number of actions. The proportion of actions to reduce exposures was 0.414 for Connecticut residents with current asthma. This proportion was higher for children (0.451) than adults (0.401); higher for males (0.423) than females (0.406); and higher for non-Hispanic Whites (0.429) than Hispanics (0.363), non-Hispanic Others (0.315), and non-Hispanic Blacks (0.308).

Lost Productivity and Activity Limitation

Respondents to the 2007 - 2009 Asthma Call-back Survey were asked, "During the past 12 months, how many days were you unable to work or carry out your usual activities because of your asthma?" Among adults with current asthma, approximately 41,400 (17.1%) were unable to work or carry out their usual activities because of asthma for one to seven days, and 17,500 (7.3%) were unable to work for eight or more days. Missing work for one to seven days was more frequent among women (22.5%) than men (8.7%). On average in the past 12 months, a Connecticut adult with current asthma was unable to work or conduct usual activities because of asthma for 5.1 days. In the past year, a child with current asthma who attended school or day care missed 2.3 days because of asthma.

ACBS respondents with current asthma were also asked about the amount to which they limited their usual activities due to asthma. Overall, 152,500 (46.1%) had no activity limitation, 128,300 (38.8%) had little, 41,300 (12.5%) had a moderate amount, and 8,900 (2.7%) limited activities "a lot". While a higher percentage of children (42.7%) limited their activities "a little" compared to adults (37.4%), a higher percentage of adults (3.4%) compared to children (0.8%) limited their usual activities "a lot" because of asthma. Among persons with current asthma, a higher proportion of females (59.2%) than males (47.4%) experienced activity limitation in the past 12 months because of asthma.

Asthma Control

Following the guidelines in the National Asthma Education and Prevention Program *Expert Panel Report 3: Guidelines for the Management and Diagnosis of Asthma*, asthma control was classified as well controlled, not well controlled, or very poorly controlled using four parameters: daytime symptoms, nighttime symptoms, interference with normal activity, and use of short-acting beta agonists (SABA).²⁰ ACBS findings for 2007 - 2009 show that among persons with current asthma, it was

²⁰ See also the article Factors associated with asthma control among adults in five New England states, 2006-2007 by Nguyen, Zahran, Iqbal, Peng, and Boulay (2011).

considered well controlled for 34.1%, not well controlled for 48.2%, and very poorly controlled for 17.8%. A greater percentage of adults (19.7%) experienced poor asthma control compared to children (12.3%). Among children, those less than five years old had the poorest asthma control with 74.9% experiencing asthma that was categorized as not well controlled or very poorly controlled. Among adults, 25 - 34 year olds had the highest percentage (70.5%) of asthma that was not well-controlled or very poorly controlled. Females (52.5%) were more likely than males (42.5%) to report asthma that was not well controlled. Persons with annual household incomes of \$15,000 - \$24,999 (14.4%) were least likely to have well-controlled asthma while those with annual household incomes greater than or equal to \$75,000 (40.3%) were the most likely to have well-controlled asthma.

Medication

According to 2007 - 2009 ACBS findings, approximately 235,600 (72.4% of adults and 67.4% of children) took asthma medication less than three months ago. With respect to sex, 132,000 (70.9%) females and 102,600 (71.2%) males with current asthma took asthma medication within the last three months; 2.3% of males reported never taking asthma medication compared to 0.8% of females. Asthma medication was taken less than one day ago by a higher proportion of non-Hispanic Blacks (46.5%) and non-Hispanic Whites (44.3%) than Hispanics (33.9%) and non-Hispanic Others (20.8%).

Overall, approximately 67.9% of persons with current asthma had a prescription for asthma medication in the past three months - approximately forty percent of the prescriptions were for asthma control and 55.7% were for rescue medications. A third (32.6%) of current asthma sufferers did not use any prescribed asthma medication; 28.1% used prescribed rescue medication only; 11.7% used prescribed control medication only; and 27.5% had prescriptions for both control and rescue medications.

Less than half (43.8%) of people with current asthma used an inhaled corticosteroid (ICS). Among ICS users, 86.7% had daily use and 40.4% took an ICS during an asthma attack. Short-acting beta agonist (SABA) medications were used by 79.1% and long-acting beta agonist (LABA) medications were used by 30.4%. Among SABA users, 21.7% used it daily and 93.4% used it during an asthma attack. Overall, 56.6% of people with current asthma properly used inhalant asthma control medication and 64.8% properly used asthma rescue medication.²¹ Sixty percent of adults compared to 43.1% of children, and 55.8% of females compared to 57.3% of males properly used asthma control medication. A greater proportion of adults (67.7%) properly used rescue medications than children (56.9%). See the appendices for additional information on use of asthma medications.

²¹ "Proper use" of control and rescue medications was determined by comparing the reported prescription medications taken in the past three months with: the number of metered doses; use of a spacer; use during an asthma attack or episode; use before exercise; daily, and daily use schedule. See the *Medications* section of the ACBS.

Health Care Utilization

ACBS respondents were asked “How long has it been since you last talked to a doctor or other health professional about your asthma?” Among Connecticut residents with current asthma, approximately 242,800 (73.3%) had talked to a doctor or other healthcare professional about their asthma within the past 12 months and 197,200 (59.9%) had at least one routine asthma checkup. Within the past year, approximately 70.4% of adults and 81.6% of children with current asthma had spoken with a doctor about asthma. More females with current asthma (76.3%) talked with a doctor about asthma than their male counterparts (69.2%). Non-Hispanic Blacks (91.4%) followed by Hispanics (81.2%) were more likely to have spoken to a doctor about asthma within the past 12 months than non-Hispanic Whites (71.7%) and non-Hispanic Others (60.9%).

Children (69.3%) were more likely than adults (56.5%) to have had one or more routine asthma checkups in the past year. Fewer males (55.6%) than females (63.1%) had at least one asthma checkup in the past year. A greater percentage of non-Hispanic Whites (42.5%) did not have routine asthma checkups in the past 12 months compared to non-Hispanic Blacks (21.4%) and Hispanics (26.5%).

Approximately 294,900 (89%) individuals with current asthma did not have any ED or urgent care visits in the past 12 months because of asthma. Children (11.9%) were slightly more likely than adults (10.7%) to have had at least one ED or urgent care asthma-related visit within the past 12 months. Females (11.2%) and 10.9% of males with current asthma sought care at an ED or urgent care facility. A greater percentage of non-Hispanic Blacks (24.8%) than Hispanics (18.1%) and non-Hispanic Whites (9.5%) visited an ED or urgent care center due to asthma in the past year. Most (97.2%) people with current asthma in Connecticut were not hospitalized because of it according to ACBS findings. It is estimated that 9,300 persons had at least one asthma hospitalization within the past 12 months. Roughly one in six people who had an asthma hospitalization had two or more such events.

An estimated 246,200 Connecticut residents with current asthma did not visit a doctor for urgent treatment of worsening asthma symptoms within the past 12 months. Among the 84,100 (25.5%) who did, an estimated 14,300 (16.6%) children and 28,900 (11.8%) adults had two or more doctor visits for urgent treatment of asthma symptoms. Females (16.1%) more than males (9.3%) had two or more doctor visits for urgent treatment. The percentage of two or more doctor visits for treatment of worsening asthma symptoms was highest among non-Hispanic Blacks (28.7%) followed by Hispanics (22.4%), non-Hispanic Others (14.3%), and non-Hispanic Whites (11.1%).

Alternative Care

Findings of the 2007 - 2009 ACBS were that at least one type of complementary or alternative care was used by approximately 211,300 (63.8%) persons with current asthma in the past 12 months. Alternative types of care used to control asthma included: herbs (2.3%); vitamins (8.3%); aromatherapy (3.5%); homeopathy (2.7%); yoga (3.1%); breathing techniques (25.5%); acupuncture

(1.2%); acupressure (1.5%); reflexology (1.1%); naturopathy (2%); and other alternative care (6.4%). Self-care therapy refers to using herbs, vitamins, aromatherapy, homeopathy, yoga, and breathing techniques to control asthma. Approximately 109,800 (33.2%) people with current asthma used at least one self-care alternative therapy in the last 12 months. Practitioner-care therapy refers to using acupuncture, acupressure, reflexology, and naturopathy to control asthma. Among people with current asthma, approximately 13,600 (4.1%) used at least one type of practitioner-care therapy in the past year.

Knowledge of Asthma and Asthma Management

ACBS respondents were asked if they were ever taught to recognize early asthma signs or symptoms. Based on responses to this question, it is estimated that 239,800 (73.6%) persons with current asthma had ever received education on this topic area. More children (87.2%) than adults (68.7%) had received some education about recognizing asthma signs or symptoms. Seventy-two percent (72.2%) of males and 74.4% of females had been educated. Among non-Hispanic Blacks, 85.3% had ever been taught to recognize asthma signs and symptoms compared to 79.9% of Hispanics, 77.8% of non-Hispanic Others, and 71.8% of non-Hispanic Whites. Approximately 274,900 (83%) people with current asthma had ever been taught what to do during an asthma attack. Children (88.2%) more than adults (81.6%), and males (85.9%) more than females (81.3%), had ever received education about what to do during an asthma attack. It is estimated that 34,600 (10.4%) of people with current asthma in Connecticut had ever taken a course on asthma management. Children (15.2%) were more likely than adults (8.8%) to have ever had such a course. Males (12.9%) more than females (8.6%) had ever taken a course on how to manage asthma.

Less than half (44.7% or 148,500) of individuals with current asthma had ever been taught to use a peak flow meter to adjust their daily medications. Children (48.3%) more than adults (43.5%), and males (45%) more than females (44.2%), had ever been taught to use a peak flow meter. Hispanics (60.1%) more than non-Hispanic Whites (43.3%), non-Hispanic Others (40.2%), and non-Hispanic Blacks (39.1%) had ever received education on using a peak flow meter.

ACBS respondents were asked if a doctor or other health professional had ever given them an asthma action plan (AAP). Based on their responses, it is estimated that among Connecticut residents with current asthma, 112,500 (34.3%) had ever been given an AAP by their health care providers and approximately 215,700 (65.7%) had not ever been given an AAP. A higher percentage of adults (73.2%) than children (44%), and a higher percentage of females (70.9%) than males (59.2%), had not ever been given an AAP. An estimated 79.5% of non-Hispanic Blacks, 72.4% of non-Hispanic Others, 65.3% of non-Hispanic Whites, and 61.8% of Hispanics had not ever been given an asthma action plan.

Cost of Asthma Care

The ACBS inquired about cost as a barrier to accessing care for asthma within the past 12 months. Respondents were asked if cost was a barrier to: 1) seeing a primary care doctor; 2) seeing a specialist; or 3) purchasing medication. Based on ACBS responses, it is estimated that among persons in Connecticut with current asthma:

- 22,200 (6.7%) regarded cost as a barrier to visiting a primary care physician for asthma care;
- 8,900 (2.7%) experienced cost as a barrier to seeing a specialist for asthma care; and
- 35,600 (10.7%) encountered cost as a barrier to buying medication for their asthma.

The cost barrier score is a summary variable that combines positive responses to three cost barrier questions in the ACBS. The cost barrier score ranges from zero to three. Zero indicates that cost was not a barrier to primary care, specialist care, or buying medication. Three indicates that cost was a barrier to all three things. The average cost barrier score is the sum of cost barrier scores divided by the total number of persons who gave a response to all three cost barrier questions. The average cost barrier score for persons with current asthma in Connecticut was 0.201, indicating that few persons with current asthma saw cost as inhibiting them from receiving asthma care and medication. As shown in Figure 15, approximately 88% of Connecticut residents with current asthma did not regard cost as a barrier to care.

Overall, 40,200 (12.1%) of people with current asthma in Connecticut encountered any cost barrier to asthma care (5.5% had one; 5.2% had two; and 1.4% had three barriers). Cost was an impediment to care for: 3.5% of children; 15.2% of adults; 9.7% of males; 14.1% of females; 18.1% of Hispanics; 17.1% of non-Hispanic Blacks; 11.2% of non-Hispanic Others; and 11.1% of non-Hispanic Whites with current asthma. Unfortunately, the underlying natures of the cost barriers (e.g., transportation, insufficient insurance coverage, income) are unknown.

Figure 15. Cost Barriers to Asthma Care Encountered in the Past 12 Months by Persons with Current Asthma, Connecticut, 2007 – 2009, with 95% Confidence Intervals

