

Asthma in Youth



Utah Youth Asthma Report

2008



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Introduction

This report presents insights into asthma among Utah children 0-17 years of age. The extent of asthma morbidity among Utah's youth was estimated by using data from the Utah Health Status Survey (HSS), the Utah Youth Tobacco Survey (YTS), and the Utah Youth Risk Behavior Survey (YRBS). In addition, the Utah

Inpatient Hospital Discharge Database (HDDDB) was used to evaluate hospitalizations for asthma and the Utah Emergency Department Encounter Database (EDED) was used to evaluate emergency department visits due to asthma. For more information on these databases, refer to the Appendix.

Background

Asthma is a disease that affects the lungs and is characterized by episodes or attacks of inflammation and narrowing of small airways. Symptoms can include shortness of breath, cough, wheezing, and chest pain or tightness, and are triggered by a variety of things like pollen, dust mites, mold, animal dander, infections, exercise, exposure to tobacco smoke, and changes in the weather.¹

The profile of asthma changes as children get older. In general, wheezing is common among infants and toddlers because their small airways are more susceptible to anything that impedes airflow, and they have a high incidence of respiratory infections. Diagnosing asthma in infants and toddlers can be difficult given the many etiologies that can cause wheezing in very young children. Furthermore, young children who wheeze only during respiratory infections are likely to have transient symptoms.^{2,3,4} This pattern may make clinicians reluctant to label wheezing as a chronic disease among young children. However, respiratory distress in young children can rapidly become life threatening and warrants prompt attention. For this reason, emergency department and hospital services usage for asthma is high among young children.

Among school-age children, allergies/atopic sensitization starts to become a more prominent cause of wheezing, and displaces respiratory infections as a primary trigger of attacks. The emergence of more clearly identifiable and predictable symptoms in school-age children allows easier identification and management of asthma compared with younger children. Families, health care professionals, and schools that work well together can successfully help children control symptoms. However, families coping with environmental factors that can interfere with good asthma management may be less successful.⁵

Background (cont.)

Adolescents with asthma need to learn to recognize and treat their symptoms independently. Issues with emerging autonomy may accentuate good management strategies, or exacerbate problems with asthma control. The relatively low level of health care use for asthma among adolescents may indicate a combination of patterns among this group: changes in disease severity, higher success in controlling a chronic disease, lack of medical attention and poor use of medication to relieve symptoms. Of particular concern for adolescents is the higher rate of asthma deaths compared with younger children.⁶

Asthma is a serious, chronic illness among Utah children. The impact this disease has on children and their families is significant and translates into loss of time at work and school, loss of productivity, and additional costs to Utah's health care system.

Prevalence of Childhood Asthma

Nationally, from 1980 to 1996, asthma prevalence among children ages 0-17 increased by an average of 4.3% per year, from 3.6% to 6.2%. Low-income populations, minorities, and children living in inner cities experience disproportionately higher morbidity and mortality due to asthma. Asthma's effect on children and adolescents include the following: asthma

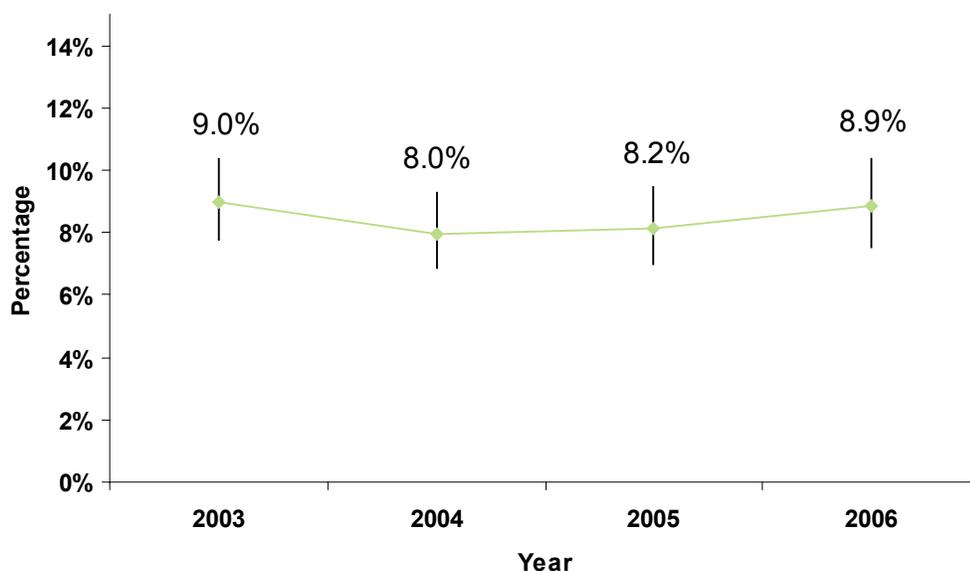
accounts for 14 million missed days of school annually; asthma is the third leading cause of hospitalizations among those younger than age 15; the number of child deaths from asthma increased nearly threefold from 93 in 1979 to 266 in 1996, and; the estimated cost of treating asthma in those younger than 18 years of age is \$3.2 billion per year.⁷

Health Status Survey

The Utah Health Status Survey provides information on a variety of topics related to health status and health care access at state and local health district levels. Data are collected on both children and adults. More information on the Health Status Survey is found in the Appendix.

Asthma prevalence among Utah children remained essentially unchanged from 2003 to 2006. See Figure 1.

Figure 1. Prevalence of Current Asthma (0-17 Years of Age) Utah, 2003-2006



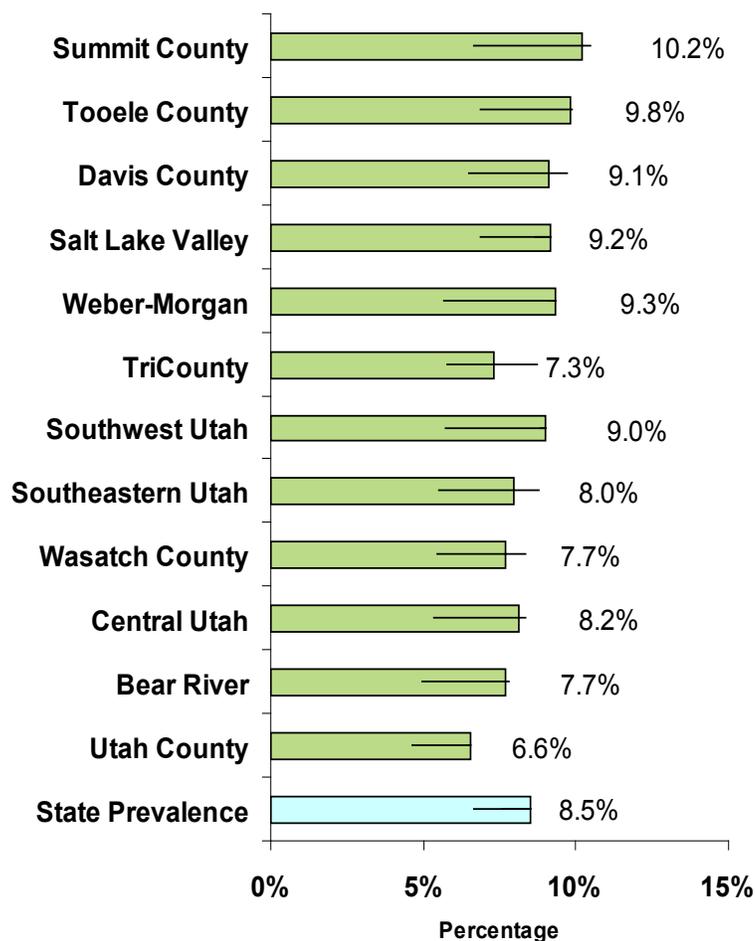
Note: Answer to the question, "Are you (Is he/she) currently under medical care for asthma?" Rates are not age-adjusted.

Source: Utah Health Status Survey, 2003, 2004, 2005, 2006.

Prevalence of Childhood Asthma

Children living in the Utah County Health District had the lowest reported rate of asthma (6.6%), while children residing in Summit County Health District had the highest rate (10.2%). The prevalence of childhood asthma was not statistically different across local health districts or when compared to the state rate. See Figure 2.

Figure 2. Prevalence of Current Asthma (0-17 Years of Age) by Local Health District, Utah, 2003, 2004, 2005, and 2006 Combined



Note: Answer to the question, "Are you (Is he/she) currently under medical care for asthma?" Source: Utah Health Status Survey 2003, 2004, 2005, and 2006 combined.

Asthma in Adolescents

Nationally, in 2003, 18.9% of high school students had been told by a doctor or nurse that they had asthma (doctor-diagnosed asthma). Of those, 16.1% had current asthma, and 37.9% of that group reported having had an episode of asthma or an asthma attack during the prior 12 months. These findings emphasize the need for health care providers, schools,

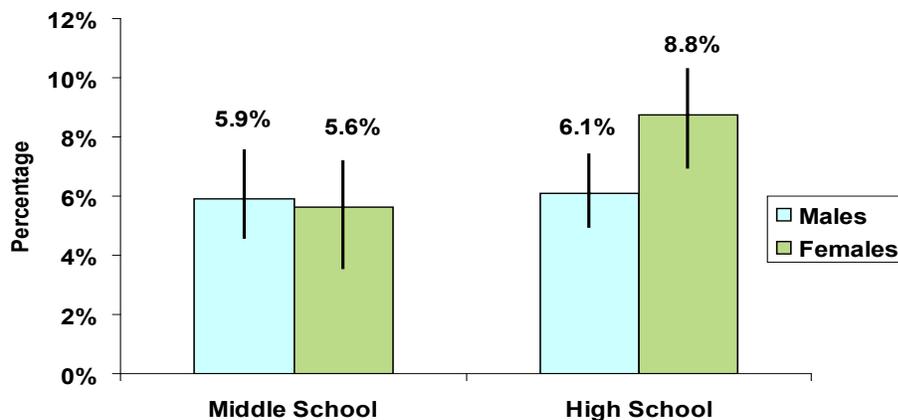
families, and public health practitioners to be prepared to respond to asthma-related emergencies and to help students manage their asthma. Schools can help improve asthma management among students whose asthma is not well-controlled by providing health services, education, and control of environmental triggers.⁸

Utah Youth Tobacco Survey

The Utah Youth Tobacco Survey is designed to monitor behaviors, attitudes, and knowledge about tobacco products, and includes questions on the diagnosis of, management of, and activity limitations due to asthma. The survey is administered to middle and high school students in the school setting. More information on the Utah Youth Tobacco Survey is found in the Appendix.

Overall self-reported, current doctor-diagnosed asthma prevalence was higher for high school students (7.4%) compared to middle school students (5.8%), though these rates were not statistically different. Figure 3 shows these data by sex and school level.

Figure 3. Prevalence of Current Asthma Among Middle and High School Students by Sex, Utah, 2003, 2005, and 2007 Combined



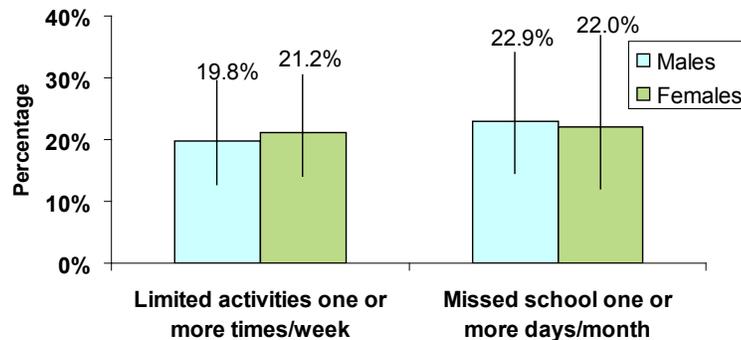
Current asthma includes those with doctor-diagnosed asthma who had an asthma attack in the past 12 months.

Source: Utah Youth Tobacco Survey, Utah, 2003, 2005, and 2007 combined.

Asthma in Adolescents

Overall, middle school students were more likely to report limiting their activities (20.5%) or missing school (22.5%) compared to high school students (17.2% and 15.6%, respectively); these differences were not statistically significant. See Figures 4 and 5 for analyses by sex.

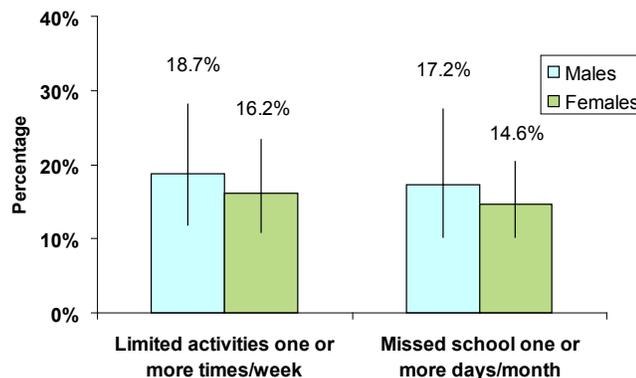
Figure 4. Complications and Limitations Among Middle School Students With Current Asthma by Sex, Utah, 2003, 2005, and 2007 Combined



Current asthma includes those with doctor-diagnosed asthma who had an asthma attack in the past 12 months.

Source: Utah Youth Tobacco Survey, Utah, 2003, 2005, and 2007 combined.

Figure 5. Complications and Limitations Among High School Students With Current Asthma by Sex, Utah, 2003, 2005, and 2007 Combined



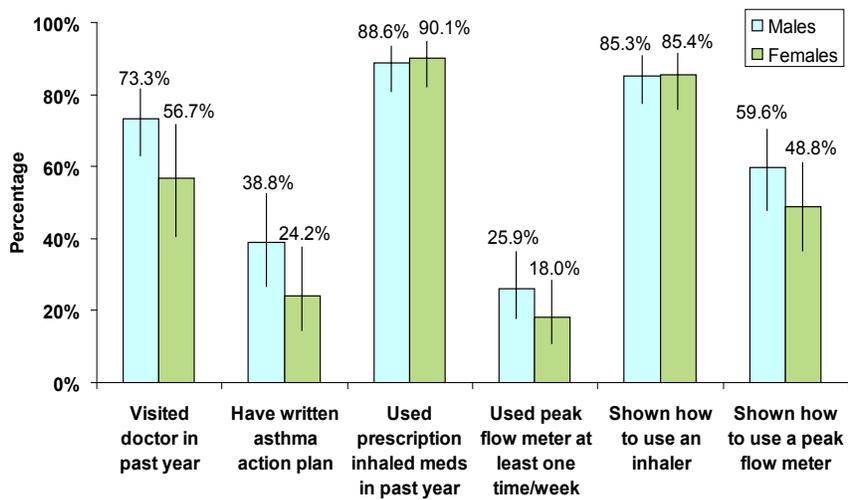
Current asthma includes those with doctor-diagnosed asthma who had an asthma attack in the past 12 months.

Source: Utah Youth Tobacco Survey, Utah, 2003, 2005, and 2007 combined.

Asthma in Adolescents

Overall, high school students (36.5%) were more likely to report having a written asthma plan compared to middle school students (31.5%) and middle school students (65.1%) were more likely to have visited a doctor in the last 12 months compared to high school students (58.6%); these differences were not statistically significant. See Figures 6 and 7 for analyses by sex.

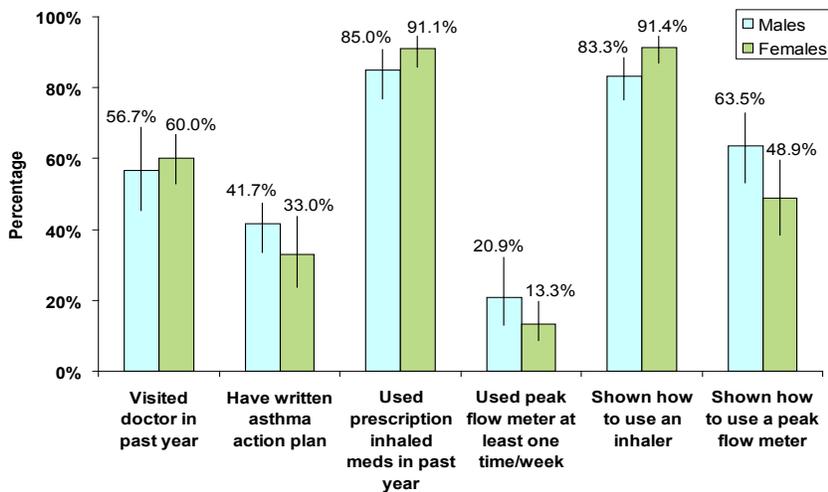
Figure 6. Percentage of Asthma Management Activities for Middle School Students with Current Asthma by Sex, Utah, 2003, 2005, and 2007 Combined



Current asthma includes those with doctor-diagnosed asthma who had an asthma attack in the past 12 months.

Source: Utah Youth Tobacco Survey, 2003, 2005, and 2007 combined.

Figure 7. Percentage of Asthma Management Activities for High School Students With Current Asthma by Sex, Utah, 2003, 2005, and 2007 Combined



Current asthma includes those with doctor-diagnosed asthma who had an asthma attack in the past 12 months.

Source: Utah Youth Tobacco Survey, Utah, 2003, 2005, and 2007 combined.

Asthma in Adolescents

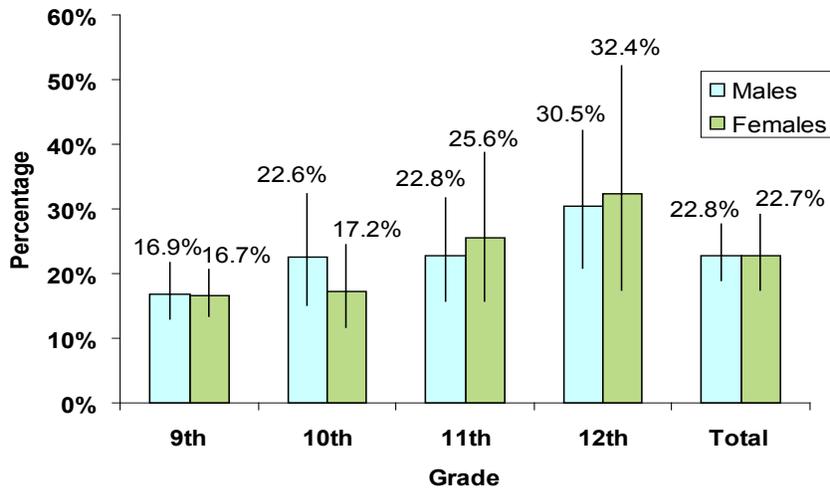
Youth Risk Behavior Survey

The Youth Risk Behavior Survey is designed to monitor health behaviors that contribute to the leading causes of death, disability, and social problems among youth in the United States. The survey is administered to high school students in the school setting. This biennial, national and state level survey includes questions to measure lifetime asthma, current asthma, and asthma episodes and attacks. More information on the Youth Risk Behavior Survey is found in the Appendix.

The overall percentage of Utah high school students who have ever been told by a doctor that they have asthma was 22.7% in 2007. The rates for males (22.8%) and females (22.7%) were not statistically different. The overall rate of current asthma, defined as those with doctor-diagnosed asthma who had an asthma attack in the past 12 months, was lower than doctor-diagnosed asthma as expected, with an overall rate of 13.0%. There was no statistically significant difference between the sexes for the rate of current asthma (14.0% and 12.2% for males and females, respectively). Both the doctor-diagnosed asthma rate and the current asthma rate appear to increase with grade level but, due to large confidence intervals possibly brought about by a small sample size, these rates were not statistically significant. Figures 8 and 9 show these data.

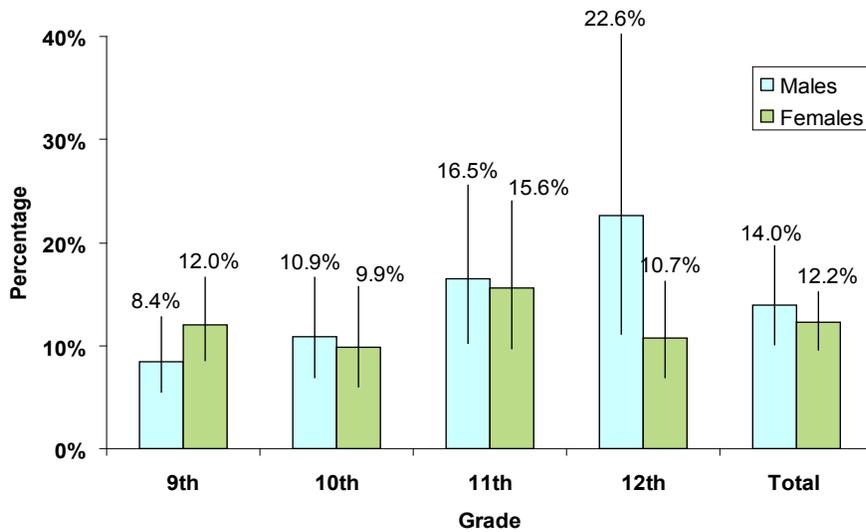
Asthma in Adolescents

Figure 8. Percentage of High School Students With Doctor-diagnosed Asthma, Utah, 2007



Source: Youth Risk Behavior Survey, 2007.

Figure 9. Percentage of High School Students With Current Asthma, Utah, 2007



Current asthma includes those with doctor-diagnosed asthma who had an asthma attack in the past 12 months.

Source: Youth Risk Behavior Survey, 2007.

Hospitalization of Children Due to Asthma

Nationally, asthma is the third leading cause of hospitalization among children under 15 years of age.⁶ Approximately 32.6% of all asthma hospital discharges in 2005 were among those under 15 years of age; however, only 27.8% of the U.S. population is younger than 15.⁶ Nationally, within the last few years,

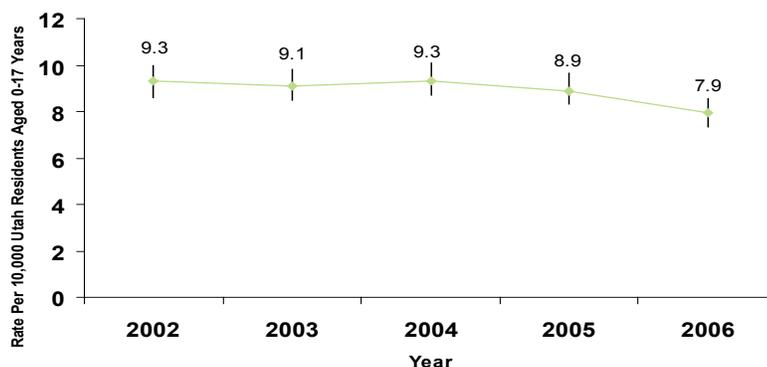
mortality and hospitalizations due to asthma have decreased and asthma prevalence has stabilized, possibly indicating a better level of disease management.⁶ The annual direct health care cost of asthma is approximately \$14.7 billion. Prescription drugs represent the largest single direct cost at \$6.2 billion.⁶

Utah Inpatient Hospital Discharge Database

The Utah Inpatient Hospital Discharge Database was used to determine the rates of childhood hospitalization due to asthma. For this report, hospitalizations for asthma consisted of those inpatient hospital stays for children and adolescents 0-17 years of age with a primary diagnosis code (International Classification of Disease-Clinical Modification, Ninth Revision, [ICD-9-CM]) of 493. In addition, if a child or adolescent is hospitalized more than once during the year, each individual hospitalization is counted once in the database. More information about the Utah Inpatient Hospital Discharge Database is found in the Appendix.

The Utah asthma hospitalization rate for children remained constant from 2002 to 2005. The 2006 asthma hospitalization rate of 7.9 hospitalizations per 10,000 children aged 0-17 years is significantly lower than the 2002 rate of 9.3 hospitalizations. See Figure 10.

Figure 10. Asthma Hospitalization Rate per 10,000 Children (0-17 Years of Age), Utah, 2002-2006



Note: Rates are not age-adjusted.
Source: Utah Inpatient Hospital Discharge Database.

Hospitalization of Children Due to Asthma

In 2006, there were a total of 639 hospitalizations for asthma among children aged 0-17 years in Utah. The average length of stay was 2.2 days and the average cost per hospitalization was \$4,897. The total length of stay per hospitalization was higher in the 1-4-year and 5-9-year age groups compared to the other age groups.

In 2006 there were more inpatient asthma-related hospitalizations for male children (381) compared to female children (258). There was a higher incidence of male child hospitalization in the younger age groups (<1 year, 1-4 years, and 5-9 years) compared to female children. The number of hospitalizations appears to be more comparable in the 10-14 year age group; there were nearly twice as many female children as male children hospitalizations in the 15-17-year age group.

Table 1. Details on Inpatient Hospitalizations Due to Asthma, Utah, 2006

Age Group	Total Number of Discharges	Total Length of Stay (Days)	Average Length of Stay (Days)	Average Charge/Stay (\$)
Males				
<1 Year	18	52	2.9	6138
1-4 Years	220	442	2.0	4407
5-9 Years	108	222	2.1	4507
10-14 Years	29	71	2.5	5570
15-17 Years	6	15	2.5	6226
Total	381	802	2.1	4634
Females				
<1 Year	9	23	2.6	5916
1-4 Years	125	292	2.3	5094
5-9 Years	80	187	2.3	4967
10-14 Years	30	86	2.9	5897
15-17 Years	14	37	2.6	7098
Total	258	625	2.4	5285

Source: Utah Inpatient Hospital Database, Utah, 2006.

Emergency Department Visits

Asthma attacks are frequently managed in emergency departments. Having an asthma attack that warrants a visit to the emergency department may be a sign of severe asthma, uncontrolled asthma, inappropriate use of emergency services, or limited access to health care. Therefore, trends in emergency department visits can

be an indication of the burden of asthma on families and the health care system, and may also be a sign of the impact of public health interventions. Nationally, in 2005, 679,000 emergency room visits were due to asthma in those less than 15 years of age.⁶

Utah Emergency Department Encounter Database

The Utah Emergency Department Encounter Database was used to determine the rates of emergency department use for children with asthma in Utah. This section focuses on emergency department encounters for children with asthma who were treated and released following their emergency department visit. ICD-9 code 493 was used to define asthma. For more information about the Utah Emergency Department Encounter Database, see the Appendix.

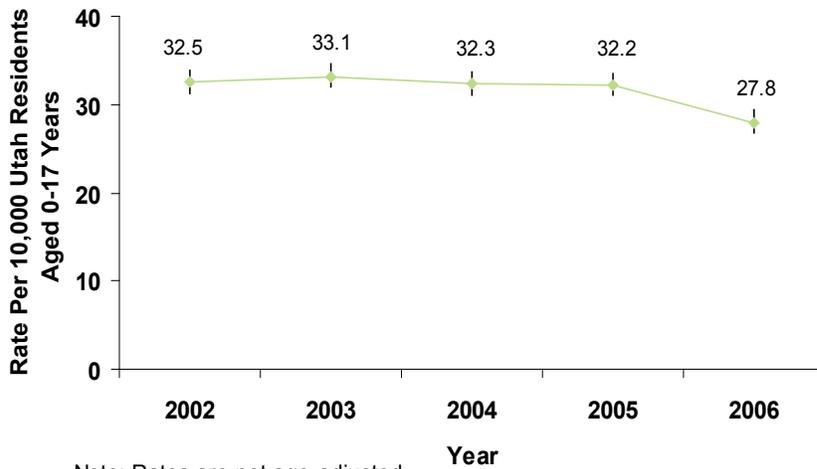
There were 12,260 visits to Utah emergency departments for asthma among children aged 0-17 years from 2002 to 2006. During this five-year period, boys experienced a higher rate of emergency department visits due to asthma (38.2 visits per 10,000 children 0-17 years of age) compared to girls (24.5 visits per 10,000 children 0-17 years of age).

The rate of emergency department use for children in Utah decreased between 2002 and 2006, from 32.5 visits in 2002 to 27.8 visits per 10,000 children 0-17 years of age in 2006. The total number of emergency department visits decreased by 158 visits, from 2,424 visits in 2002 to 2,266 visits in 2006. The 2006 asthma-related emergency room visits represented 1.4% of all emergency department visits for children 0-17 years of age. Figure 11 shows the rates for asthma-related emergency department use for children.

When emergency department use was analyzed by sex for the same five-year period, there were statistically significant differences by sex across all age groups. For children aged <1 year, 1-4 years, 5-9 years, and 10-14 years significantly more males visited the emergency department due to asthma compared to females. In the <1-year age group, the male rate (43.7 visits per 10,000 children) was more than double the female rate (17.1 visits per 10,000 children). In the 1-4-year age group, the male rate (66.1 visits per 10,000 children) was nearly double the female rate (35.5 visits per 10,000 children). In the 15-17-year age group, the female rate (25.4 visits per 10,000 children) was higher than the male rate (15.4 visits per 10,000 children). See Figure 12.

Emergency Department Visits

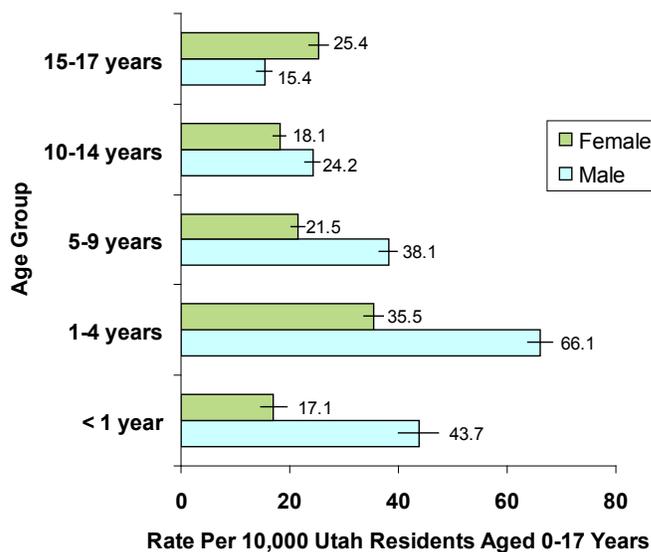
Figure 11. Asthma Emergency Department Visits (Treat and Release) for Children (0-17 Years of Age) by Year, Utah, 2002-2006



Note: Rates are not age-adjusted.

Source: Utah Emergency Department Encounter Database, 2002-2006.

Figure 12. Asthma Emergency Department Visits (Treat and Release) by Age Group and Sex, Utah 2002-2006 Combined



Source: Utah Emergency Department Encounter Database, 2002-2006 combined.

Mortality

Nationally, in 2002, 4,261 people died from asthma, for a rate of 1.5 per 100,000 people. Among children, asthma deaths are rare. In 2002, 187 children aged 0-17 years died from asthma, or 0.3 deaths per 100,000 chil-

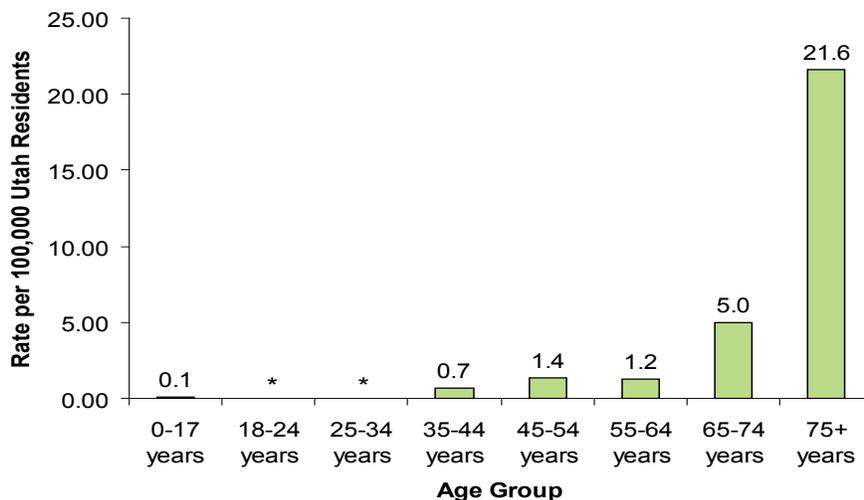
dren, compared to 1.9 deaths per 100,000 adults aged 18 years and older. Females, regardless of age, had an asthma death rate about 40% higher than males.⁹

Utah Death Certificate Database

The Utah Death Certificate Database was used to determine the rates of death due to asthma in Utah. This section describes mortality rates for Utahns of all ages due to asthma. ICD-10 codes J45 and J46 were used to define death due to asthma. For more information about the Utah Death Certificate Database see the Appendix.

Across all age groups, there were 217 total deaths due to asthma in Utah from 2001 to 2006 giving a mortality rate of 1.5 deaths per 100,000 Utah residents. Five children aged 0-17 years died from asthma, or 0.1 deaths per 100,000 children, which is comparable to the national rate of 0.3 for that age group. The mortality rate due to asthma for adults aged 18 years and older in Utah was 2.1 deaths per 100,000 residents, compared to the national rate of 1.9. In Utah the highest rate of death due to asthma (21.6 deaths per 100,000 residents) occurred among the age group 75+. See Figure 13.

Figure 13. Asthma Death Rate per 100,000 Utah Residents, by Age Group, Years 2001-2006 Combined



* The rates for age groups 18-24 and 25-34 were very small and not appropriate for publication.

Source: Utah Death Certificate Database.

Selected Utah Asthma Interventions

Data are used to guide the development of interventions to meet the needs of youth. Several examples of successful interventions are described.

Winning With Asthma

The Coach's Asthma Clipboard Program (CACP) was launched January 11, 2006 in Minnesota and Utah, but the word quickly spread to neighboring states. The 30-minute educational program, available online at www.WinningWithAsthma.org, is one of the first of its kind. It encourages those involved in youth sports, especially coaches, to understand how to help athletes properly manage their asthma during athletic events. The program teaches proper medication management, ways to prevent exercise-induced asthma, steps to take when athletes are experiencing asthma attacks, asthma triggers (what they are and what can be done to avoid them), and guidelines specific for cold-weather sports. Those who complete the program receive a booklet with additional asthma information and a coach's clipboard with "What to Do During an Asthma Attack" printed on the back. Pre- and post-test surveys are also included for agencies to evaluate the program's effectiveness.

School Resource Manual and Training

The School Resource Manual and Training was launched in the fall of 2004. The program uses interns from local colleges and universities to train elementary and secondary school faculty and staff about asthma basics and what to do during an asthma attack. Between 2004 and 2007, 5,034 faculty and staff were trained in 201 schools. The training, conducted in public, private, and charter schools, is approximately 45 minutes long and was developed to meet the needs of schools. All teachers receive a laminated general emergency protocol to post in their classroom and the school receives a school resource manual with additional information about asthma.

Selected Utah Asthma Interventions for Youth

Open Airways for Schools

The American Lung Association’s “Open Airways for Schools” program is an innovative asthma education program designed to help children learn to manage their asthma so they can spend more time in the classroom and less in the emergency room. The program teaches children ages 8-11 to better manage their asthma through six 40-minute interactive lessons. Children with asthma are brought together during or after school to learn these skills. The curriculum includes: a 110-page booklet with a script to guide instructors through each lesson, a 30-page instructor’s guide with helpful tips, a poster flip-chart with 13 colorful posters, and handout slides for children and parents.

Asthma Inhaler Law

In 2004, the Utah Legislature passed the Asthma Inhaler Law, which allows children to self-carry and administer their inhaled asthma medication with proper authorization. Previously, school district policies varied across the state and parents often felt confused about whether children could carry their asthma medications in school. When the law went into effect, the Utah Department of Health Asthma Program launched an extensive educational campaign, introducing the authorization form and sending posters to all pharmacies, school districts, and pediatric medical offices. The authorization form was translated into Spanish in 2007.

Appendix: Data Sources

Utah Emergency Department Encounter Database (EDED) and Utah Inpatient Hospital Discharge Database (HDDB)

The EDED contains consolidated information on complete billing, medical codes, personal characteristics describing a patient, services received, and charges billed for each patient emergency department (ED) encounter. The Bureau of Emergency Medical Services/Office of Health Care Statistics receives quarterly emergency department encounter data from hospitals. The data are converted into a standardized format and validated through a process of automated editing and report verification. Each record is subjected to a series of edit checks for accuracy, consistency, completeness, and conformity with the definitions specified in the Utah Hospital Emergency Patient Encounter Data Submittal Manual. Records failing the edit check are returned to the data supplier for correction.

The HDDB contains consolidated information for complete billing, medical codes, personal characteristics describing a patient, services received, and charges billed for each inpatient hospital stay. The Office of Health Care Statistics (OHCS) receives quarterly discharge data from hospitals. The data are converted into a standardized format and validated using automated editing and report verification. Each record is subjected to a series of edits to check for accuracy, consistency, completeness, and conformity with the definitions specified in the Data Submittal Manual. Records failing the edit check are returned to the data supplier for correction.

Since the data source is billing forms, all visits or encounters have a diagnosis code. There is some difference of opinion regarding whether some providers emphasize diagnosis codes that yield higher reimbursements. The hospital and ED data are considered “Administrative Data” because they were created for use in billing and remittance of payment. As such, they were not constructed for public health surveillance purposes, and are weak in areas such as external causes of injury and race or ethnicity. In general, however, they are extremely valuable and reasonably complete and valid.

Appendix: Data Sources

Utah Health Status Survey (HSS)

The HSS has been conducted in Utah in 1986, 1991, 1996, 2001, 2003-2004, and 2005-2006. It provides information on a variety of topics related to health status and health care access at statewide and health district levels. Data are collected on both adults and children. HSS is a telephone interview survey that uses a computer-assisted random digit dial technique. In each household, one adult (aged 18 years or over) is randomly selected to respond to the survey questions about themselves, about the household as a unit, and with regard to each household member. Thus information on all persons residing in the household is captured. The survey results are weighted to reflect age, sex, geographic distribution, and Hispanic ethnicity of the population.

Utah Youth Risk Behavior Survey (YRBS)

The YRBS is a state-based survey that collects uniform, state-specific data on priority health risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States. These behaviors, often established during childhood and early adolescence, include: tobacco use, unhealthy dietary behaviors, inadequate physical activity, alcohol and other drug use, and sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, including HIV infection. Also included are behaviors that contribute to unintentional injuries and violence. The YRBS was designed to: determine the prevalence of health risk behaviors; assess whether health risk behaviors increase, decrease, or stay the same over time; examine the co-occurrence of health risk behaviors; provide comparable national, state, and local data; provide comparable data among subpopulations of youth; and monitor progress toward achieving the Healthy People 2010 objectives and other program indicators.

Appendix: Data Sources

The YRBS includes national, state, and local school-based surveys of representative samples of 9th through 12th grade students. These surveys are conducted every two years, usually during the spring semester. The national survey, conducted by the Centers for Disease Control and Prevention (CDC), provides data representative of high school students in public and private schools in the United States. The state and local surveys, conducted by departments of health and education, provide data representative of public high school students in each state or local school district. Utah has participated in the YRBS since its inception in 1999. School and student participation in the survey project are voluntary and student responses on the questionnaire are confidential. Active consent is obtained from parents of participating students. Students who do not have parental consent do not participate in the survey.

Utah Youth Tobacco Survey (YTS)

The YTS is a state-based survey that collects uniform, state-specific data prevalence rates of many different tobacco products, knowledge and attitudes regarding tobacco use, the impact of media and advertising, minors' access to tobacco products, knowledge of tobacco in school curricula, cessation attempts and successes, and exposure to environmental tobacco smoke. The survey also includes questions about asthma diagnosis, treatment, and activity limitations due to asthma.

The survey instrument was developed in 1998-1999 through a collaborative process by participating states and the CDC Office on Smoking and Health. The survey was conducted in Utah in 2003, 2005, and 2007. The survey is conducted in both middle and high schools. School and student participation in the survey project is completely voluntary and student responses to the questionnaire are completely confidential. Active consent is obtained from parents of participating students. Students who do not have parental consent do not participate in the survey.

Appendix: Data Sources

Utah Death Certificate Database

Utah requires that death certificates be filed by funeral directors. Funeral directors obtain demographic information from an informant, usually a close family member of the deceased. The cause of death is certified by the decedent's physician or the physician who attended the death. Accidental and suspicious deaths are certified by the Medical Examiner. Death Certificate data are assessed for completeness and consistency. The Office of Vital Records and Statistics (OVR) conducts annual training for funeral directors and local registrars. When death certificates are received, the cause of death literals are computer-entered by personnel at the OVR. The data are then shipped to the National Center for Health Statistics (NCHS), where the data are machine-coded into ICD-10 codes. NCHS returns the ICD-10 codes to OVR and the records are updated.

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