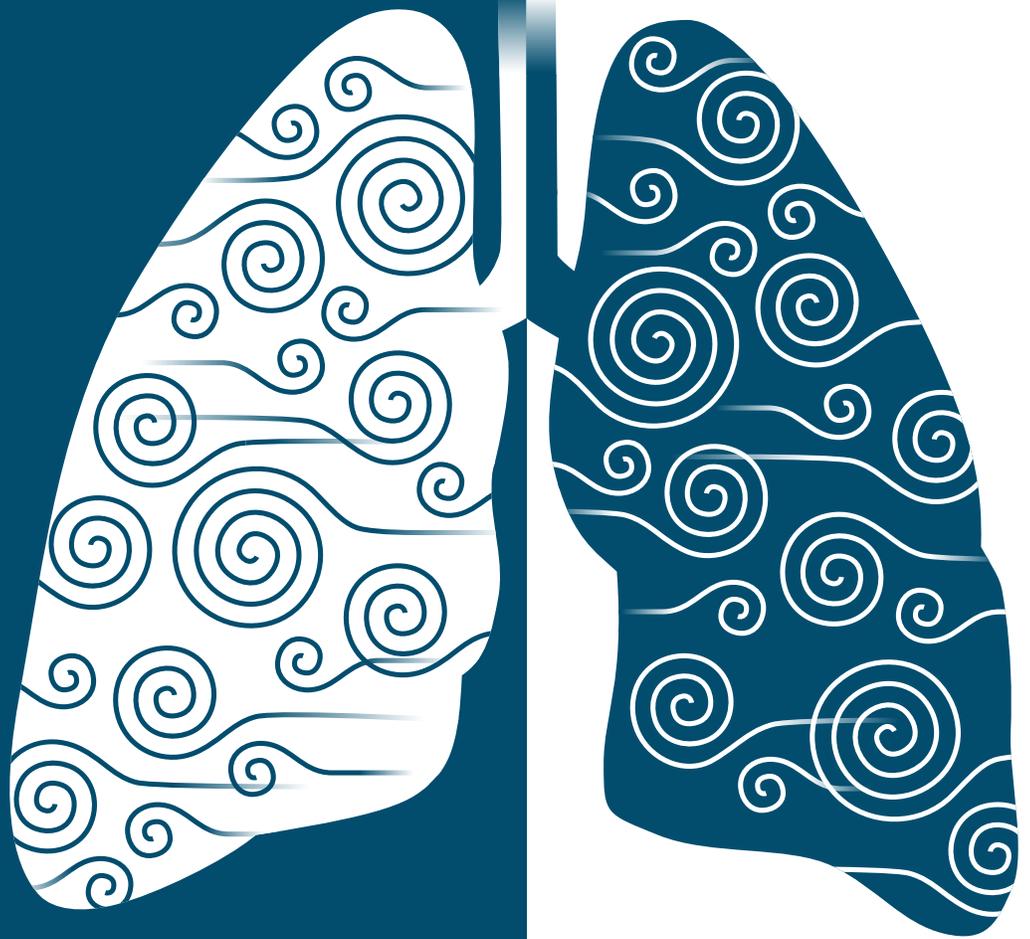


The Burden of Asthma in California

A Surveillance Report



The Burden of Asthma in California

A Surveillance Report

June 2007



Arnold Schwarzenegger
Governor
State of California

S. Kimberly Belshé
Secretary
Health and Human Services Agency

Sandra Shewry
Director
Department of Health Services



Contents

Acknowledgments	1
Executive Summary	3
Introduction	7
1. Asthma Prevalence	13
2. Symptoms and Management — Adults	23
3. Symptoms and Management — Children/Youth	39
4. School-based Asthma Surveillance	49
5. Risk Factors Associated with Asthma	57
6. Work-related Asthma	65
7. Asthma Emergency Department Visits	75
8. Asthma Hospitalizations	81
9. Asthma Among Medi-Cal Members	99
10. Asthma Mortality	105
Healthy People 2010	115
Asthma Disparities	117
Conclusions	121
Technical Notes	125
Acronyms	135
Glossary of Terms	137

Acknowledgments

This report was prepared by staff members of California Breathing, a public health asthma program of the Environmental Health Investigations Branch of the California Department of Health Services.

Authors:

Meredith Milet, MPH, Epidemiologist, California Breathing
Sarah Tran, MPH, Epidemiologist, California Breathing
Melody Eatherton, MPH, Epidemiologist, California Breathing
Jennifer Flattery, MPH, Epidemiologist, Occupational Health Branch
Rick Kreutzer, MD, Chief, Environmental Health Investigations Branch
Lauren Wohl-Sanchez, MFA, Graphic Designer, Environmental Health Investigations Branch

Many thanks to the California Breathing staff members who assisted with the development and editing of this report: Karina Arambula, Sara Campbell Hicks, Jennifer Bolcoa, Bindi Gandhi, Anne Ndivo, Deanna Rossi, Debbie Shrem, Patrick Sluka, and Janet Tobacman.

We also gratefully acknowledge the following reviewers:

Lori Copan, MPH, Environmental Health Investigations Branch, California Department of Health Services
Barbara Cowan, MPH, California Breathing, California Department of Health Services
Leslie Fierro, MPH, National Center for Environmental Health, Centers for Disease Control and Prevention
Galatea King, MPH, Environmental Health Investigations Branch, California Department of Health Services
Jeanne Moorman, MS, National Center for Environmental Health, Centers for Disease Control and Prevention
David Nunez, MD, MPH, California Asthma Public Health Initiative, California Department of Health Services
Daniel Smith, DrPH, Environmental Health Investigations Branch, California Department of Health Services
Svetlana Smorodinsky, MPH, Environmental Health Investigations Branch, California Department of Health Services
Richard Sun, MD, MPH, Medi-Cal Managed Care Division, California Department of Health Services

For more information or to obtain additional copies of this report contact:

Meredith Milet, MPH
California Department of Health Services
Environmental Health Investigations Branch
850 Marina Bay Parkway
Building P, Third Floor
Richmond, CA 94804
Phone: (510) 620-3634
Fax: (510) 620-3720
E-mail: mmilet@dhs.ca.gov

This report is available on the web at: <http://www.californiabreathing.org>

Suggested Citation:

Milet M, Tran S, Eatherton M, Flattery J, Kreutzer R. "The Burden of Asthma in California: A Surveillance Report." Richmond, CA: California Department of Health Services, Environmental Health Investigations Branch, June 2007.

This work is supported by grant number U59/CCU922471-01-2 from the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC.

Executive Summary

Asthma is one of the most common chronic diseases in the United States and has been recognized as a growing public health concern. The effects of asthma include missed school and work days, disruption of sleep and daily activities, urgent medical visits for asthma exacerbations, and even death. Asthma not only impacts people with asthma but also their family members and friends, as well as schools and businesses. There is no cure for asthma, but with access to medical care, appropriate medications, and proper self-management, people can control their symptoms so that they have a minimal effect on their daily lives.

The California Department of Health Services has established a blueprint for taking action against asthma through the *Strategic Plan for Asthma in California*. Over the past five years, strategies outlined in the plan have been implemented in an effort to reduce the burden of asthma in California. With input from stakeholders throughout the state, the plan was revised in 2007 for the next five years of implementation. In this way, California continues to promote better health and quality of life for people with asthma throughout the state.

California's asthma surveillance system uses data from a wide variety of sources to describe the burden of asthma in the state. Surveillance data include, but are not limited to: the number of people with asthma, frequency of symptoms, use of routine health care, visits to the emergency department and hospital, costs of health care utilization, and deaths due to asthma. Using all of the most recent available surveillance data, this report presents a comprehensive summary of the burden of asthma in California.

Over five million Californians have been diagnosed with asthma at some point in their lives, and almost three million currently have asthma. The majority of adults with asthma have mild symptoms, but about one in four have symptoms that are moderate or severe. About a third of children with asthma had an attack in the past year. Surveillance data show that there is much room for improvement in routine health care for people with asthma. Half of adults with asthma have not had a routine checkup for asthma in the past year and only about one-third of adults and children with asthma have received an asthma management plan. More encouraging is that the data indicate a decline in rates of the most severe outcomes — hospitalizations and deaths. Still, there are almost 500 deaths, 36,000 hospital discharges, and 145,000 emergency department (ED) visits (that did not result in hospitalization) per year due to asthma.

In addition, the costs of asthma hospitalizations are enormous — \$763 million in 2005. This figure does not include the cost of ED visits, which are a precursor of asthma hospital admissions. Proper prevention efforts could reduce many of these poor outcomes and costs. For example, 19 percent of people who were hospitalized for asthma from 2003 to 2005 had at least one repeat visit during that time period. Intervening to prevent those repeat asthma hospitalizations would have saved \$565 million over three years.

In almost all measures of asthma burden, there are large disparities by race/ethnicity, income, age, gender, and geographic location. Blacks have especially disproportionate rates of ED visits, hospitalizations, and mortality. Although people of all incomes have a similar prevalence of asthma, people with lower incomes have more severe symptoms, higher rates of hospitalizations, and are more likely to have repeat hospitalizations. These and other key findings of this report are listed below.

Key Findings

Prevalence and Symptoms

- Approximately 3.7 million adults (13.7%) and 1.7 million children (13.3%) in California have been diagnosed with asthma at some point in their lives.
- Approximately 2.1 million adults (7.6%) and 827,000 children (8.6%) in California currently have asthma.
- Among adults with asthma, approximately 62 percent have very mild symptoms, 11 percent have mild symptoms, 17 percent have moderate symptoms, and 9 percent have severe symptoms.
- 52.4 percent of adults and 11.9 percent of children with asthma have symptoms at least weekly.
- On average, a child with asthma misses 2.6 days of school per year due to his/her asthma.

Routine Health Care

- 27.8 percent of children with frequent asthma symptoms do not take daily asthma medications.
- About 50 percent of adults with asthma did not have a routine checkup in the past year.
- Only 32.5 percent of adults and 38.4 percent of children with asthma have received asthma management plans from a health care provider.

ED, Hospitalization, and Mortality

- In 2005, there were approximately 145,000 asthma-related ED visits (39.1 per 10,000 residents) and 36,060 asthma hospitalizations (10.0 per 10,000 residents) in California.
- Many asthma hospitalizations were repeat visits:
 - In 2005, 13 percent of people hospitalized for asthma had more than one discharge. This increases to 19 percent over a three-year period (2003–2005).
 - There were more than 4,700 repeat hospitalizations in 2005, and over 24,000 in 2003–2005 combined.
- In 2004, there were 450 deaths due to asthma (13.0 per million residents).

Trends Over Time

- In the past 10 years, asthma prevalence has gone up, but severe outcomes have decreased:
 - The percent of adults ever diagnosed with asthma increased over the past 10 years, from 11.0 percent in 1995 to 13.7 percent in 2005.
 - The percent of adults who currently have asthma has remained relatively constant over the past five years.
 - Asthma hospitalization rates have decreased gradually over the past 10 years, from 13.3 per 10,000 in 1995 to 10.0 per 10,000 in 2005.
 - Asthma mortality rates have decreased substantially, especially in the past five years, going from 19.3 per million in 1999 to 13.0 per million in 2004.

Disparities

- Children make up a large part of the asthma burden:
 - Lifetime asthma is highest among children age 5–17, at 15.8 percent.
 - Lifetime asthma is even higher among adolescents in schools, at 17.7 percent.
 - Current asthma is highest among children age 5–17, at 10.4 percent.
 - Rates of asthma-related ED visits are two times higher among children under age 19 (63.0 per 10,000) than among adults (30.0 per 10,000). In particular, males under age 15 have the highest rates.
 - Rates of asthma-related hospitalizations are 1.6 times higher among children under age 15 (14.0 per 10,000) than among people over age 15 (8.6 per 10,000). Rates are particularly high among males under age five.
- Blacks have a disproportionate share of the asthma burden:
 - Asthma prevalence among Blacks is 30 percent higher than Whites.
 - Rates of ED visits, hospitalizations, and mortality are two to three times higher among Blacks than the next highest race/ethnicity groups.
- The gender disparity in asthma varies by age. When looking at prevalence, ED visits, hospitalizations, and mortality, males have higher rates as children and females have higher rates as adults.
- Lower income is associated with higher asthma hospitalization rates and worse symptoms:
 - The rate of asthma hospitalizations is three times higher among people from places where the median income is less than \$20,000 compared to people from places where the median income is greater than \$50,000.
 - People with more repeat asthma hospitalizations come from areas with a lower median income than people who do not have repeat hospitalizations.
 - Prevalence of severe symptoms is almost seven times higher among adults with household incomes below \$20,000 (19.5%) compared to adults with household incomes over \$100,000 (2.8%).

Costs

- Costs for asthma hospitalizations are very high:
 - The average charge for an asthma hospitalization was \$23,953 in 2005, a 158 percent increase since 1995. However, the average length of stay for asthma hospitalizations did not change during this same time period.
 - Total charges for asthma hospitalizations in 2005 in California were \$763 million.
 - Government-funded health insurance programs (Medicare and Medi-Cal) pay for 61 percent of asthma hospitalizations, or \$547 million in charges.
 - Charges for repeat hospitalizations were \$118 million in 2005 and \$565 million for 2003–2005 combined.

Risk Factors

- Between 137,000 and 315,000 people have asthma related to their work.
- People with asthma are exposed to triggers in the home:
 - 45.5 percent of people with asthma have cats or dogs in the home.
 - 12.6 percent of people with asthma have cockroaches in the home.
 - 11.1 percent of people with asthma are exposed to tobacco smoke in the home.
- People who smoke are more likely to have asthma than non-smokers (14% among smokers vs. 12% among non-smokers).
- In both children and adults, being overweight is associated with higher asthma prevalence.
- Among people with asthma age 5–64, fewer than 50 percent receive a yearly flu shot. Coverage is especially low among people age 18–49 (18%).

Introduction

What is asthma?

Asthma is a chronic inflammatory lung condition characterized by recurrent flares or exacerbations of breathlessness, wheezing, coughing, and chest tightness. The severity of symptoms can range from mild to life-threatening. Since the early 1980s, the prevalence of asthma has been increasing. In 2004, there were approximately 21 million adults and nine million children with asthma in the United States.¹ There were 13.6 million physician office visits, one million hospital outpatient visits, 1.8 million emergency department visits, and 3,780 deaths due to asthma nationwide in 2004.² Asthma also causes millions of school and work absences every year.³

In addition to its impacts on health, asthma has a substantial economic impact. In 2000, total costs due to asthma in the U.S. were estimated at \$18.3 billion. This includes \$10.1 billion in direct costs — such as for health care services and medications — and \$8.2 billion in indirect costs incurred by time lost from school, work, and premature deaths.⁴

No one knows the exact causes of new onset asthma. People with a family history of asthma are more likely to develop it, and research suggests that exposure to tobacco smoke, infections, and some allergens and irritants may increase the likelihood of developing asthma.^{5,6} Additionally, various chemicals and other industrial substances have been implicated in causing asthma in the workplace.⁷

Much more is known about asthma triggers — things that bring on asthma symptoms and asthma flares. Each person with asthma may be susceptible to different triggers. Some known asthma triggers are listed below.⁸

Air pollution	Pet dander
Cockroaches	Pollen
Cold air	Strong emotions/stress
Dust mites	Strong odors
Exercise	Tobacco smoke
Mold	Viral infections

¹ National Center for Health Statistics web site (<http://www.cdc.gov/nchs/fastats/asthma.htm>); Summary Health Statistics, National Health Interview Survey (NHIS), 2004.

² Ibid.

³ Mannino DM, Homa DM, Akinbami LJ, Moorman JE, Gwynn C, Redd SC. Surveillance for Asthma--United States, 1980-1999. *Morbidity and Mortality Weekly Report*. March 29 2002;51(SS-1):1-13.

⁴ Asthma and Allergy Foundation of America. "Cost of Asthma." www.aafa.org

⁵ National Heart Lung and Blood Institute (NHLBI) web site, "What is Asthma?" at (http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_WhatIs.html)

⁶ McConnell R, Berhane K, Gilliland F, et al. Asthma in exercising children exposed to ozone: a cohort study. *Lancet*. Feb 2 2002;359(9309):386-91.

⁷ Chan-Yeung M, Malo JL. Aetiological agents in occupational asthma. *Eur Respir J*. 1994;7:346-371.

⁸ National Heart Lung and Blood Institute (NHLBI) web site, "What is Asthma?" at (http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_WhatIs.html)

There is no cure for asthma, but with proper management most people can control their condition so that their symptoms occur infrequently and have a minimal impact on their daily life. This takes effort — by the person with asthma and by their caregiver and/or health care provider. To keep asthma under control, people with asthma and parents of children with asthma need to learn about asthma, use medications as directed by a clinician, avoid asthma triggers, get regular checkups, and follow an asthma management plan.⁹ Standards of care for health care providers have been developed by the National Asthma Education and Prevention Program (NAEPP) of the National Heart, Lung, and Blood Institute. NAEPP guidelines have been condensed into a core set of 10 key clinical activities for asthma health care delivery:¹⁰

1. Establish asthma diagnosis.
2. Classify severity of asthma.
3. Schedule routine follow-up care.
4. Assess for referral to specialty care.
5. Recommend measures to control asthma triggers.
6. Treat or prevent co-morbid conditions.
7. Prescribe medications according to severity.
8. Monitor use of β_2 -agonist drugs.
9. Develop a written asthma management plan.
10. Provide routine education on patient self-management.

Asthma as a Public Health Priority in California

The California Department of Health Services (CDHS) has identified asthma as an important public health concern. In 2002, CDHS developed the *Strategic Plan for Asthma in California* as a blueprint for taking action. This plan was created with the help of stakeholders from medicine, public health, environmental organizations, and community organizations, as well as asthma experts and people personally affected by asthma. The plan sets a direction for asthma interventions by outlining priority goals and objectives. Currently, CDHS is re-convening stakeholders to revise and update the plan after five years of implementation. The revised plan will be released in 2007. In the past five years, CDHS has worked to implement the strategic plan in several ways. Key activities carried out by various CDHS programs are summarized below.

California Breathing, a public health asthma program, was developed within the Environmental Health Investigations Branch (EHIB), with funding from the Centers for Disease Control and Prevention (CDC) initiative, *Addressing Asthma from a Public Health Perspective*. California Breathing activities include: developing and maintaining an asthma surveillance system for California, creating an infrastructure for a statewide partnership of asthma stakeholders (California Asthma Partners), administering programs to address asthma disparities,

⁹ National Heart Lung and Blood Institute (NHLBI) web site, "What is Asthma?" at (http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_Whats.html)

¹⁰ Williams SG, Schmidt DK, Redd SC, Storms W. Key Clinical Activities for Quality Asthma Care: Recommendations of the National Asthma Education and Prevention Program. *Morbidity and Mortality Weekly Report*. March 28 2003;52(RR06):1-8.

and conducting activities to improve asthma-related policies and practices in schools and child care centers. For more information, please visit www.californiabreathing.org.

The California Asthma Public Health Initiative (CAPHI) is another CDHS public health asthma program, located within the Chronic Disease and Injury Control Branch, that focuses on asthma among California children age 0-18. Through the Best Practices in Childhood Asthma (BPCA) initiative, the program works to improve clinical care, reduce asthma morbidity, and reduce/eliminate asthma health disparities for children with asthma. BPCA activities include: providing funding for clinic-based asthma coordinators, implementing continuous quality improvement (CQI) strategies in clinics, providing state-level training and technical assistance, and conducting community outreach to promote best practices in asthma care.

CDHS also addresses asthma through various initiatives within Medi-Cal, the state Medicaid health insurance program. The Plan/Practice Improvement Project (PPIP) is a project funded by the California Healthcare Foundation to help Medi-Cal health plans increase the quality of the clinical care that they provide for people with asthma. Participating health plans use a systematic program to plan and implement better asthma care in all of their primary care practices. More information is available at http://www.chcs.org/info-url_nocat3961/info-url_nocat_show.htm?doc_id=278854. The Disease Management Pilot Program (DMPP) is another Medi-Cal project related to asthma. This program provides a special disease management benefit to people with various chronic diseases, including asthma. The disease management benefit includes education and other services designed to support adherence to care plans and to teach strategies for healthy lifestyle changes. More information is available at <http://www.dhs.ca.gov/omcp/html/DiseaseMgmtHomepage.htm>.

The Child Health and Disability Prevention (CHDP) program of the Children's Medical Services Branch is another program that addresses asthma. The Health Assessment Guidelines published by CHDP include updated asthma risk assessment and referral guidelines. These guidelines have been distributed to over 6,500 health care providers serving the 1.5 million children who participate in the CHDP program annually. CHDP has implemented the "Gateway" registration process, through which children can receive temporary Medi-Cal coverage. Temporary coverage helps children who are suspected to have asthma get further diagnosis and immediate care. Additionally, local CHDP programs in public health departments provide asthma-related continuing education for medical providers and community members to promote early identification and appropriate interventions for asthma.

Hundreds of non-governmental organizations throughout California work on asthma-related initiatives that complement the work of state agencies. It would be difficult to outline the breadth and scope of non-governmental asthma-related activities in this report. However, California Asthma Partners — a project of California Breathing — has identified organizations working on asthma and linked their efforts to the objectives in the *Strategic Plan for Asthma in California*. More information about organizations working on asthma in California can be found at www.asthmapartners.org.

Asthma Surveillance in California

The Centers for Disease Control and Prevention (CDC) defines surveillance as “the ongoing systematic collection, analysis, and interpretation of health data, essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.” Surveillance is an essential public health activity intended to protect the health of a community. This is different from research, which is conducted for the purpose of advancing and generating new knowledge that can be applied beyond any one particular community.

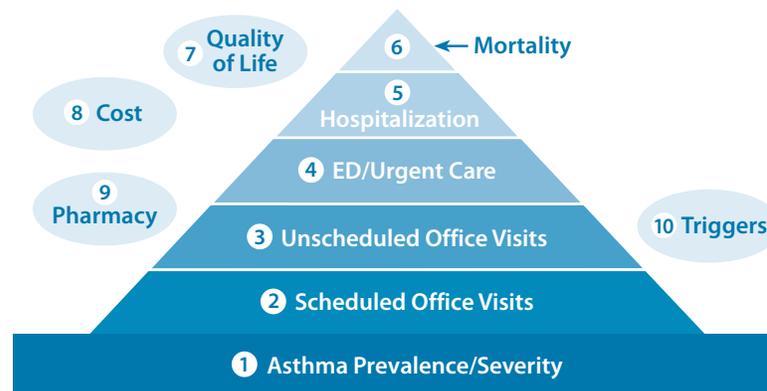
Ideally, an asthma surveillance system should include data on all parts of the spectrum of health care and quality of life for people with asthma. The Asthma Surveillance Pyramid depicted on the following page is a model developed by the CDC to describe the spectrum of asthma outcomes. The bottom of the pyramid represents asthma prevalence, or all people with asthma. This is the largest group in the pyramid and refers to the lowest level of asthma severity. Each successively higher level in the pyramid represents an increased level of asthma severity and a smaller proportion of people affected. Outside the pyramid are quality of life, cost, pharmacy, and triggers; these are four factors that impact all of the other outcomes in the pyramid.

The CDHS has developed an asthma surveillance system that integrates data from a variety of sources. The text accompanying the pyramid on the following page outlines these data sources and discusses their strengths and limitations. More detailed information about each of these can be found in the Technical Notes section of this report. CDHS attempts to use all available information for comprehensive asthma surveillance. However, some indicators shown in the pyramid are not currently accessible (as noted in the accompanying text).

Although not specified in the pyramid, California’s asthma surveillance system also includes work-related asthma. Work-related asthma is asthma that is caused or triggered by conditions or substances in the workplace. An ongoing surveillance system has been in place to track work-related asthma in California since 1993. This system includes doctor’s reports of work-related asthma, follow-up interviews with cases, and questions on the BRFSS survey. More information can be found in the work-related asthma section of this report.

As outlined below the figure, the California asthma surveillance system is fairly comprehensive, but it has some significant gaps. The areas with the most room for expansion are: office visits, pharmacy, triggers, costs, and quality of life. CDHS staff members continually work toward improving and expanding the current asthma surveillance system. For example, we recently began routine analysis of data on emergency department (ED) visits for asthma. Additionally, in 2006, California participated in a special BRFSS asthma survey where people who participate in the BRFSS and indicate that they have asthma are called back for a more comprehensive survey about their asthma. This “call-back” survey includes detailed questions about symptoms, health care utilization, education from health care providers, household environment, and medications. In particular, the questions on asth-

The Asthma Surveillance Pyramid: A Description of California's Asthma Data



1. **Asthma Prevalence/Severity:** Prevalence is estimated through telephone surveys that are administered to a random sample of the population. In California, there are two such surveys—the Behavioral Risk Factor Surveillance System (BRFSS) and the California Health Interview Survey (CHIS). These surveys ask respondents whether or not they have asthma and pose follow-up questions if they answer yes. BRFSS has been conducted in California since 1984 and in some years includes very detailed information about asthma severity. However, the sample size of BRFSS is too small to get reliable estimates for population subgroups such as race/ethnicity groups. CHIS has only been conducted bi-annually since 2001, but it has a much larger sample size and can provide reliable estimates by race/ethnicity and county. Data from CHIS 2001 and 2003 are used in this report; complete data from the 2005 CHIS were not available at the time this report was prepared.
- 2/3. **Scheduled and Unscheduled Office Visits:** Currently, there is no centralized system that uses medical records to track asthma-related physician visits in California. BRFSS adult asthma module asks people with asthma how many visits they have had in the past year. However, such self-reported information may be unreliable and does not provide details about the full extent of health care usage for asthma or the type and quality of care that is given.
4. **Emergency Department/Urgent Care:** In 2005, the Office of Statewide Health Planning and Development (OSHPD) began collecting data on admissions from all licensed emergency departments (EDs) in California. These data are used to calculate the extent of ED usage for asthma in the state. This report includes data on asthma-related ED visits for 2005. As future years of data are collected, we will be able to examine trends in this important measure.
5. **Hospitalizations:** OSHPD routinely collects data on inpatient discharges from every licensed acute care hospital in California. These data are used to calculate the extent of hospitalizations for asthma in the state and have been an essential part of the asthma surveillance system since 2000.
6. **Mortality:** The CDHS Center for Health Statistics compiles death certificate data, and these records are used to calculate the extent of asthma mortality in the state. These data have also been part of the asthma surveillance system since 2000.
7. **Quality of Life:** Quality of life for people with asthma is currently measured through the BRFSS and CHIS surveys. Topics include activity limitations, work and school days missed, and general health status. This information is self-reported; there is no system for collecting statewide data on the actual total days of work or school missed due to asthma.
8. **Cost:** There are many direct and indirect costs associated with asthma. Currently, measurable health care costs include charges for asthma hospitalizations (included in this report). Other costs of asthma—both direct costs of health care utilization and medications, as well as indirect costs due to factors such as school and work missed—are not measured on a statewide basis.
9. **Pharmacy:** The asthma surveillance system in California includes two measures of medication use among people with asthma. First, Medi-Cal calculates the appropriate use of medication among Medi-Cal enrollees with asthma; this measure is summarized in this report. Second, the BRFSS and CHIS surveys ask respondents how often they take asthma medications. However, there is no centralized system for summarizing pharmacy data for people with asthma throughout the state; therefore, detailed information on specific types of medication are not reported here.
10. **Triggers:** There are many types of asthma triggers and it is difficult to measure how much people with asthma are exposed to them. Some information on exposure to triggers such as tobacco smoke, cockroaches, and pets is available from the CHIS survey.

ma medications and triggers in the household environment are more detailed than any other currently available survey. California will participate in this survey again in 2007. For work-related asthma, efforts are underway to expand the surveillance system to collect reports from hospital discharge data, ED data, and worker's compensation data.

How to Use this Report

While California asthma surveillance data have been published in many formats in the past, this report is the first major compilation of all available asthma surveillance data in a single report. The goal of this report is to present a comprehensive picture of the burden of asthma in the state. The report can be used to establish the significance of asthma as a public health problem, document baselines for evaluation of public health programs, and provide a framework for asthma education, interventions, and policy.

The data in this report characterize the population of people with asthma in California. Data are presented by year to show trends over time and are also grouped by demographics such as age, sex, race/ethnicity, and income. The main focus of this report is information on asthma statewide; however, some data are also presented by county. Local data are also a very important resource and accordingly, more detailed information on asthma at the county level can be found in the County Asthma Profiles (www.california-breathing.org/asthma_data/county_asthma_profiles).

The body of this report is divided into the following topics: prevalence, symptoms and management, school-based surveillance, risk factors, work-related asthma, emergency department visits, hospitalizations, Medi-Cal members, and mortality. Each section begins with an introduction that summarizes the findings of that section. Throughout each section, graphs are accompanied by written summaries. Data sources are noted throughout; more detailed information on methods and data sources is compiled in the Technical Notes section. Data from surveys are presented with 95 percent confidence intervals (95% CI). CIs indicate the possible margin of error of the estimate. A detailed explanation of how to interpret CIs is included in the Technical Notes. Following the main data sections of the report are three summary sections: how California compares to Healthy People 2010 objectives, asthma disparities, and overall conclusions.

The various data sources cited throughout this report use different systems for categorizing race/ethnicity. In order to standardize race/ethnicity labels, we chose to use the names found most commonly in the surveillance data sources. This method does not address the complex issues associated with how these sources originally identified race/ethnicity. However, we decided that the "common denominator" would be the most objective method for choosing race/ethnicity labels. The labels used throughout this report are: American Indian/Alaska Native (AI/AN), Asian/Pacific Islander (API), Black, Hispanic, and White. All Hispanics are in one category, meaning that the other groups are non-Hispanic (e.g., our label White includes only non-Hispanic Whites). In making these particular choices, we do not wish to offend any race or ethnic group that may disagree with or may feel excluded from these categories.

1. Asthma Prevalence

What is asthma prevalence?

The percent of people with asthma is also called asthma prevalence. More specifically, asthma prevalence refers to the proportion of people with asthma in a specific population during a certain time frame. This section summarizes asthma prevalence among adults and children in California. The data are based on two large statewide telephone surveys: the Behavioral Risk Factor Surveillance System (BRFSS) and the California Health Interview Survey (CHIS). These surveys ask adults whether they have asthma and also ask parents or guardians about whether their children have asthma. Not everyone with asthma continues to have asthma symptoms, so the surveys ask about their diagnosis of asthma and whether they still suffer from asthma. A person has lifetime asthma if he or she has been diagnosed with asthma by a health care provider at any time in the past. A person has current asthma if he or she reports still having asthma. For more information about BRFSS or CHIS, please see the Technical Notes section at the end of this report.

Approximately
3.7 million adults
and 1.7 million
children in
California have
been diagnosed
with asthma.

How many people have asthma in California?

In 2005, 13.7 percent of adults surveyed said they had ever been diagnosed with asthma (lifetime asthma) and 7.6 percent said they still have asthma (current asthma). Among children under age 18, 13.3 percent had lifetime asthma and 8.6 percent had current asthma. This translates to approximately 3.7 million adults and 1.7 million children in California who have been diagnosed with asthma, and 2.1 million adults and 827,000 children in California who have current asthma.

Has the prevalence of asthma been changing?

The percent of adults with lifetime asthma has gone up, but the percent with current asthma has not changed by much. Among adults in California, lifetime asthma prevalence increased over the past decade, starting at 11.0 percent in 1995 and reaching 13.7 percent in 2005. Lifetime asthma prevalence in California is higher than the national prevalence. Current asthma prevalence has not increased or decreased consistently from 2000 (when it was first measured) to 2005; it ranged from 6.6 to 8.5 percent. This is similar to the national prevalence of current asthma, which is approximately eight percent.

Who has asthma in California?

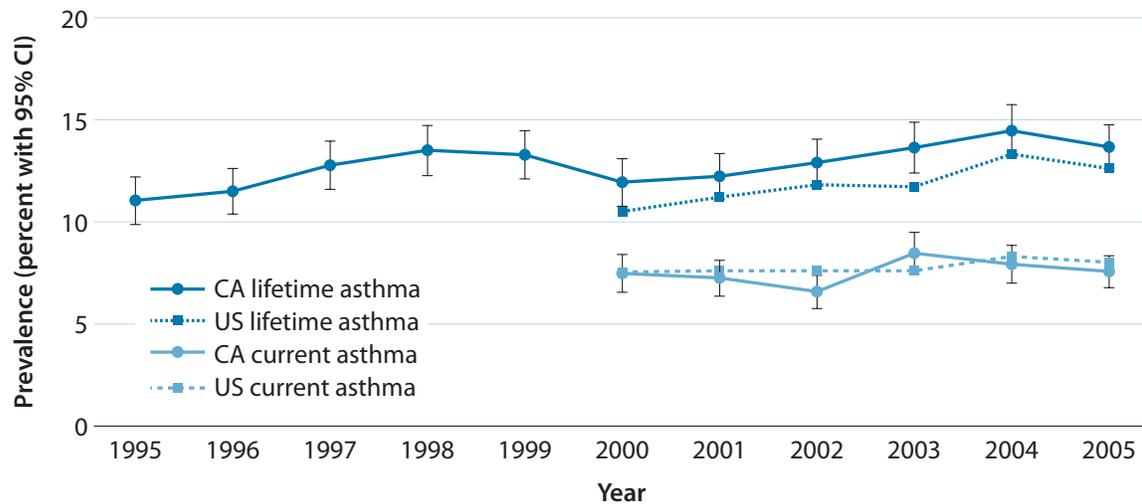
Many people in California have asthma, but some groups have higher prevalence than others. The prevalence of lifetime asthma is greatest among American Indians/Alaska Natives

(AI/AN, 23.6%) and Blacks (18.2%). Children age 5-17 have higher lifetime asthma prevalence (15.4% for age 5-11, 16.2% for age 12-17) than adults age 35 and older (13.0% for age 35-64, 11.4% for age 65+). There are also differences in asthma prevalence by gender. Among children, both lifetime and current asthma prevalence are higher in males than females. In adults, both are higher in females than males.

Summary:

- In 2005, 13.7 percent of adults in California had been diagnosed with asthma at some point in their lives (lifetime asthma); 7.6 percent had current asthma.
- The prevalence of lifetime asthma among adults has been increasing since 1995, when it was 11.0 percent.
- The prevalence of current asthma among adults has not increased or decreased significantly since 2000.
- Lifetime asthma prevalence in California is higher than in the U.S. overall; current asthma prevalence in California is about the same as in the U.S. overall.
- Significantly greater proportions of American Indians/Alaska Natives (23.6%) and Blacks (18.2%) have lifetime asthma than Whites (14.1%), Asians/Pacific Islanders (A/PI, 9.9 %) or Hispanics (10.7%).
- Lifetime asthma prevalence is highest among children age 5–11 (15.4%), adolescents age 12–17 (16.2%), and young adults age 18-34 (15.5%), and then decreases in older adults.
- Current asthma prevalence is highest among children age 5–11 (10.7%) and adolescents age 12–17 (10.1%), and then decreases in adults.
- Among adults, asthma prevalence (both lifetime and current) is higher for females than males. Among children, it is higher for males than females.

Lifetime and Current Asthma Prevalence Among Adults, California and U.S. 1995–2005



Lifetime asthma prevalence among adults (18 and over) in California increased² from 1995-2005 with some fluctuations. The prevalence went from 11.0 percent in 1995 to 13.7 percent in 2005 and has been about one percentage point higher than the U.S. prevalence since 2000.

Current asthma prevalence among adults in California did not increase or decrease consistently from 2000 to 2005, the only years in which it has been measured. The prevalence stayed within the range of 6.6 percent (2002) and 8.5 percent (2003) and has been similar to the U.S. prevalence.

Year	Lifetime Asthma Prevalence		Current Asthma Prevalence	
	%	(95% CI ¹)	%	(95% CI)
1995	11.0	(9.9 – 12.2)	—	—
1996	11.5	(10.4 – 12.6)	—	—
1997	12.8	(11.6 – 13.9)	—	—
1998	13.5	(12.2 – 14.7)	—	—
1999	13.3	(12.1 – 14.5)	—	—
2000	11.9	(10.8 – 13.1)	7.5	(6.5 – 8.4)
2001	12.2	(11.1 – 13.3)	7.2	(6.4 – 8.1)
2002	12.9	(11.7 – 14.0)	6.6	(5.7 – 7.4)
2003	13.6	(12.4 – 14.9)	8.5	(7.4 – 9.5)
2004	14.5	(13.2 – 15.7)	7.9	(7.0 – 8.8)
2005	13.7	(12.6 – 14.7)	7.6	(6.8 – 8.3)

Data Source: BRFSS 1995-2005; U.S. data from www.cdc.gov/brfss.

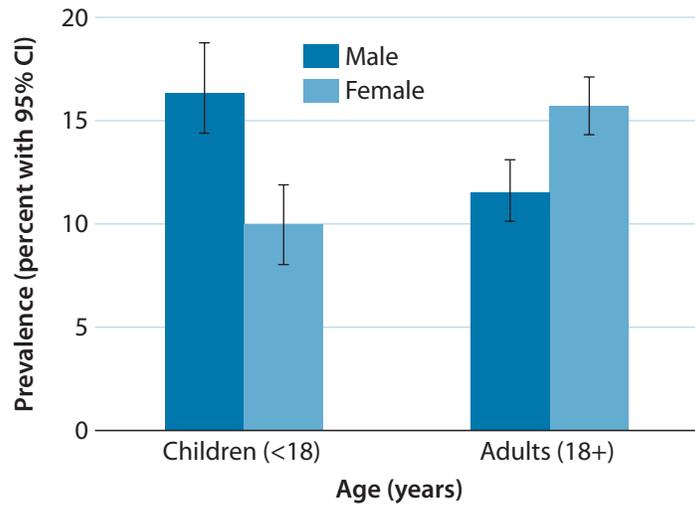
¹ 95% CI = 95% Confidence Interval

² Increase of 0.2% per year, p=0.01 (simple linear regression)

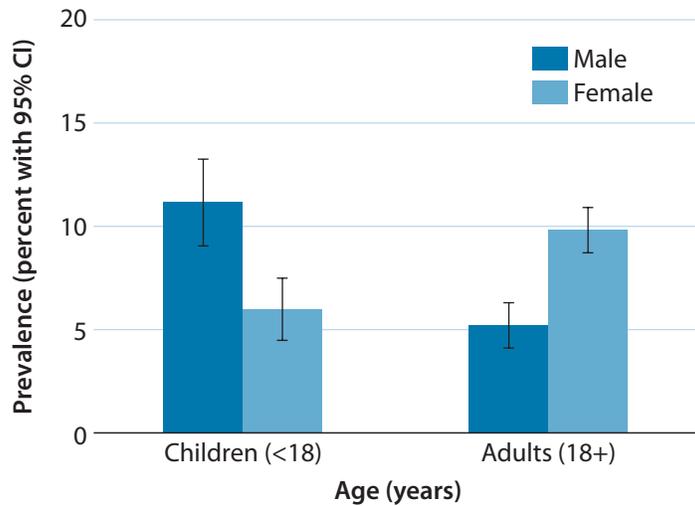
Asthma Prevalence by Gender and Age, California 2005

In 2005, lifetime and current asthma prevalence for male children (0–17 years) were significantly greater than for female children. Male children have 1.6 times higher lifetime asthma prevalence and 1.9 times higher current asthma prevalence than females. The reverse is true for adults: the prevalence of lifetime and current asthma is significantly greater in females than in males. Female adults have 1.4 times higher lifetime asthma prevalence and 1.9 times higher current asthma prevalence than male adults.

Lifetime



Current

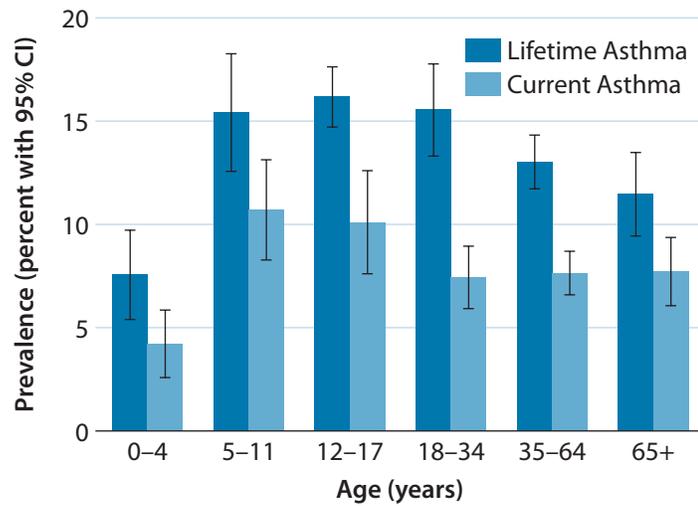


Gender	Children (0-17 years)		Adults (18+ years)	
	Lifetime Asthma Prevalence % (95% CI)	Current Asthma Prevalence % (95% CI)	Lifetime Asthma Prevalence % (95% CI)	Current Asthma Prevalence % (95% CI)
Male	16.3 (13.9 – 18.8)	11.1 (9.0 – 13.2)	11.5 (10.0 – 13.1)	5.2 (4.2 – 6.3)
Female	10.0 (8.0 – 11.9)	6.0 (4.5 – 7.5)	15.7 (14.3 – 17.2)	9.8 (8.7 – 10.9)

Data Source: BRFSS 2005

Lifetime and Current Asthma Prevalence by Age, California 2005

Lifetime asthma prevalence is highest among the 12–17 age group (16.2%) and lowest among the 0–4 age group (7.5%).³ Lifetime asthma prevalence decreases in adults age 35 and over. Current asthma prevalence is highest among children age 5–17 and lower among adults 18 and over.



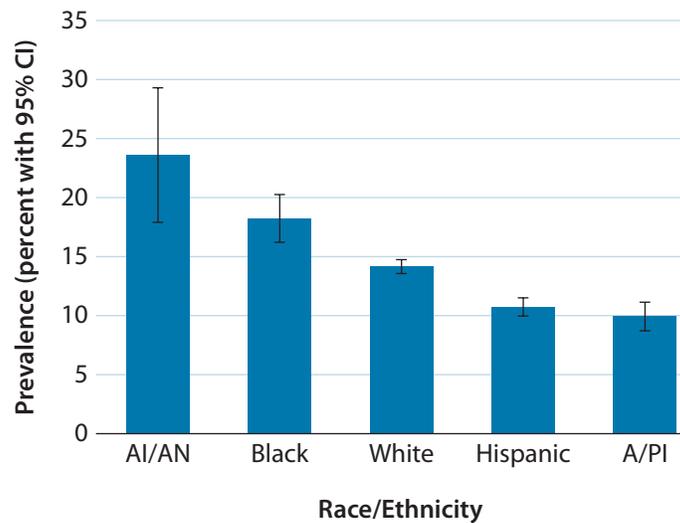
Age (years)	Lifetime Asthma Prevalence		Current Asthma Prevalence	
	%	(95% CI)	%	(95% CI)
0-4	7.5	(5.4 – 9.7)	4.2	(2.6 – 5.8)
5-11	15.4	(12.5 – 18.2)	10.7	(8.2 – 13.1)
12-17	16.2	(14.7 – 17.6)	10.1	(7.6 – 12.6)
18-34	15.5	(13.3 – 17.8)	7.4	(5.9 – 8.9)
35-64	13.0	(11.7 – 14.3)	7.6	(6.6 – 8.7)
65+	11.4	(9.4 – 13.5)	7.7	(6.0 – 9.3)

Data Source: BRFSS 2005

³ Asthma diagnosis is not often made for children under age three.

Lifetime Asthma Prevalence by Race/Ethnicity, California 2003

In 2003, American Indian/Alaska Natives (AI/AN, 23.6 %) and Blacks (18.2%) had the highest prevalence of lifetime asthma — significantly higher than other race/ethnicity groups. Hispanics (10.7%) and Asian/Pacific Islanders (A/PI, 9.9%) had the lowest lifetime asthma prevalence. However, the Hispanic and Asian/Pacific Islander groups include many diverse subgroups that may have varying prevalences of lifetime asthma.

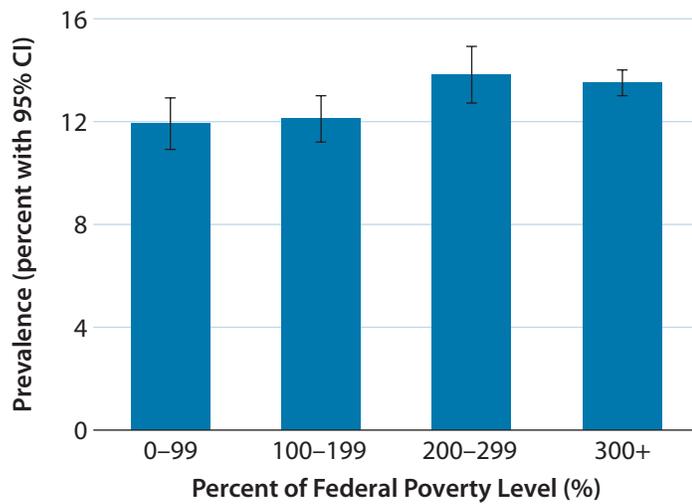


Race/Ethnicity	Lifetime Asthma Prevalence	
	%	(95% CI)
AI/AN	23.6	(17.9 – 29.3)
Black	18.2	(16.2 – 20.2)
White	14.1	(13.5 – 14.6)
Hispanic	10.7	(9.9 – 11.4)
A/PI	9.9	(8.7 – 11.0)

Data Source: CHIS 2003

Lifetime Asthma Prevalence by Poverty Level, California 2003

Lifetime asthma prevalence increases slightly with income. About 12 percent of Californians living below 100 percent of the federal poverty level reported having asthma, compared to almost 14 percent of those living more than 300 percent above the federal poverty level.



Percent of Federal Poverty Level (%)	Lifetime Asthma Prevalence % (95% CI)
0 - 99	11.9 (10.9 - 13.0)
100 - 199	12.1 (11.2 - 13.0)
200 - 299	13.8 (12.7 - 14.9)
300+	13.5 (13.0 - 14.1)

Data Source: CHIS 2003

Age First Diagnosed with Asthma, California Adults 2003

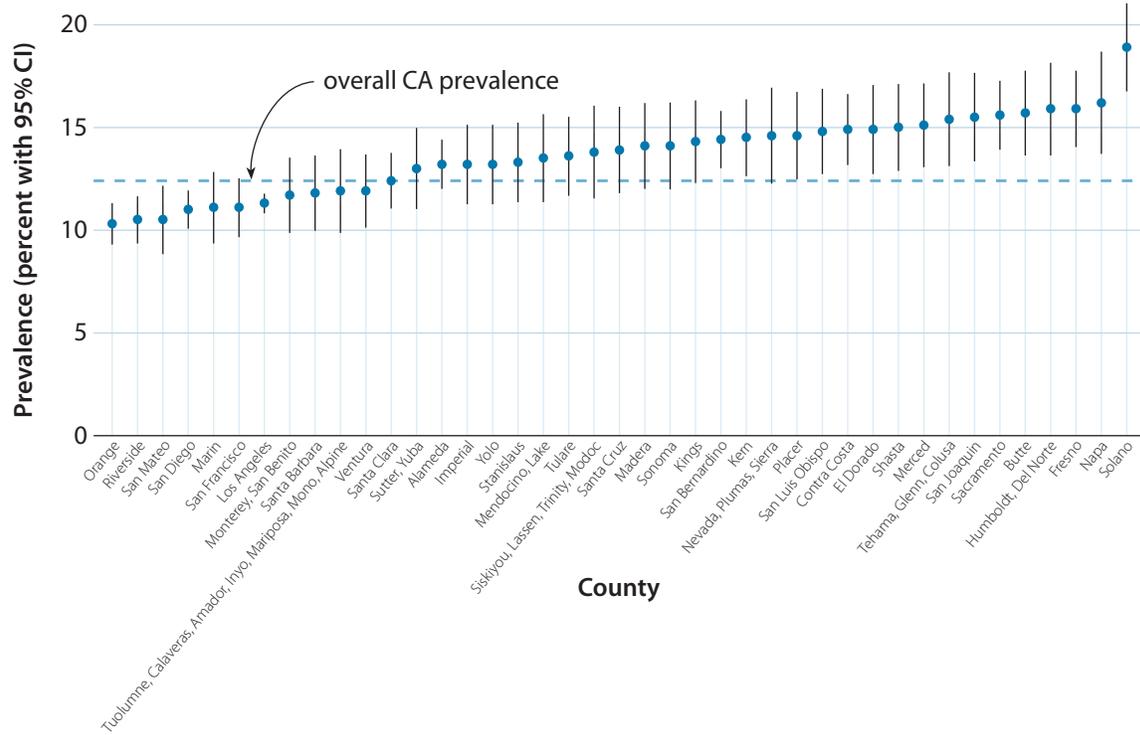
In the CHIS, the age when the individual was first diagnosed with asthma was determined from the question: "How old were you when you were first told by a doctor that you had asthma?"

The majority (57.4%) of adults with asthma were diagnosed as children (age 0-19), most commonly before age 10.

Age at Diagnosis (years)	%	(95% CI)
0 - 9	34.8	(33.0 - 36.5)
10 - 19	22.6	(21.0 - 24.2)
20 - 39	21.5	(20.0 - 23.0)
40 - 59	15.0	(13.7 - 16.2)
60+	6.2	(5.3 - 7.0)

Data source: CHIS 2003

Lifetime Asthma Prevalence by California County, 2001/2003 Aggregated



Note: 95% confidence intervals can be used to compare county prevalence statistically to the overall California prevalence, but in most cases they cannot be used to compare county prevalence statistically to each other.

Asthma prevalence has substantial geographic variation. Solano County has the highest prevalence at 18.9 percent, while the prevalence in Orange County is the lowest at 10.3 percent. These prevalence estimates are not adjusted for demographic distributions in the county (e.g., age, gender, race/ethnicity), which may affect asthma prevalence.

County or County Group	Lifetime Asthma Prevalence	
	%	(95% CI)
Solano	18.9	(16.8 - 21.1)
Napa	16.2	(13.7 - 18.7)
Humboldt, Del Norte	15.9	(13.7 - 18.2)
Fresno	15.9	(14.1 - 17.8)
Butte	15.7	(13.6 - 17.7)
Sacramento	15.6	(13.9 - 17.3)
San Joaquin	15.5	(13.4 - 17.7)
Tehama, Glenn, Colusa	15.4	(13.1 - 17.7)
Merced	15.1	(13.1 - 17.2)
Shasta	15.0	(12.9 - 17.1)
Contra Costa	14.9	(13.2 - 16.7)
El Dorado	14.9	(12.7 - 17.1)
San Luis Obispo	14.8	(12.7 - 16.9)
Nevada, Plumas, Sierra	14.6	(12.3 - 16.9)
Placer	14.6	(12.5 - 16.7)
Kern	14.5	(12.7 - 16.4)
San Bernadino	14.4	(13.0 - 15.8)
Kings	14.3	(12.3 - 16.3)
Madera	14.1	(12.0 - 16.2)
Sonoma	14.1	(12.0 - 16.2)
Santa Cruz	13.9	(11.8 - 16.0)
Siskiyou, Lassen, Trinity, Modoc	13.8	(11.5 - 16.0)
Tulare	13.6	(11.7 - 15.5)
Mendocino, Lake	13.5	(11.3 - 15.6)
Stanislaus	13.3	(11.4 - 15.2)
Alameda	13.2	(12.0 - 14.4)
Imperial	13.2	(11.2 - 15.1)
Yolo	13.2	(11.3 - 15.2)
Sutter, Yuba	13.0	(11.0 - 15.0)
Santa Clara	12.4	(11.0 - 13.7)
California (All Counties)	12.4	(12.2 - 12.7)
Tuolumne, Calaveras, Amador, Inyo, Mariposa, Mono, Alpine	11.9	(9.8 - 13.9)
Ventura	11.9	(10.1 - 13.7)
Santa Barbara	11.8	(9.9 - 13.6)
Monterey, San Benito	11.7	(9.9 - 13.6)
Los Angeles	11.3	(10.9 - 11.8)
Marin	11.1	(9.4 - 12.9)
San Francisco	11.1	(9.7 - 12.5)
San Diego	11.0	(10.1 - 11.9)
Riverside	10.5	(9.3 - 11.7)
San Mateo	10.5	(8.8 - 12.2)
Orange	10.3	(9.3 - 11.3)

Source: CHIS 2001-2003

2. Symptoms and Management – Adults

How does asthma affect the lives of adults who have it?

Asthma symptoms — including wheezing, coughing, chest tightness, and trouble breathing — can make it hard to do usual activities. The National Center for Health Statistics estimates that asthma is responsible for 134 million days of restricted activity a year in the U.S.

Fortunately, many of the problems associated with asthma can be avoided when people properly manage their asthma. Current national guidelines recommend that all people with asthma should: receive education on how to avoid triggers¹ and how to recognize and manage asthma attacks; receive a written asthma self-management plan from a health care provider; and have a routine checkup with a health care provider at least every six months.

This section looks at asthma symptoms and management among adults using data from the Behavioral Risk Factor Surveillance System (BRFSS) and the California Health Interview Survey (CHIS). Respondents who have lifetime asthma are asked a series of detailed questions regarding asthma symptoms and health care use. The specific wording of the questions is presented before each series of graphs. Based on these questions, people are classified into the following levels of asthma symptoms: very mild, mild, moderate, and severe. Please see the Technical Notes section of this report for more information about the method used to classify asthma symptom levels.

How severe are symptoms for California adults with asthma?

The majority (73.5%) of adults with asthma in California have very mild or mild symptoms. Twenty-seven percent have moderate or severe symptoms. About 72 percent of adults with asthma in California had some symptoms in the past 30 days and 22 percent had symptoms every day. About half of adults with asthma reported difficulty sleeping because of their asthma. About 29 percent said their symptoms sometimes prevent them from doing usual activities. Symptoms are worse among older adults and those living in low-income households. Overall, adults with asthma are less likely to describe their health as “excellent” and more likely to describe it as “poor” than adults without asthma.

Twenty-two percent of adults with asthma have symptoms every day. Only one in three adults with asthma has an asthma management plan. Fifty percent of adults with asthma have not had a routine checkup in the past year.

¹ Triggers are factors that exacerbate existing asthma or bring about asthma attacks.

Are adults with asthma getting proper preventive health care?

The majority of adults with asthma said that their health care provider gave them information on how to avoid triggers (67.7%) and how to recognize an asthma attack (57.1%), but only 33 percent said they received an asthma management plan. Only half of adults with asthma said they had a routine checkup in the past year. Thirty-one percent went to the doctor for urgent asthma symptoms and 17 percent went to the emergency department (ED) for asthma in the past year.

Summary:

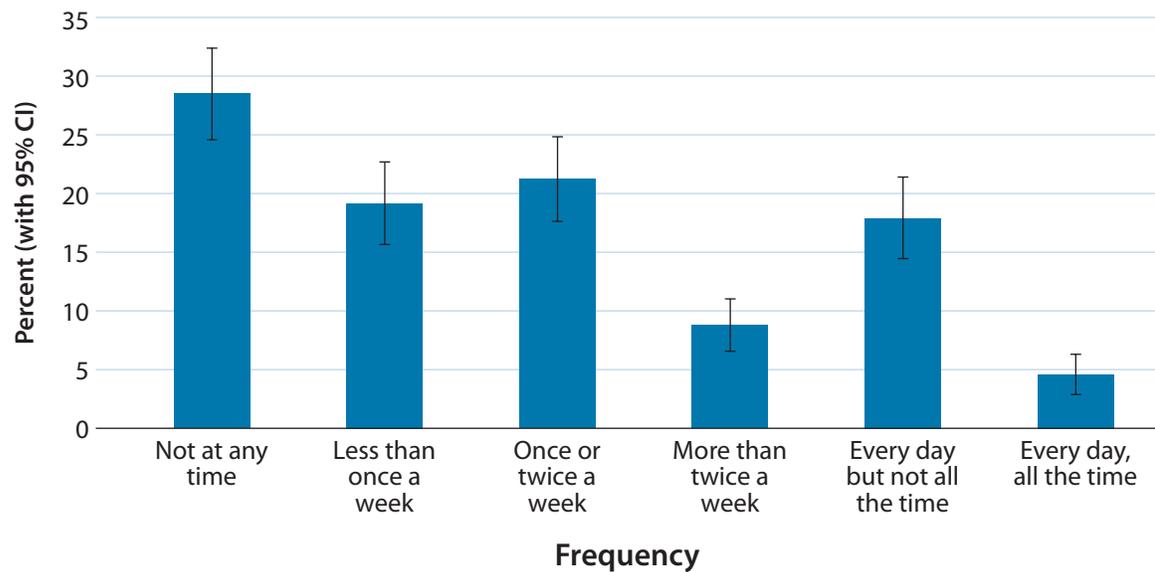
Among adults with lifetime asthma:

- Over 70 percent had symptoms in the past month; 22.4 percent have symptoms every day.
- Twenty-seven percent have moderate or severe symptoms; 73.5 percent have mild or very mild symptoms.
- People age 35 and over and those with household incomes less than \$20,000 are more likely to have severe symptoms.
- About half (51.0%) had some sleep disruption in the past 30 days due to their asthma.
- Asthma symptoms kept 28.6 percent from working or carrying out usual activities in the past year.
- Only 32.5 percent said they received an asthma management plan from their health care provider.
- The majority said they received information from their health care provider on how to recognize asthma attacks (57.1%) and how to avoid worsening asthma (67.7%).
- Only half (49.5%) had a routine health checkup for their asthma in the past year.
- In the past year, 31.2 percent had urgent treatment for asthma at a doctor's office and 17.0 percent went to an ED.
- Overall, adults with asthma are less likely to perceive their health status as "excellent" and more likely to perceive it as "poor" than adults never diagnosed with asthma.

Frequency of Asthma Symptoms

In the BRFSS, adults with lifetime asthma are asked the following question about asthma symptoms: “Symptoms of asthma include cough, wheezing, shortness of breath, chest tightness, and phlegm production when you don’t have a cold or respiratory infection. During the past 30 days, how often did you have any symptoms of asthma?”

Frequency of Asthma Symptoms in the Past 30 Days among California Adults with Lifetime Asthma, 2002/2004



More than two-thirds (71.5%) of adults with asthma reported having symptoms in the past 30 days; 22.4 percent reported having symptoms every day.

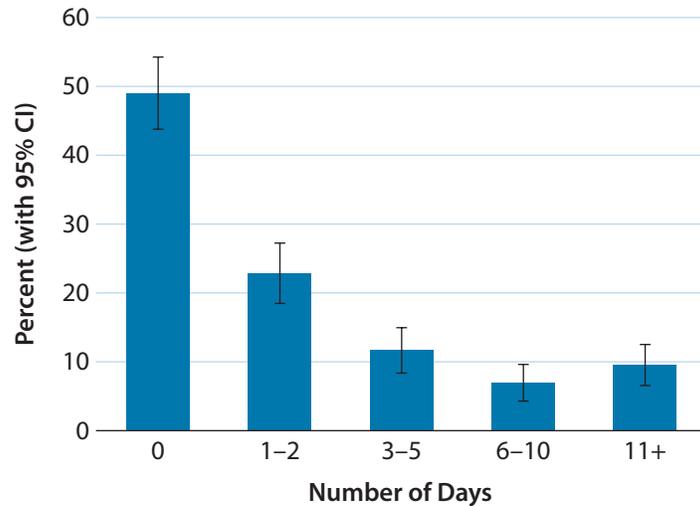
Frequency of Symptoms	%	(95% CI)
Not at any time	28.5	(24.6 – 32.4)
Less than once a week	19.1	(15.6 – 22.7)
Once or twice a week	21.2	(17.6 – 24.8)
More than twice a week	8.7	(6.5 – 11.0)
Every day but not all the time	17.9	(14.4 – 21.3)
Every day, all the time	4.5	(2.8 – 6.3)

Data Source: BRFSS 2002/2004 Aggregated

BRFSS respondents with lifetime asthma are also asked: “During the past 30 days, how many days did symptoms of asthma make it difficult for you to stay asleep?”

Number of Days in Past Month that Asthma Symptoms Made it Difficult to Sleep Among California Adults with Lifetime Asthma, 2002/2004

About half (51.0%) of adults with asthma reported having sleep disruption due to their asthma sometime in the past 30 days. Almost 10 percent reported having sleep disruption on 10 or more days in the past month.



Days	%	(95% CI)
0	49.0	(43.7 – 54.2)
1-2	22.8	(18.4 – 27.2)
3-5	11.6	(8.4 – 14.9)
6-10	6.9	(4.3 – 9.6)
11+	9.5	(6.5 – 12.4)

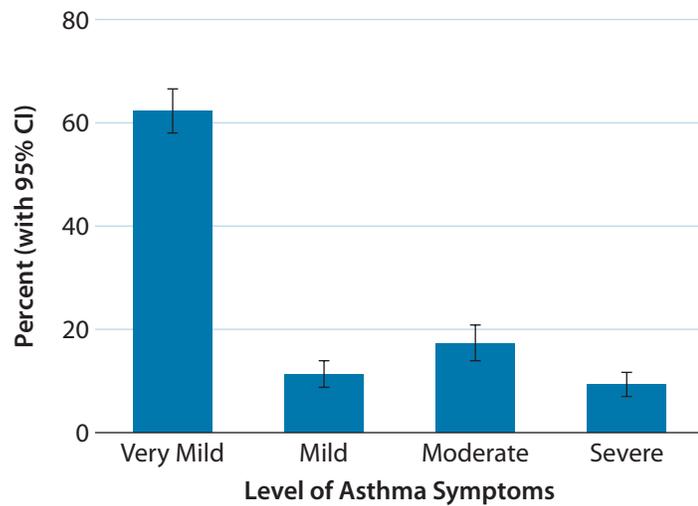
Data Source: BRFSS 2002/2004 Aggregated

Level of Asthma Symptoms

Based on each person's frequency of symptoms and difficulty sleeping because of asthma, people with asthma were classified into four levels of symptoms: very mild, mild, moderate, and severe. A detailed description of the method used to assign these levels can be found in the Technical Notes section.

Level of Asthma Symptoms Among California Adults with Lifetime Asthma, 2002/2004

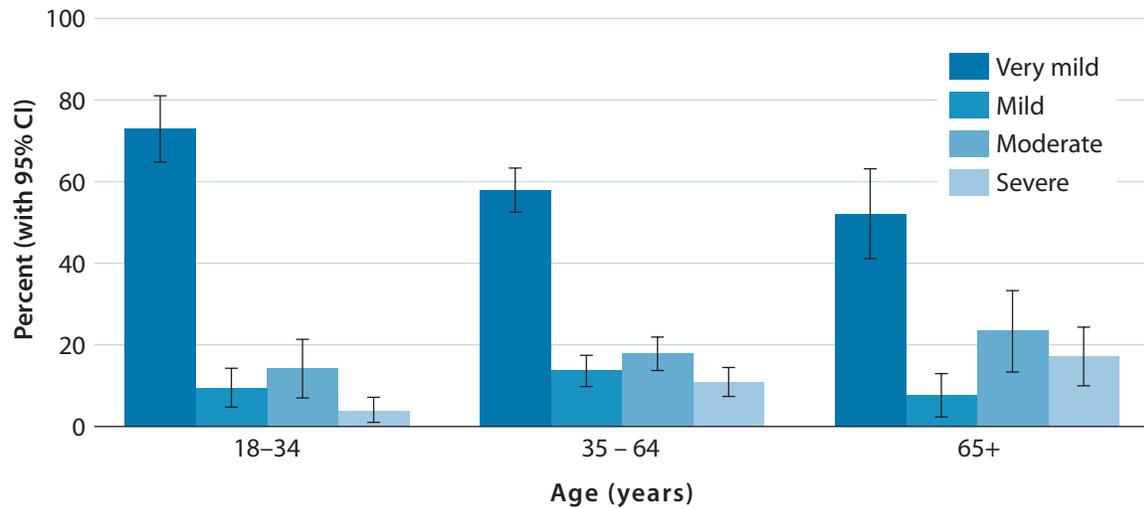
The majority (62.2%) of adults with asthma have very mild symptoms. Almost 27 percent of adults with asthma have moderate to severe symptoms.



Level of Asthma Symptoms	%	(95% CI)
Very Mild	62.2	(57.9 – 66.4)
Mild	11.3	(8.6 – 13.9)
Moderate	17.3	(13.8 – 20.8)
Severe	9.3	(6.9 – 11.6)

Data Source: BRFSS 2002/2004 Aggregated

Level of Asthma Symptoms by Age Among California Adults with Lifetime Asthma, 2002/2004



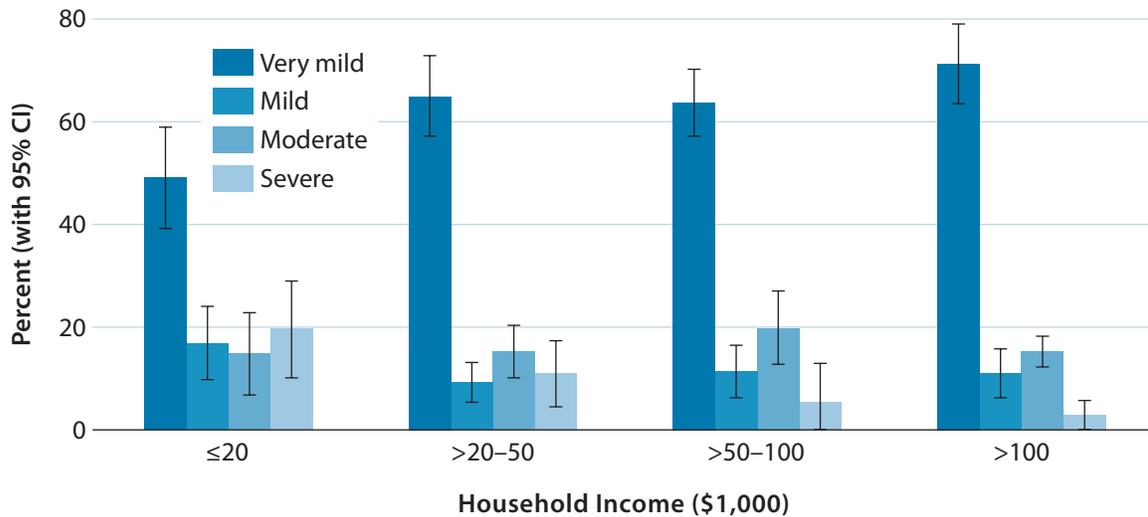
Level of Asthma Symptoms	18-34		35-64		65+	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Very Mild	72.9	(64.7 – 81.0)	57.9	(52.5 – 63.3)	52.1	(41.1 – 63.1)
Mild	9.3	(4.6 – 14.1)	13.5	(9.8 – 17.3)	7.6	(2.2 – 13.0)*
Moderate	14.1	(6.9 – 21.3)	17.8	(13.7 – 21.8)	23.3	(13.3 – 33.3)
Severe	3.7	(1.0 – 6.4)*	10.8	(7.2 – 14.4)	17.0	(9.8 – 24.2)

* Statistically Unstable

Data Source: BRFSS 2002/2004 Aggregated

Older adults are more likely to have worse asthma symptoms.

Level of Asthma Symptoms by Household Income Among California Adults with Lifetime Asthma, 2002/2004



Level of Asthma Symptoms	≤\$20,000 % (95% CI)	>\$20,000–50,000 % (95% CI)	>\$50,000–100,000 % (95% CI)	>\$100,000 % (95% CI)
Very mild	49.0 (39.1 – 58.9)	64.9 (57.7 – 72.0)	63.6 (55.6 – 71.6)	71.1 (61.7 – 80.6)
Mild	16.8 (8.9 – 24.6)	9.2 (5.3 – 13.1)	11.3 (6.2 – 16.4)	10.9 (4.5 – 17.2)
Moderate	14.7 (8.2 – 21.2)	15.1 (10.0 – 20.2)	19.8 (12.7 – 26.9)	15.2 (7.6 – 22.8)
Severe	19.5 (11.8 – 27.3)	10.8 (6.1 – 15.6)	5.3 (2.3 – 8.3)	2.8 (0.0 – 6.2)*

* Statistically unstable

Data Source: BRFSS 2002/2004 Aggregated

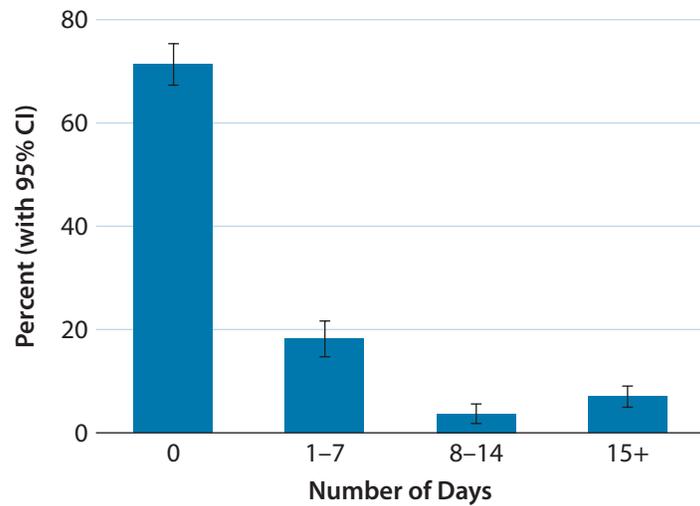
The level of asthma symptoms also varies by income level. The proportion of adults with severe symptoms in the lowest income bracket (19.5%) is about seven times higher than in the highest (2.8%).

Activity Limitations

Asthma symptoms may make it difficult to work or do usual activities. In BRFSS, these activity limitations are determined using the question: “During the past 12 months, how many days were you unable to work or carry out your usual activities because of your asthma?”

Days in Past Year Unable to Work or Carry Out Usual Activities Due to Asthma Among California Adults with Lifetime Asthma, 2002/2004

About 29 percent of adults reported that they were unable to work or carry out usual activities because of their asthma sometime in the past 12 months.



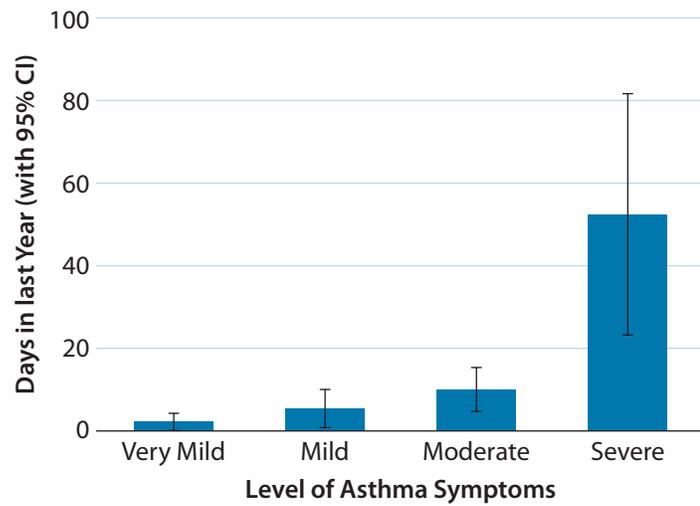
Number of Days	%	(95% CI)
0	71.3	(67.3 – 75.4)
1-7	18.1	(14.7 – 21.6)
8-14	3.6	(1.7 – 5.5)
15+	6.9	(4.9 – 9.0)

Data Source: BRFSS 2002/2004 Aggregated

Average Number of Days Unable to Work or Carry Out Activities Due to Asthma by Level of Asthma Symptoms Among California Adults with Lifetime Asthma, 2002/2004

Adults with more severe asthma symptoms have more days of missed work or activity limitations than those with milder symptoms.

On average, people with severe symptoms had 52 days per year when they either missed work or couldn't carry out usual activities.



Level of Asthma Symptoms	Mean (days)	95% CI
Very mild	2.1	(0.0 – 4.2)*
Mild	5.4	(0.8 – 9.9)*
Moderate	10.0	(4.7 – 15.3)
Severe	52.3	(23.0 – 81.7)

* Statistically unstable

Data Source: BRFSS 2002/2004 Aggregated

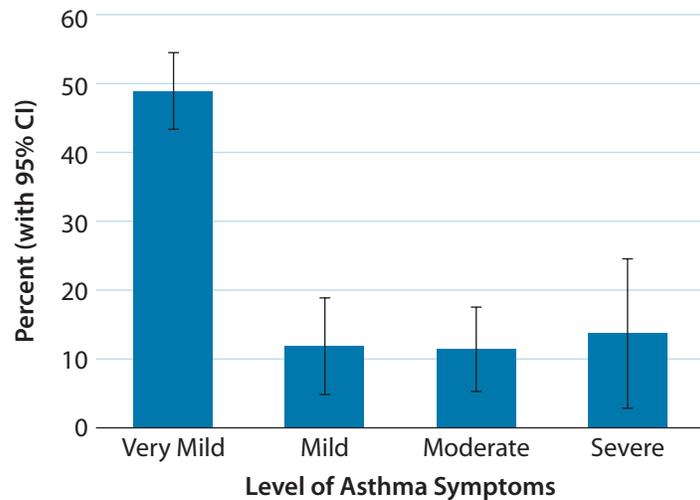
Asthma Management and Education

Asthma management and education are determined from responses to the following questions in BRFSS:

- “During the past 30 days, how often did you take asthma medication that was prescribed or given to you by a doctor? This includes using an inhaler.”
- “Has a doctor or other health professional ever given you an asthma management plan?”
- “Did your doctor ever explain how to recognize early symptoms of an asthma attack and tell you what you should do?”
- “Did your doctor ever give you information on how to avoid the things that make your asthma worse?”

Percent of Adults with Lifetime Asthma Who Have Not Taken Any Asthma Medications in the Past 30 Days by Level of Asthma Symptoms, California 2002/2004

In BRFSS, the question about asthma medications does not distinguish between long-term control medications and rescue medications, such as inhalers. It also does not separate people who were prescribed medication from those who were not. Therefore, it is impossible to determine whether each person with asthma is taking appropriate medications. Some people with asthma — especially mild asthma — may not need to take medications for proper management. However, it is notable that an estimated 14 percent of people who reported severe asthma symptoms in the past 30 days also reported that they had not taken any asthma medication in that time — either long-term control medication or rescue medication. Similarly, 11.4 percent of people with moderate symptoms and 11.8 percent of people with mild symptoms did not take any asthma medication in the past 30 days.



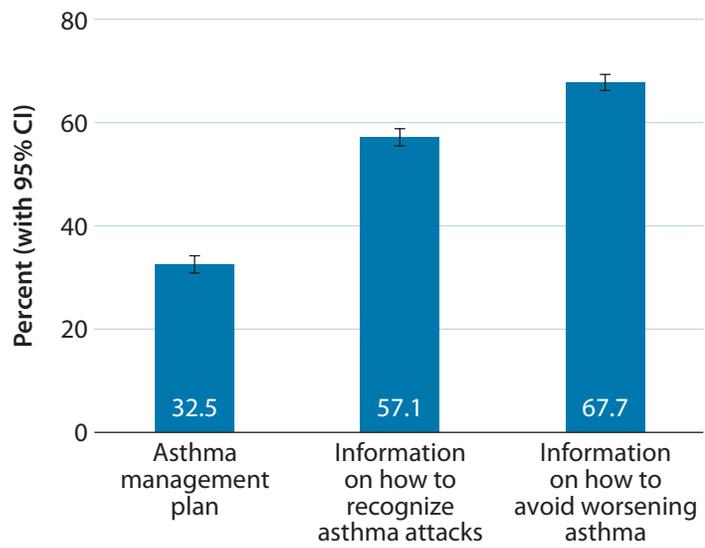
Level of Asthma Symptoms	%	(95% CI)
Very mild	48.9	(43.3 – 54.4)
Mild	11.8	(4.8 – 18.8)
Moderate	11.4	(5.3 – 17.4)
Severe	13.7	(2.8 – 24.5)*

* Statistically unstable

Data Source: BRFSS 2002/2004 Aggregated

Percent of Adults with Lifetime Asthma Receiving Information and Management Plans from Providers, California 2001 and 2003

The majority of adults with asthma said that their health provider gave them information on how to recognize asthma attacks (57.1%) and how to avoid worsening asthma symptoms (67.7%). However, only 32.5 percent of them received an asthma management plan, which is nationally recommended for all people with asthma.



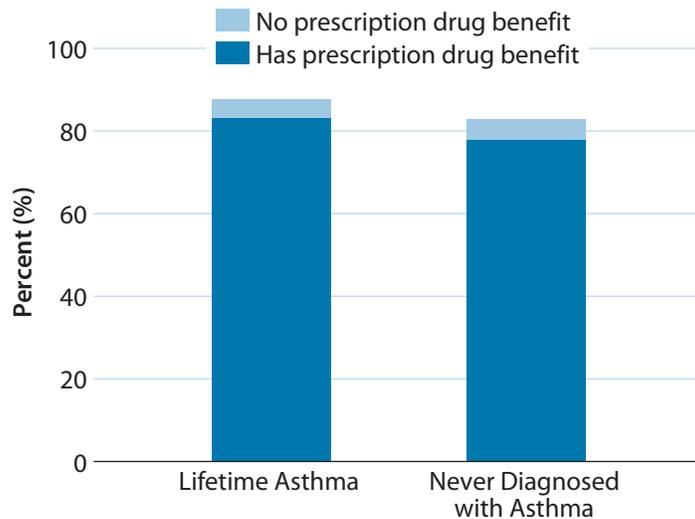
Data Source: Asthma management plan — CHIS 2003;
Other information on asthma — CHIS 2001

Health Care Utilization

In CHIS, insurance coverage refers to any insurance program, including Medi-Cal, Medicare, Indian Health Service, private insurance, etc. It is important to note that detailed information on coverage is not available. Having insurance and prescription drug coverage is important for people to be able to get asthma care and medication. However, costs and coverage levels vary widely across insurance plans, and having insurance does not guarantee that health care will be affordable and/or easy to access.

Percent of Adults with Health Insurance by Lifetime Asthma Status, California 2003

In 2003, the large majority of adults with asthma were currently insured (87.6%) and had prescription drug benefits (83.0%). These are higher proportions than among people who do not have asthma (82.8% insured, 77.7% with drug benefits).



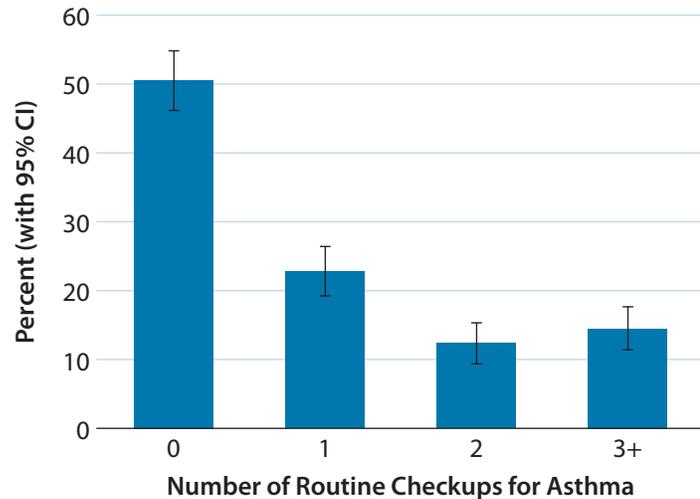
Insurance Coverage	Lifetime Asthma % (95% CI)	Never Diagnosed with Asthma % (95% CI)
Currently has health insurance	87.6 (86.2 – 89.0)	82.8 (82.2 – 83.4)
With prescription drug benefit	83.0	77.7
Without prescription drug benefit	4.6	5.1

Data Source: CHIS 2003

Adults with lifetime asthma are asked in BRFSS about their routine health care utilization: “During the past 12 months, how many times did you see a doctor, nurse, or other health professional for a routine checkup for your asthma?”

Frequency of Having a Routine Checkup for Asthma in the Past Year Among California Adults with Lifetime Asthma, 2002/2004

Half (50.5%) of adults with asthma said that they did not get a routine health checkup for their asthma in the past year, even though national guidelines recommend such checkups every six months. Compared to adults with mild symptoms, those with severe symptoms were almost twice as likely to get routine asthma care (see Appendix).



Routine Checkup	%	(95% CI)
None	50.5	(46.1 – 54.8)
Once	22.8	(19.2 – 26.4)
Twice	12.3	(9.3 – 15.3)
Three times or more	14.5	(11.4 – 17.6)

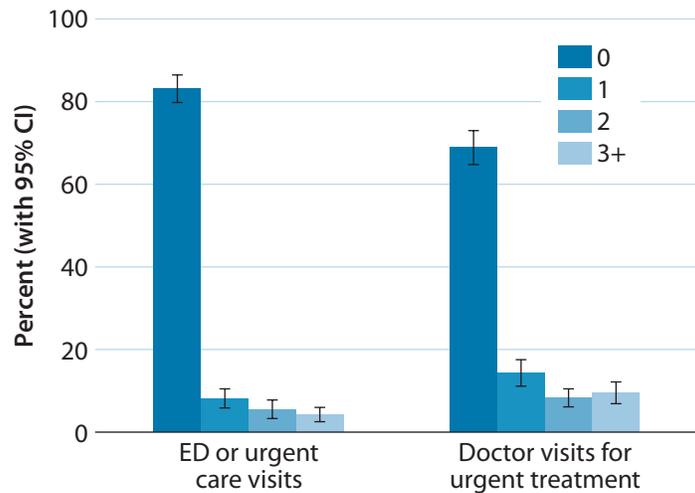
Data Source: BRFSS 2002/2004 Aggregated

Adults with lifetime asthma are also asked in the BRFSS about urgent health care utilization for asthma:

- “During the past 12 months, how many times did you visit an emergency room [emergency department (ED)] or urgent care center because of your asthma?”
- “(Besides those emergency room visits,) 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?”

Frequency of Having Urgent Care for Asthma in the Past Year Among California Adults with Lifetime Asthma, 2002/2004

When people are managing their asthma appropriately, urgent treatment in the ED or at a doctor’s office should not be needed. Among adults with asthma, 17.0 percent went to an ED or urgent care center and 31.2 percent went to a doctor for urgent asthma care in the past year.



Frequency	ED or urgent care visits % (95% CI)	Doctor visit for urgent treatment % (95% CI)
None	83.0 (79.6 – 86.4)	68.8 (64.6 – 72.9)
Once	7.9 (5.6 – 10.2)	14.0 (10.7 – 17.3)
Twice	5.2 (3.0 – 7.4)	8.0 (5.8 – 10.2)
Three times or more	3.9 (2.2 – 5.6)	9.2 (6.5 – 11.9)

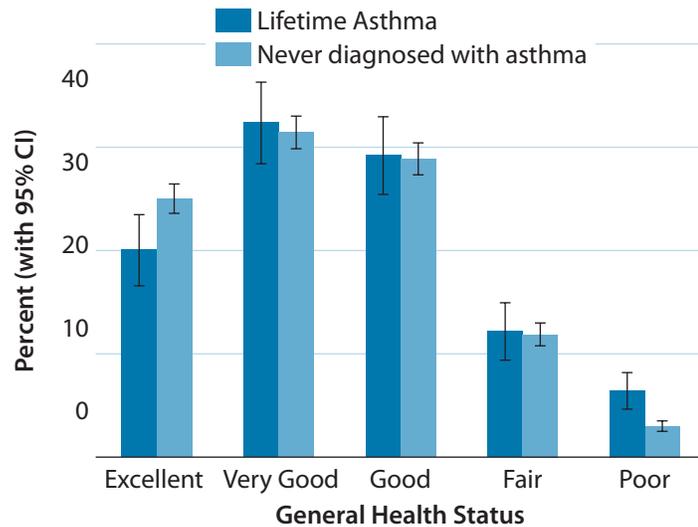
Data Source: BRFSS 2002/2004 Aggregated

Perceived Health Status

Perceived health status is determined from the following question in BRFSS: “Would you say in general that your health is excellent, very good, good, fair, or poor?”

General Health Status by Asthma Status among California Adults, 2005

Adults with lifetime asthma are significantly more likely to describe their health status as “poor” (6.4% versus 3.0%), and less likely to describe it as “excellent” (20.0% versus 25.0%) than adults not diagnosed with asthma.



Health Status	Lifetime Asthma		Never Diagnosed with Asthma	
	%	(95% CI)	%	(95% CI)
Excellent	20.0	(16.6 – 23.5)	25.0	(23.5 – 26.4)
Very Good	32.3	(28.4 – 36.3)	31.4	(29.8 – 33.0)
Good	29.2	(25.4 – 32.9)	28.8	(27.3 – 30.4)
Fair	12.1	(9.3 – 14.9)	11.8	(10.7 – 12.9)
Poor	6.4	(4.6 – 8.1)	3.0	(2.5 – 3.5)

Data Source: BRFSS 2005

3. Symptoms and Management — Children/Youth

How does asthma affect the lives of children and youth who have it?

Just like in adults, asthma attacks and symptoms can interfere with a child's daily activities and quality of life. Asthma symptoms can be prevented by routine health care, proper asthma management, and removing triggers from the child's environment. National guidelines recommend that children and youth (like adults) have a written asthma self-management plan from a health care provider.

Sixty-two percent of children/youth with asthma do not have an asthma management plan.

This section summarizes how asthma is experienced by children and youth age 0–17 in California. To show how much asthma affects this age group, we look at the number of school days missed, days of activity limitation, frequency of symptoms and asthma attacks, and the level of asthma management. Data are from the California Health Interview Survey (CHIS). In CHIS, there is one survey for youth age 12–17, who answer survey questions themselves. For children under age 12, there is a separate survey that is answered by parents or guardians on behalf of the children. Most asthma-related questions are the same for both age groups. The specific wording for each survey question is written before each graph. Some questions are asked of all children/youth diagnosed with asthma and some are asked only of those with current asthma — this is specified in graph titles and corresponding text. Please see the Technical Notes section for more information about CHIS.

How bad are symptoms for California children and youth with asthma?

About one out of every three children/youth with lifetime asthma had an asthma attack or episode in the past year. Twelve percent of children/youth with current asthma have symptoms at least weekly. Half of children age 0–11 with current asthma sometimes miss school or day care because of their asthma (49.5%). On average, a child with current asthma missed 2.6 days of school/day care per year in 2002-2003 because of his/her asthma.

How are California children and youth with asthma managing their disease?

Among all children/youth diagnosed with asthma, only 38.4 percent have an asthma management plan from their health provider. Twenty-two percent of children/youth with current asthma needed urgent or emergency asthma care in the past year. Among those with weekly or daily symptoms, 27.8 percent do not take daily asthma medications.

Summary:

Among children and youth with lifetime asthma:

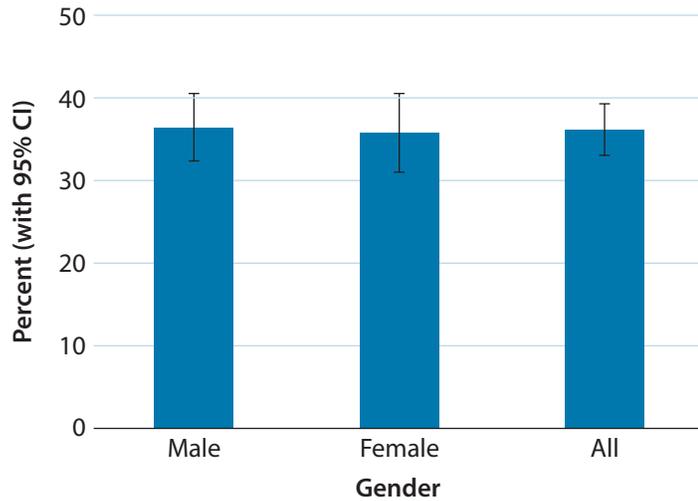
- Over one-third (36.1%) had an asthma episode or attack in the past year.
- Of those with current asthma, 12 percent have symptoms once a week or more.
- Half of children age 0–11 with current asthma missed school or day care sometime in the past 12 months because of their asthma. On average, they missed 2.6 days of school/day care per year in 2002–2003.
- Sixty percent of children age 0–11 couldn't do physical activity sometime during the past year because of their asthma.
- Only 38.4 percent got an asthma management plan from their health care provider.
- About 22 percent of those with current asthma got urgent or emergency treatment for their asthma in the past year.
- Of those with weekly or daily symptoms, 27.8 percent do not take daily asthma medications.

Frequency of Asthma Symptoms

In the California Health Interview Survey (CHIS), children/youth (0–17 years) with asthma or their parents/guardians are asked: “During the past 12 months, have you [has he/she] had an episode of asthma or an asthma attack?”

Frequency of Asthma Episodes or Attacks in the Past Year by Gender Among California Children/Youth with Lifetime Asthma, 2003

More than one-third (36.1%) of children/youth with lifetime asthma had an asthma attack in the past 12 months. The prevalence of asthma attacks is similar for males (36.4%) and females (35.7%).



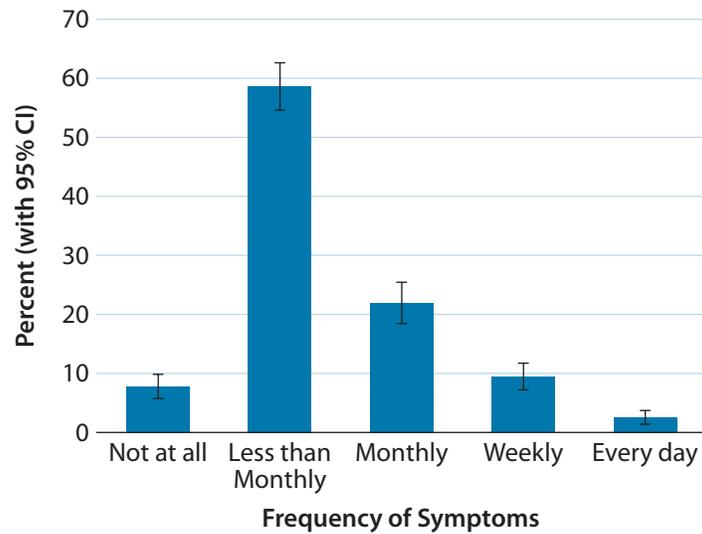
Gender	%	(95% CI)
Male	36.4	(32.3 – 40.5)
Female	35.7	(30.9 – 40.5)
All	36.1	(33.0 – 39.2)

Data Source: CHIS 2003

Frequency of asthma symptoms among children/youth with current asthma was determined from the question: “During the past 12 months, how often have you had asthma symptoms, such as coughing, wheezing, shortness of breath, chest tightness and phlegm?”

Frequency of Asthma Symptoms in the Past Year Among California Children and Youth with Current Asthma, 2003

Most (92.3%) children/youth with current asthma experienced some symptoms in the past year. Close to 60 percent (58.6%) had symptoms less than once a month and about 12 percent (11.9%) had symptoms at least once a week.



Frequency	%	(95% CI)
Not at all	7.7	(5.7 – 9.7)
Less than monthly	58.6	(54.6 – 62.5)
Monthly	21.9	(18.4 – 25.4)
Weekly	9.4	(7.1 – 11.6)
Every day	2.5	(1.3 – 3.8)

Data Source: CHIS 2003

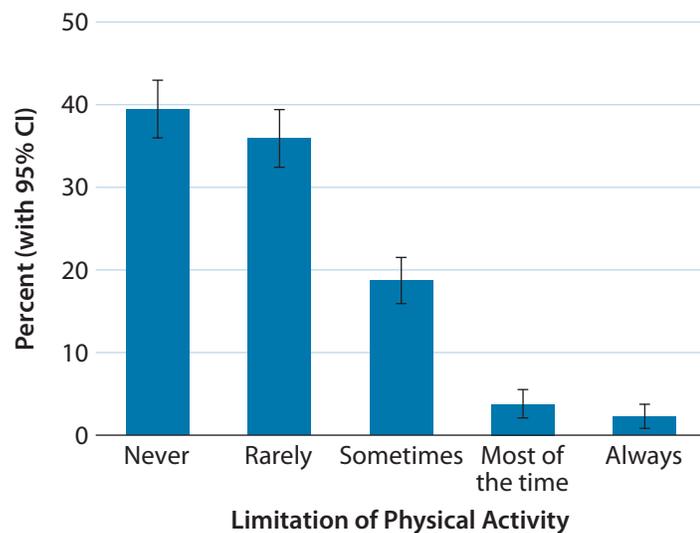
Activity Limitations and School Days Missed

CHIS questions about activity limitations and school days missed were asked only for children under age 12. The questions are:

- “How often does [the child’s] asthma limit his/her physical activity — would you say always, most of the time, sometimes, rarely or never?”
- “During the past 12 months, how many days of day care or school did [the child] miss due to asthma?” [This question is only asked for children who attend school or day care.]

Frequency of Physical Activity Limitations Due to Asthma Among California Children (0–11) with Lifetime Asthma, 2001

About 60 percent (60.6%) of children age 0–11 with lifetime asthma have some physical activity restrictions due to their asthma; 24.6 percent of them had limited physical activity “sometimes,” “most of the time,” or “always.” Only 2.2 percent were “always” limited.



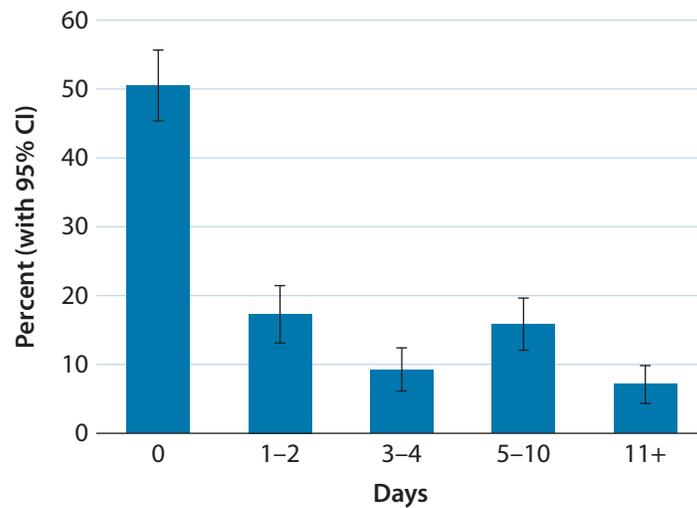
Frequency	%	(95% CI)
Never	39.4	(35.9 – 43.0)
Rarely	35.9	(32.4 – 39.5)
Sometimes	18.7	(15.9 – 21.6)
Most of the time	3.7	(2.0 – 5.4)
Always	2.2	(0.7 – 3.7)*

* Statistically unstable

Data Source: CHIS 2001

School Days Missed Due to Asthma among California Children (0-11) with Current Asthma, 2003

Nearly half (49.5%) of children age 0–11 with current asthma missed at least one day of school or day care in the past year because of their asthma. About 23 percent (22.9%) missed five or more school/day care days. On average, a child with current asthma missed 2.6 days of school/day care in a 12 month period in 2002–2003. Among those who missed any days because of their asthma, the average was 5.2 missed days.



Days Missed	%	(95% CI)
0	50.5	(45.4 – 55.7)
1-2	17.3	(13.2 – 21.5)
3-4	9.2	(6.0 – 12.3)
5-10	15.8	(12.0 – 19.6)
11+	7.1	(4.4 – 9.9)

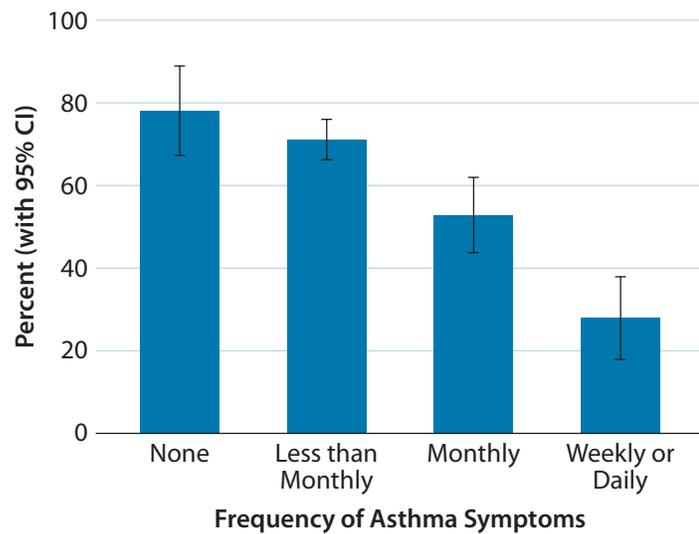
Data Source: CHIS 2003

Asthma Management and Education

To look at use of asthma medications, we use the CHIS question: “Are you [is child] now taking daily medication to control your [his/her] asthma that was prescribed or given to you by a doctor?”

Percent of Children/Youth with Current Asthma Who are Not Taking Daily Asthma Medications, by Frequency of Asthma Symptoms, California 2003

From the CHIS survey, we do not know detailed information about asthma severity nor whether medications are prescribed for each person with asthma. Taking daily medication may not be appropriate for some people, especially those with mild asthma. However, it is worth noting the children/youth who report very frequent asthma symptoms, but do not take daily asthma medications. Among children/youth with weekly or daily symptoms, 27.8 percent do not take daily asthma medications.



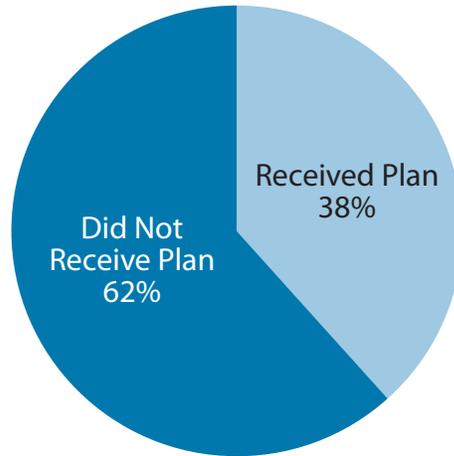
Frequency of Asthma Symptoms	%	(95% CI)
None	78.0	(67.2 – 88.8)
Less than Monthly	71.1	(66.2 – 75.9)
Monthly	52.8	(43.7 – 62.0)
Weekly or Daily	27.8	(17.9 – 37.7)

Data Source: CHIS 2003

National guidelines recommend that health care providers give all asthma patients a written self-management plan. To measure this, we look at the following CHIS question: “Has a doctor or other health professional ever given you an asthma management plan [for child]?”

Percent of Children/Youth with Lifetime Asthma Receiving an Asthma Management Plan from a Provider, California 2003

Only 38.4 (95% CI 35.3–41.5) percent of children and youth with diagnosed asthma received an asthma management plan from their health care provider.

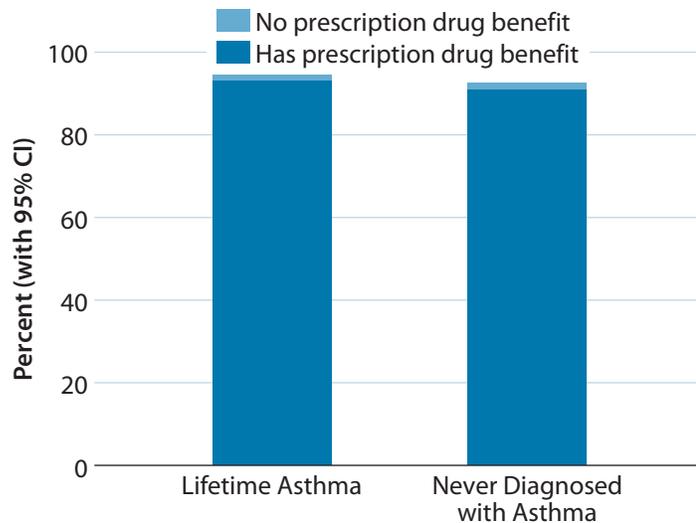


Data Source: CHIS 2003

In CHIS, insurance coverage refers to any insurance program, including Medi-Cal, Medicare, Indian Health Service, private insurance, etc. It is important to note that detailed information on coverage is not available. Having insurance and prescription drug coverage is important for people to be able to get asthma care and medication. However, costs and coverage levels vary widely across insurance plans, and having insurance does not guarantee that health care will be affordable and/or easy to access.

Percent of Children and Youth with Health Insurance by Lifetime Asthma Status, California 2003

In 2003, the large majority of children and youth with lifetime asthma were currently insured (94.5%) and had prescription drug benefits (93.1%). These proportions are similar to those who don't have asthma (92.6% insured, 90.8% with drug benefits).



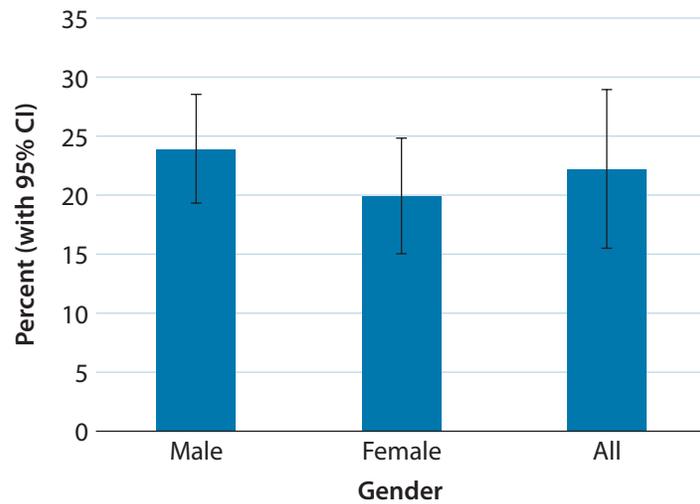
Coverage	Lifetime Asthma % (95% CI)	Never Diagnosed with Asthma % (95% CI)
Has current health insurance	94.5 (92.7 – 96.3)	92.6 (91.9 – 93.4)
With prescription drug benefit	93.1	90.8
Without prescription drug benefit	1.4	1.9

Data Source: CHIS 2003

Another way to measure proper asthma management is by looking at the need for urgent treatment because it is only necessary when symptoms are not well controlled. The CHIS question on urgent treatment is: "During the past 12 months, have you [has child] had to visit a hospital emergency room [emergency department (ED)] or urgent care clinic because of your [his/her] asthma?"

Frequency of Asthma-Related ED/Urgent Care Visits in the Past Year among California Children/Youth with Current Asthma, by Gender, 2003

Among children/youth with current asthma, 22.2 percent got urgent care for their asthma at an ED or urgent care clinic in the past year.



Gender	%	(95% CI)
Male	23.9	(19.3 – 28.5)
Female	19.9	(15.1 – 24.8)
All	22.2	(18.9 – 25.6)

Data Source: CHIS 2003

4. School-based Asthma Surveillance

Why is school-based surveillance for asthma done separately?

The California Department of Education sponsors a health survey called the California Healthy Kids Survey (CHKS). The 2003-2005 CHKS was given to over 950,000 fifth, seventh, ninth, and eleventh grade students in California. CHKS includes questions about asthma, and its large sample size provides a unique opportunity to measure asthma prevalence among adolescents.

Almost 18 percent of adolescents in California have lifetime asthma.

To estimate asthma prevalence, students in 7th, 9th, and 11th grades are asked, "Has a doctor ever told you or your parent/guardian that you have asthma?" Fifth graders are asked about asthma prevalence using a slightly different question that is more appropriate for their level of understanding, "Has a parent or some other adult ever told you that you have asthma?" Fifth graders were not asked about race/ethnicity, so results categorized by race/ethnicity only include 7th, 9th, and 11th graders. All of the prevalence data in this section refer to lifetime asthma. Please see the Technical Notes section for more information about the CHKS.

What is the prevalence of asthma among adolescents in California?

Almost 18 percent of adolescents (5th–11th graders) in California schools have been diagnosed with asthma. Black adolescents have the highest prevalence at 25.9 percent. In comparison, the prevalence is about 20 percent for Whites and American Indians/Alaska Natives (AI/AN), 17 percent for Asians/Pacific Islanders (A/PI), and 13 percent for Hispanics.

Within race/ethnicity groups, there are subgroups that have very different asthma prevalences. In Hispanics, lifetime asthma prevalence among Puerto Rican students (22.5%) is almost twice that of Mexican students (12.8%). In Asians/Pacific Islanders, lifetime asthma prevalence among Filipino and Pacific Islander students (23.6% and 22.5% respectively) is more than twice that of Korean students (10.2%).

How severe are asthma symptoms among California adolescents?

About 40 percent of students with lifetime asthma said they had symptoms of wheezing, chest tightness, or trouble breathing in the past year when not exercising. Thirty percent said they saw a doctor or went to the hospital for these symptoms. Over 16 percent of adolescents who haven't been diagnosed with asthma also have similar symptoms, meaning that there might be a large number of students with undiagnosed asthma.

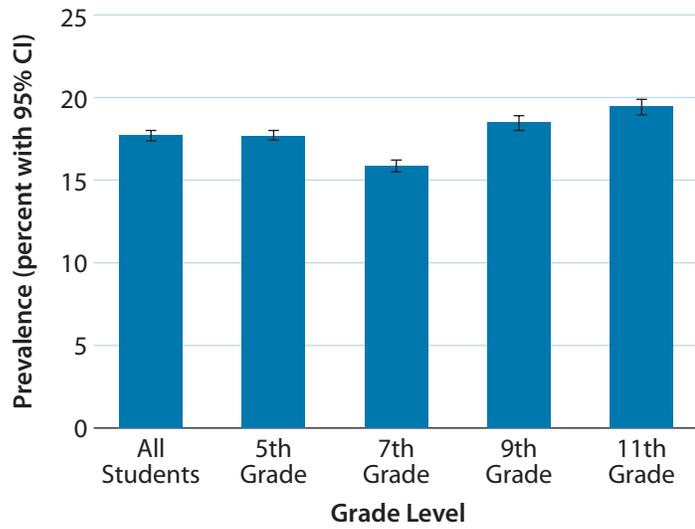
Summary:

Among adolescents in California schools:

- The prevalence of lifetime asthma is 17.7 percent.
- Lifetime asthma prevalence is higher in males (18.7%) than females (16.8%).
- Blacks have the highest prevalence at 25.9 percent, followed by Whites (20.2%), American Indians/Alaska Natives (19.5%), Asians/Pacific Islanders (16.8%), and Hispanics (13.3%).
- There are variations in asthma within the Hispanic ethnic group. Lifetime asthma prevalence is over 20 percent in Puerto Ricans (22.5%) and Cubans (20.6%). Mexicans have the lowest prevalence (12.8%).
- Lifetime asthma prevalence also varies in Asians/Pacific Islanders. About 24 percent of Filipinos have asthma, followed by other Pacific Islanders at 22.5 percent. Koreans have the lowest prevalence at 10.2 percent.
- Among students diagnosed with asthma, 40.6 percent had symptoms not related to exercise in the past year.
- About 16 percent of students who said they were never diagnosed with asthma also had symptoms of wheezing, chest tightness, or trouble breathing when not exercising.

**Lifetime Asthma Prevalence
Among California Students, by
Grade, 2003-2005**

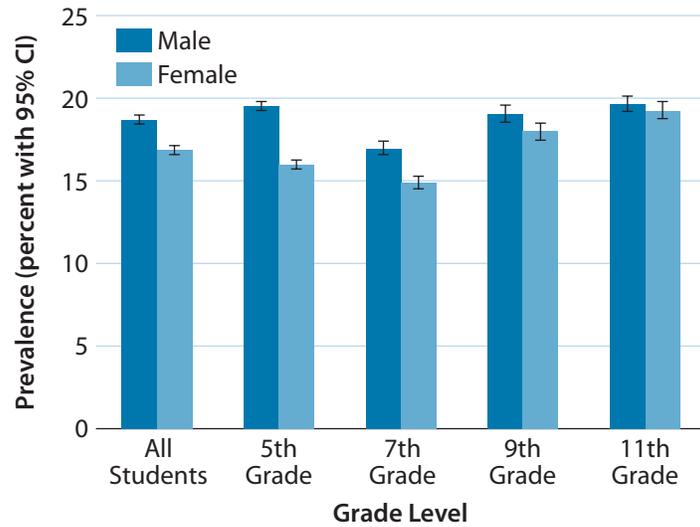
The overall prevalence of lifetime asthma among California students is 17.7 percent. Lifetime asthma prevalence increases from seventh grade (15.9%) to eleventh grade (19.4%). Fifth graders, who were asked a slightly different lifetime asthma question than the other grades, had a prevalence of 17.7 percent.



Grade Level	Lifetime Asthma Prevalence	
	%	(95% CI)
All Students	17.7	(17.5 - 18.0)
5th Grade	17.7	(17.4 - 17.9)
7th Grade	15.9	(15.9 - 16.2)
9th Grade	18.5	(18.0 - 18.9)
11th Grade	19.4	(19.0 - 19.9)

Lifetime Asthma Prevalence Among California Students, by Grade and Gender, 2003-2005

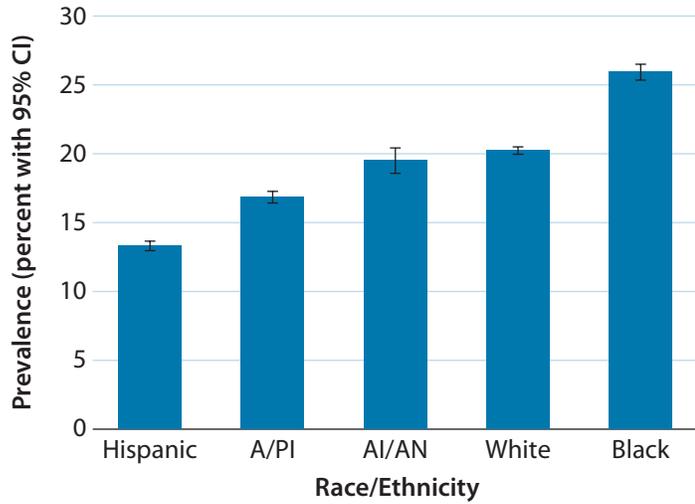
The prevalence of lifetime asthma among adolescents differs by gender. Male students (18.7%) have significantly higher lifetime asthma prevalence than female students (16.8%). However, the difference between the genders gets smaller at each higher grade.



Lifetime Asthma Prevalence					
Gender	All Students % (95% CI)	5th Grade % (95% CI)	7th Grade % (95% CI)	9th Grade % (95% CI)	11th Grade % (95% CI)
Male	18.7 (18.4 – 18.9)	19.5 (19.2 – 19.8)	17.0 (16.5 – 17.4)	19.0 (18.5 – 19.5)	19.6 (19.2 – 20.1)
Female	16.8 (16.6 – 17.1)	16.0 (15.7 – 16.2)	14.9 (14.5 – 15.3)	18.0 (17.4 – 18.5)	19.3 (18.7 – 19.8)

Lifetime Asthma Prevalence Among California Students, by Race/Ethnicity, 2003-2005

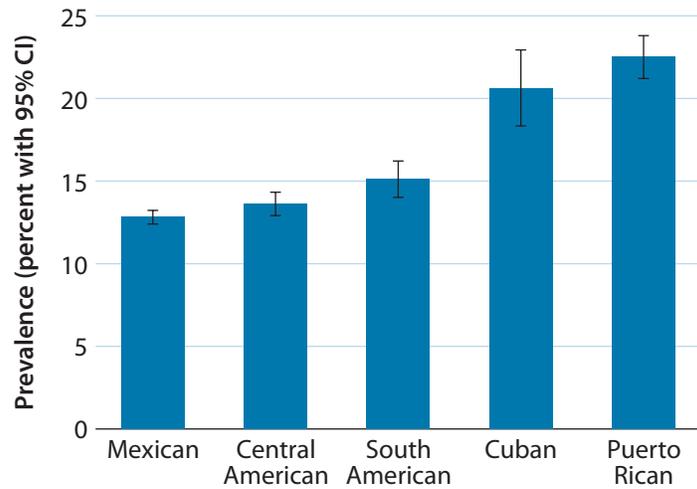
Lifetime asthma prevalence among adolescents varies by race/ethnicity. Black students have the highest prevalence at 25.9 percent and Hispanic students have the lowest prevalence at 13.3 percent.



Race/Ethnicity	Lifetime Asthma Prevalence % (95% CI)
Hispanic	13.3 (12.9 – 13.6)
Asian/Pacific Islander (A/PI)	16.8 (16.4 – 17.2)
American Indian/Alaska Native (AI/AN)	19.5 (18.6 – 20.4)
White	20.2 (19.9 – 20.5)
Black	25.9 (25.3 – 26.5)

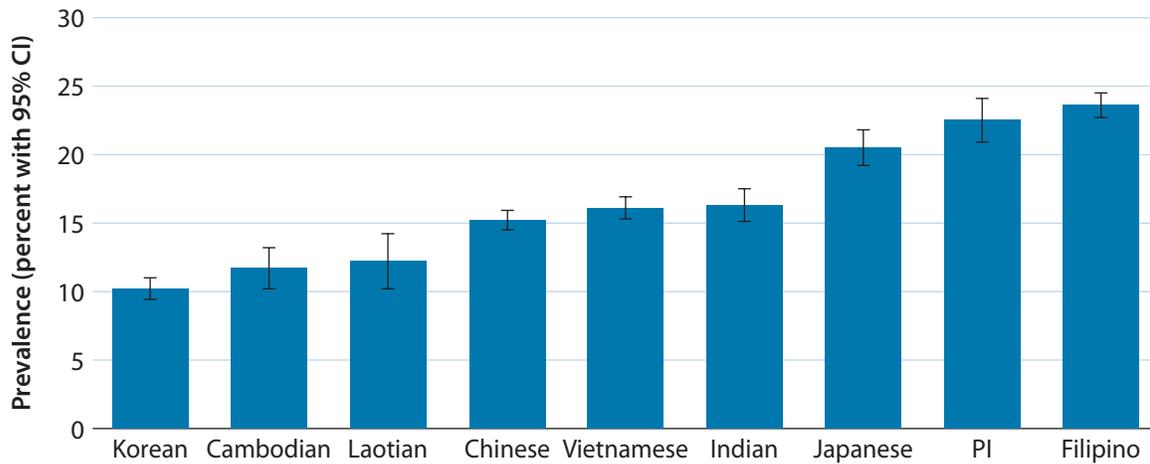
Lifetime Asthma Prevalence Among Hispanic Students, by Hispanic Subgroup, California 2003-2005

Overall, Hispanic adolescents have the lowest asthma prevalence of all the race/ethnic groups (13.3%), but combining all Hispanics into one group hides the fact that prevalence varies dramatically by Hispanic subgroup. Over 20 percent of Puerto Rican (22.5%) and Cuban (20.6%) students have asthma, which is comparable to Black (25.9%) and White (20.2%) students. Asthma prevalence is lower among the other Hispanic groups: Mexicans (12.8%), Central Americans (13.6%), and South Americans (15.1%).



Hispanic subgroup	Lifetime Asthma Prevalence % (95% CI)
Mexican	12.8 (12.4 – 13.1)
Central American	13.6 (13.0 – 14.3)
South American	15.1 (14.1 – 16.2)
Cuban	20.6 (18.3 – 22.9)
Puerto Rican	22.5 (21.1 – 23.8)

Lifetime Asthma Prevalence Among Asian/Pacific Islander (A/PI) Students, by A/PI Subgroup, California 2003-2005



Similar to Hispanics, lifetime asthma prevalence among Asian/Pacific Islander (A/PI) students varies dramatically by subgroup. The prevalence is highest in Filipino (23.6%) and Pacific Islander (22.5%) students — significantly higher than White students (20.2%). Korean students have the lowest asthma prevalence (10.2%) — significantly lower than the lowest Hispanic subgroup, Mexican students (12.8%).

A/PI subgroups	Lifetime Asthma Prevalence	
	%	(95% CI)
Korean	10.2	(9.5 – 11.0)
Cambodian	11.7	(10.1 – 13.2)
Laotian	12.2	(10.2 – 14.2)
Chinese	15.2	(14.6 – 15.9)
Vietnamese	16.1	(15.4 – 16.9)
Indian	16.3	(15.2 – 17.5)
Japanese	20.5	(19.3 – 21.8)
Pacific Islander (PI)	22.5	(20.9 – 24.1)
Filipino	23.6	(22.8 – 24.5)

Frequency of Symptoms Among California Students with Lifetime Asthma, 2003-2005

Among students diagnosed with asthma, 40.6 percent said they had symptoms in the last year when not exercising and 58.8 percent said they had symptoms when they were exercising. Almost 45 percent had a dry cough at night when they didn't have a cold or flu. Twenty-nine percent said they went to a doctor or hospital for their asthma symptoms in the past year.

Asthma Symptoms	Frequency % (95% CI)
Wheezing, chest tightness, or trouble breathing when not exercising during the past 12 months	40.6 (40.1 – 41.1)
Wheezing, chest tightness, or trouble breathing when exercising during the past 12 months	58.8 (57.7 – 60.0)
Dry cough at night without a cold or flu during the past 12 months	44.6 (43.5 – 45.8)
Visiting the doctor or hospital for wheezing or trouble breathing in the past 12 months	29.4 (28.4 – 30.3)

Frequency of Symptoms Among California Students Who Have Never Been Diagnosed with Asthma, 2003-2005

There are potentially a large number of students with undiagnosed asthma. Among students who said they were never diagnosed with asthma, 16.2 percent had asthma-like symptoms in the past year when not exercising and 31.1 percent had a dry cough at night without a cold. Further, 7.4 percent said they visited a doctor for asthma-like symptoms in the past year.

Asthma-like Symptoms	Frequency % (95% CI)
Wheezing, chest tightness, or trouble breathing when not exercising during the past 12 months	16.2 (16.0 – 16.5)
Wheezing, chest tightness, or trouble breathing when exercising during the past 12 months	26.8 (26.2 – 27.4)
Dry cough at night without a cold or flu during the past 12 months	31.1 (30.4 – 31.9)
Visiting the doctor or hospital for wheezing or trouble breathing in the past 12 months	7.4 (7.0 – 7.7)

5. Risk Factors Associated with Asthma

What are the risks for asthma?

There is a difference between what causes someone to have asthma and what triggers asthma attacks and symptoms. The things that cause people to develop asthma are not fully understood. We know that family history is one risk factor. Exposure to dust mites, cockroaches, and secondhand smoke among young children are also potential causes of asthma. Being overweight may also be a risk factor for asthma, but it is unclear whether asthma leads to overweight or overweight leads to asthma. The cause of asthma is likely to differ for each individual.

We know much more about asthma triggers — the factors that make existing asthma worse or bring about asthma attacks. Asthma triggers include: respiratory infections, pollen, mold, pet dander, dust mites, cockroaches, tobacco smoke (both from smoking and secondhand smoke), air pollution, household and workplace chemicals, stress, and vigorous exercise. Each person with asthma may be susceptible to different types of triggers.

This section describes data on a few triggers that are reported in statewide surveys. For more information on these surveys, please see the Technical Notes section.

What do we know about asthma risk factors in California?

In California, about 13 percent of adults with lifetime asthma have cockroaches in their home and about 30 percent have cats or dogs in their home. About 11 percent of adults with lifetime asthma are exposed to secondhand smoke in their home. Lifetime asthma prevalence is higher among current smokers (14%) than people who have never smoked (12%). We do not have statewide information on other asthma triggers in the home, such as mold, dust mites, and use of household chemicals.

Air pollution outside the home is also an asthma trigger and can come from traffic, dust, wood burning, agriculture, and industrial sites like power plants and refineries. Levels of air pollution vary widely from place to place, so aggregated state air pollution levels are not very useful and are not presented in this report. It is more useful to measure air pollution in local areas and many areas in California have been ranked among the highest in the country for air pollution.¹ County air pollution levels are available in the County

Eleven percent of adults with lifetime asthma are exposed to secondhand smoke in their homes.

Only 18 percent of adults age 18 – 49 with lifetime asthma had an annual flu vaccination in 2005.

Being overweight is associated with asthma.

Asthma Profiles published by California Breathing (http://www.californiabreathing.org/asthma_data).

Being overweight is also associated with having asthma. Adults and adolescents who are overweight or obese have higher lifetime asthma prevalence than those at normal weight. Sixteen percent of obese adults have lifetime asthma, compared to 11 percent of normal weight adults. Similarly, 22 percent of overweight adolescents have lifetime asthma, compared to 18 percent of normal weight adolescents.

Because having the flu can also be an asthma trigger, current national guidelines recommend that all people with asthma get a yearly flu vaccination. In 2005, almost 60 percent of young children age 0-5 with lifetime asthma and 74 percent of adults over age 65 with lifetime asthma had flu vaccinations. However, less than 50 percent of people in all other age groups had flu vaccinations. Adults age 18 – 49 have the lowest flu vaccination coverage, at 18.1 percent. Despite these low rates, flu vaccination coverage is higher among people with lifetime asthma than among people not diagnosed with asthma.

Summary:

- Adults with lifetime asthma are exposed to a variety of triggers in the home: tobacco smoke (11.1%), cockroaches (12.6%), dogs (31.2%), and cats (25.2%).
- The prevalence of lifetime asthma is greater among adults who said they currently smoke (14.0%) than those who currently do not (11.7%) or are former smokers (12.7%).
- Lifetime asthma prevalence is significantly higher among adults who are obese (16.0%) than those who are overweight (11.7%) or at normal weight (11.1%).
- Adolescents who are overweight also have significantly higher lifetime asthma prevalence than those who are at normal weight (21.9% vs. 18.3%).
- Flu vaccination coverage among people with lifetime asthma is highest for people over age 65 (74.2%) and lowest for people age 18 – 49 (18.1%).
- For every age group, a higher percentage of people with lifetime asthma said they got a flu vaccination in the past year than those not diagnosed with asthma.

¹ American Lung Association. *State of the Air: 2004*. <http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=50752>

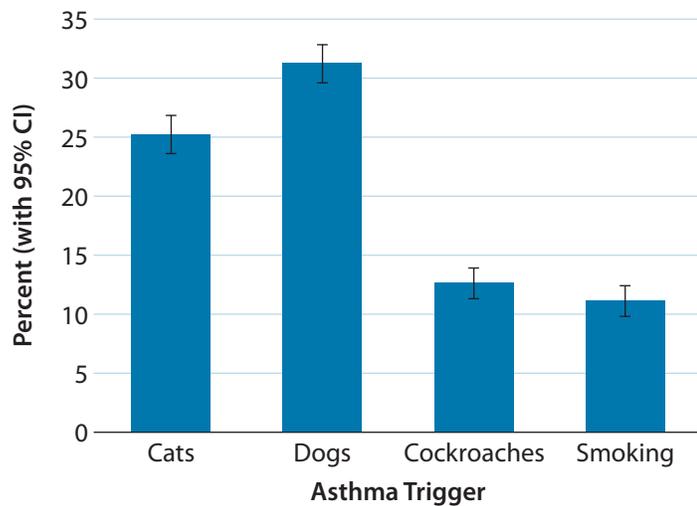
Asthma Triggers

Household pets and pests — such as cats, dogs, and cockroaches — and secondhand smoke are potential triggers for asthma symptoms. Among CHIS survey respondents, an individual is exposed to a potential asthma trigger in the home if he or she answered “yes” to one or more of the following questions:

- “Do you have any cats that you allow inside your home?”
- “Do you have any dogs that you allow inside your home?”
- “In the past 12 months, have you seen cockroaches inside your home?”
- “Does anyone smoke cigarettes, cigars, or pipes anywhere inside your home?”

Percent of Adults with Lifetime Asthma who are Exposed to Asthma Triggers Inside the Home, California 2003

Exposure to specific asthma triggers varied among adults diagnosed with asthma. Many are exposed to dogs (31.2%) or cats (25.2%) in their home. About 13 percent said they are exposed to cockroaches in the home and 11 percent are exposed to smoking.

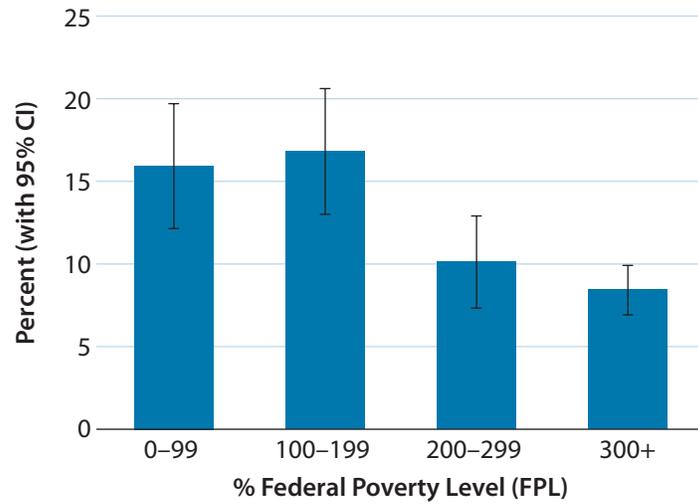


Trigger	Percent Exposed (95% CI)
Cats	25.2 (23.6 – 26.7)
Dogs	31.2 (29.6 – 32.9)
Cockroaches	12.6 (11.3 – 14.0)
Smoking	11.1 (9.8 – 12.3)

Data Source: CHIS 2003

Percent of Adults with Lifetime Asthma who are Exposed to Smoking in the Home, by Household Income, California 2003

Among adults with lifetime asthma, exposure to smoking in the home varied by household income. People whose incomes are below the poverty level are twice as likely than those with the highest incomes to live in a home where people smoke (15.9% vs. 8.4%).



Percent of Federal Poverty Level	Percent Exposed %	Percent Exposed (95% CI)
0-99% FPL	15.9	(12.1 - 19.7)
100-199% FPL	16.8	(13.0 - 20.5)
200-299% FPL	10.1	(7.3 - 12.9)
300+% FPL	8.4	(6.9 - 9.9)

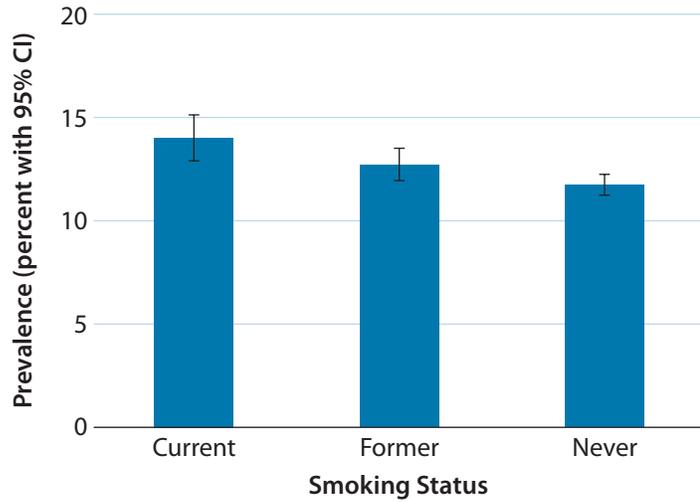
Data Source: CHIS 2003

Personal Smoking Status

In CHIS, adults are asked about their current smoking behavior. “Never smokers” are defined as individuals who have smoked zero to less than 100 cigarettes in their lifetime.

Lifetime Asthma Prevalence Among California Adults, by Smoking Status, 2003

The prevalence of lifetime asthma is slightly higher among adults who currently smoke (14.0%) than among those who are “former” (12.7%) or “never” (11.7%) smokers.



Smoking Status	Lifetime Asthma Prevalence % (95% CI)
Current	14.0 (12.9 – 15.2)
Former	12.7 (11.9 – 13.6)
Never	11.7 (11.2 – 12.3)

Data Source: CHIS 2003

Obesity

Body Mass Index (BMI) is a measurement used to classify a person's weight accounting for his/her height. The equation for BMI is:

$$\text{BMI} = \frac{\text{weight in kilograms}}{(\text{height in meters})^2}$$

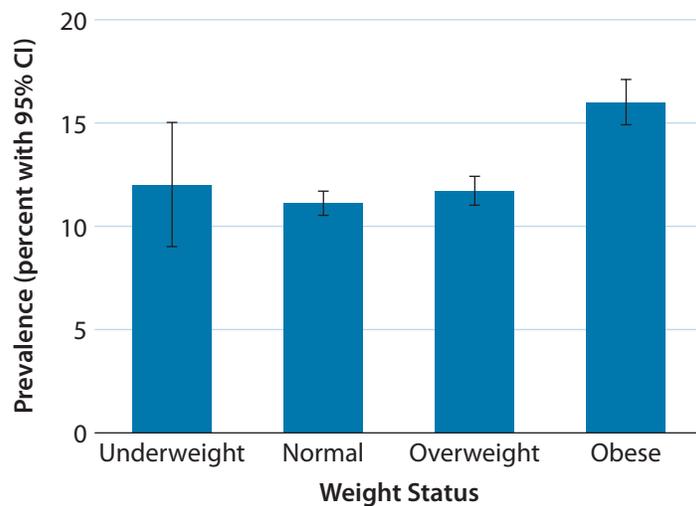
The table below lists how BMI is converted into weight status categories for adults.

Adult Weight Status Categories by BMI

Weight Status	Adult BMI
Underweight	<18.5
Normal	18.5 to <25.0
Overweight	25.0 to <30.0
Obese	≥ 30.0

Lifetime Asthma Prevalence Among California Adults, by Weight Status, 2003

The prevalence of lifetime asthma among adults increases with increasing weight, starting at the "normal" weight group. Sixteen percent of obese adults have asthma compared to 11.1 percent of normal weight adults.



Weight Status	Lifetime Asthma Prevalence	
	%	(95% CI)
Underweight	12.0	(9.0 – 15.0)
Normal	11.1	(10.5 – 11.7)
Overweight	11.7	(11.0 – 12.4)
Obese	16.0	(14.9 – 17.0)

Data Source: CHIS 2003

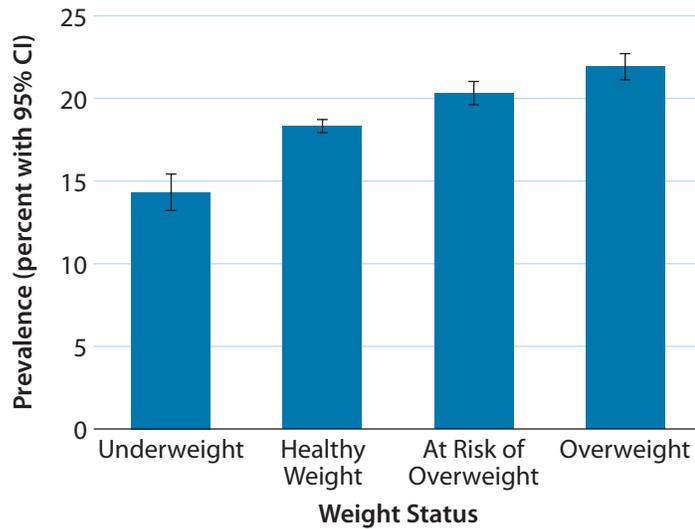
For children and adolescents, the definition of normal BMI changes with age and differs across genders. Therefore, we look at their BMI relative to others in the same age and gender group. The BMI is plotted on the CDC BMI-for-age growth charts (for either girls or boys) to get a percentile ranking. The percentile shows the position of the child or adolescent’s BMI relative to children of the same gender and age.

Child/Adolescent Weight Status Categories by BMI

Weight Status	Child/Adolescent BMI
Underweight	<5th percentile
Healthy Weight	5th to <85th percentile
At Risk of Overweight	85th to <95th percentile
Overweight	≥ 95th percentile

Lifetime Asthma Prevalence among California Adolescents (7th–11th graders) by Weight Status, 2003-2005

Like in adults, the prevalence of lifetime asthma among adolescents also increases with BMI. Lifetime asthma prevalence among adolescents in the overweight category (21.9%) is significantly higher than among those in the normal weight category (18.3%).



Weight Status	Lifetime Asthma Prevalence % (95% CI)
Underweight	14.3 (13.2 – 15.4)
Healthy Weight	18.3 (17.9 – 18.7)
At Risk of Overweight	20.3 (19.6 – 21.1)
Overweight	21.9 (21.1 – 22.8)

Data Source: CHKS 2003-2005

Flu Vaccination

Flu (influenza) and other respiratory infections can be much worse for people with asthma and cause an increase in asthma symptoms. The Advisory Committee on Immunization Practices (ACIP) recommends that all adults and children who have asthma receive a yearly influenza vaccination (flu shot). Additionally, all children age 6–59 months and all adults age 50 and over are recommended to have a yearly influenza vaccination, regardless of asthma status.

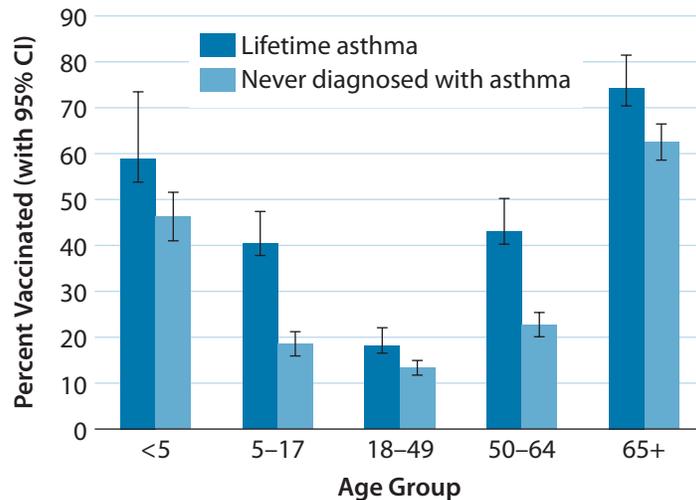
Questions:

Adults: “A flu shot is an influenza vaccine injected in your arm. During the past 12 months, have you had a flu shot?”

Children: “During the past 12 months, has [child] had a flu shot? A flu shot is a flu vaccine injected in a child’s arm or thigh.”

Percent of People Who Had a Flu Vaccination in the Past Year by Asthma Status and Age, California 2005

People with lifetime asthma are more likely to get a flu vaccination than people not diagnosed with asthma. However, in all age groups, coverage does not meet the 100 percent ACIP recommendation. Coverage is highest in age groups that are targeted for vaccination regardless of asthma status (0–5 and 65+) and lowest among adults age 18–49.



Age Group	Percent Vaccinated	
	Lifetime Asthma % (95% CI)	Never Diagnosed with Asthma % (95% CI)
< 5	58.9 (44.5 – 73.4)	46.2 (41.0 – 51.5)
5 – 17	40.4 (33.5 – 47.3)	18.5 (15.8 – 21.1)
18 – 49	18.1 (14.2 – 22.0)	13.3 (11.7 – 14.8)
50 – 64	42.9 (35.6 – 50.2)	22.7 (20.0 – 25.3)
65+	74.2 (67.0 – 81.4)	62.4 (58.5 – 66.4)

Data source: BRFSS 2005

6. Work-related Asthma

What is work-related asthma?

Work-related asthma (WRA) is asthma that is caused or triggered by conditions or substances in the workplace. There are two main types of WRA: 1) new onset asthma, or new asthma that develops from workplace exposures in a person who did not previously have asthma; and 2) work-aggravated asthma, or pre-existing asthma that is made worse by conditions in the workplace. To be considered WRA, there must be a doctor's diagnosis and symptoms that started after a possible workplace exposure. There are currently over 350 substances known to cause new onset WRA (also called sensitizers).¹ The most important treatment for WRA is to identify the things in the workplace that trigger asthma and control or eliminate them.

Between 137,000 and 315,000 adults in California have work-related asthma.

How many people in California have work-related asthma?

In California, it is estimated that between 137,000 and 315,000 adults have WRA.² However, WRA is very often unrecognized and therefore not always diagnosed. Research shows that health care providers rarely ask about workplace factors when diagnosing or treating adult asthma.³

Who gets work-related asthma in California?

People from all over California in a wide array of industries and occupations have WRA. Generally speaking, more women than men are reported with WRA, and more people are reported with new onset WRA, compared to work-aggravated asthma. Some of the industries with the highest rates of WRA include local transit, manufacturing of lumber and wood products, utilities, heavy construction, social services, and health services. Some of the specific occupations with the highest rates of WRA include correctional officers, firefighting occupations, special education teachers, health technicians, welfare eligibility clerks, and respiratory therapists. The most common asthma triggers that people with WRA are exposed to are: dust, unknown chemicals, indoor air pollutants, mold, smoke, paint, and cleaning materials. The most common sensitizers that people with WRA are exposed to are: latex, formaldehyde, isocyanates, rat antigens, glutaraldehyde, and redwood. (See page 67 for a description of these substances.)

How does work-related asthma affect the people who get it?

Work-related asthma has a significant impact on people who have it. Among people identified with WRA, 62 percent were either unable to perform their usual work or had to

¹ Association of Occupational and Environmental Clinics, AOEC Exposure Codes. Available at: <http://www.aoec.org/tools.htm>. Accessed October 23, 2006.

² Flattery J, Davis L, Rosenman K, Harrison R, Lyon-Callo S, Filios M. The Proportion of Self-reported Asthma Associated with Work in Three States—California, Massachusetts, and Michigan, 2001. *J of Asthma*. 2006;43:213–218.

³ Sama S, Hunt P, Cirillo P, et al. A Longitudinal Study of Adult-Onset Asthma Incidence Among HMO Members. *Environ Health*. 2003;2:10-18.

perform modified work. Among people who also had a follow-up interview, 27 percent said that they were still exposed to the substances associated with their breathing problems. Among those no longer exposed, 34 percent reported they had left their job, either from being fired/laid off or voluntarily to stop exposure. A majority of cases (71%) reported that co-workers also suffered from breathing problems. Over 60 percent had been to the emergency department for their asthma (an average of four times) since their breathing problems at work began, and 14 percent had been hospitalized. More than half (56%) had experienced asthma symptoms in the last two weeks. Among cases asked about workers' compensation, 42 percent had not filed a claim.

How is surveillance for work-related asthma done in California?

An ongoing surveillance system has been in place to track WRA in California since 1993. Health care providers report cases of WRA through Doctor's First Reports of Occupational Injury and Illness, and each case is contacted for follow-up, including a telephone interview to collect additional data and to provide the patient with educational materials and technical assistance. Even though this surveillance system is known to significantly undercount WRA cases, the data are very useful for identifying risk factors, characteristics, and outcomes of people who experience WRA. These data have in turn been used to identify prevention strategies.

In addition to surveillance through Doctor's First Reports, there were two WRA-related questions added to the Behavioral Risk Factor Surveillance System (BRFSS) survey in 2001. These questions are used to estimate the percent of adults with current asthma who have WRA and the percent who have discussed the possibility of WRA with their health care provider.

Summary:

- An estimated 137,000-315,000 people in California have asthma related to their work, yet WRA is often not recognized or reported.
- The majority of WRA cases are new onset asthma (59%); 41 percent are work-aggravated.
- More women than men are identified as having WRA (59% vs. 41%).
- The average age of people with WRA is 41.
- The majority of people with WRA are unable to do their usual work (62%), report continuing symptoms (56%), and have gone to the emergency department for their WRA (61%).
- The overall rate of WRA in California is 2.1 per 100,000 workers. However, some industries and occupations have rates that are many times higher than the average.
- People with WRA are most commonly exposed to the following asthma triggers: dust, unknown chemicals, indoor air pollutants, mold, smoke, paint, and cleaning materials.
- The WRA sensitizers to which people are most commonly exposed are: latex, formaldehyde, isocyanates, rat antigens, glutaraldehyde, redwood, and mites.
- In some industries and occupations, high WRA rates cannot be tied to any one or two specific exposures. Others, however, have very specific exposures associated with the majority of cases, allowing for targeted prevention efforts.

Definitions of Substances Named in this Section

Animal Dander	Small particles or organic matter from animals (mostly from skin and fur)
Epoxy Resin	Product used in paints and other surface coatings, molded and reinforced plastics, electronic component coverings, and adhesives ranging from spray foams to dental cement
Formaldehyde*	A chemical used to make building products like particle board, wrinkle-free fabrics, cosmetics, plastics, and as a disinfectant and a preservative; also called formalin
Glutaraldehyde*	A chemical used as a disinfectant and sterilizer in health care settings, for leather tanning, tissue fixative, x-ray processing, and in dental materials
Grain Dust*	A mix of grain proteins, bacterial toxins, pesticides, and soil that comes from agricultural activity
Hydrocarbons	A vast family of compounds containing carbon and hydrogen in various combinations; found especially in fossil fuels such as petroleum products and natural gas
Indoor Air Pollutants	Used as a general category for substances in the air inside a building that are associated with asthma-related symptoms
Isocyanates*	Chemicals used to make many different kinds of foams used in products as far ranging as car seats, foam mattresses, surfboards, and packing materials
Latex*	Also known as natural rubber, it is used in a wide variety of consumer products including rubber gloves, tubing, rubber bands, and balloons
Mites*	Extremely small insects that eat organic material from plants or animals
Pepper Spray	A chemical agent derived from chile peppers and used for defense to incapacitate an attacker
Pesticides	Chemicals used to kill unwanted plants and pests such as insects, weeds, rodents, and fungi; used in agriculture and other settings such as regular treatment of buildings in urban areas
Rat Antigens*	Substances and proteins from rats that can cause an allergic response
Roofing Tar	Tar used in many roofing installations; it contains substances that can irritate the respiratory system
Smoke	General category for any type of smoke exposure including cigarette smoke, plastic smoke, etc.
Solvents	A large class of chemicals used to dissolve other substances; used widely for cleaning, degreasing, and making glues, inks, paints, and thousands of other products

*Substances marked with an asterisk are sensitizers, or substances known to be able to cause new onset asthma.

Prevalence of Work-related Asthma

Percent of Adults with Current Asthma Reporting an Association with Work, California 2001

Overall, 7.4 percent of adults with current asthma had possible WRA.

This equates to approximately 137,000 adults in 2001 with WRA in California. This is very likely an underestimate, as research shows that only a small percentage of adults with asthma ever discuss work as a possible factor in their asthma with their health care provider.

The American Thoracic Society conducted an extensive review of the epidemiological literature and estimated that 15 percent of all adult asthma is WRA⁴. When this number is applied to results from the California Health Interview Survey (CHIS) documenting the prevalence of adults with current asthma, an estimated 315,000 adults had WRA in 2003.

Questions on 2001 BRFSS	Percent "yes" % (95% CI)
Q1. Were you ever told by a doctor or other medical person that your asthma was related to any job you ever had?	
All	5.8 (2.6 – 9.0)
Male	8.4 (1.5 – 15.3)
Female	4.4 (1.1 – 7.7)
Q2. Did you ever tell a doctor or other medical person that your asthma was related to any job you ever had?	
All	3.9 (1.5 – 6.3)
Male	5.5 (0.4 – 10.6)
Female	3.1 (0.6 – 5.6)
Possible WRA (yes to either Q1 or Q2)	
All	7.4 (3.9 – 10.9)
Male	9.8 (2.6 – 17.0)
Female	6.1 (2.2 – 10.0)

Data Source: BRFSS 2001

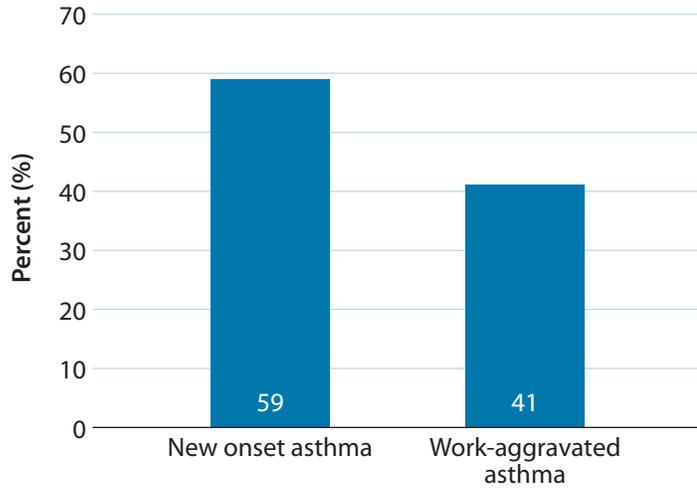
⁴ Balmes J, Becklake M, Blanc P, et al. Environmental and Occupational Health Assembly, American Thoracic Society. American Thoracic Society Statement: Occupational Contribution to the Burden of Airway Disease. Am J Respir Crit Care Med. 2003;167:787-797.

Characteristics of Work-related Asthma

The characteristics of WRA presented below are from the WRA surveillance system from 1993-2005 (N=3,552).

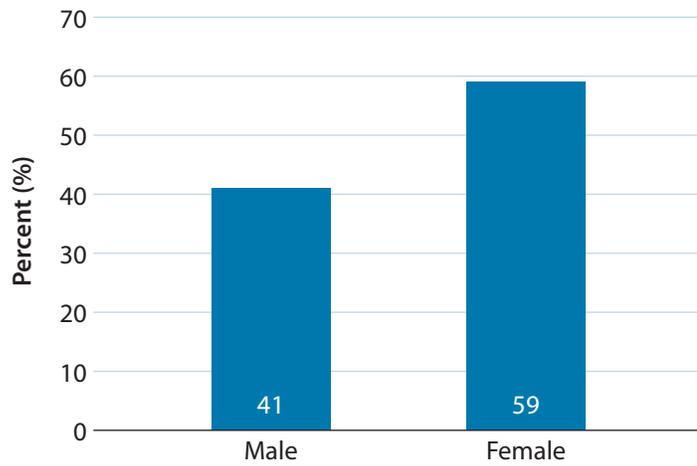
Classification of WRA Cases, California WRA Surveillance System, 1993-2005

The majority of people with WRA have new onset asthma, as opposed to existing asthma made worse by workplace conditions (work-aggravated asthma).



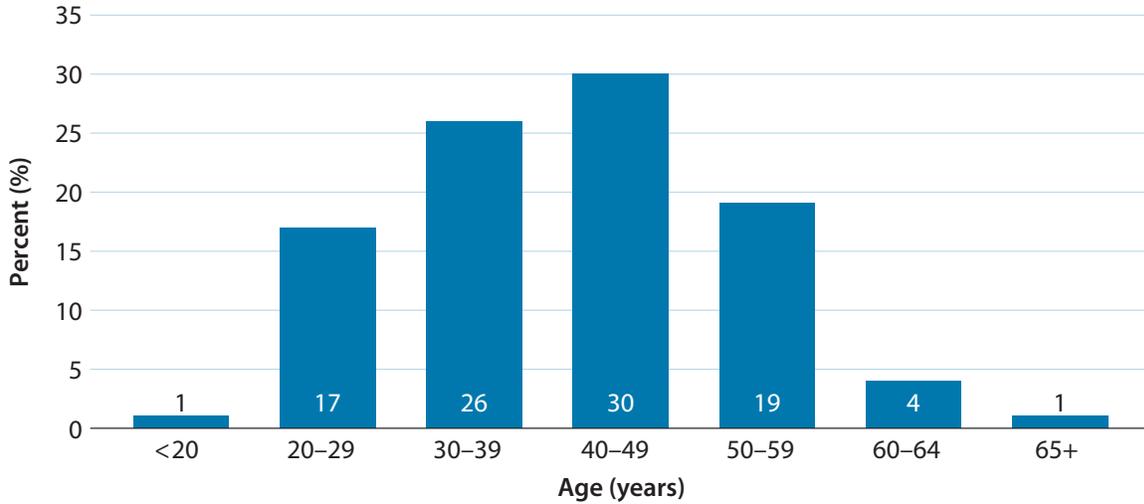
WRA Cases by Gender, California WRA Surveillance System, 1993-2005

More women than men are reported to the WRA surveillance system (59% vs. 41%).



WRA Cases by Age, California WRA Surveillance System, 1993-2005

The average age of people reported to have WRA is 41 years, although teenagers and people over the age of 65 also experience WRA.



Note: The surveillance of WRA includes working people of all ages, including teenagers.

Characteristics of WRA Cases, California WRA Surveillance System, 1993-2005

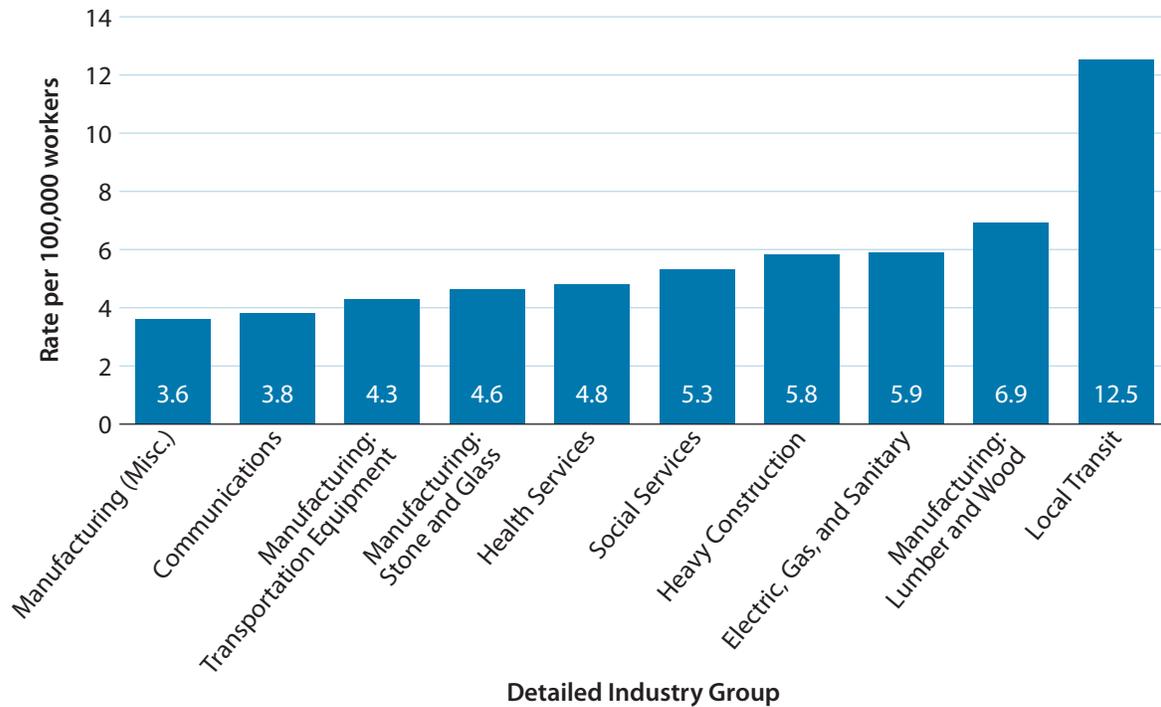
WRA has serious consequences: the majority of cases had been to the emergency department for their asthma (an average of four times) since their work-related breathing problems began. One in seven had been hospitalized and over half had experienced asthma symptoms in the previous two weeks. Yet just over half had applied for workers' compensation. Over 70 percent knew of other people at their workplace who were experiencing breathing problems similar to theirs, and 27 percent were still exposed to the substances that triggered their WRA in the workplace.

Severity/Impact	
Unable to perform usual work or had to modify work	62%
Emergency department visit since WRA began	61%
Average number of times in emergency department	4
Hospitalized since WRA began	14%
Filed for workers' compensation	58%
Symptoms in last two weeks	56%
Know others in workplace with similar breathing problems	71%
Still exposed to asthma trigger in workplace	27%
Other Risk Factors	
Personal allergy history	66%
Family asthma history	46%
Never smoked	61%
Current smoker	12%
Former smoker	27%

Industries and Occupations

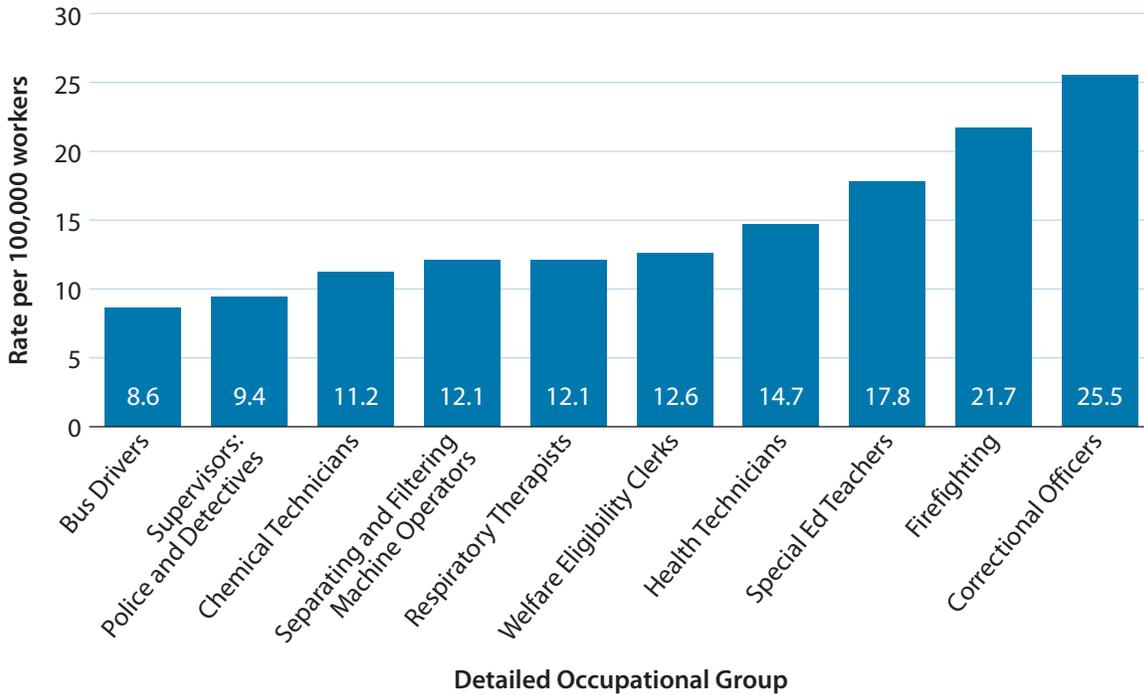
WRA Rates by Detailed Industry Groups, California WRA Surveillance System, 1993-2004 (n=3,479)

The overall rate of work-related asthma in California is 2.1 per 100,000 workers. Certain industries have substantially higher rates, including local transit (12.5 per 100,000); lumber and wood product manufacturing (6.9); electric, gas, and sanitary utilities (5.9); heavy construction (5.8); social services (5.3); and health services (4.8).



WRA Rates by Detailed Occupational Groups, California WRA Surveillance System, 1993-2004 (n=3,479)

Some specific occupations also have high rates of WRA. These include correctional officers (25.5 per 100,000), firefighting occupations (21.7), special education teachers (17.8), health technicians (14.7), and welfare eligibility clerks (12.6). Two of the ten occupations with the highest rates are in the health care industry (health technicians and respiratory therapists).



Exposures

A wide variety of substances (exposures) are associated with WRA. Understanding the conditions or substances contributing to people's asthma symptoms in the workplace is critical for creating effective prevention strategies. The tables below list the most commonly reported WRA exposures (both exposures that trigger asthma symptoms and those that can cause new onset asthma, or sensitizers). Note that sometimes workers do not know what specific chemical triggered their asthma symptoms.

Most Commonly Reported Exposures Among WRA Cases Receiving Follow-up, California WRA Surveillance System, 1993-2004

The most commonly reported exposures include dust, unknown chemicals, indoor air pollutants, mold, smoke, paint, and cleaning chemicals.

Exposure	Number of Cases (cases may report up to 3 exposures)
Dust	383
Chemicals	363
Indoor Air Pollutants	177
Mold	173
Smoke	158
Paint	140
Cleaning Materials, not specified	137
Plant Materials, not specified	104
Indoor Air Pollutants from Building Renovation	86
Pesticides, not specified	77

Most Commonly Reported Sensitizer Exposures Among WRA Cases Receiving Follow-up, California WRA Surveillance System, 1993-2004

The most common sensitizers reported were latex, formaldehyde, isocyanates, rat antigens, glutaraldehyde, and redwood.

Sensitizer Exposure	Number of Cases (cases may report up to 3 exposures)
Latex	32
Formaldehyde	26
Isocyanates	20
Rat Antigens	15
Glutaraldehyde	13
Redwood	12
Mites	10
Grain Dust	8
Epoxy Resin	8
Flour	6

**Most Common Exposures
Among the 10 Occupations
with the Highest Rates of WRA,
California WRA Surveillance
System 1993–2004 (n=3,479)**

Examining the most common exposures by occupation can help to focus prevention strategies. For example, diesel exhaust is by far the most common exposure reported by bus drivers, so measures should be explored to control or eliminate that exposure.

Occupation	Exposure
Correctional officers	pepper spray, smoke, dust
Firefighting occupations	smoke
Special education teachers	mold, dust, indoor air pollutants
Health technicians	glutaraldehyde, paint, latex, animal dander, dust, cleaning chemicals
Welfare eligibility clerks	roofing tar, paint, dust
Respiratory therapists	latex, cleaning chemicals, glutaraldehyde
Separating, filtering, clarifying machine operators	solvents, salts, acids, glues
Chemical technicians	solvents, inks, isocyanates, hydrocarbons
Supervisors, police and detective	pepper spray, mold, smoke, rat antigens
Bus drivers	diesel exhaust

7. Asthma Emergency Department Visits

When people manage their asthma properly and receive appropriate health care, they should not have to go to the emergency department (ED) because of their asthma. Nonetheless, many people with asthma end up at the ED for treatment of asthma symptoms. This may be because they have not managed their asthma properly, they have not received a plan for managing worsening asthma, or they lack health insurance or access to a primary health care provider.

How many people in California visit the ED for asthma?

In 2005, there were 144,945 asthma ED visits in California, that did not result in an inpatient hospitalization. This translates to an estimated yearly rate of 39.1 visits per 10,000 residents. Data on ED visits are only available for 2005, so we do not know whether the rate is increasing or decreasing.

In 2005, there were 39.1 asthma ED visits per 10,000 residents in California. The rate of asthma ED visits is three times higher in Blacks than Whites.

Who visits the ED for asthma?

Rates of asthma ED visits differ by race/ethnicity, age, and gender. There is a large disparity by race/ethnicity, with Blacks having the highest ED visit rate (106.9 per 10,000). This rate is three times as high as the rate among Whites (34.9 per 10,000), who have the next highest rate. The rate of asthma ED visits goes down with age — it is highest among young children age 0–4 (92.6 per 10,000) and lowest among people age 65 and over (20.8 per 10,000). Among children under age 15, males have higher rates of ED visits than females. In older children and adults females have higher rates than males.

How are asthma ED visits measured?

Data on asthma ED visits are from the 2005 Emergency Department Data maintained by the California Office of Statewide Health Planning and Development (OSHPD). This dataset has a record for each patient admitted to a licensed emergency department in California (not including ED visits that resulted in a hospital admission to the same hospital for the same encounter) and includes information like age, gender, race/ethnicity, and diagnosis. ED visits are presented as a rate — the number of asthma ED visits per 10,000 California residents. When rates are compared across groups, they are adjusted for age to account for different age distributions. Please see the Technical Notes section at the end of this report for more information.

Summary:

- In 2005, there were an estimated 39.1 asthma ED visits per 10,000 residents in California.
- Blacks have the highest rate of asthma ED visits (106.9 per 10,000) — three times as high as Whites (34.9 per 10,000).
- Rates of asthma ED visits decrease with age, with the highest rate in the youngest age group (0-4 years) at 92.6 per 10,000.
- In children under age 15, males (92.8 per 10,000) have higher rates of asthma ED visits than females (49.0 per 10,000). Among people over age 15, females (38.9 per 10,000) have higher rates than males (22.4 per 10,000).
- Medicare and Medi-Cal were the payers for 39 percent of asthma ED visits in 2005. Private insurers covered 37 percent.
- Only data from 2005 are available, therefore trends cannot be identified.

Asthma ED Visits Compared to HP2010 Targets, California 2005

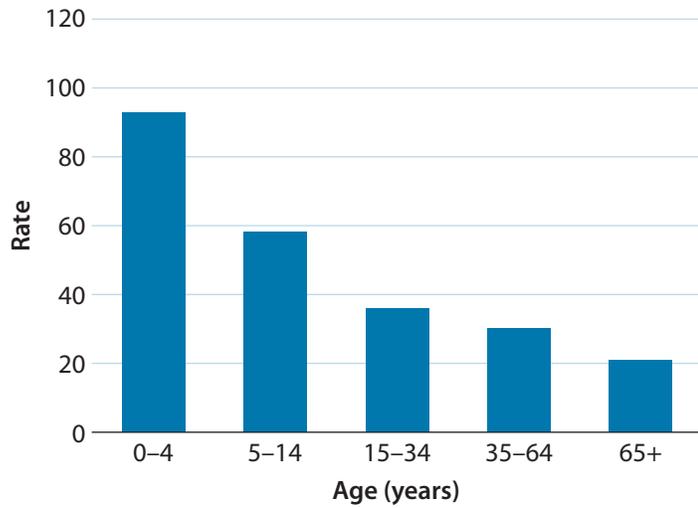
Asthma emergency department (ED) visit rates for the 0–4 age group (92.6 per 10,000) and 65+ age group (20.8 per 10,000) have not met their respective Healthy People 2010 (HP2010) targets. However, the rate for the 5–64 age group (37.2 per 10,000) has met the HP2010 target.

Age Group	n	Rate	HP2010 Target
<5	24,359	92.6	80
5 – 64	112,171	37.2	50
65+	8,415	20.8	15

Note: See Healthy People 2010 section for an explanation of HP2010 objectives.

Asthma ED Visits per 10,000 California Residents by Age, 2005

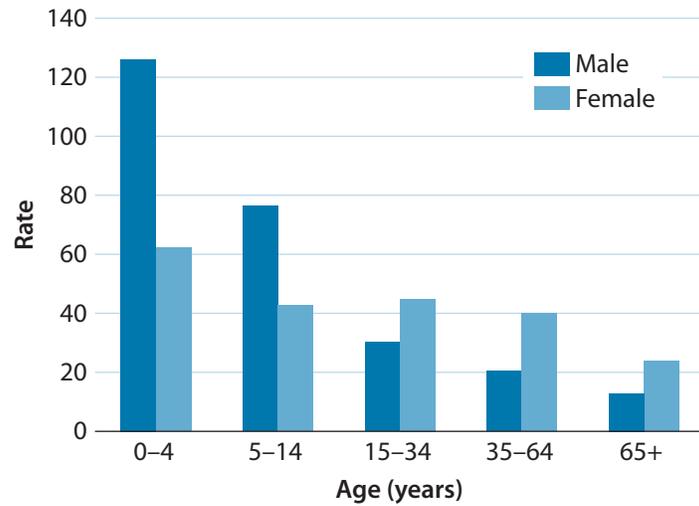
Asthma ED visit rates decrease with age and are highest among children under five (92.6 per 10,000). Adults 65 and over have the lowest asthma ED visit rate at 20.8 per 10,000.



Age Group	n	Rate (per 10,000)
0-4	24,359	92.6
5-14	30,822	58.2
15-34	38,362	36.0
35-64	42,987	30.2
65+	8,415	20.8

Asthma ED Visits per 10,000 California Residents by Age and Gender, 2005

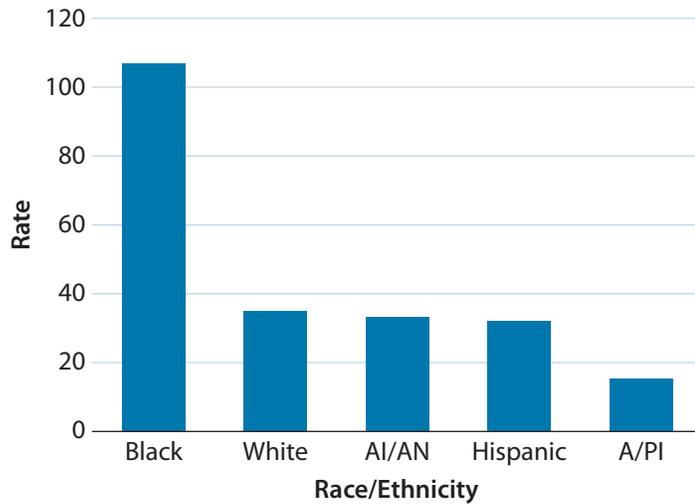
The gender disparity in asthma ED visits varies by age. Females have higher rates than males in the older age groups (15 and over) and lower rates than males in the younger age groups (0–14).



Age Group	Male		Female	
	n	Rate (per 10,000)	n	Rate (per 10,000)
Total	68,638	37.2	75,692	41.0
0 – 4	16,218	125.9	8,006	62.1
5 – 14	19,716	76.3	10,996	42.5
15 – 34	15,331	29.9	22,881	44.7
35 – 64	14,441	20.2	28,368	39.7
65+	2,932	12.7	5,441	23.6

Age-Adjusted Asthma ED Visits per 10,000 California Residents by Race/Ethnicity, 2005

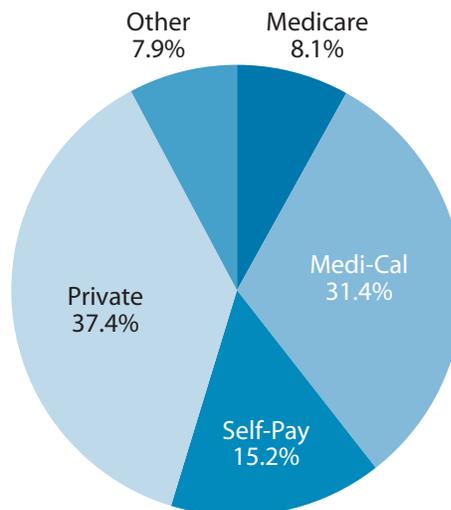
Blacks have the highest rate of asthma ED visits (106.9 per 10,000) — three times higher than Whites. Asians/Pacific Islanders have the lowest ED visit rate (A/PI, 15.2 per 10,000) while Whites, American Indians/Alaska Natives (AI/AN), and Hispanics had moderate rates ranging from 32 to 35 per 10,000.



Race/Ethnicity	n	Age-Adjusted Rate (per 10,000)
Black	26,860	106.9
White	50,246	34.9
AI/AN	896	33.1
Hispanic	45,715	31.9
A/PI	6,235	15.2

Expected Source of Payment for Asthma ED Visits, California 2005

Public payers, Medicare, and Medi-Cal, cover 39.5 percent of all asthma ED visits. Private payers also account for a large proportion at 37 percent.



Note: See *Technical Notes* for a detailed description of payer categories.

Age-Adjusted Asthma ED Visits per 10,000 Residents by Counties in California, 2005

Rates of asthma ED visits vary substantially by county. The rate in Del Norte County is more than twice as high as in California overall. In comparison, the rate in Santa Clara County is just over half the California rate. These estimates are adjusted for age, but not other demographic distributions in the county that can affect asthma ED visits (e.g., gender, race/ethnicity).

County	Age-Adjusted Rate	n
Del Norte	80.8	227
Imperial	75.1	1,249
Tehama	66.7	384
Kings	62.2	913
Inyo	61.1	108
Lake	58.3	348
Tuolumne	55.4	290
Humboldt	55.0	719
Mendocino	52.6	474
Tulare	52.4	2,286
Fresno	51.1	4,713
Contra Costa	50.6	5,215
Solano	50.5	2,172
Alameda	49.6	7,486
Plumas	48.6	98
Shasta	47.6	827
Madera	47.3	688
San Bernardino	46.8	9,539
Colusa	46.3	101
Yuba	43.7	291
San Joaquin	43.5	2,933
Butte	41.7	878
Sonoma	41.1	1,947
Merced	40.8	1,044
Calaveras	40.6	175
Stanislaus	39.9	2,074
Sacramento	39.4	5,543
Napa	39.3	518
CALIFORNIA	39.1	144,945
Modoc	39.0	31
Kern	38.7	3,057
Los Angeles	38.5	39,889
San Benito	38.4	234
San Mateo	37.6	2,646
Siskiyou	36.9	155
Mariposa	36.1	62
Amador	35.9	124
Riverside	35.4	6,723
Lassen	34.9	122
Monterey	33.8	1,491
San Luis Obispo	33.6	834
Neveda	33.2	313
Ventura	32.5	2,641
Trinity	32.3	44
San Diego	31.4	9,369
San Francisco	30.8	2,286
Glenn	29.9	86
Yolo	28.9	555
Santa Cruz	27.4	698
Marin	27.0	646
El Dorado	26.4	447
Orange	26.4	8,145
Sutter	25.8	231
Santa Barbara	25.7	1,073
Placer	24.7	714
Santa Clara	23.7	4,122
Mono	—	18

8. Asthma Hospitalizations

Asthma hospitalizations, like asthma emergency department (ED) visits, are often preventable for people who manage their asthma properly and receive appropriate health care. Being hospitalized for asthma is both very serious and very costly. Data on asthma hospitalizations can be used to identify groups of people with asthma who should be a priority for targeted interventions.

How many people in California are hospitalized for asthma?

In 2005, there were more than 36,000 asthma hospitalizations in California. This translates to a rate of 10.0 hospitalizations per 10,000 residents. From 1995–2005, the average number of asthma hospitalizations per year was 38,050 and the average rate was 11.3 per 10,000 residents. Approximately 13 percent of people hospitalized for asthma in 2005 had more than one asthma hospitalization in that year (this is called a repeat hospitalization).

Has the rate of asthma hospitalizations been changing?

The rate of asthma hospitalizations in California went down slightly from 13.3 per 10,000 in 1995 to 10.0 per 10,000 in 2005. California's rate has consistently been about two thirds as high as the overall U.S. rate.

Who is hospitalized for asthma in California?

Asthma hospitalization rates vary by race/ethnicity, income, age, and gender. Like ED visits, there is a large disparity by race/ethnicity, with Blacks having the highest rate (28.7 per 10,000). This rate is three times higher than the rate among Whites (8.9 per 10,000). There is also a trend for higher asthma hospitalization rates among lower income groups. Asthma hospitalization rates are highest among young children age 0–4 (24.8 per 10,000), followed by adults over age 65 (22.3 per 10,000). Among children under age 15, the rate of asthma hospitalizations is higher for males than females; among older children and adults, this trend is reversed, with females having higher rates than males.

In 2005, there were more than 36,000 asthma hospitalizations in California, with total charges amounting to \$763 million.

Thirteen percent of people hospitalized for asthma were hospitalized more than once in 2005, and these repeat hospitalizations cost \$118 million.

The rate of asthma hospitalizations is three times higher in Blacks than Whites.

What are the costs of asthma hospitalizations?

In 2005, there were \$763 million in total charges for asthma hospitalizations in California. The average charge for an asthma hospitalization was \$23,953. Since 1995, the average charge more than doubled despite the fact that the average length of stay for asthma hospitalizations has not changed. The majority of the costs associated with asthma hospitalizations are paid for through public programs. Medicare and Medi-Cal cover 61 percent of asthma hospitalizations, or \$547 million in charges. Costs for repeat hospitalizations were \$118 million in 2005, 81 percent of which (\$95 million) was covered by Medicare or Medi-Cal.

How are asthma hospitalizations measured?

Data on asthma hospitalizations are from the Patient Discharge Databases maintained by the California Office of Statewide Planning and Development (OSHPD). These datasets have a record for each inpatient discharged from a licensed acute care hospital in California and include information like age, gender, race/ethnicity, diagnosis, and charges. Hospitalizations are presented as a rate — the number of asthma-related hospitalizations per 10,000 California residents. When rates are compared across groups, they are adjusted for age to account for different age distributions. Please see the Technical Notes section for more information.

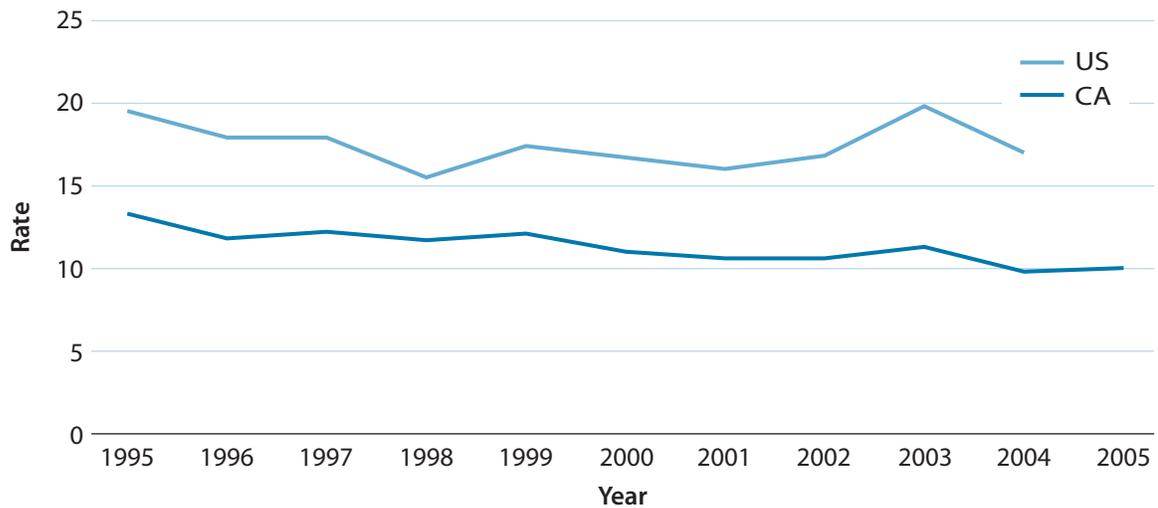
Summary:

- From 1995-2005, there was an average of 38,050 asthma hospitalizations per year, or an age-adjusted rate of 11.3 per 10,000 residents.
- Of all the people who were hospitalized for asthma in 2005, 13 percent were hospitalized more than once (repeat hospitalizations).
- Asthma hospitalization rates in California have decreased slightly in the past decade and have been consistently lower than overall U.S. rates.
- Blacks have consistently had higher rates of asthma hospitalizations than other race/ethnicities. In 2005, the rate for Blacks (28.7 per 10,000) was more than three times higher than the rate for Whites (8.9 per 10,000).
- Asthma hospitalization rates are highest among children under five years old (24.8 per 10,000) and adults over age 65 (22.3 per 10,000).
- Among adults, females have higher asthma hospitalization rates than males; among children, males have higher rates.
- Total costs for asthma hospitalizations in 2005 were \$763 million.
- The average charge per asthma hospitalization more than doubled between 1995 (\$9,277) and 2005 (\$23,953). In contrast, the average length of stay for asthma hospitalizations has hardly changed (3.5 days).
- Medicare and Medi-Cal covered 61 percent of asthma hospitalizations in 2005, or \$547 million in charges.

Asthma Hospitalization Rates

Age-Adjusted Asthma Hospitalizations per 10,000 Residents, California and U.S., 1995–2005

Asthma hospitalizations decreased gradually since 1995.¹ The rate in 2005 was 10.0 hospitalizations per 10,000 residents. California's rates have consistently been about 1.5 times lower than overall U.S. rates.



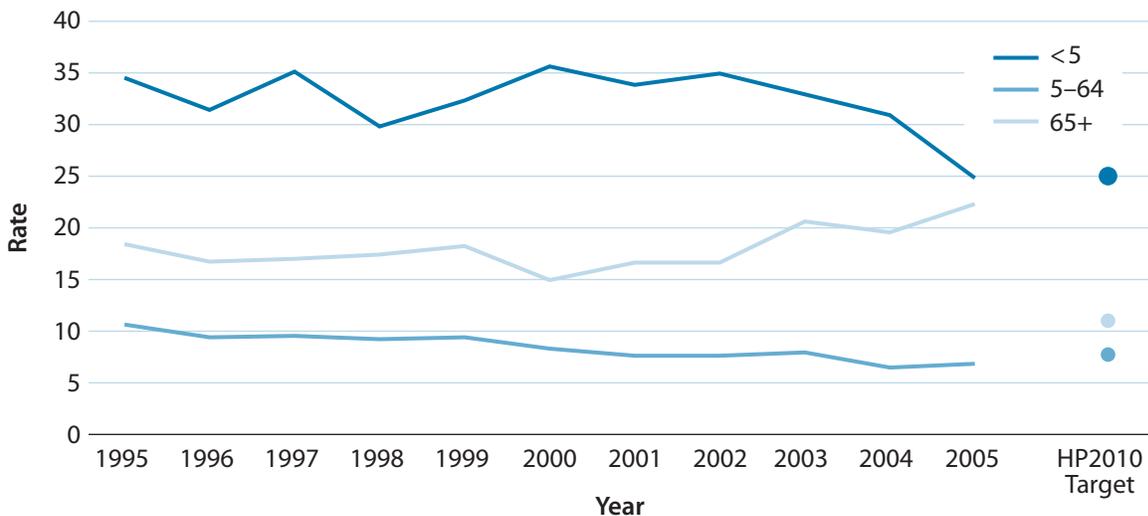
Year	Number	Age-adjusted Rate (per 10,000)
1995	42,333	13.3
1996	37,852	11.8
1997	39,708	12.2
1998	37,953	11.7
1999	39,937	12.1
2000	37,096	11.0
2001	36,101	10.6
2002	36,827	10.6
2003	39,734	11.3
2004	34,959	9.8
2005	36,060	10.0

Note: U.S. Data not available for 2005; U.S. data are from the National Hospital Discharge Survey, 1995-2004

¹ Decrease of 0.3 per year, $p < 0.001$ (simple linear regression)

Asthma Hospitalizations per 10,000 California Residents by Age, Compared to HP2010 Targets, 1995–2005

Asthma hospitalization rates have been consistently highest in children under the age of five. In 2005, the hospitalization rate in this group was 3.6 times higher than the 5–64 age group. There has been some decline in the rate among those under age five, bringing the group closer to the Healthy People 2010 (HP2010) target. However, the recent fall in the rate for this age group should be interpreted with caution until future years of data are available. The 65 and over age group is far from meeting the HP2010 target. In fact, rates in this group have increased in recent years. Rates among the 5–64 age group have decreased over time² and have met the HP2010 target since 2001.



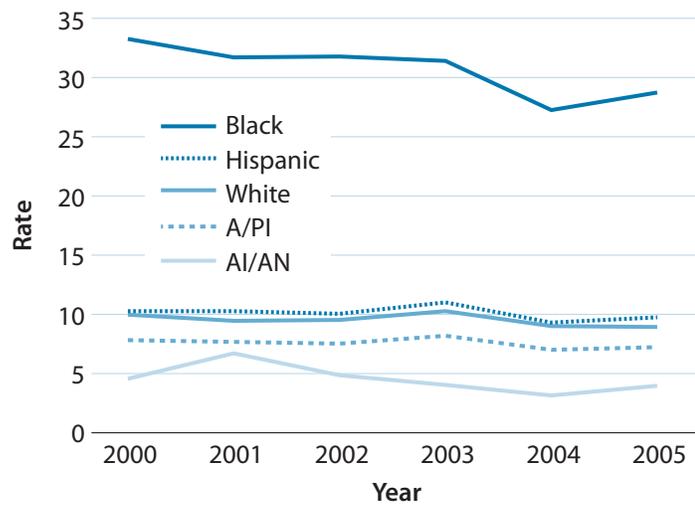
Note: Rates are age-adjusted for 5–64 and 65+ age groups. See Healthy People 2010 section for an explanation of HP2010 objectives.

Year	<5		5-64		65+	
	n	Rate (per 10,000)	n	Rate (per 10,000)	n	Rate (per 10,000)
1995	9,694	34.5	26,717	10.6	5,922	18.4
1996	8,586	31.4	23,842	9.4	5,424	16.7
1997	9,371	35.1	24,717	9.5	5,620	17.0
1998	7,753	29.8	24,411	9.2	5,789	17.4
1999	8,210	32.3	25,453	9.4	6,274	18.2
2000	8,830	35.6	22,861	8.3	5,405	14.9
2001	8,367	33.8	21,503	7.6	6,231	16.6
2002	8,710	34.9	21,710	7.6	6,407	16.6
2003	8,363	32.9	23,184	7.9	8,187	20.6
2004	7,973	30.8	19,148	6.5	7,838	19.5
2005	6,522	24.8	20,473	6.8	9,065	22.3

² Decrease of 0.4 per year, $p < 0.001$ (simple linear regression)

Age-Adjusted Asthma Hospitalizations per 10,000 California Residents by Race/Ethnicity, 2000–2005

Asthma hospitalization rates among Blacks have been consistently higher than other race/ethnicity groups — about three times higher than Whites. However, rates among Blacks have decreased in the past five years,³ while rates in other groups have remained relatively constant.

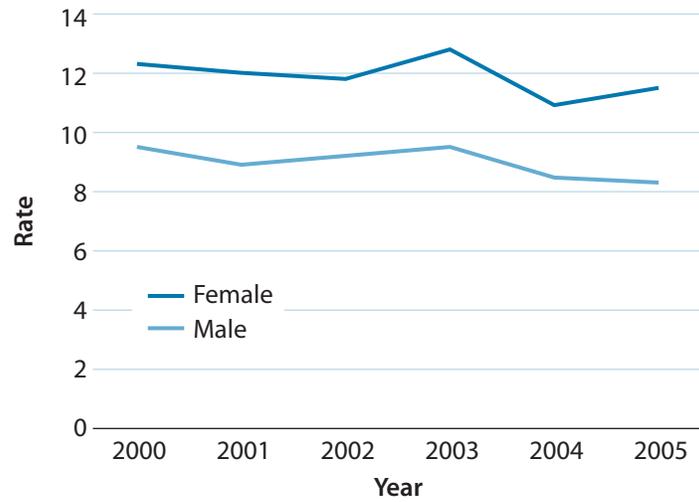


Year	Black		Hispanic		White		A/PI		AI/AN	
	n	Age-adjusted Rate (per 10,000)	n	Age-adjusted Rate (per 10,000)	n	Age-adjusted Rate (per 10,000)	n	Age-adjusted Rate (per 10,000)	n	Age-adjusted Rate (per 10,000)
2000	7,522	33.3	10,295	10.2	15,440	10.0	2,572	7.8	85	4.5
2001	7,146	31.7	10,275	10.3	14,827	9.4	2,630	7.7	126	6.7
2002	7,273	31.7	10,626	10.0	14,981	9.5	2,659	7.5	90	4.8
2003	7,325	31.4	11,472	11.0	16,672	10.3	2,968	8.2	87	4.0
2004	6,357	27.3	10,141	9.3	14,606	8.9	2,605	6.9	74	3.1
2005	6,770	28.7	10,213	9.7	14,923	8.9	2,805	7.2	99	3.9

³ Decrease of 1 per year, p=0.02 (simple linear regression)

Age-Adjusted Asthma Hospitalizations per 10,000 California Residents by Gender, 2000–2005

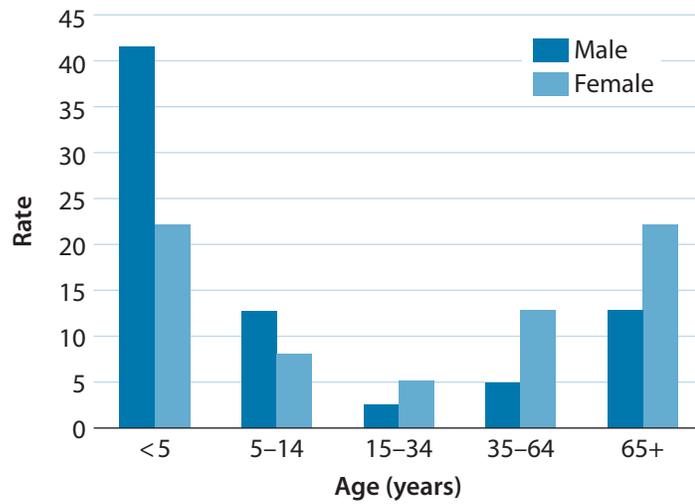
For all ages combined, asthma hospitalization rates for females are consistently about 1.3 times higher than males.



Year	Males		Females	
	n	Age-adjusted Rate (per 10,000)	n	Age-adjusted Rate (per 10,000)
2000	16,297	9.5	20,739	12.3
2001	15,350	8.9	20,750	12.0
2002	15,987	9.2	20,840	11.8
2003	16,732	9.5	23,000	12.8
2004	14,979	8.5	19,980	10.9
2005	14,671	8.3	21,389	11.5

Asthma Hospitalizations per 10,000 California Residents by Age and Gender, 2000–2005 Aggregated

The gender disparity in asthma hospitalizations varies by age. Among children less than 15 years of age, males have higher rates than females, while among those 15 and over, females have higher rates.

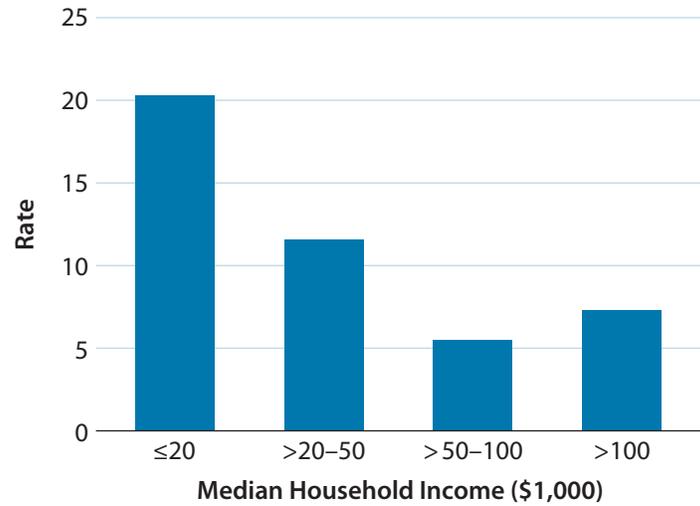


Year	Males		Females	
	n	Rate (per 10,000)	n	Rate (per 10,000)
< 5	32,228	41.5	16,534	22.2
5 – 14	20,881	12.7	12,571	8.0
15 – 34	8,183	2.5	15,235	5.1
35 – 64	20,024	5.0	51,984	12.9
65+	12,700	12.8	30,433	22.9

The next two charts show asthma hospitalization rates by household income. Information on each person's income is not available in hospitalization data, so the median income in each person's zip code is used as a proxy.

Age-Adjusted Asthma Hospitalizations per 10,000 California Residents by Median Household Income, 2005

Asthma hospitalizations are associated with income. People who live in areas where the median household income is less than \$20,000 (20.3 per 10,000) are hospitalized for asthma at almost three times the rate as those living where the median income is \$100,000 or more (7.3 per 10,000).

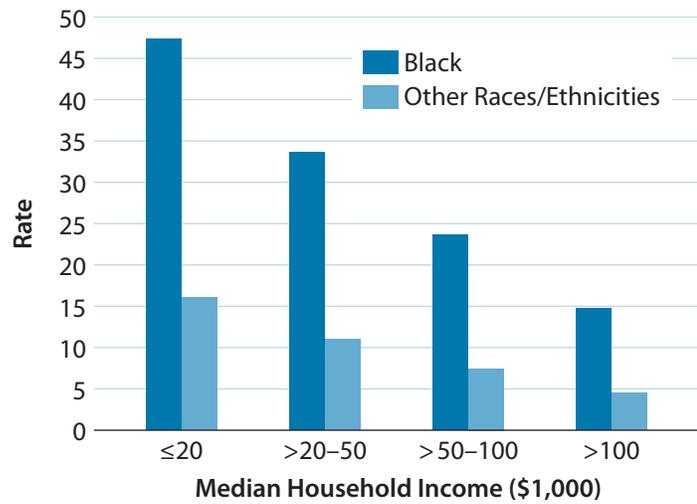


Median Household Income	n	Age-adjusted Rate (per 10,000)
≤\$20,000	309	20.3
>\$20,000-\$50,000	23,974	11.6
>\$50,000-\$100,000	10,184	5.5
>\$100,000	336	7.3

Note: Income data and population denominator are from the 2000 U.S. Census. See Technical Notes for more information.

Age-Adjusted Asthma Hospitalizations per 10,000 California Residents, by Median Household Income and Race/Ethnicity, 2005

The disparity between Blacks and other races/ethnicities in asthma hospitalizations is not explained by income levels. Rates in Blacks are about three times higher than other races/ethnicities across all income levels.

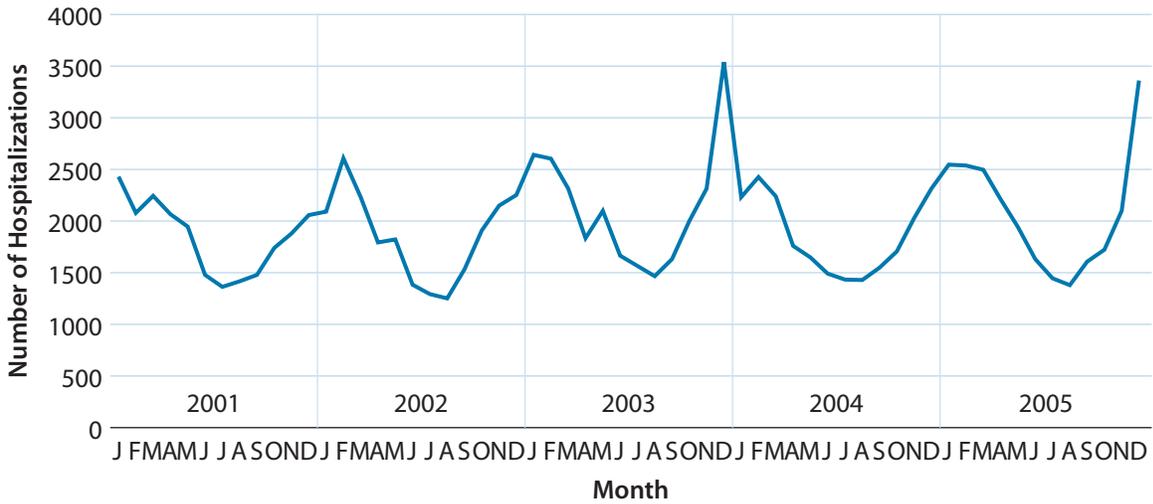


Median Household Income	n	Black	Other Races/Ethnicities
		Age-adjusted Rate (per 10,000)	Age-adjusted Rate (per 10,000)
≤\$20,000	97	47.4	16.1
>\$20,000-\$50,000	5,275	33.6	11.0
>\$50,000-\$100,000	1,189	23.7	7.5
>\$100,000	11	14.7	4.5

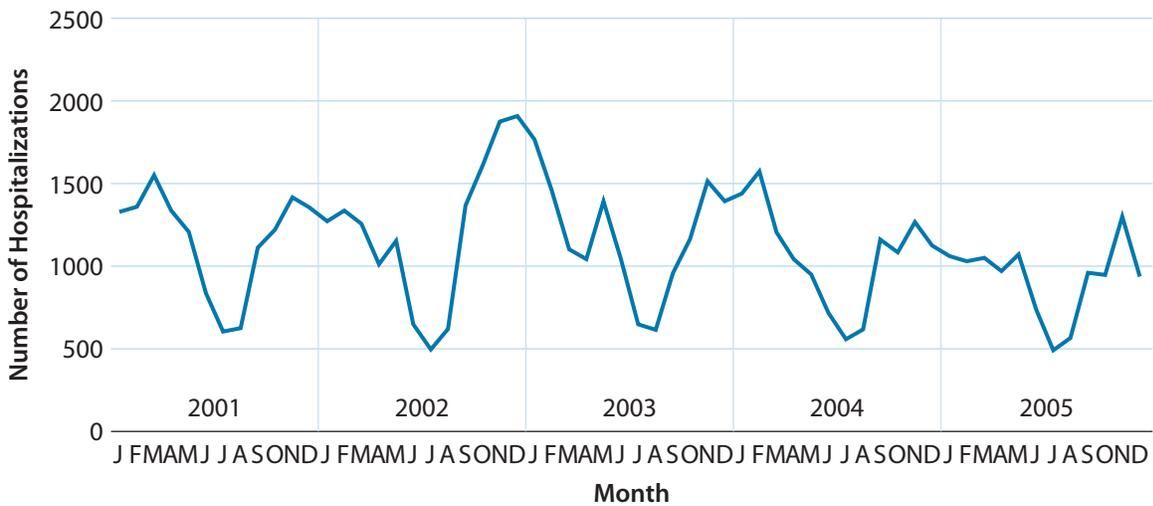
Note: Income data and population denominator are from the 2000 U.S. Census. See Technical Notes for more information.

Asthma hospitalizations change consistently by season. The number increases in the winter months, with highs in November-February for children and December-February for adolescents and adults. The number then decreases in the summer months, with lows in July and August for all age groups.

Asthma Hospitalizations by Month of Admission, California Adolescents and Adults (15+), 2001–2005

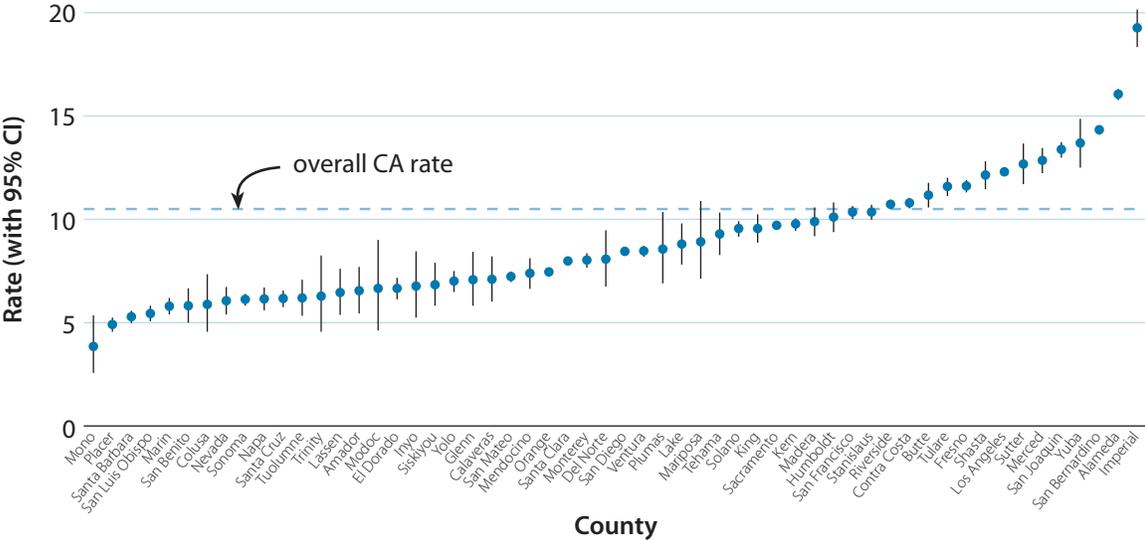


Asthma Hospitalizations by Month of Admission, California Children (0–14), 2001–2005



Age-Adjusted Asthma Hospitalizations per 10,000 Residents by Counties in California, 2000–2005 Aggregated

County rates of asthma hospitalizations vary substantially, with a high of 19.2 per 10,000 in Imperial County and a low of 3.8 per 10,000 in Mono County. Hospitalization rates are adjusted for age but not for other demographic distributions in the county that can affect asthma hospitalizations (e.g., gender, race/ethnicity).



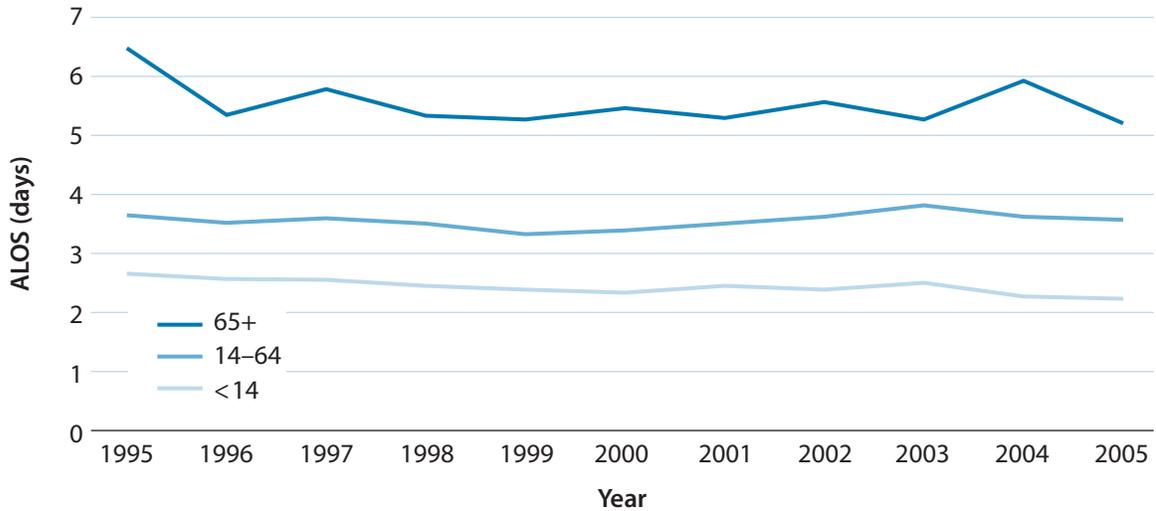
Note: Only counties with 20 or more asthma discharges are reported. Ninety-five percent confidence intervals can be used to compare county rates statistically to the overall California rate, but in most cases they cannot be used to compare county rates statistically to each other.

County	n	Age-adjusted Rate (per 10,000)
Imperial	1,809	19.2
Alameda	13,687	16.0
San Bernardino	15,442	14.3
Yuba	525	13.7
San Joaquin	4,828	13.4
Merced	1,599	12.8
Sutter	635	12.7
Los Angeles	71,313	12.3
Shasta	1,223	12.1
Tulare	2,591	11.6
Fresno	6,087	11.6
Butte	1,353	11.2
Contra Costa	6,423	10.8
Riverside	11,188	10.7
CALIFORNIA	220,777	10.5
San Francisco	4,486	10.3
Stanislaus	2,938	10.3
Humboldt	753	10.1
Madera	804	9.9
Kern	4,128	9.8
Sacramento	7,479	9.7
Solano	2,321	9.5
Kings	753	9.5
Tehama	306	9.3
Mariposa	103	8.9
Lake	305	8.8
Plumas	108	8.5
San Diego	14,266	8.4
Ventura	3,913	8.4
Santa Clara	7,910	8.0
Monterey	1,963	8.0
Del Norte	125	8.0
Mendocino	408	7.4
Orange	12,863	7.4
San Mateo	3,112	7.2
Glenn	115	7.1
Calaveras	173	7.1
Yolo	671	7.0
Inyo	67	6.8
Siskiyou	180	6.8
Modoc	35	6.6
El Dorado	655	6.6
Amador	133	6.5
Lassen	126	6.4
Trinity	52	6.3
Tuolumne	210	6.2
Sonoma	1,723	6.1
Napa	495	6.1
Santa Cruz	903	6.1
Nevada	368	6.0
Colusa	70	5.9
Marin	853	5.8
San Benito	180	5.8
San Luis Obispo	788	5.4
Santa Barbara	1,268	5.3
Placer	821	4.9
Mono	28	3.8

Average Length of Stay (ALOS) and Charges

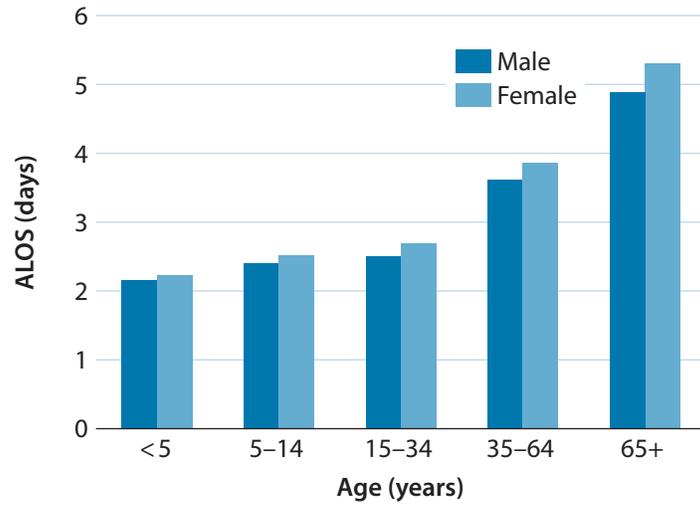
Average Length of Stay (ALOS) for Asthma Hospitalizations by Age, California 1995–2005

Average length of stay (ALOS) for asthma hospitalizations has not varied much since 1995. In 2005, the overall ALOS for asthma hospitalizations in California was 3.5 days. ALOS increases with age. It is highest for adults over age 65 (5.2 days), followed by age 14–64 (3.6 days), and age 0–13 (2.2 days).



**Average Length of Stay (ALOS)
for Asthma Hospitalizations
by Gender and Age, California
2000–2005 Aggregated**

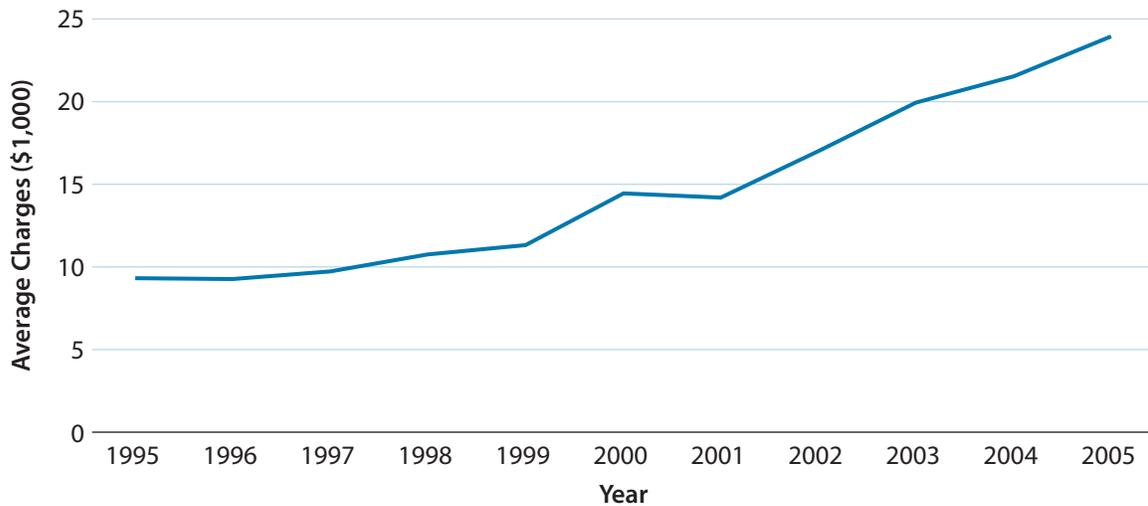
Overall, ALOS is slightly higher for females than males, and the difference is larger as age increases.



Age Group	ALOS	
	Male	Female
<5	2.2	2.2
5 – 14	2.4	2.5
15 – 34	2.5	2.7
35 – 64	3.6	3.9
65+	4.9	5.3

Average Charges per Asthma Hospitalization, California 1995–2005

Total charges for all asthma hospitalizations in 2005 were \$763 million. The average charge per asthma hospitalization increased more than twofold in the past 10 years, even after adjusting for inflation. In 1995, the average charge was \$9,277 for each asthma hospitalization, versus \$23,953 in 2005.



Year	Average charges per Asthma Hospitalization	Inflation-adjusted (2005)
1995	\$9,277	\$11,888
1996	\$9,265	\$11,533
1997	\$9,697	\$11,800
1998	\$10,716	\$12,840
1999	\$11,312	\$13,261
2000	\$14,445	\$16,383
2001	\$14,190	\$15,648
2002	\$17,024	\$18,481
2003	\$19,942	\$21,167
2004	\$21,500	\$22,228
2005	\$23,953	\$23,953

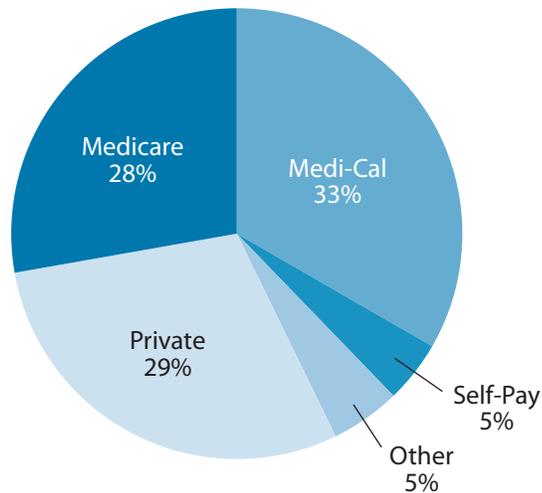
Average Charges per Asthma Hospitalization, by Age, California 2005

Charges per asthma hospitalization increase with age. The average charge for people age 65 and over was three times higher than for children under age five (\$35,724 vs. \$11,904).

Age Group	Average Charges
0 – 4	\$11,904
5 – 14	\$14,222
15 – 34	\$18,360
35 – 64	\$27,176
65+	\$35,724

Expected Source of Payment for Asthma Hospitalizations, California 2005

In 2005, 61 percent of asthma hospitalizations were covered by Medicare and Medi-Cal while 29 percent were covered by private insurance. Medicare and Medi-Cal accounted for 72 percent of the total charges for asthma hospitalizations (\$547 million), versus 20 percent for private payers (\$153 million).



Note: See Technical Notes for a detailed description of payer categories.

Repeat Asthma Hospitalizations

When someone has more than one asthma hospitalization within a certain time period, it is called a repeat hospitalization. Repeat hospitalizations for asthma were counted over one-year (2005), three-year (2003–2005), and five-year (2001–2005) time periods. Costs for these hospitalizations were also estimated. Interventions targeted at people who are hospitalized for asthma could prevent repeat hospitalizations.

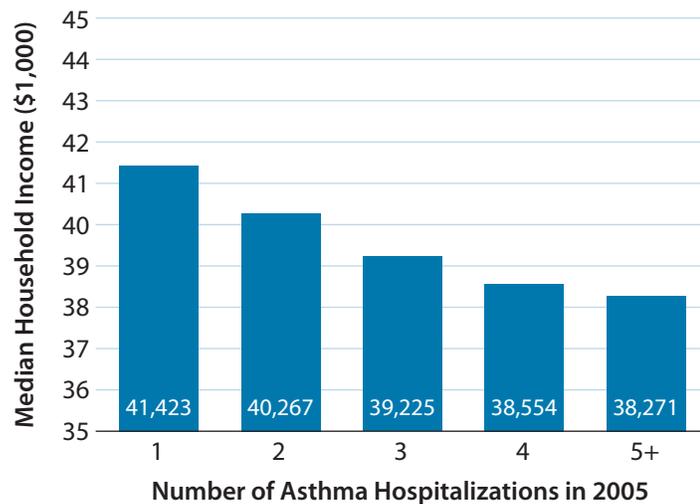
Repeat Hospitalizations for Asthma, California 2001–2005

In 2005, of all people who had an asthma hospitalization, 13 percent came back for at least one subsequent asthma hospitalization. The costs for repeat asthma hospitalizations were \$118 million, 81 percent of which was paid by public programs (Medicare and Medi-Cal). Over a three- and five-year period, a substantially higher percent of people had repeat hospitalizations.

	2005	2003 – 2005	2001 – 2005
Percent of all people hospitalized for asthma who had a repeat hospitalization	13%	19%	22%
Number of asthma hospitalizations that were repeat hospitalizations	4,774	24,257	47,712
Total charges for repeat hospitalizations	\$118 million	\$565 million	\$1 billion
Charges for repeat hospitalizations paid by Medicare or Medi-Cal	\$95 million	\$444 million	\$762 million

Median Household Income of People Hospitalized for Asthma, by Number of Asthma Hospitalizations, California 2005

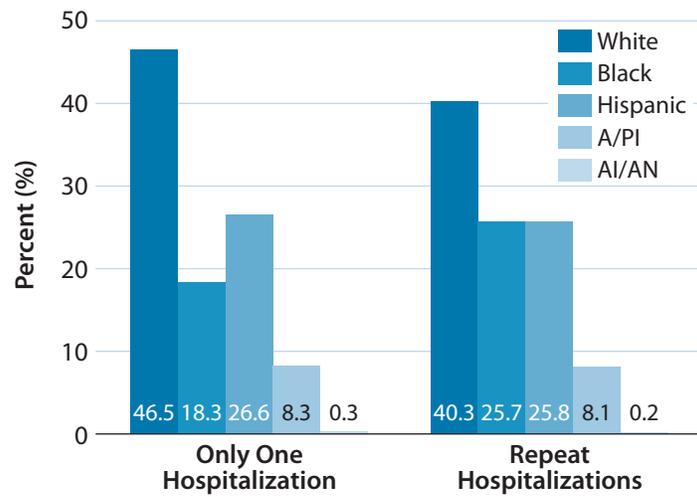
Repeat hospitalizations are associated with income. Individuals with more asthma hospitalizations in 2005 were more likely to be from areas with lower median household income.



Note: Income data are from the 2000 U.S. Census. See Technical Notes for more information.

Race/Ethnicity of People with One Asthma Hospitalization Compared to People with Repeat Asthma Hospitalizations, California 2005

In 2005, a higher percentage of people who had repeat asthma hospitalizations were Black (25.7%) and a lower percentage were White (40.3%) compared to people who only had one asthma hospitalization (18.3% Black, 46.5% White).



9. Asthma Among Medi-Cal Members

Medi-Cal is California's state Medicaid health care program, which provides medical insurance to children and adults who have limited income or are disabled. Because low income is associated with higher asthma severity and hospitalization rates, data on Medi-Cal members represent a high-risk population. However, these data do not represent the general population. Please see the Technical Notes section for more information on Medi-Cal asthma data.

How many Medi-Cal members with asthma receive appropriate medications?

About 62 percent of Medi-Cal Managed Care members with persistent asthma received appropriate medications in 2005. This is slightly lower than the national Medicaid average of 64.2 percent in 2004.

Appropriate medication use is determined using a measure from the Health Employer Data and Information Set (HEDIS®). Developed by the National Committee for Quality Assurance (NCQA), HEDIS® is a nationally recognized, standardized set of performance indicators that measure access, utilization, and quality of health care. To assess the quality of care provided by contracted Medi-Cal Managed Care health plans, the California Department of Health Services (CDHS) requires each plan to report rates for a series of performance measures from HEDIS®. One of these measures is "Use of Appropriate Medications for People with Asthma," which is the proportion of members with persistent asthma who are being prescribed medications acceptable as primary therapy for long-term control of asthma. This measure is applied to people over age five, as asthma control medications are not routinely prescribed for children under this age.

What are the measures for asthma health care utilization in Medi-Cal?

The rates of emergency department (ED) visits and hospitalizations for asthma among Medi-Cal members with asthma are reported. These rates are given as visits per 1,000 member-months, which means the number of visits for every 1,000 members with asthma in one month. For example, a rate of five asthma hospitalizations per 1,000 member-months means that in one month, there were five asthma hospitalizations for every 1,000 Medi-Cal members with asthma. The denominator for these rates is people with asthma, while the denominator for the overall ED visit and hospitalization rates in California (shown in earlier sections of this report) is all residents, regardless of asthma status. So, the rates in those sections cannot be compared to these Medi-Cal rates.

62 percent of Medi-Cal Managed Care members with persistent asthma receive appropriate medications.

Among Medi-Cal members, Blacks have the highest rates of asthma ED visits and hospitalizations.

The accuracy of these rates is subject to the accuracy and completeness of the data used to produce them. Variation in rates may be due either to a true difference in utilization, variations in the completeness of Medi-Cal data, or data processing irregularities.

Which Medi-Cal members are using the hospital and ED the most for their asthma?

The most notable disparity in asthma hospitalizations and ED visits among Medi-Cal members is by race/ethnicity. The asthma hospitalization rate among Blacks is 6.5 per 1,000 member months, and this is 1.3 times higher than the rate among Whites (5.0 per 1,000 member months), which is the next highest rate. Blacks also have the highest rate of asthma ED visits (13.3 per 1,000 member months), followed by American Indians/Alaska Natives (AI/AN, 10.8 per 1,000 member months). These rates are 1.5 and 1.2 times higher than Whites, respectively.

Summary:

- Among Medi-Cal members with persistent asthma, 62.1 percent got appropriate long-term control asthma medications in 2005. The national Medicaid average was 64.2 percent in 2004.
- Per month in 2004, there were 9.3 asthma ED visits for every 1,000 Medi-Cal members with asthma.
- Blacks had the highest rate of asthma ED visits (13.3 per 1,000 Medi-Cal members with asthma per month) and Asians/Pacific Islanders (A/PI) had the lowest rate (4.5 per 1,000 Medi-Cal members with asthma per month).
- Per month in 2004, there were 4.8 asthma hospitalizations for every 1,000 Medi-Cal members with asthma.
- Blacks had the highest rate of asthma hospitalizations (6.5 per 1,000 Medi-Cal members with asthma per month) and Hispanics had the lowest rate (3.5 per 1,000 Medi-Cal members with asthma per month).

HEDIS – Use of Appropriate Medications for People with Asthma

To assess the quality of care provided by contracted Medi-Cal Managed Care health plans, CDHS requires each plan to report rates for a series of performance measures from HEDIS®. “Use of Appropriate Medications for People with Asthma” is a HEDIS® measure of the proportion of members with persistent asthma who are prescribed acceptable long-term asthma control medications.

HEDIS Use of Appropriate Medications for People with Asthma

In 2005, 62.1 percent of Medi-Cal Managed Care members with persistent asthma received appropriate medications. This percentage has increased since 2001. Averages in California have been slightly lower than national averages.

Year	Medi-Cal Managed Care Average %	National Medicaid Average %
2001	54.5	57.1
2002	54.6	—
2003	—	62.5
2004	61.0	64.2
2005	62.1	—

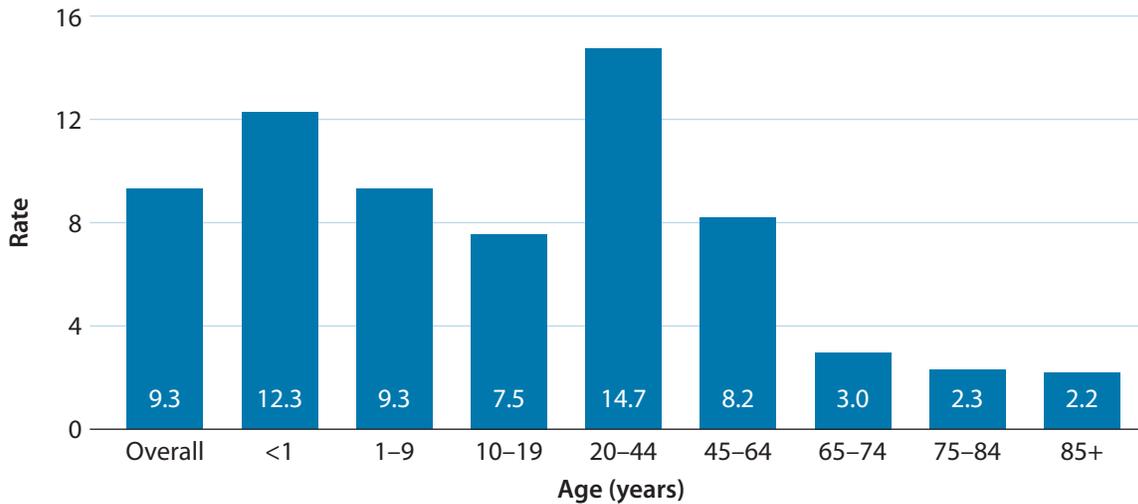
Note: Dashes indicate years when data are not available.

Medi-Cal Emergency Department Visits for Asthma

The two figures below show the number of asthma-related emergency department (ED) visits that occurred per month for every 1,000 Medi-Cal members with asthma. This is also referred to as the rate per 1,000 member-months.

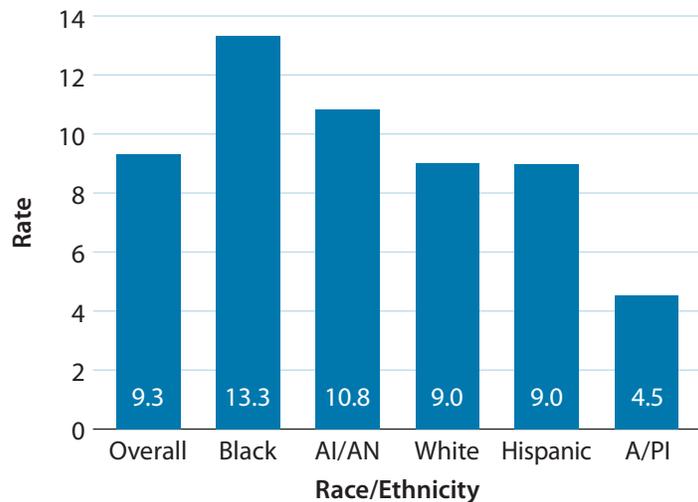
Medi-Cal ED Visits for Asthma per 1,000 Member Months of Asthma Population by Age, 2004

In 2004, there were 9.3 asthma ED visits per 1,000 Medi-Cal members with asthma per month. The rate was highest among adults age 20–44 (14.7 per 1,000 member-months) and lowest among adults over age 85 (2.2 per 1,000 member-months).



Medi-Cal ED Visits for Asthma per 1,000 Member Months of Asthma Population by Race/Ethnicity, 2004

Asthma ED visit rates in Medi-Cal are highest among Blacks (13.3 per 1,000 member-months) and lowest among Asians/Pacific Islanders (A/PI), at 4.5 per 1,000 member-months.

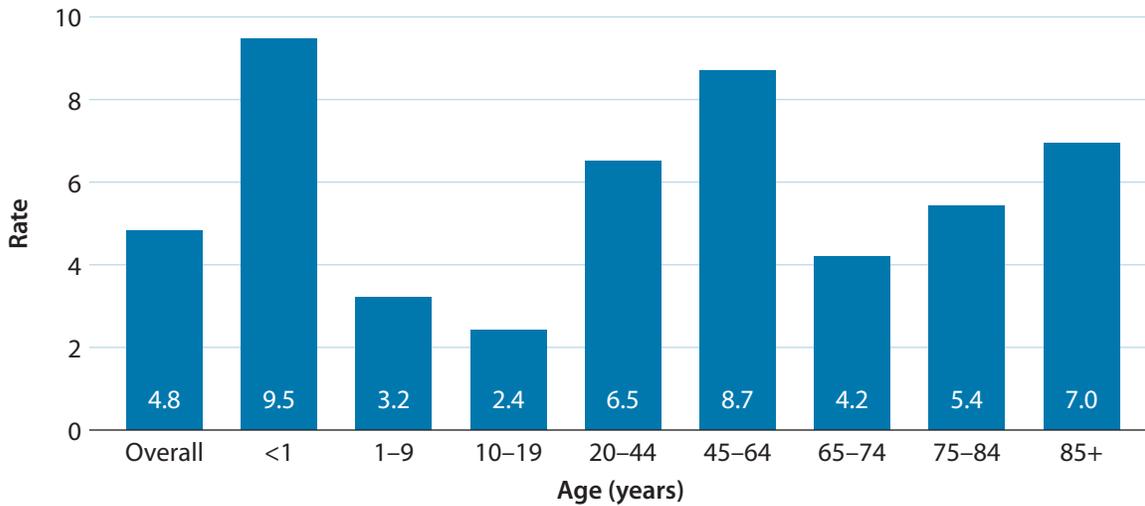


Medi-Cal Hospitalizations for Asthma

The two figures below show the number of asthma hospitalizations that occurred per month for every 1,000 Medi-Cal members with asthma — i.e., the rate per 1,000 member months.

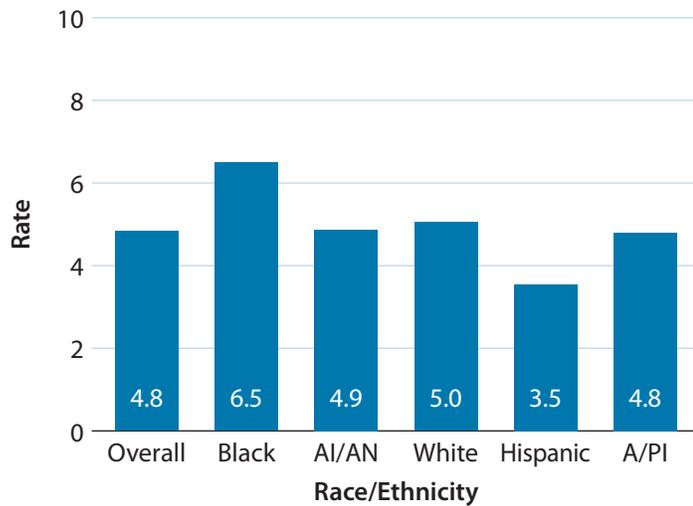
Medi-Cal Hospitalizations for Asthma per 1,000 Member Months of Asthma Population by Age, 2004

In 2004, there were 4.8 asthma hospitalizations per 1,000 Medi-Cal members with asthma per month. The rate was highest among infants under one year of age (9.5 per 1,000 member-months) followed by adults age 45–64 (8.7 per 1,000 member-months).



Medi-Cal Hospitalizations for Asthma per 1,000 Member Months of Asthma Population by Race/Ethnicity, 2004

Asthma hospitalization rates in Medi-Cal also vary by race/ethnicity. Blacks (6.5 per 1,000 member months) had the highest rate, followed by Whites (5.0 per 1,000 member-months). The rate was lowest among Hispanics at 3.5 per 1,000 member-months.



10. Asthma Mortality

Although it is rare, death due to asthma does occur. Like asthma hospitalizations and emergency department (ED) visits, most asthma deaths can be prevented by proper management and quality health care.

How many people in California die from asthma?

In 2004, there were 450 deaths due to asthma in California, or a rate of 13.0 deaths per million residents (this is also called the mortality rate). From 1999–2004, the average annual number of asthma deaths was 508, and the average rate was 15.5 per million residents. On average, a person dies from asthma 16 years prematurely (this is also called years of potential life lost).

Has the rate of asthma deaths been changing?

The asthma death rate in California has been going down — it decreased by one per year (or about six percent per year) from 1999–2004. In the past, death rates from asthma in California have been higher than rates in the U.S. overall, but in 2002 and 2003 the rate in California was about equal to the overall U.S. rate.

Who is dying from asthma in California?

Asthma death rates vary by race/ethnicity, age, and gender. Similar to rates for hospitalizations and ED visits, Blacks have the highest asthma death rate — 34.1 per million residents. This is almost three times higher than the rate among Whites, which is 11.8 per million residents. The rate of asthma deaths increases with age and is highest among people over age 65 (56.9 per million). Asthma deaths are very rare among children, at rates of two to three per million. Among children and young adults (age 0–34), males have higher asthma death rates than females; in adults age 35 and older this trend is reversed, with females having higher rates.

How are asthma deaths measured?

Data on asthma deaths come from the Center for Health Statistics of the California Department of Health Services (CDHS). These data sets have a record for each death in California and include information such as age, gender, race/ethnicity, and cause of death. Deaths are presented as a rate — the number of asthma deaths per million California residents. When rates are compared across groups, they are adjusted for age to account for different age distributions. Please see the Technical Notes section at the end of this report for more information about mortality data.

In 2004, there were 450 deaths due to asthma in California. The rate of asthma deaths in California is declining. Asthma mortality is three times higher in Blacks than Whites.

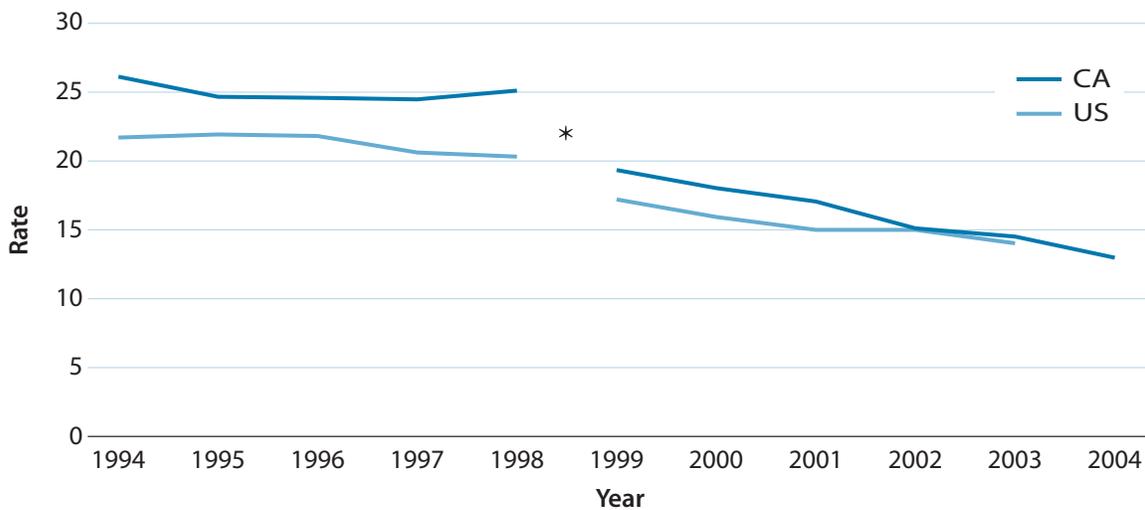
Summary

- From 1999–2004, there was an average of 508 asthma deaths per year, or a rate of 15.5 per million California residents.
- These deaths corresponded to an average of 8,400 years of potential life lost each year or 16 years lost per person.
- The rate of asthma deaths in California has been decreasing from 1999 to 2004.
- Blacks consistently have the highest asthma death rate across all race/ethnicity groups — more than two times higher than Whites.
- Asthma death rates are highest among adults over age 65 (56.9 per million).
- Among children under age 15, asthma deaths are very rare (2.1 per million), but have not met the HP2010 target of one per million.
- Overall, females have higher asthma death rates than males, but this trend exists only in older age groups (age 35 and above).

Age-Adjusted Asthma Deaths per 1,000,000 Residents, California and U.S., 1994-2004

Asthma death rates decreased by about one per year from 1999–2004¹. The rate in 2004 was 13.0 deaths per million California residents. California’s asthma death rate has been consistently higher than the U.S. rate in the past, but in 2002 and 2003 both rates were comparable.

* In 1999, the way that deaths were classified was changed (see note under graph), and it is estimated that only 89 percent of deaths classified as asthma in the older coding system (ICD-9) are still classified as asthma in the new system (ICD-10). Therefore, it is difficult to compare rates before 1999 to rates after 1999; the change in coding alone causes some decrease in rates.



Note: Cause of death is classified using the International Classification of Diseases, versions 9 and 10 (ICD-9, ICD-10). Break in lines signifies change in coding from ICD-9 to ICD-10. U.S. data not available for 2004. U.S. data are from the Mortality Component of the National Vital Statistics System, 1994-2003.

Year	n	Age-adjusted Rate (per 1,000,000)
1994	684	26.1
1995	651	24.6
1996	657	24.6
1997	667	24.5
1998	697	25.1
1999	561	19.3
2000	555	18.1
2001	543	17.0
2002	496	15.1
2003	497	14.5
2004	450	13.0

¹ Decrease of 0.9 per year, p<0.001 (simple linear regression)

Average Age of Death and Years of Potential Life Lost (YPLL) for Asthma Deaths, 1994–2004

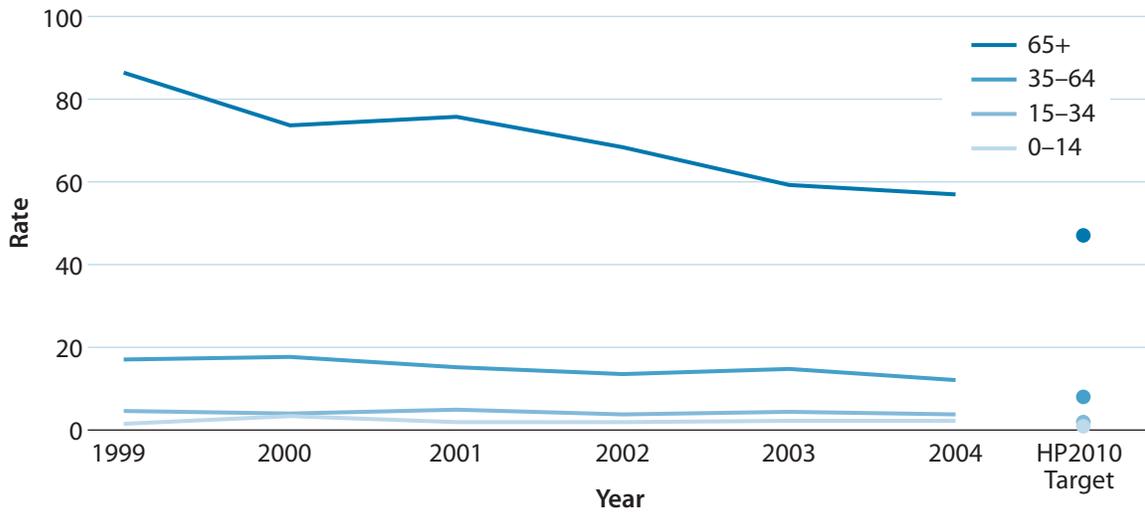
One way to measure the impact of asthma deaths is to count the number of years lost prematurely due to each death from asthma. This is also called years of potential life lost (YPLL). Using a life expectancy of 75 years, there was an average of 16 years of potential life lost per person and 8,400 per year from 1999–2004.

Year	Number of Deaths	YPLL Total	Average YPLL Per Person	Average Age at Death
1994	684	10,409	15.2	62.3
1995	651	9,912	15.2	62.5
1996	657	9,557	14.5	63.3
1997	667	9,596	14.4	63.6
1998	697	10,241	14.7	63.6
Total 1994 – 1998	3,356	49,715	14.8	63.1
1999	561	8,543	15.2	62.9
2000	555	9,470	17.1	61.3
2001	543	8,737	16.1	62.6
2002	496	7,742	15.6	62.9
2003	497	8,485	17.1	61.6
2004	450	7,351	16.3	62.6
Total 1999 – 2004	3,102	50,328	16.2	62.3

Note: The Years of Potential Life Lost (YPLL) measure was calculated using a life expectancy of 75 years. Please see the Technical Notes section for more information.

Asthma Deaths per 1,000,000 California Residents by Age, Compared to HP2010 Targets, 1999–2004

Asthma death rates increase with age and are highest among adults 65 and over. Death rates have not achieved HP2010 targets in any age group. Among adults, asthma death rates decreased from 1999–2004² — about one per year among age 35–64 and six per year among age 65+. Among other age groups, asthma death rates did not change significantly.



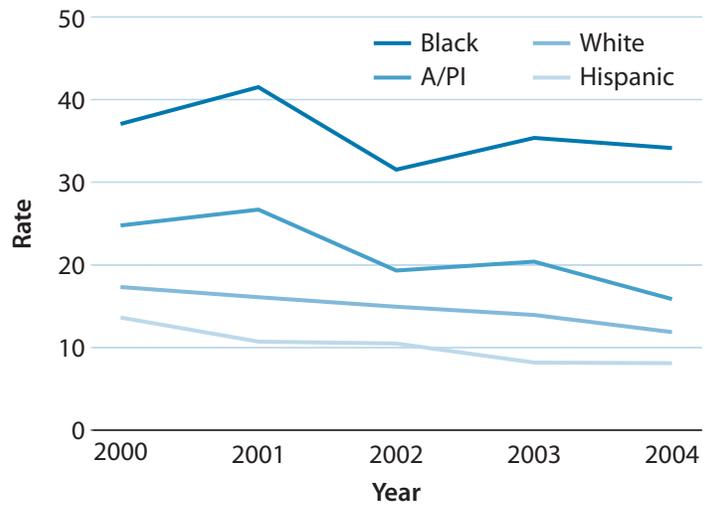
Note: See Healthy People 2010 section for an explanation of HP2010 objectives.

Year	0 – 14		15 – 34		35 – 64		65+	
	n	Rate (per 1,000,000)	n	Rate (per 1,000,000)	n	Rate (per 1,000,000)	n	Rate (per 1,000,000)
1999	9	1.4	46	4.6	205	17.0	299	86.3
2000	26	3.3	40	4.0	221	17.7	267	73.6
2001	15	1.9	50	4.9	195	15.1	283	75.7
2002	15	1.9	39	3.8	179	13.5	263	68.3
2003	17	2.1	45	4.3	201	14.8	234	59.2
2004	17	2.1	39	3.7	167	12.0	227	56.9

² Age 35–64: decrease of 1 per year, p=0.02; Age 65+: decrease of 6 per year, p<0.001 (simple linear regression).

Age-adjusted Asthma Deaths per 1,000,000 California Residents by Race/Ethnicity, 2000–2004

Blacks have the highest asthma mortality rates. From 2000–2004, rates among Blacks were 2.4 times higher than Whites. Whites and Hispanics had significant decreases of over one per year from 2000–2004.³ Asians/Pacific Islanders (A/PI) and Blacks did not decrease consistently.

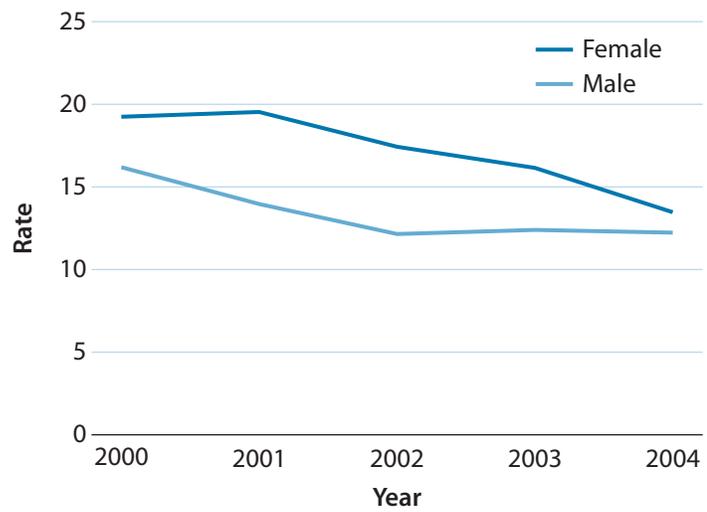


Year	Hispanic		White		A/PI		Black	
	n	Age-adjusted Rate (per 1,000,000)	n	Age-adjusted Rate (per 1,000,000)	n	Age-adjusted Rate (per 1,000,000)	n	Age-adjusted Rate (per 1,000,000)
2000	69	13.6	331	17.3	74	24.8	76	37.1
2001	62	10.7	312	16.0	83	26.6	80	41.5
2002	61	10.4	299	14.9	64	19.3	68	31.5
2003	58	8.1	285	13.9	74	20.4	77	35.4
2004	61	8.1	247	11.8	59	15.8	76	34.1

³ Whites: decrease of 1.3 per year, p<0.001; Hispanics: decrease of 1.4 per year, p=0.02 (simple linear regression)

Age-adjusted Asthma Deaths per 1,000,000 California Residents by Gender, 2000–2004

Asthma mortality is consistently higher among females than males. Overall from 2000–2004, the rate for females was 1.3 times higher than for males. This disparity was substantially diminished in 2004, but future data are needed to establish a trend. On average for women, the asthma mortality rate decreased by 1.5 deaths per 1,000,000 California residents per year.⁴

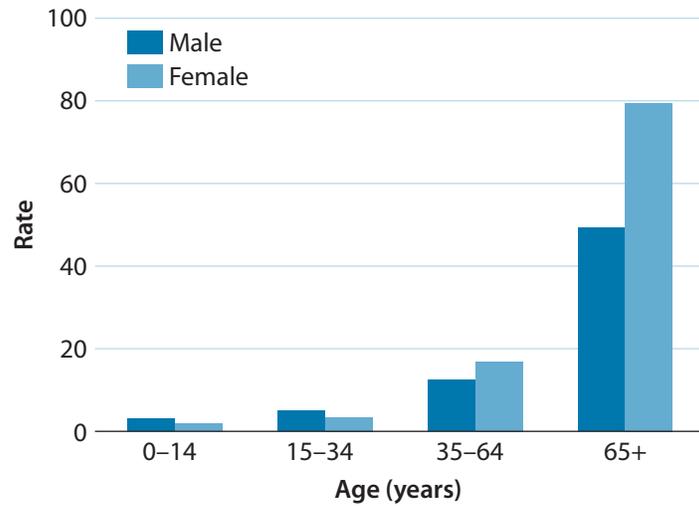


Year	n	Male Age-adjusted Rate (per 1,000,000)	n	Female Age-adjusted Rate (per 1,000,000)
2000	227	16.2	327	19.2
2001	199	13.9	344	19.5
2002	181	12.1	315	17.4
2003	195	12.4	302	16.1
2004	193	12.2	257	13.5

⁴ Decrease of 1.5 per year, p=0.01 (simple linear regression)

Asthma Deaths per 1,000,000 California Residents by Age and Gender, 2000–2004 Aggregated

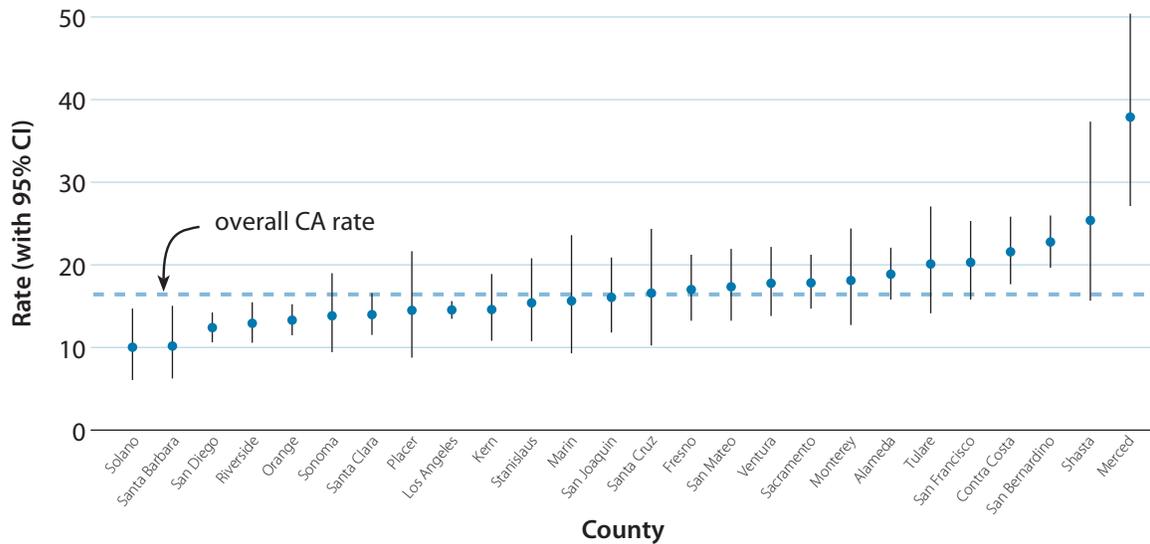
The gender disparity in asthma mortality varies by age. Females have higher rates than males among people over age 35, however they have lower rates than males among people under age 35.



Age	Male		Female	
	n	Rate (per 1,000,000)	n	Rate (per 1,000,000)
0 – 14	58	2.9	32	1.7
15 – 34	132	4.9	81	3.3
35 – 64	404	12.3	559	16.8
65+	401	49.1	873	79.4

Age-Adjusted Asthma Deaths per 1,000,000 Residents by Counties in California, 2000-2004 Aggregated

There are large differences in asthma mortality rates by county. The highest rate is in Merced County (37.8 per million) and the lowest is in Solano County (9.9 per million). These rates are adjusted for age, but not for other demographic distributions in the county that can affect asthma mortality (e.g., gender, race/ethnicity).



Note: Only counties with 20 or greater asthma deaths are reported. Ninety-five percent confidence intervals can be used to compare county rates statistically to the overall California rate, however in most cases they cannot be used to compare county rates statistically to each other.

County	n	Age-adjusted Rate (per 1,000,000)
Merced	31	37.8
Shasta	25	25.3
San Bernardino	167	22.7
Contra Costa	105	21.5
San Francisco	86	20.2
Tulare	30	20.1
Alameda	125	18.8
Monterey	31	18.1
Sacramento	108	17.8
Ventura	63	17.7
San Mateo	65	17.3
Fresno	61	17.0
Santa Cruz	20	16.5
San Joaquin	42	16.0
Marin	23	15.6
CALIFORNIA	2,540	15.5
Stanislaus	32	15.3
Placer	21	14.5
Los Angeles	663	14.5
Kern	45	14.5
Santa Clara	102	13.9
Sonoma	36	13.8
Orange	173	13.3
Riverside	105	12.9
San Diego	167	12.4
Santa Barbara	21	10.1
Solano	20	9.9

Healthy People 2010

How does California compare to the Healthy People 2010 targets?

The United States Department of Health and Human Services developed Healthy People 2010 (HP2010) as a set of disease prevention and health promotion objectives to be achieved by the year 2010. These objectives are national benchmarks that can be used to direct public health efforts and measure progress over time. HP2010 covers a wide range of health topics, including asthma. For more information on HP2010, visit www.healthypeople.gov.

There are several HP2010 objectives that relate to asthma, covering the following topics: mortality, hospitalizations, emergency department (ED) visits, activity limitations, school/work missed, asthma education, and proper asthma care. However, only three of these objectives can be accurately measured in California using currently available surveillance data. These are: reduce asthma deaths, reduce hospitalizations for asthma, and reduce hospital ED visits for asthma. The tables below present information on the most current U.S. and California measurements of the HP2010 objectives as well as the national year 2010 targets. These data represent rates for the population overall; rates may differ for specific race/ethnic groups, genders, age groups, or geographic regions.

Reduce Asthma Deaths (HP2010 Objective 24-1)

Age group	U.S. 2003 (per million)	California 2004 (per million)	Healthy People 2010 Target (per million)
0-4	2.2	2.3	0.9
5-14	2.7	2.0	0.9
15-34	4.7	3.7	1.9
35-64	14.2	12.0	8.0
65+	54.4	56.9	47.0

Reduce Hospitalizations for Asthma (HP2010 Objective 24-2)

Age group	U.S. 2002 (per 10,000)	California 2005 (per 10,000)	Healthy People 2010 Target (per 10,000)
0-4	59.0	24.8	25.0
5-64	12.4	6.8	7.7
65+	22.4	22.3	11.0

**Reduce Hospital Emergency
Department Visits for Asthma
(HP2010 Objective 24–3)**

Age group	U.S. 1998-2000 (per 10,000)	California 2005 (per 10,000)	Healthy People 2010 Target (per 10,000)
0–4	159.6	92.6	80.0
5–64	69.9	37.2	50.0
65+	31.5	20.8	15.0

Age 5–64

California has been most successful in reaching the HP2010 targets for people age 5–64. The rate of asthma ED visits in this age group has already met the target in 2005, five years before the target date. Similarly, the asthma hospitalization rate has been declining and has met the HP2010 target for five years. The asthma mortality rate is still slightly higher than the target rate, however it has been decreasing. If the mortality rate in this age group continues to decrease by the same magnitude as it has been decreasing over the past five years, then the rate should meet the HP2010 target by the year 2008.

Age 0–4

The comparison to HP2010 is more complicated for young children. The asthma ED visit rate in 2005 was above the HP2010 target and we do not know whether the rate is changing over time. The asthma hospitalization rate met the target for the first time in 2005, however this was a large dip in one year of data that may not continue in subsequent years. Lastly, for children age 0–4, the asthma mortality rate has not shown any significant decline and remains consistently just above the target rate.

Age 65+

For adults over age 65, California has a mixed picture when compared to HP2010 targets. The rate of asthma ED visits did not meet the HP2010 target in 2005 and we do not know whether the rate is changing over time. The rate of asthma hospitalizations has not met the HP2010 target and has increased in recent years. In this age group, the asthma mortality rate also has not met the HP2010 target, however it has been declining. The mortality rate could reach the HP2010 target by 2006 if the current magnitude of decline continues.

Asthma Disparities

What groups in California are most affected by asthma?

Race/Ethnicity (see Figure A)

When compared to other races/ethnicities, Blacks have the most striking disparities in asthma morbidity and mortality. Asthma prevalence among Blacks is 30 percent higher than the next highest group (Whites). The disparity is even larger when measuring health care utilization and mortality. Rates of emergency department (ED) visits and hospitalizations for asthma among Blacks are three times higher than the next highest group (Whites and Hispanics, respectively). Mortality rates are also more than two times higher for Blacks compared to the next highest group, (Asians/Pacific Islanders, A/PI). These disparities in health care utilization and mortality can not be explained solely by the difference in prevalence.

Notably, American Indians/Alaska Natives (AI/AN) have the highest lifetime asthma prevalence of any race/ethnicity — 30 percent higher than Blacks. However, this group does not have the same disparate rates of health care utilization and mortality.

Income (see Figure B)

Lower income is associated with more frequent asthma symptoms and higher asthma hospitalization rates. Prevalence of severe symptoms (see Technical Notes for definition of severe symptoms) is almost seven times higher among adults with household incomes below \$20,000 compared to adults with household incomes over \$100,000. The rate of asthma hospitalizations is three times higher among people living in areas where the median income is less than \$20,000 compared to people living in areas where the median income is greater than \$50,000. Additionally, people with more repeat asthma hospitalizations come from areas with a lower median income. These disparities by income can not be explained by higher asthma prevalence; the prevalence of lifetime asthma among people with low incomes is similar, and in fact slightly lower than, among people with higher incomes.

Age (see Figure C)

Children have a proportionally larger asthma burden than adults in California. Lifetime asthma is highest among children age 5–17 (15.8%) and even higher among adolescents in school (17.7%). Current asthma is also highest among children age 5–17 (10.4%). Children have high rates of asthma-related health care utilization compared to adults. Rates of asthma ED visits are two times higher among children under age 19 than among adults. Similarly, rates of asthma hospitalizations are 1.6 times higher among children under age 15 than among people over age 15. Rates of both asthma ED visits and asthma hospitalizations are particularly high among males under age five. Age disparities in health care utilization are not completely explained by differences in asthma prevalence. Rates of ED visits and hospitalizations are about 60 percent higher for children over age five than for

adults, while lifetime prevalence is only 20 percent higher. (When children age 0–5 are included the difference is even larger because young children have the highest ED visit and hospitalization rates and the lowest prevalence, however this may be because they are less likely to receive an asthma diagnosis.)

Gender (see Figures D and E)

The gender disparity in asthma varies by age. When looking at prevalence, ED visits, hospitalizations, and mortality, males consistently have higher rates among children (age 0–17) and females have higher rates among adults (age 18+). However, the gender differences in ED visits, hospitalizations, and mortality are equal or less than the difference in prevalence. Therefore, the differences in outcomes may be explained by the difference in prevalence.

Note: The following figures present asthma disparities by race/ethnicity, income, age, and gender. In order to summarize the various indicators of asthma burden — prevalence, ED visits, hospitalizations, and mortality — in one chart, all measures were put on a common scale. This scale is a ratio of each measure in one group compared to a reference group. The reference group in each figure is always graphed at the 1.0 line. For example, Figure A indicates that the ratio of asthma ED visits among Whites compared to Blacks is 0.5, meaning that the rate of ED visits among Blacks is twice as high as among Whites.

Figure A: Measures of Asthma on a Common Scale by Race/Ethnicity, Ratio of Measures Compared to Blacks

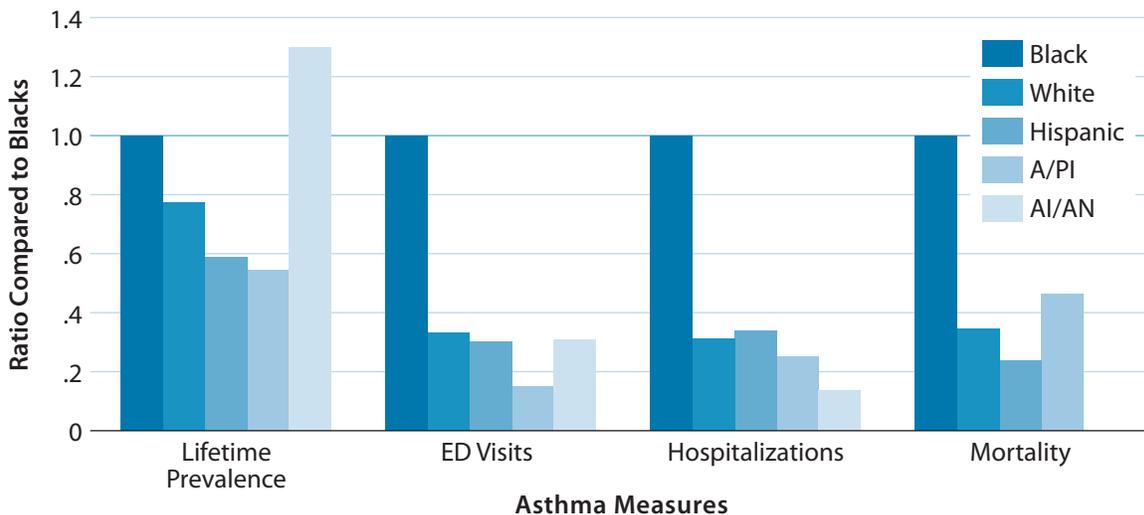


Figure B: Measures of Asthma on a Common Scale by Income (\$1,000), Ratio of Measures Compared to <\$20,000

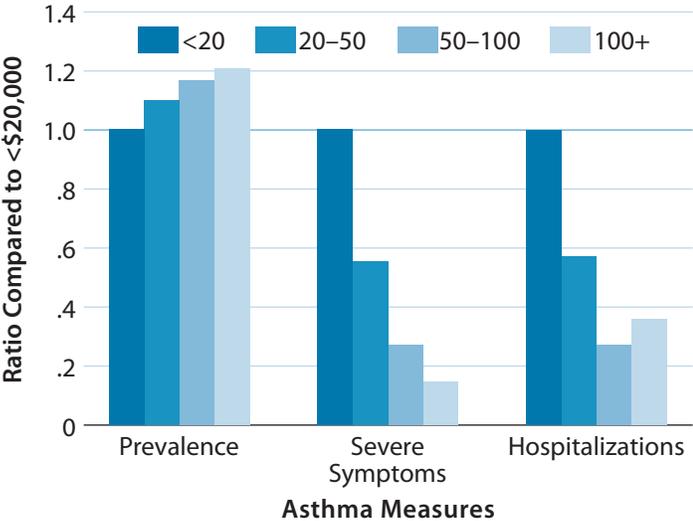


Figure C: Measures of Asthma on a Common Scale by Age, Ratio of Measures Compared to Children Age 5-17

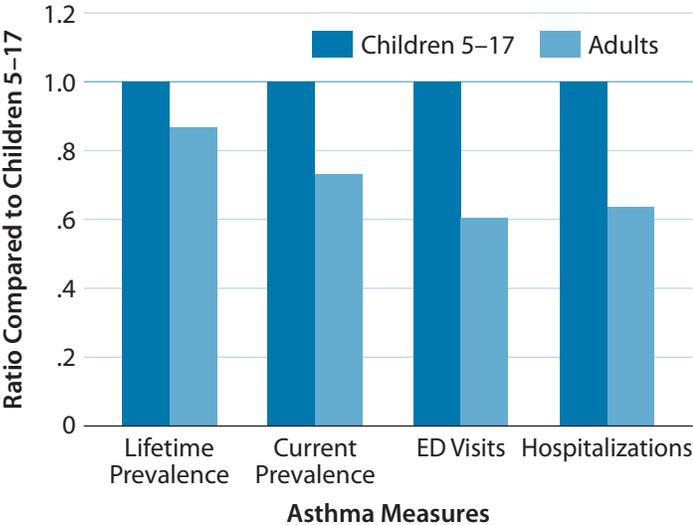


Figure D: Measures of Asthma on a Common Scale by Gender among Children Age 0–17, Ratio of Measures Compared to Males

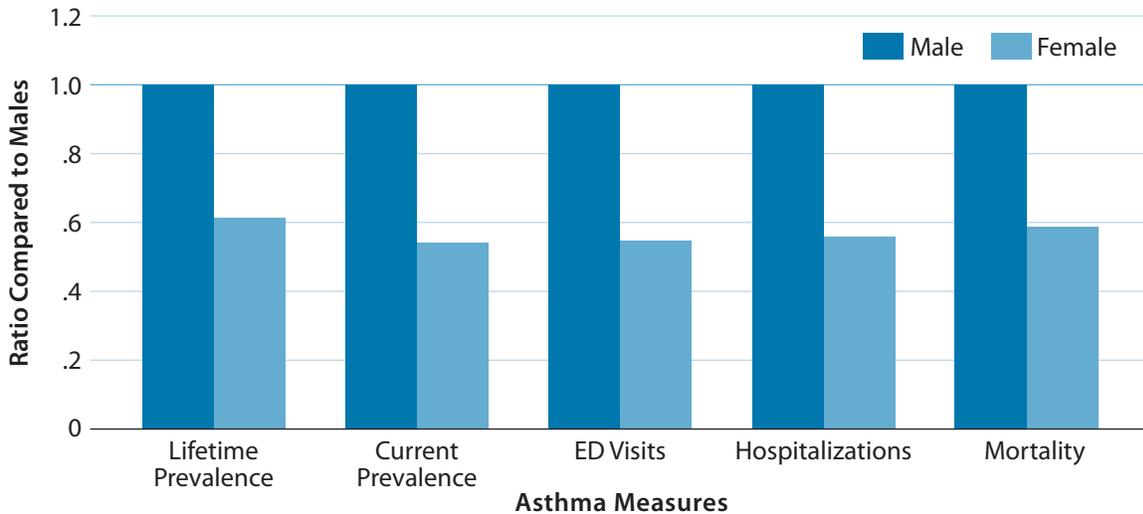
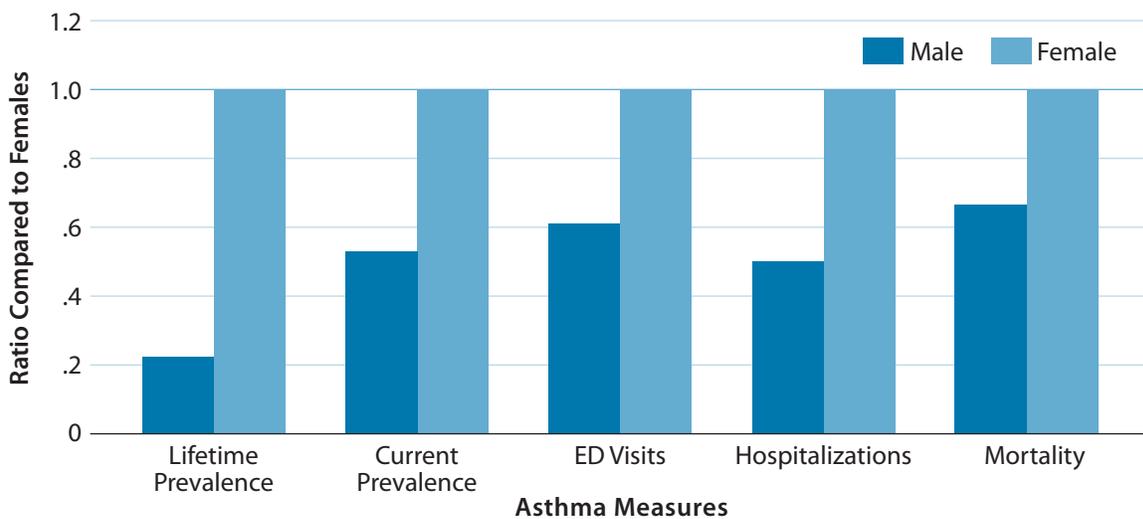


Figure E: Measures of Asthma on a Common Scale by Gender among Adults, Ratio of Measures Compared to Females



Conclusions

This report demonstrates the burden of asthma throughout various settings and communities in California. While there are some encouraging signs, in general these data show that there is a great need for improvement for people with asthma in California. Approximately five million Californians have been diagnosed with asthma. Asthma symptoms are responsible for decreased quality of life and difficulty doing day-to-day activities. The most severe consequence of asthma — death — claimed 450 lives in 2004. Asthma also has a large impact on the health care system, with millions of urgent visits to physicians,¹ approximately 145,000 emergency department (ED) visits, and 36,000 hospitalizations (including about 5,000 repeat hospitalizations) every year. The costs associated with asthma are immense, with \$763 million in charges for asthma hospitalizations alone in 2005. This does not include other direct health care costs such as asthma medications, physician visits, and ED visits. In addition, there are unmeasured indirect costs including years of life lost due to asthma mortality, lost wages and productivity from days missed at work, and lost school revenue when children miss school because of their asthma.

The burden of asthma in California is spread unevenly, as outlined in the Asthma Disparities section of this report. There are considerable racial/ethnic and income disparities in asthma. Similar racial/ethnic disparities have been shown at the national level.^{2,3} Blacks and American Indians/Alaska Natives have the highest lifetime asthma prevalence. Blacks also have much higher rates of asthma ED visits, hospitalizations, and mortality than any other group, and this disparity is not fully explained by differences in asthma prevalence. Asthma outcomes also vary by income, with low income groups having more severe symptoms and higher rates of asthma hospitalizations. Many environmental and individual factors have been suggested as potential causes for asthma disparities by race/ethnicity and income. These include: exposure to indoor and outdoor air pollutants due to deteriorated housing, location of housing near traffic and/or industrial pollutants, and exposure to tobacco smoke; genetics (for race/ethnicity differences); unequal access to care and quality of care; and psychosocial factors such as symptom perception, stress, and social support.

In California, there are also differences in asthma occurrence and outcomes by age, gender, and location. Children have higher asthma prevalence, ED visit rates, and hospitalization rates than adults. By gender, males have a higher burden of asthma in childhood, but females have a higher burden as adults. Similar findings on age and gender dispari-

¹ Estimated from the percent of adults with lifetime asthma reporting 1, 2, or 3+ urgent physician visits for asthma in the past year, BRFSS 2002/2004.

² U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute. Data Fact Sheet: Asthma Statistics. Bethesda, Maryland: U.S. Department of Health and Human Services, 1999 (retrieved from <http://www.nhlbi.nih.gov>).

³ Centers for Disease Control and Prevention. Asthma Prevalence and Control Characteristics by Race/Ethnicity—United States, 2002. *MMWR* 2004;53:145-148.

ties have been found at the national level.^{4,5} Both asthma prevalence and outcomes vary widely by geographic area; however, we do not know what factors cause these differences. Causes might include differences in population demographics (e.g., race/ethnicity), poverty level, insurance coverage, health care quality, or air pollution.

A few asthma indicators show promising trends. Similar to the U.S. overall, asthma mortality rates have been declining. In California, this decrease is greatest among adults over age 65, who also have the highest mortality rates. Decreases in asthma mortality on a national level have been attributed to improved management, including increases in the use of asthma medications.⁶ Asthma hospitalization rates in California also have shown a slight and gradual decline. Blacks have the highest asthma hospitalization rates, but their rates have decreased the most.

Despite the noted improvements in asthma outcomes, there is still a significant burden of asthma in California. There are millions of Californians with asthma, and asthma causes tens of thousands of hospitalizations and hundreds of deaths each year. A large percent of people who are hospitalized for asthma have repeat hospitalizations in the same year. Asthma hospitalizations and deaths are largely preventable consequences of asthma that could be avoided with proper prevention and management strategies. In particular, repeat hospitalizations could be prevented by interventions targeted at first-time hospitalizations. Given their high cost and preventable nature, asthma hospitalizations represent an area for substantial savings in health care expenditures.

This report also demonstrates a need to improve asthma prevention measures, such as the number of people who get routine checkups for their asthma, the number who have asthma management plans, and the number of people with severe symptoms who take asthma medications. Other needs illustrated in this report include: decreasing workplace exposures to sensitizers and triggers; decreasing exposure to triggers in the home, especially environmental tobacco smoke; increasing the number of people with asthma who get a flu vaccination each year; and targeting prevention efforts at reducing overweight and obesity among people with asthma.

To affect changes in asthma outcomes and to increase the effectiveness of prevention efforts, there is a need for systems change in a variety of settings. In a state as large as California, such changes require participation from many different stakeholders. It is important for the California Department of Health Services (CDHS) to create and implement a strategic plan that will allow for coordination and facilitation of expanded asthma activities. The Strategic Plan for Asthma in California was first developed in 2002 to address this need and is currently being revised for renewed implementation starting in 2007.

⁴ U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute. Data Fact Sheet: Asthma Statistics. Bethesda, Maryland: U.S. Department of Health and Human Services, 1999 (retrieved from <http://www.nhlbi.nih.gov>).

⁵ Akinbami L. The state of childhood asthma, United States, 1980-2005. Advance data from vital and health statistics; no 381, Hyattsville, MD: National Center for Health Statistics. 2006.

⁶ Sly, RM. Continuing decreases in asthma mortality in the United States. *Ann Allergy Asthma Immunol.* 2004 Mar;92(3):313-8.

With this in mind, the recommendations below are provided as broad goals for strategic planning for asthma-related activities in California.

- Expand the current asthma surveillance system in California to address data gaps, with a special emphasis on the most vulnerable populations and on tracking activities associated with implementing the Strategic Plan for Asthma in California. Areas with the most significant data gaps include: office visits, medications, triggers, costs, quality of life, and local sub-county data for all measures. Use surveillance data to evaluate progress state-wide in reducing the burden of asthma.
- Improve health care for asthma by increasing the quality of care, enhancing integration of care across systems, and educating health workers.
- Create environments in schools and child care centers that are supportive of people with asthma by raising awareness among school personnel and establishing policies that foster cleaner indoor and outdoor air.
- Minimize indoor environmental risk factors for asthma by promoting healthy housing policies and educating tenants, landlords, home owners, and regulators in the housing industry.
- Reduce workplace exposure to asthma sensitizers and triggers by evaluating worksite exposures, promoting prevention efforts within industries, expanding surveillance for work-related asthma, and increasing awareness of the issue among workers, health care providers, and employers.
- Create a safer outdoor environment, with particular emphasis on communities with disproportionate exposure to pollution. Reduce air pollution from sources such as: transportation, industry, agriculture, and environmental tobacco smoke.

In summary, the burden of asthma clearly affects various communities throughout California. Although some of this burden may be decreasing, there is a great need for improvement. California must continue to make the necessary changes for ensuring better health for people with asthma.

Technical Notes

How to Interpret Confidence Intervals

Percents that are estimated from survey data (also called point estimates) have a known margin of error that results from random sampling of the population — i.e., not all households in California are interviewed. For example, from survey data, we estimate that the prevalence of lifetime asthma among adults in California is 13.7 percent. This is the point estimate, it is our best approximation of the true value in the California population, however it may not be accurate because not all people were interviewed. In order to express our level of certainty about this point estimate, we calculate a confidence interval. The confidence interval is a range with lower and upper limits that are calculated based on the margin of error of the estimate. The 95 percent confidence interval (95% CI) means that we are 95 percent confident that this range contains the true population percent.

The width of the confidence interval provides useful information about the stability of the point estimate. A narrower confidence interval means that there is less variability among the sample of people surveyed and/or there is a larger sample size. A wider confidence interval indicates more variability and/or a smaller sample size. Throughout the report, we identify the values with very wide confidence intervals that may be unstable and should be interpreted with caution.

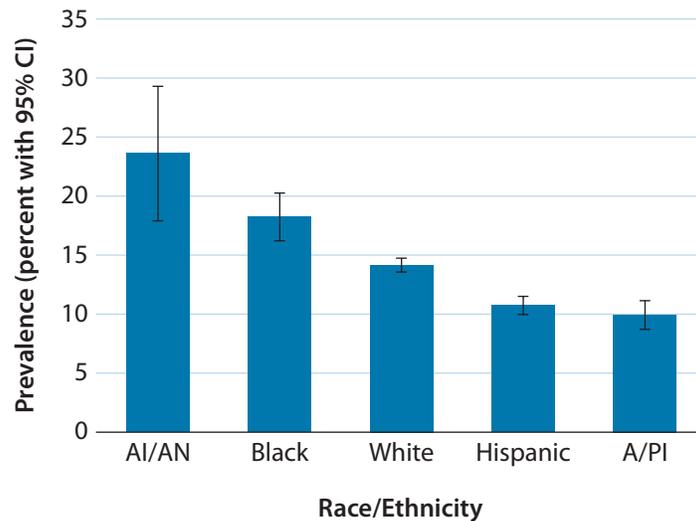
The 95% CI can also be used to determine if the difference between two groups is statistically significant. When the confidence intervals do not overlap, the difference between two groups is considered to be statistically significant and likely not due to chance. When they do overlap, we cannot conclude that they are significantly different (further statistical testing would be needed to make this determination). In the report, we say two groups are “significantly different” when the confidence intervals do not overlap.

To illustrate the concept of a 95% CI, we will use data on asthma prevalence by ethnicity (shown on the next page), which is from the Asthma Prevalence section of this report. Lifetime asthma prevalence among Blacks is 18.2 percent with a 95% CI of 16.2–20.2 percent. So, our best estimate of the prevalence of lifetime asthma among Blacks is 18.2 percent, but we are 95 percent certain that the true value is at least 16.2 percent and at most 20.2 percent. For Whites, lifetime asthma prevalence is 14.1 percent with a 95% CI of 13.5–14.6 percent. This confidence interval does not overlap with the confidence interval for Blacks — the upper limit for Whites (14.6%) is still less than the lower limit for Blacks (16.2%). Therefore, we conclude that the difference in prevalence is statistically significant, or more specifically, that Blacks have a significantly higher prevalence than Whites.

The magnitude of the difference is not necessarily associated with statistical significance. For example, the lifetime asthma prevalence for American Indians/Alaska Natives (AI/AN) (23.6%, 95% CI: 17.9–29.3) is 5.4 percentage points higher than for Blacks. Because the confidence intervals overlap, we cannot conclude that the difference is statistically sig-

nificant and not due to chance. In comparison, the difference in magnitude between the prevalence for Blacks and Whites is only 4.1 percentage points, but the difference is statistically significant. The example of asthma prevalence by ethnicity also illustrates both narrow and wide confidence intervals. The confidence interval for Whites has a very small range — 13.5 to 14.6 percent. This means that the estimated lifetime asthma prevalence is fairly precise. In contrast, the confidence interval for American Indians/Alaska Natives has a wide range — 17.9 to 29.3 percent. This means that the estimated lifetime asthma prevalence is not very precise; it could be about 18 percent or as high as about 30 percent.

Lifetime Asthma Prevalence by Race/Ethnicity, California 2003



Race/Ethnicity	Lifetime Asthma Prevalence	
	%	(95% CI)
AI/AN	23.6	(17.9 – 29.3)
Black	18.2	(16.2 – 20.2)
White	14.1	(13.5 – 14.6)
Hispanic	10.7	(9.9 – 11.4)
A/PI	9.9	(8.7 – 11.0)

Data Source: CHIS 2003

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing survey that is a collaboration between the California Department of Health Services (CDHS), the Public Health Institute, and the Centers for Disease Control and Prevention (CDC). BRFSS moni-

tors health-related factors contributing to the leading causes of morbidity and mortality in California's population. The survey is conducted by the Survey Research Group (SRG) of the CDHS Cancer Surveillance Section and has been administered in California since 1984. It is a statewide, random digit telephone survey conducted on adults age 18 and over. Data are collected monthly from a random sample of California adults living in non-institutionalized households with telephones. Participation in BRFSS is voluntary and anonymous. In 2005, the California BRFSS interviewed 6,098 adults.

BRFSS topics include seat belt use, exercise, tobacco and alcohol consumption, HIV/AIDS knowledge and prevention, and other health-related conditions, perceptions, and behaviors. BRFSS also collects demographic information such as age, sex, race/ethnicity, marital and employment status, education, and household income. BRFSS questionnaire includes "core" questions that are asked every year. There are two core questions about asthma prevalence (lifetime and current). There are also non-core questions in BRFSS that are revised each year by CDC and state survey coordinators to address issues of local concern and to meet the data needs of specific users. For example, there is an option to include additional questions about asthma in the survey.

Data on general asthma prevalence are taken from the two asthma questions on BRFSS core questionnaire. Data on asthma symptoms and management among adults are taken from a set of non-core questions that includes topics such as asthma management, symptoms and severity, activity limitations, and asthma-related health care utilization. This set of optional questions was administered to adults in California in 2002 and 2004. Results from these two years are combined for a larger sample size. Asthma prevalence among children is taken from another set of non-core questions that is specific to childhood asthma and was administered in California in 2005. To administer this set of questions, one child from each household with children is randomly selected and an adult (usually a parent) responds about the child in question.

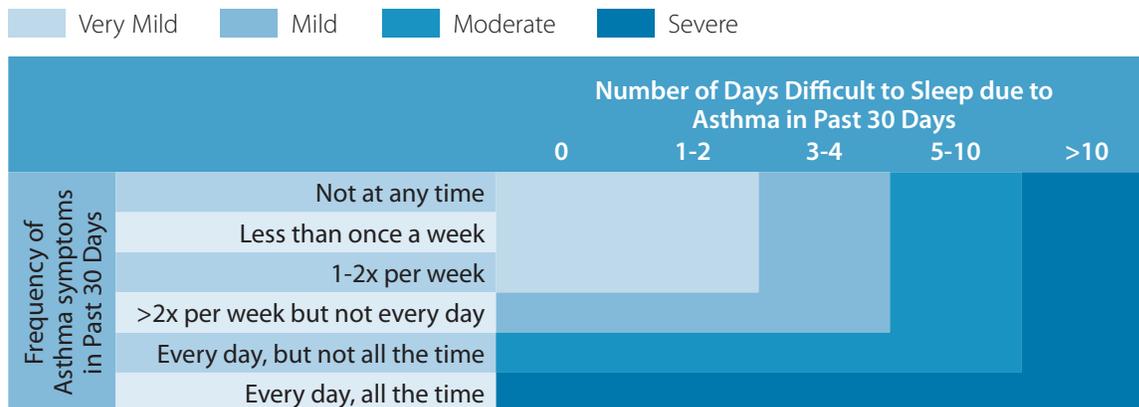
Weighting

BRFSS respondents differ to some extent from the California population by age, sex, and race/ethnicity. As a result, the sample is weighted so that the age, sex, and race/ethnicity composition in the data reflects that of the 2000 California adult population, thereby making the results generalizable to the California adult population. More information about the weighting method used in the BRFSS can be found on the CDC website, www.cdc.gov/brfss.

Level of Symptoms

The level of asthma symptoms was determined by classifying each respondent based on answers to two questions from the non-core BRFSS survey questions: 1) "Symptoms of asthma include cough, wheezing, shortness of breath, chest tightness, and phlegm production when you don't have a cold or respiratory infection. During the past 30 days, how often did you have any symptoms of asthma?" and 2) "During the past 30 days, how

many days did symptoms of asthma make it difficult for you to stay asleep?” Respondents were scored based on their answers to these questions and then assigned to an asthma symptom level. The algorithm for assigning these levels is outlined in the chart below:



Limitations

Despite its size and standardization, BRFSS has several limitations. Data are self-reported; respondents may inaccurately recall past events, tell interviewers what they think they want to hear, or be afraid to reveal information that is too personal (this is called reporting bias). The survey response rate, or the percentage of people contacted who agreed to participate in the survey, was rather low in 2005 at 38 percent. Telephone surveys exclude households without phones and people living in institutionalized settings (e.g., college dorms and nursing homes). Due to these factors, there is the possibility of bias if the people who answered the survey are different from those who refused and/or those who were not reached. Because survey results have a degree of uncertainty, estimates are shown along with confidence intervals, which are explained earlier in this section.

California Health Interview Survey

The California Health Interview Survey (CHIS) is conducted by the University of California at Los Angeles (UCLA) Center for Health Policy Research, in cooperation with CDHS and the Public Health Institute. CHIS is a statewide telephone survey administered every two years since 2001. In 2001, the CHIS population included 55,428 adults, 5,801 adolescents, and 12,592 children under age 12. In 2003, it included 42,044 adults, 4,010 adolescents, and 8,526 children under age 12. CHIS was also administered in 2005, but the data from that year were not available at the time this report was prepared. There are separate surveys for each age group — adults, adolescents, and children — and the surveys have varying questions. Adults and adolescents age 12 to 17 answer survey questions, however, for the child survey, adult parents or guardians are interviewed about the children in question. More information about CHIS can be found at <http://www.chis.ucla.edu>. The data in this report were obtained from the AskCHIS web-based data query system, which can be found at the same website.

Other statewide and nationwide health surveys generally only provide information about the most numerous racial and ethnic groups in the country and often data are only available for Whites, Blacks, and Hispanics. Given California's high degree of ethnic diversity, CHIS conducts special sampling to be able to report data on American Indians, Asians, and Pacific Islanders as well. The survey is conducted in English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese, and Korean. Sampling is done with the goal of producing useful statistics for almost every California county.

Limitations

CHIS is telephone-administered and relies on self-report by the respondent; respondents may inaccurately recall past events, tell interviewers what they think they want to hear, or be afraid to reveal information that is too personal (this is called reporting bias). Telephone surveys exclude households without phones and people living in institutionalized settings (e.g., college dorms and nursing homes). In addition, people randomly chosen to participate in the survey do not always participate. The survey response rates, or the percentage of people who participated in the survey, were low at 34 percent. Due to these factors, there is the possibility of bias if the people who answered the survey are different from those who refused and/or those who were not reached. Because survey results have a degree of uncertainty, estimates are shown along with confidence intervals, which are explained earlier in this section.

California Healthy Kids Survey

The California Healthy Kids Survey (CHKS) is an anonymous self-report survey administered biennially in California schools to assess youth health risks and behaviors. CHKS is sponsored by the California Department of Education and is administered through a contract with WestEd, a nonprofit education research agency. All public schools in California are eligible to participate in CHKS, and school districts receiving Safe and Drug Free Schools and Communities or Tobacco Use and Prevention Education funding are required to administer it. Survey questions are similar to the CDC National Youth Risk Behavior Survey (YRBS).

This report uses CHKS data that were collected from 2003–2005. 953,281 students — including fifth, seventh, ninth, and eleventh graders — participated in this cycle of the survey. Results reported for lifetime asthma prevalence generally include 847,987 students who provided complete sex, grade, and lifetime asthma information. Results for lifetime asthma prevalence that rely on categorization for race/ethnicity only include 636,827 students, since fifth graders were not surveyed for race/ethnicity information. Results reported for prevalence of asthma symptoms are from students who answered both the individual symptom question and the lifetime asthma question.

Seventh-, ninth-, and eleventh-grade students responded to the lifetime asthma prevalence question, "Has a doctor ever told you or your parent/guardian that you have asthma?" This question is on the core survey, which is administered to all participating schools. Four additional questions regarding current asthma-like symptoms were asked on an optional part of the survey that is used by a subset of those schools.

The asthma prevalence question for fifth graders was phrased slightly differently: “Has a parent or some other adult ever told you that you have asthma?” This question and one current asthma-like symptom question were both on the core survey administered to all participating fifth graders.

Limitations

As with any survey, there are limitations to CHKS. There may be differences in the sample size from year to year based on response rates, parental consent, and demographic differences. There also may be variability in responses due to different methodologies in administering the survey from school to school. The validity of self-report data is also a concern, but effort was made to identify and omit surveys from students who may not have taken the survey seriously, were careless, or did not answer truthfully. As with all survey data, there is a degree of uncertainty in the estimates, therefore they are presented with 95 percent confidence intervals.

Asthma Emergency Department Visits

Data on asthma emergency department (ED) visits were obtained from the 2005 Emergency Department Data maintained by the California Office of Statewide Health Planning and Development (OSHPD). The data set is comprised of a record for each patient admitted to a licensed ED in California, not including ED visits that resulted in a hospital admission to the same hospital for the same encounter. It contains demographic data on each patient discharged, including age, gender, race/ethnicity, and county of residence. Additional data elements include the patient’s principal diagnosis and expected source of payment. All ED visits where asthma was the primary diagnosis were selected based on the ninth revision of the International Classification of Diseases (ICD-9), code 493.

ED visit rates were calculated (overall and by demographic characteristics) using yearly population estimates as the denominator, provided by the California Department of Finance. Rates were age-adjusted using the direct method to the 2000 U.S. population. Eleven age groups were used: <1, 1–4, 5–84 in 10-year age groups, and over 84. Rates based on small numbers are very imprecise; therefore, any rate based on fewer than 30 ED visits is omitted from tables and figures.

Insurance status or expected source of payment measures the source from which the facility expected to receive payment for charges incurred from the hospitalization. For the purposes of this analysis, sources of payment were grouped as follows:

- Medicare = Medicare, including HMO and PPO
- Medi-Cal = Medi-Cal, including HMO and PPO
- Private Insurance = private insurance company, HMO, PPO, Blue Cross/Blue Shield
- Self-Pay = self-pay
- Other = workers’ compensation, county indigent programs, veterans affairs, charity care, no charge, and other governmental sources

Asthma Hospitalizations

Data on asthma hospitalizations were obtained from the Patient Discharge Databases maintained by OSHPD. These data sets are comprised of a record for each inpatient discharged from a licensed acute care hospital in California. This includes: General Acute Care Hospitals, Acute Psychiatric Hospitals, Chemical Dependency Recovery Hospitals, and Psychiatric Health Facilities. The only exceptions are records not reported by some California State Hospitals.

The database contains demographic data on each patient discharged, including age, gender, race/ethnicity, and county of residence. Additional data elements include principal diagnosis, length of stay, expected source of payment, and total charges. All discharges with asthma as the primary diagnosis were selected based on ICD-9 code 493.

Hospitalization rates were calculated (overall and by demographic characteristics) using yearly population estimates as the denominator, provided by the California Department of Finance. Rates were age-adjusted using the direct method to the 2000 U.S. population. Eleven age groups were used: <1, 1–4, 5–84 in 10-year age groups, and over 84.

The number of asthma hospitalizations per month was analyzed to present a seasonal pattern of asthma hospitalizations. Admission month was defined as the month of the year the patient was admitted to the hospital. Length of stay measures the number of days spent in the hospital for each individual hospitalization. The average charges measures the average cost associated with each hospitalization. It is important to note for average charge estimates that not all hospitals report charges to OSHPD. Kaiser Foundation and Shriners' Hospitals are exempt from reporting charges. The Consumer Price Index from the U.S. Bureau of Labor Statistics (<http://www.bls.gov/cpi>) was used to adjust hospitalization charges for inflation. Insurance status or expected source of payment measures the source from which the hospital expected to receive payment for charges incurred from the hospitalization. For the purposes of this analysis, sources of payment were grouped as follows:

- Medicare = Medicare, including HMO and PPO
- Medi-Cal = Medi-Cal, including HMO and PPO
- Private Insurance = private insurance company, HMO, PPO, Blue Cross/Blue Shield
- Self-Pay = self-pay
- Other = workers' compensation, county indigent programs, veterans affairs, charity care, no charge, and other governmental sources

Data on household income is not available for each hospitalization record. To estimate income, each person is assigned the median household income of his/her zip code. This income data is from the 2000 Census. Rates by income use the number of asthma hospitalizations for which each income level has been assigned in the numerator, and the population within that income in the denominator. These population denominators also come from the 2000 Census data. Depending on population changes from 2000-2005, rates by income may not be accurate estimates for 2005; however, the accuracy of the

comparison across income categories is not affected by population changes because all groups use the same 2000 denominator.

Limitations

Hospitalization data are abstracted from physicians' notes for billing purposes; therefore, there is the potential for incorrect diagnoses and inconsistent coding. There could also be misclassification of race/ethnicity, which may lead to inaccurate rates by race/ethnicity.

Medi-Cal Data

HEDIS – Use of Appropriate Medications for People with Asthma

HEDIS data are from the Medi-Cal Managed Care Division Reports of the Performance Measures for Medi-Cal Managed Care Members, available at <http://www.dhs.ca.gov/mcs/mcmcd/html/ManagedCareReports.htm>.

Medi-Cal Managed Care plans reported on Use of Appropriate Medications for People with Asthma for the first time in 2001. Members included in this measurement are between the ages of 5 and 56, must have two-year continuous enrollment, and are identified as having persistent asthma. The definition of persistent asthma is an approximation based on previous year's service and medication utilization rather than a clinical measure of severity.

CDHS requires all Medi-Cal managed care plans to have their results audited by an NCQA-licensed audit organization using the standardized methodology specified by NCQA. NCQA requires all health plans to report this measure using the administrative method; the hybrid method is not allowed.

Asthma Hospitalizations and Emergency Department Visits

Medi-Cal hospitalization and ED data are from the Medi-Cal Managed Care Division's Management Information System/Decision Support System (MIS/DSS), which is the CDHS relational database where files are merged from the following sources: services billed to and paid by the Medi-Cal Fee-For-Service (FFS) program, encounter data reported by Managed Care Plans, and eligibility as it appears on the Medi-Cal Eligibility Data System (MEDS).

Inpatient admits (hospitalizations) are a count of unique dates of admission for each individual. ED visits are calculated using a sum of encounters when a primary or secondary diagnosis of asthma is found. An encounter is defined as a history and physical exam or evaluation and management (E&M) encounter with a single provider on a single date of service in an ED. For both hospitalizations and ED visits, asthma is identified using ICD-9 code group 493.

The denominator is the total number of months of eligibility (member months) in the 12-month report period. The dates of services reported are January 1, 2004, through December 31, 2004. There is no continuous enrollment requirement in these reports. The rates are for all members enrolled for any period of time during the covered dates of services or enrollment. The rates per asthma population use member months only for those previously diagnosed with asthma. The denominators are the total member months for

members identified with a primary or secondary diagnosis of asthma during a 24-month period. The 24-month period includes the 12-month report period and the preceding 12 months. Prescriptions for treatment of asthma are not used to identify these members.

The rates per thousand asthma members per month are calculated as follows:

$$\frac{\text{total \# of asthma ER visits}}{\text{total asthma member months}} \times 1,000$$

$$\frac{\text{total \# of asthma admits}}{\text{total asthma member months}} \times 1,000$$

Limitations

The accuracy of the rates contained in these reports is subject to the accuracy and completeness of the data used to produce them. Variation in rates may be due to either a true difference in utilization, variations in the completeness of Medi-Cal data, or data processing irregularities. A relatively small number of services may result in an inordinately large rate per thousand when the corresponding total member month count for the category is also small.

Asthma Mortality

Data for asthma deaths were obtained from the California Death Public Use Tapes from the Center for Health Statistics of CDHS. This database contains demographic data on each death including age, gender, race/ethnicity, county of residence, and date of death. After 1999, the tenth revision of the ICD-10 coding system was used to assign a specific cause of death from the original death certificate field "underlying cause of death." Deaths that were coded with the ICD-10 codes J45–J46, asthma, were selected for analysis. For data before 1999, ICD-9 coding was used and the asthma code 493 was used for analysis of asthma mortality. Because of the change from ICD-9 to ICD-10 coding in 1999, it is difficult to compare rates prior to and after that year. The change in coding alone is thought to cause about a 12 percent decrease in rates. Accordingly, the analysis of mortality data in this report focuses on 1999–2004.

Rates were calculated using the number of deaths due to asthma, by year and/or demographic characteristics. Population denominators were obtained from the California Department of Finance. Asthma deaths among American Indians/Alaska Natives (AI/AN) in California were too small to report separately. AI/AN and individuals with race/ethnicity of 'other' or 'unknown' were excluded from race-specific analyses but included in overall estimates. Rates were age-adjusted using the direct method to the 2000 U.S. population. Eleven age groups were used: <1, 1–4, 5–84 in 10-year age groups, and over 84. Rates based on small numbers are very imprecise, therefore any rate based on fewer than 20 deaths is omitted from tables and figures.

The years of potential life lost (YPLL) index enumerates the total years lost due to decedents who did not reach a particular age cut off. YPLLs were calculated for California us-

ing the cutoff of age 75. The age at death of each individual was subtracted from 75 and the sum of those numbers is the YPLL for the year or combined time period. Individuals over the age of 75 were not included in the calculation.

Limitations

These mortality data rely on information listed on death certificates. Therefore, there is a potential for incorrect coding of cause of death, potentially leading to an over- or under-count of the actual number of deaths due to asthma. In addition, misclassification of race/ethnicity of the decedent is possible, which could lead to inaccurate reporting of counts by race/ethnicity.

Acronyms

ACIP	Advisory Committee on Immunization Practices
AI/AN	American Indian/Alaska Native
ALA	American Lung Association
ALOS	Average length of stay
A/PI	Asian/Pacific Islander
BMI	Body mass index
BPCA	Best Practices in Childhood Asthma initiative
BRFSS	Behavioral Risk Factor Surveillance System
CAP	California Asthma Partners
CAPHI	California Asthma Public Health Initiative
CDC	Centers for Disease Control and Prevention
CDHS	California Department of Health Services
CHDP	Child Health and Disability Prevention program
CHIS	California Health Interview Survey
CHKS	California Healthy Kids Survey
CI	Confidence interval
COPD	Chronic obstructive pulmonary disease
CQI	Continuous quality improvement
DMPP	Disease Management Pilot Program
E&M	Evaluation and management
ED	Emergency department
EHIB	Environmental Health Investigations Branch
ER	Emergency room
FPL	Federal poverty level
HEDIS	Health Employer Data and Information Set
HMO	Health maintenance organization
HP2010	Healthy People 2010
ICD	International Classification of Diseases
MCO	Managed care organization
MEDS	Medi-Cal Eligibility Data System
MIS/DSS	Management Information System/Decision Support System

NAEPP	National Asthma Education and Prevention Program
NCQA	National Committee for Quality Assurance
NHIS	National Health Interview Survey
NHLBI	National Heart, Lung, and Blood Institute
OSHPD	California Office of Statewide Health Planning and Development
PPIP	Plan/Practice Improvement Project
PPO	Preferred provider organization
SRG	Survey Research Group
UCLA	University of California at Los Angeles
WRA	Work-related asthma
YPLL	Years of potential life lost

Glossary of Terms

Access to care: Refers to the availability of affordable, culturally sensitive, routine health care services. Access to care also include certain process-of-care measures, such as possession of health insurance, prescription of long-term control medications, and provision of an asthma management plan (or asthma action plan) to all people with asthma.

Asthma management plan (or asthma action plan): A list of specific instructions drawn up by a health care professional for a person with asthma to follow at home, school, work, etc. An asthma management plan includes a normal schedule for asthma medicines, as well as what to do if peak flow readings or asthma symptoms become worse than usual. Asthma management plans are usually split into Zones: Green Zone, Yellow Zone, and Red Zone.

Air pollution: Unwanted toxic or radioactive gases or particulate matter introduced into the atmosphere, usually as a result of human activity. Examples of air pollution include ozone, sulfur oxides, nitrogen oxides, and particulates.

Age-adjustment: A statistical method applied to data to account for differences in the age distributions of populations for comparison; also known as age standardization.

Asthma: A chronic respiratory disorder characterized by recurrent episodes of breathlessness and wheezing that can be life-threatening. Many factors contribute to airflow limitation in asthma, each related to the inflammatory process. See also "asthma attack."

Asthma attack: Also called asthma flare or episode; an asthma attack occurs when the airway constricts in response to a provoking stimulus, causing reduced airflow, mucus secretion, wheezing, coughing, chest tightness, and difficulty breathing.

Co-morbid conditions: Two or more medical conditions that exist in a person at the same time. This is often because having one condition predisposes the person to other health conditions.

Confidence interval (95%): The range where the true magnitude of effect (e.g., prevalence, relative risk) lies with a 95 percent degree of assurance.

Current asthma prevalence: The proportion of people in the population who currently have asthma.

Crude rate: A rate (usually expressed as the number of cases per population at risk over a specified time period) that is not age-adjusted.

Environmental tobacco smoke: Also called secondhand smoke or passive smoking; inhalation of air containing tobacco smoke that is from someone else smoking.

Flu vaccination: A vaccine that is given with a needle (flu shot) or as a nasal spray to reduce the chance of the person getting the flu. Flu vaccination is approved for use in people older than six months. Those who are at high risk for complications from the flu are recommended to get vaccinated each year, including anyone with certain chronic medical conditions, including asthma.

Hospitalization: The event of an inpatient being discharged from a hospital after receiving treatment. Treatment as an out-patient is not considered to be a hospitalization. See also “repeat hospitalization.”

ICD-9: International Classification of Disease, 9th revision; a numbered system for classifying diseases and health conditions that is published by the World Health Organization and used as an international standard for epidemiological and health management purposes.

ICD-10: International Classification of Disease, 10th revision; published in 1990 as an updated version of ICD-9. See also “ICD-9.”

Inhaler: A device used to dispense asthma medication to be inhaled into the lungs. The advantage of using an inhaler (such as inhaled corticosteroid) is that the medicine goes directly to where the inflammation is, and has minimal effects on the rest of the body (and therefore, fewer side effects than corticosteroids taken orally).

Lifetime asthma prevalence: The proportion of people in the population who have ever been diagnosed with asthma by a health provider. This term is used interchangeably with “ever diagnosed with asthma.”

Long-term control medication: A preventive medicine that must be taken every day to control asthma symptoms; not used for quick relief. Corticosteroids, long-acting inhaled beta2-agonists, and antileukotrienes are some examples.

Morbidity: The presence and/or severity of a disease or health condition in question.

Mortality rate: The number of people dying from a disease during a specified time period, divided by the total number of people in the population during that time period.

Percentile: The percentile is a value ranging from 1 to 100 that indicates the proportion of the data that lies below it. For example, a value at the 60th percentile means that 60 percent of the observations lie below this value and thus, 40 percent lie above it.

Prevalence: The number of existing cases of the disease in a population at a specified time. See also “current asthma prevalence” and “lifetime asthma prevalence.”

Repeat hospitalizations: Having more than one hospital discharge (within a specified time frame) for treatment of the same health condition. See also “hospitalization.”

Rescue medication: Also called short-term or quick-relief medication; used to treat asthma symptoms when they occur. They relieve symptoms rapidly and are normally taken only on an as-needed basis. Some examples are: short-acting, inhaled beta2-agonists and anticholinergics.

Risk factor: A personal habit or characteristic, clinical condition, or environmental exposure that is associated with an increased probability or severity of disease.

Sensitizer: A chemical that may lead to the development of an allergic reaction after repeated exposure. Sensitizers can cause an immune response that may lead to the development of new asthma in previously healthy people.

Statistical significance: A statistically significant result means that chance is an unlikely explanation of the finding. However, this does not ascribe causality.

Surveillance: The ongoing systematic collection, analysis, and interpretation of health data, essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.

Trigger: A risk factor that causes exacerbations of asthma; a stimulus that causes an increase in asthma symptoms and/or airflow limitation.

Weighted percent: A percentage that has been adjusted to compensate for the respondents' probability of selection and demographic differences when compared to the general population; allows the results to be generalized to the larger population.



www.californiabreathing.org