

December 2010

Income Disparities in Asthma Burden and Care in California

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Funded by a grant from
The California Endowment.

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RT2010-4

Suggested Citation:

Wolstein J, Meng YY and Babey SH. *Income Disparities in Asthma Burden and Care in California*. Los Angeles, CA: UCLA Center for Health Policy Research, 2010.



This report is based on data from the 2001 to 2007 California Health Interview Survey (CHIS). The largest statewide health survey conducted in the U.S., CHIS is a collaboration of the UCLA Center for Health Policy Research, the California Department of Public Health and the California Department of Health Care Services. For more information on CHIS and for access to CHIS data and results, visit www.chis.ucla.edu.



This UCLA Center for Health Policy Research report was funded by The California Endowment.

Executive Summary

Asthma is increasing in California. Between 2001 and 2007, the prevalence of asthma increased significantly and by 2007 nearly five million Californians had been diagnosed with this chronic condition. Although asthma occurs among Californians at all socio-economic levels, it disproportionately affects low-income Californians, who miss more days of work and school, are more likely to have frequent asthma symptoms, and are more likely to go to the emergency department or be hospitalized for asthma care. Policy and environmental changes that promote and encourage adequate health care coverage, quality health care for low-income Californians with asthma, and asthma-friendly environments will likely help address these disparities.

Key findings of this report include:

Asthma is widespread and increasing in California

- Lifetime asthma prevalence has increased from 11.3% to 13% between 2001 and 2007 among California adults.
- Current asthma prevalence varies considerably by county, ranging from 6% in San Francisco County to 12.9% in Fresno County (among Californians age 1 and over).
- Lake, Tehama/Glenn/Colusa, Sutter, Yuba, Contra Costa, Solano, Sacramento, Fresno, Kern, Merced, Madera and San Bernardino counties all had current asthma rates significantly higher than that of the state.

Asthma disproportionately affects vulnerable Californians

- 8.7% of Californians with incomes below 200% of the Federal Poverty Level (FPL) have current asthma, compared to 7.8% of those with incomes at or above 400% FPL.
- 31.9% of low-income California adults with current asthma experience asthma symptoms at least once a week compared to just 19.3% of their higher-income counterparts.
- Low-income Californians with current asthma are more likely to be children and people of color.

Asthma impacts productivity of low-income Californians

- Low-income children with current asthma miss more than twice as many days of school due to asthma as higher-income children (2.8 vs. 1.3 days).
- Low-income adults with current asthma miss three times as many work days as higher-income adults (2.2 vs. 0.6 days).

Emergency department visits and hospitalizations due to asthma are higher among low-income Californians

- Among families with incomes below 200% FPL, 18.8% of adults and 23.9% of children went to an emergency department or urgent care facility in the past year because of their asthma, compared with just 8.8% and 12.5% of their more affluent counterparts, respectively.
- Hospitalization rates among low-income Californians with current asthma were more than five times higher than the rates among their high-income counterparts (6.5% vs. 1% for adults and 5.8% vs. 1.1% for children).

Low-income Californians with asthma are more likely to be uninsured and lack access to appropriate asthma care

- 22.1% of low-income California adults and children with current asthma were uninsured all or part of the past year compared with 4.4% of higher-income Californians.
- Low-income California adults and children with current asthma are less likely to get an asthma management plan than higher-income Californians.
- Low-income Californians are more likely to have no usual source of care and have difficulty understanding their doctor.

Low-income Californians are more likely to encounter risk factors for asthma exacerbation

- Rates of exposure to second-hand smoke are more than three times as high among low-income Californians with current asthma compared to their higher-income counterparts (13.5% vs. 4%).

Understanding Asthma

Lifetime Asthma

Refers to people who have been diagnosed with asthma at some point in their lives.

Current Asthma

Refers to people who have been diagnosed with asthma and who also report they still have asthma, or have had an episode or attack in the previous year. *Current asthma* provides a better estimate of the degree to which asthma currently impacts the population as *lifetime asthma* may include those who had asthma in the past but currently do not have the condition.

Income Disparities in Asthma Burden and Care in California

Asthma is a chronic condition that causes the airways of the lungs to become inflamed and more sensitive to constriction, causing difficulties in breathing. Management of asthma requires a comprehensive approach, including ongoing assessment and monitoring by a health care provider, patient education, use of appropriate medications, and control of exposures to environmental triggers.¹ Low-income individuals have a higher prevalence of asthma, greater exposure to environmental triggers, and encounter more obstacles to receiving adequate and appropriate medical care for this condition than high income individuals.²

Using data from the 2007 California Health Interview Survey (CHIS 2007), this report examines variations in the prevalence of asthma, as well as income disparities in asthma burden and care among Californians with current asthma. It also examines several factors that may contribute to these disparities.

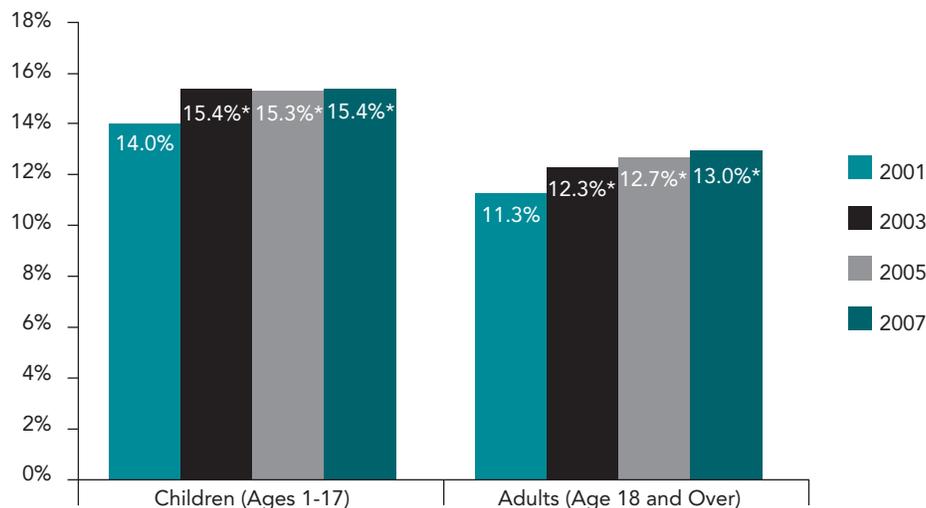
Asthma Prevalence

Statewide, over 4.9 million Californians have been diagnosed with asthma. In 2007 the lifetime asthma prevalence (for a definition of *lifetime asthma* see “Understanding Asthma” on page 2) was 13% among adults, up from 11.3% in 2001 (Exhibit 1). Among

- 1 The Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma – Summary Report 2007. *Journal of Allergy and Clinical Immunology*. Nov 2007;120(5 Suppl):S94-138.
- 2 McDaniel M, Paxson C, Waldfogel J. Disparities in childhood asthma in the United States: evidence from the National Health Interview Survey, 1997 to 2003. *Pediatrics*. May 2006;117(5):e868-77. Litonjua AA, Carey VJ, Weiss ST, Gold DR. Race, socioeconomic factors, and area of residence are associated with asthma prevalence. *Pediatric Pulmonology*. Dec 1999;28(6):394-401.

Exhibit 1.

Lifetime Asthma Prevalence by Year, California, 2001-2007



* Indicates significantly different from 2001; $p < 0.05$.

Source: 2001, 2003, 2005 and 2007 California Health Interview Surveys

children, lifetime asthma prevalence was 15.4% in 2007. There was a significant increase in lifetime asthma prevalence among children between 2001 and 2003, but the prevalence has not increased significantly since 2003.

In 2007, nearly three million adults and children in California had current asthma (8.2%; for a definition of *current asthma* see “Understanding Asthma” on page 2). Current asthma varies by income, with the most disadvantaged group suffering from the highest rates of current asthma. Specifically, 8.7% of Californians with incomes below 200% of the FPL have current asthma, compared to 7.8% of those with incomes at or above 400% FPL (Exhibit 2).

Asthma Prevalence Varies by County

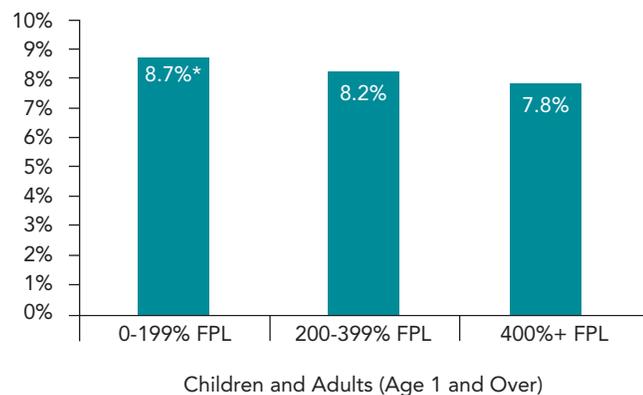
To examine current asthma prevalence in California counties, data from CHIS 2005 and CHIS 2007 were combined to increase sample sizes for smaller counties and produce stable estimates for a greater number of counties (Exhibit 3). The combined estimates vary

considerably, ranging from 6% in San Francisco County to 12.9% in Fresno County. Among adults, the prevalence of current asthma ranged from 5.6% in San Francisco County to 13.8% in Tehama, Glenn and Colusa Counties (Exhibit 4). Among children, it ranged from 6.2% in Monterey County to 17.3% in Fresno County (Exhibit 5). In several counties the prevalence of asthma among children and adults was lower than that of the state. For instance, in San Francisco, Monterey, Los Angeles, Orange, San Diego and Riverside counties, the rate was significantly lower than the statewide prevalence of 8.3%. However, Lake, Tehama/Glenn/Colusa, Sutter, Yuba, Contra Costa, Solano, Sacramento, Fresno, Kern, Merced, Madera and San Bernardino counties all had current asthma rates significantly higher than that of the state.

Having a high proportion of families living in poverty can contribute to higher prevalence of asthma (Exhibit 3). For example, Tehama/Glenn/Colusa and Fresno are among the counties with the highest proportion of families living in poverty, and these counties have some of the highest prevalence of current asthma.⁴ However, in the majority of counties, low-income residents experience a higher prevalence of current asthma. These data suggest that asthma disparities occur throughout the state.

Exhibit 2.

Prevalence of Current Asthma by Income, California, 2007



* Indicates significantly different from 400% FPL and above; $p < 0.05$.

Note: In 2007 the Federal Poverty Level was \$13,690 for a family of two and \$20,650 for a family of four.³

Source: 2007 California Health Interview Survey

4 US Census Bureau, Small Area Income and Poverty Estimates. <http://www.census.gov/did/www/saiper/country.html> Accessed [November 4, 2010].

3 Federal Register, Vol. 72, No. 15, January 24, 2007, pp. 3147–3148 (<http://aspe.hhs.gov/poverty/07poverty.shtml>).

Exhibit 3.

Disparities in Prevalence of Current Asthma by County or County Group, California, 2005 and 2007 Combined

County	Adults (Age 18 and Over)	Children (Ages 1-17)	All Ages (Age 1 and Over)	Low-Income Californians <200% FPL (Age 1 and Over)
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Northern and Sierra Counties	9.9 (9.1-10.8)*	10.0 (8.4-11.7)	10.0 (9.2-10.7)*	12.8 (11.4-14.2)*
Butte	10.0 (7.7-12.2)*	–	9.1 (7.2-11.1)	12.2 (8.6-15.8)*
Shasta	10.1 (7.2-13.1)	10.8 (5.7-15.9)	10.3 (7.7-12.8)	12.9 (8.1-17.8)
Humboldt	9.5 (7.4-11.5)	9.2 (5.9-12.5)	9.4 (7.7-11.2)	12.3 (8.8-15.7)*
Del Norte, Siskiyou, Lassen, Trinity, Modoc, Plumas, Sierra	10.4 (7.7-13.0)*	–	10.4 (7.9-12.9)	13.3 (8.7-17.9)*
Mendocino	7.4 (5.4-9.5)	–	6.9 (5.2-8.6)	8.6 (5.5-11.7)
Lake	10.8 (8.3-13.4)*	11.2 (6.0-16.4)	10.9 (8.6-13.2)*	14.3 (10.1-18.6)*
Tehama, Glenn, Colusa	13.8 (10.5-17.0)*	7.9 (4.2-11.6)	12.3 (9.7-14.9)*	13.9 (10.0-17.8)*
Sutter	9.7 (7.2-12.1)	13.8 (8.6-19.0)	10.8 (8.5-13.1)*	12.4 (8.3-16.5)*
Yuba	10.5 (7.9-13.1)*	13.5 (7.6-19.5)	11.4 (8.8-13.9)*	15.6 (10.8-20.4)*
Nevada	8.2 (6.0-10.4)	11.1 (5.5-16.7)	8.8 (6.6-10.9)	9.6 (4.4-14.8)
Tuolumne, Calaveras, Amador, Inyo, Mariposa, Mono, Alpine	9.3 (6.7-11.9)	13.2 (6.1-20.3)	10.1 (7.6-12.5)	14.8 (9.0-20.6)*
Greater Bay Area	7.9 (7.3-8.6)	11.1 (9.7-12.5)	8.6 (8.0-9.2)	8.8 (7.4-10.2)
Santa Clara	6.7 (5.5-7.9)	8.6 (6.0-11.3)	7.2 (6.0-8.3)	8.8 (5.8-11.9)
Alameda	7.9 (6.3-9.6)	13.7 (10.1-17.3)	9.3 (7.8-10.8)	8.8 (5.8-11.7)
Contra Costa	10.1 (8.2-11.9)*	14.0 (9.9-18.1)	11.0 (9.3-12.8)*	11.2 (7.0-15.5)
San Francisco	5.6 (3.9-7.3)*	8.4 (4.6-12.2)	6.0 (4.4-7.5)*	7.7 (3.2-12.3)
San Mateo	8.2 (5.9-10.6)	10.7 (6.4-15.0)	8.8 (6.7-10.9)	6.6 (3.5-9.7)
Sonoma	8.6 (6.5-10.6)	12.0 (7.1-16.8)	9.4 (7.4-11.3)	9.0 (4.9-13.2)
Solano	11.6 (8.7-14.4)*	10.4 (7.0-13.9)	11.3 (9.0-13.6)*	10.0 (5.5-14.4)
Marin	7.7 (5.6-9.8)	6.8 (4.4-9.2)*	7.5 (5.8-9.2)	5.4 (3.2-7.6)*
Napa	7.8 (5.9-9.7)	10.5 (5.1-15.9)	8.5 (6.5-10.4)	7.9 (3.6-12.2)
Sacramento Area	10.5 (9.3-11.8)*	9.9 (7.6-12.1)	10.4 (9.3-11.5)*	14.1 (10.9-17.3)*
Sacramento	11.4 (9.6-13.2)*	9.7 (6.7-12.7)	11.0 (9.4-12.5)*	15.5 (11.3-19.7)*
Placer	8.5 (6.3-10.7)	12.2 (7.5-16.9)	9.4 (7.4-11.5)	14.4 (7.6-21.2)
Yolo	9.5 (6.6-12.4)	6.9 (3.9-10.0)*	8.9 (6.5-11.2)	9.7 (3.3-16.1)
El Dorado	8.6 (6.4-10.9)	9.9 (5.0-14.8)	8.9 (6.9-11.0)	5.3 (2.2-8.5)
San Joaquin Valley	10.0 (9.0-11.0)*	13.9 (12.0-15.8)*	11.2 (10.3-12.1)*	11.8 (10.4-13.3)*
Fresno	11.1 (8.7-13.6)*	17.3 (12.6-21.9)*	12.9 (10.7-15.1)*	12.7 (9.3-16.0)*
Kern	10.0 (7.5-12.5)	14.8 (10.2-19.4)*	11.5 (9.2-13.7)*	12.3 (9.0-15.6)*
San Joaquin	9.6 (7.3-12.0)	11.3 (7.0-15.7)	10.1 (8.0-12.3)	11.8 (7.8-15.9)
Stanislaus	9.3 (6.5-12.1)	12.2 (6.9-17.5)	10.1 (7.6-12.6)	11.2 (7.1-15.3)
Tulare	7.9 (6.0-9.9)	14.3 (9.5-19.1)	9.9 (7.9-11.9)	12.0 (8.8-15.3)*
Merced	12.2 (8.4-15.9)*	11.0 (6.6-15.4)	11.8 (8.9-14.7)*	10.4 (7.2-13.6)
Kings	7.9 (6.0-9.8)	13.3 (9.4-17.3)	9.5 (7.8-11.3)	8.5 (5.9-11.0)
Madera	12.1 (9.5-14.8)*	12.3 (7.2-17.4)	12.2 (9.8-14.6)*	11.3 (7.6-15.1)
Central Coast	7.3 (6.4- 8.3)	8.1 (6.3-9.9)*	7.5 (6.7-8.4)	6.9 (5.4-8.4)
Ventura	6.5 (4.7-8.3)	7.5 (4.2-10.9)	6.8 (5.2-8.3)	4.9 (2.2-7.7)*
Santa Barbara	8.1 (5.8-10.5)	8.4 (4.4-12.4)	8.2 (6.2-10.2)	8.2 (4.9-11.5)
Santa Cruz	8.9 (6.3-11.6)	8.4 (4.2-12.6)	8.8 (6.5-11.1)	8.7 (2.9-14.6)
San Luis Obispo	8.5 (6.2-10.8)	13.7 (7.4-19.9)	9.5 (7.3-11.8)	10.3 (5.2-15.4)
Monterey	6.4 (4.6-8.2)	6.2 (2.8-9.5)*	6.3 (4.7-7.9)*	5.8 (3.5-8.1)*
San Benito	–	8.2 (4.7-11.7)	7.6 (3.9-11.3)	10.3 (0.2-20.4)
Los Angeles	6.6 (6.1-7.0)*	9.3 (8.2-10.3)	7.3 (6.8-7.7)*	6.0 (5.4-6.7)*
Other Southern California Counties	7.0 (6.5-7.5)*	9.1 (8.1-10.1)	7.6 (7.1-8.0)*	7.5 (6.7-8.3)
Orange	6.0 (5.1-6.8)*	9.5 (7.4-11.7)	6.9 (6.0-7.7)*	6.4 (4.7-8.1)*
San Diego	7.1 (6.3-7.9)	8.2 (6.9-9.6)*	7.4 (6.7-8.1)*	7.5 (6.0-9.1)
San Bernardino	8.8 (7.5-10.1)	11.5 (8.8-14.2)	9.6 (8.4-10.8)*	8.8 (7.1-10.5)
Riverside	6.6 (5.5-7.6)*	7.0 (5.1-8.8)*	6.7 (5.8-7.6)*	7.3 (5.6-9.0)
Imperial	8.9 (6.6-11.1)	12.2 (7.6-16.8)	9.8 (7.7-11.9)	8.0 (5.5-10.5)
California	7.7 (7.4-8.0)	10.1 (9.5-10.6)	8.3 (8.1-8.5)	8.2 (7.8-8.7)

Note: The 95% Confidence Interval (CI) is a range that provides a more reliable prevalence estimate of persons in the population with current asthma, compared to the “point estimate.” It should be noted that counties with different estimates for current asthma prevalence are not necessarily significantly different from one another.

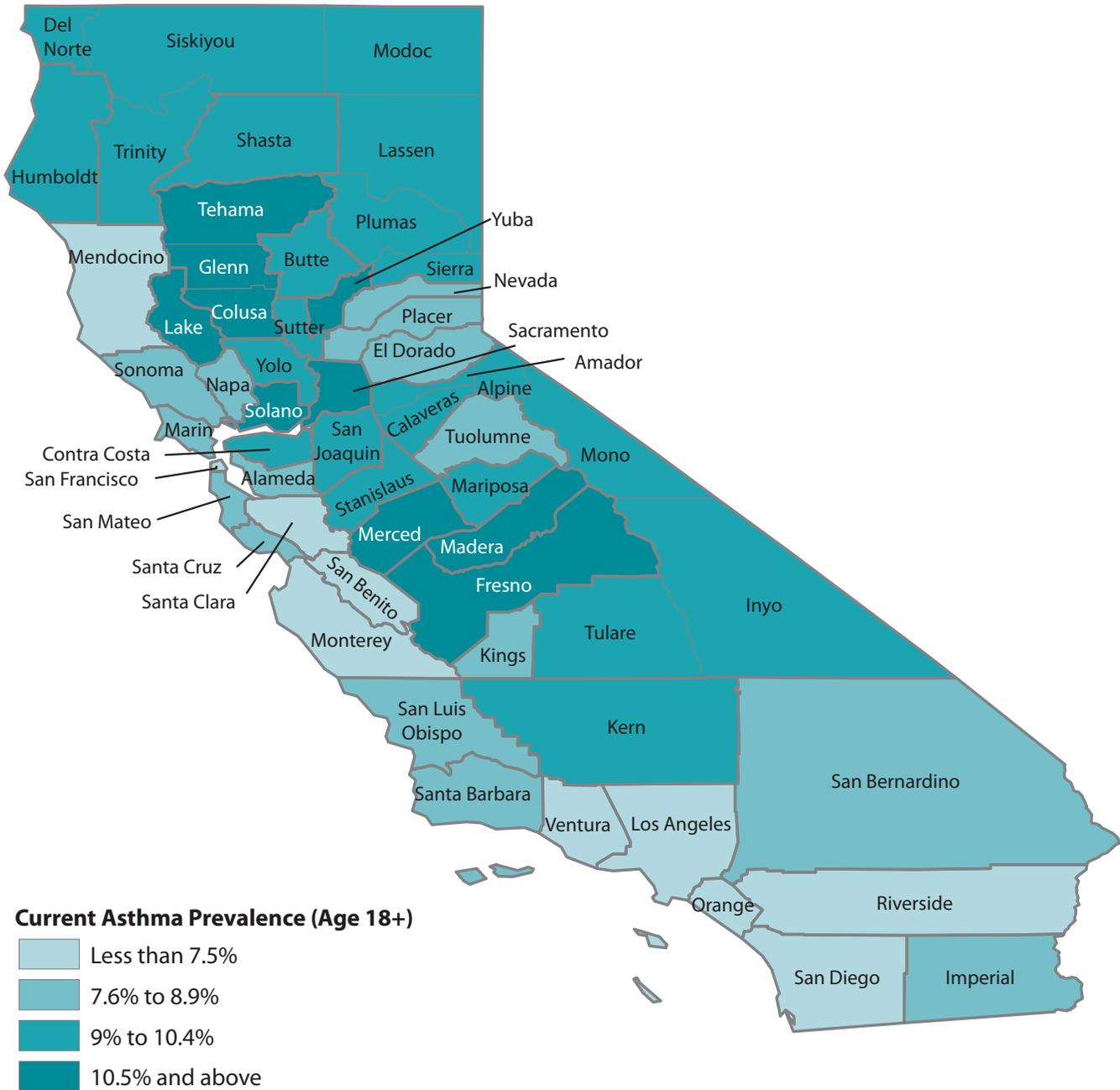
* Indicates significantly different from statewide prevalence; p<0.05.

– Indicates the estimate was not statistically reliable.

Source: 2005 and 2007 California Health Interview Surveys. Data from CHIS 2005 and CHIS 2007 were combined in this section to produce stable estimates for more counties; all other sections use data from CHIS 2007.

Exhibit 4.

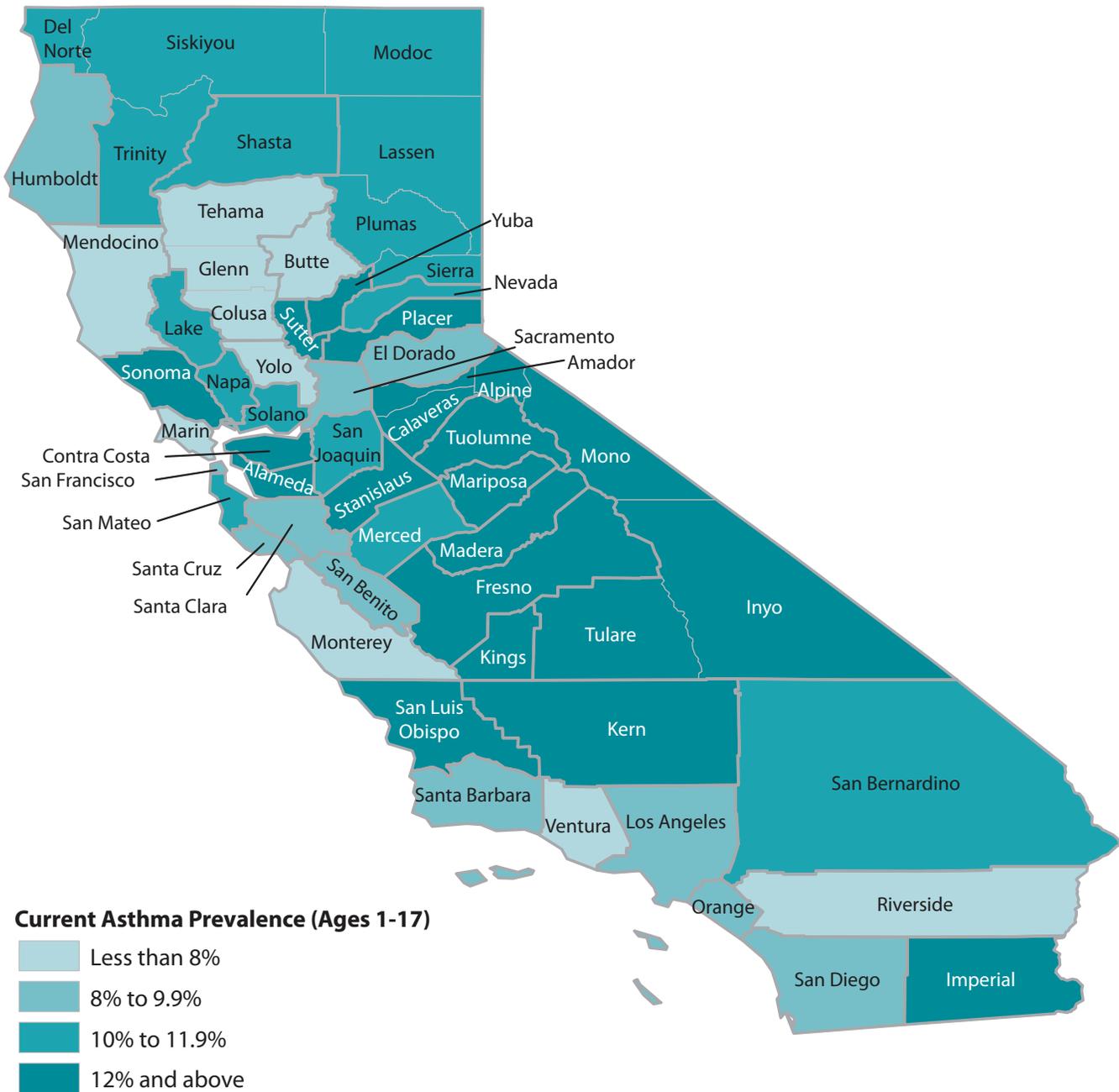
Current Asthma Prevalence by County or County Group, Adults Age 18 and Over



Source: 2005 and 2007 California Health Interview Surveys

Exhibit 5.

Current Asthma Prevalence by County or County Group, Children Ages 1-17



Source: 2005 and 2007 California Health Interview Surveys

Measuring Geographic Variation in Asthma: The Challenges

The prevalence of current asthma provides one indicator of the burden of asthma in a community. However, asthma prevalence is not the only indicator of asthma's impact on a community. Other indicators include the number of people with asthma, the number of doctor and ED visits, the rates of hospitalization and asthma mortality rates. In addition, a number of factors can contribute to regional variation in asthma prevalence. Differences in asthma prevalence could be due to differences in demographic factors (for example, age, gender, and race/ethnicity), socioeconomic status (such as income and education levels), environmental

factors (e.g., outdoor air pollution and climate), physician diagnostic practice and access to care.⁵ Variations may also relate to the migration of families with members who suffer from asthma, such as moving away from highly polluted areas or moving to areas with more accessible health care. Finally, counties with a greater proportion of people living in poverty, uninsured residents, and recent or undocumented immigrants may have higher rates of undiagnosed asthma, which could contribute to a lower prevalence of asthma relative to other areas.^{6, 7}

5 Bair YA, Garcia JA, Romano PS, Siefkin AD, Kravitz RL. Does "mainstreaming" guarantee access to care for Medicaid recipients with asthma? *Journal of General Internal Medicine* 2001; 16:475-81. Mansour ME, Lanphear BP, DeWitt TG. Barriers to asthma care in urban children: Parent perspectives. *Pediatrics*, 2000; 106:512-519.

6 Undiagnosed asthma refers to people who have asthma but the condition has not yet been diagnosed by a health care provider.

7 Magzamen S, Tager IB. Factors related to undiagnosed asthma in urban adolescents: a multilevel approach. *Journal of Adolescent Health*. 2010;46:583-91. Yeatts K, Davis KJ, Sotir M, Herget C, Shy C. Who gets diagnosed with asthma? Frequent wheeze among adolescents with and without a diagnosis of asthma. *Pediatrics*. 2003;111:1046-54.

Low-Income Californians Experience More Frequent Asthma Symptoms

More than 600,000 Californians with current asthma suffer from daily or weekly asthma symptoms (24.9% of adults and 9.4% of children). Frequent asthma symptoms are a key indicator of uncontrolled asthma, which may result from inadequate medical control and persistent exposure to environmental triggers, as well as greater severity of the condition.

A higher proportion of low-income adults experience frequent asthma symptoms compared to more affluent adults. Among adults with current asthma, 31.9% of those with incomes below 200% FPL experience daily or weekly asthma symptoms compared to only 19.3% of those at or above 400% FPL. Among children, the prevalence of frequent asthma symptoms did not vary significantly by income.

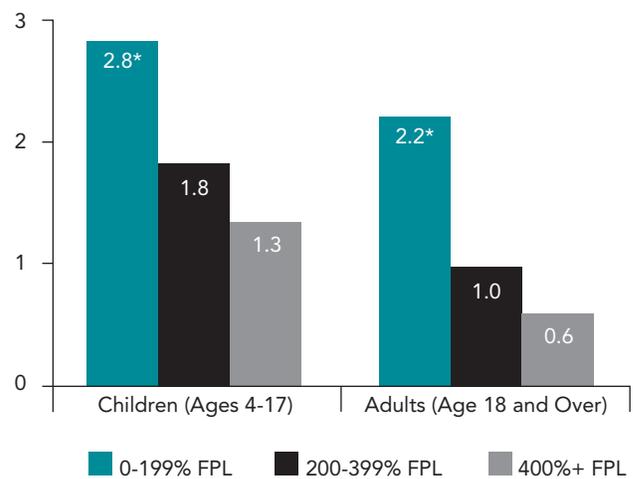
Low-Income Californians Miss More Work and School Due to Asthma

In 2007, asthma was responsible for an estimated 1.2 million missed days of work in California. Low-income Californians miss more days of work than their more affluent counterparts. Among adults with current asthma, those with incomes below 200% FPL missed three times as many work days as those with incomes at or above 400% FPL (2.2 vs. 0.6 days; Exhibit 6).

In addition, California children with asthma missed nearly 1.6 million days of school because of asthma. However, low-income children with current asthma missed more than twice as many days of school as those with higher incomes (2.8 vs. 1.3 days; Exhibit 6).

Exhibit 6.

Average Number of Days of School and Work Missed Per Year Due to Asthma by Income, Children and Adults with Current Asthma, California, 2007

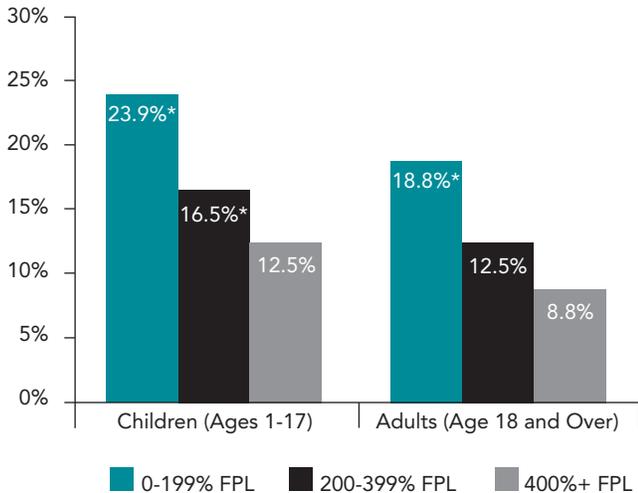


* Indicates significantly different from 400% FPL and above; $p < 0.05$.

Source: 2007 California Health Interview Survey

Exhibit 7.

Percent with at Least One Emergency Department or Urgent Care Visit for Asthma in the Past Year by Income, Children and Adults with Current Asthma, California, 2007

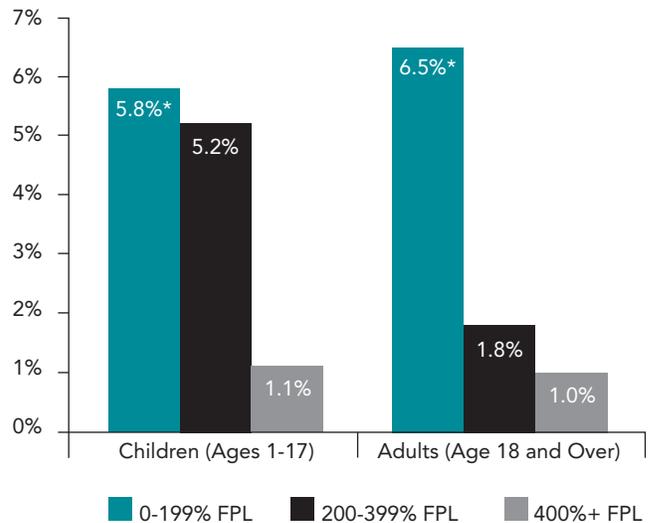


* Indicates significantly different from 400% FPL and above; p<0.05.

Source: 2007 California Health Interview Survey

Exhibit 8.

Percent Hospitalized for Asthma in the Past Year by Income, Children and Adults with Current Asthma, California, 2007



* Indicates significantly different from 400% FPL and above; p<0.05.

Source: 2007 California Health Interview Survey

Rates of Emergency Department Visits and Hospitalization Due to Asthma Are Higher Among Low-Income Californians

Emergency Department (ED) or urgent care visits for asthma can be prevented with appropriate health care, optimal management and avoidance of asthma triggers. However, more than 431,000 California adults and children with current asthma went to the ED or sought urgent care because of asthma at least once in the past year, and rates were considerably higher among low-income Californians. Among individuals below 200% FPL, 18.8% of adults and 23.9% of children visited an ED or urgent care facility in the past year, compared with just 8.8% and 12.5% of their more affluent counterparts, respectively (Exhibit 7).

Even larger income disparities are observed in rates of hospitalization due to asthma. Hospitalization rates among low-income adults with current asthma were six times higher than the rates among their higher-income counterparts (6.5% vs. 1%; Exhibit 8). Likewise, among children with current asthma, 5.8% with family incomes below 200% FPL were hospitalized for asthma compared to just 1.1% of those at or above 400% FPL.

Low-Income Californians Are Less Likely to Have Access to Appropriate Care

Asthma is a complex chronic condition and a number of factors are likely to contribute to the asthma burden experienced by California's low-income families.

Among Californians with current asthma, those with low incomes are more likely than their higher-income counterparts to lack continuous health coverage, have no usual source of care, have difficulty understanding their doctor, and have never received an asthma management plan from their doctor or other health care professional.

Lack of health insurance has been associated with worse health outcomes in both children and adults with asthma.⁸ Continuous health insurance coverage is crucial for monitoring asthma control, and receiving timely and appropriate care and medications for asthma. In California, more than 385,000 adults and children with current asthma (13%) were uninsured for all or part of the past year; this varied considerably by income. Among those with current asthma, the percent of low-income Californians who were uninsured for all or part of the past year was five times higher than that of higher-income individuals (22.1% vs. 4.4%, respectively; Exhibit 9).

It should be noted that low-income adults with asthma are even more likely to be uninsured for all or part of the year than low-income children (25.5% vs. 16.3%, respectively). The difference in health insurance coverage between children and adults might be due in part to the existence of more programs that provide insurance for children, such as Healthy Families. However, there are income disparities in continuity of insurance coverage among both adults and children. While 25.5% of adults in the lowest income category lacked continuous health insurance for the past year, only 5% of those with incomes above 400% FPL lacked continuous coverage. Likewise, 16.3% of low-income children and teens lacked continuous coverage for the past year compared to only 2.5% of those in the highest income category.

In addition to health insurance coverage, having a usual source of care (USOC) improves the continuity and quality of care for those with asthma, and reduces the likelihood of a non-urgent ED visit. More than

8 Ferris TG, Crain EF, Oken E, Wang L, Clark S, Camargo Jr CA. Insurance and quality of care for children with acute asthma. *Ambulatory Pediatrics*. Sep-Oct 2001; 1(5):267-274.

Exhibit 9.

Health Care Access Indicators by Income, Children and Adults with Current Asthma, California, 2007

Income as Percent of Federal Poverty Level (FPL)	Lacked Health Insurance All or Part of Year %	No Usual Source of Health Care %	Had Difficulty Understanding Doctor (Adults Only) %	Did Not Receive Asthma Management Plan %
0-199% FPL	22.1*	18.5*	5.9*	63.5*
200-399% FPL	13.8*	10.9	4.2	56.7
400% FPL and above	4.4	8.6	2.0	55.1
Californians with Current Asthma	13.0	12.7	3.8	58.5

* Indicates significantly different from 400% FPL and above; p<0.05.

Source: 2007 California Health Interview Survey

375,000 Californians with current asthma (12.7%) do not have a USOC. Low-income individuals are more likely than higher-income individuals to lack a USOC. Nearly 19% of individuals with asthma below 200% FPL did not have a USOC, more than twice as high as more affluent Californians (8.6%; Exhibit 9).

Effective communication between health care providers and those with asthma is a critical component of appropriate asthma care and management.⁹ However, more than 76,000 California adults with current asthma (3.8%) reported having a hard time understanding their doctor, with higher rates among low-income adults. The percent of low-income adults with asthma who experience problems understanding their doctor is nearly three times higher than that of adults with incomes at or above 400% FPL (5.9% vs. 2%; Exhibit 9).

Individualized, written asthma management plans are important in helping people with asthma to identify and respond to worsening asthma symptoms, reduce exposure to environmental triggers and to use medication effectively to control asthma. Asthma management plans have been shown to improve patient outcomes (e.g., reduce ED visits, improve

control of asthma symptoms) and are a recommended component of quality asthma care.¹⁰ Despite evidence of their importance, more than half of California adults and children with current asthma have never received asthma management plans (58.2% of adults and 59.1% of children). However, lower-income individuals are more likely not to have received an asthma management plan than higher-income individuals (63.5% of individuals with asthma below 200% FPL, compared with 55.1% with incomes at or above 400% FPL).

Low-Income Californians Are More Likely to Encounter Risk Factors for Asthma Exacerbation

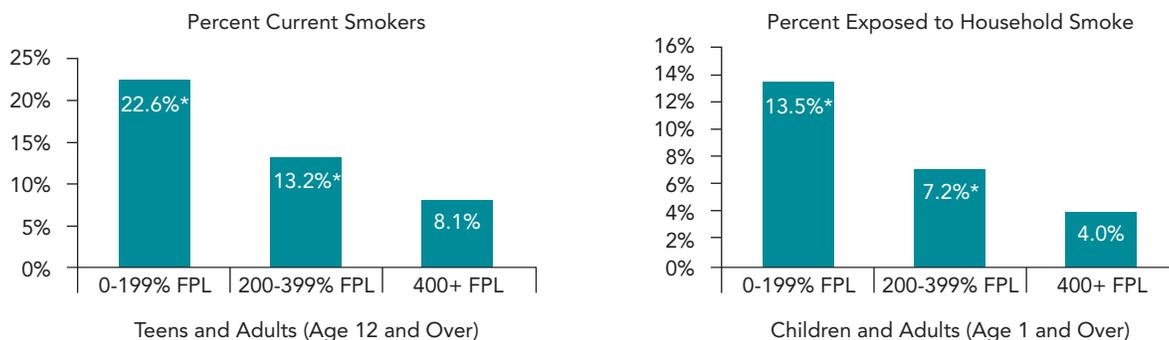
Exposure to common asthma triggers such as tobacco smoke can exacerbate asthma. People with asthma are strongly encouraged to avoid smoking. In California, nearly 347,000 adults and adolescents with current asthma smoke (14.1%). Low-income adults and adolescents with asthma are more likely to smoke. More than 22% of low-income adults and teens with asthma are current smokers, compared to just 8.1% of their high-income counterparts (Exhibit 10).

9 The Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma – Summary Report 2007. *Journal of Allergy and Clinical Immunology*. Nov 2007;120(5 Suppl):S94-138.

10 Agrawal SK, Singh M, Mathew JL, Malhi P. Efficacy of an individualized written home-management plan in the control of moderate persistent asthma: a randomized, controlled trial. *Acta Paediatrica*. 2005;94:1742-1746. Holt S, Masoli M, Beasley R. The use of the self-management plan system of care in adult asthma. *Primary Care Respiratory Journal*. 2004;13:19-27.

Exhibit 10.

Percent Who Currently Smoke, Teens and Adults with Current Asthma, and Percent Exposed to Household Smoke, All Ages with Current Asthma, California, 2007



* Indicates significantly different from 400% FPL and above; $p < 0.05$.

Source: 2007 California Health Interview Survey

Second-hand smoke exposure increases the frequency of asthma episodes and the severity of asthma symptoms in both children and adults with asthma. In California, more than 240,000 children and adults with current asthma (8.1%) are exposed to second-hand smoke at home (household smoke). Rates of exposure to second-hand smoke at home are more than three times as high among low-income Californians with asthma compared to those with incomes at or above 400% FPL (13.5% vs. 4%; Exhibit 10).

Although tobacco smoke is an important risk factor for asthma exacerbations, it is not the only factor. Low-income Californians are also more likely to be exposed to other living conditions that contribute to asthma exacerbations. For example, low-income Californians are more likely to live in substandard housing where asthma triggers such as mold and cockroaches are more prevalent.¹¹ In addition, low-income communities are more likely to be located in areas with greater exposure to air pollution from traffic and other sources.¹²

11 Rauh VA, Chew GR, Garfinkel RS. Deteriorated housing contributes to high cockroach allergen levels in inner-city households. *Environmental Health Perspectives*. 2002; 110 (supp 2): 323-327. Krieger JW, Song L, Takaro TK, Stout J. Asthma and the home environment of low-income urban children: preliminary findings from the Seattle-King County healthy homes project. *Journal of Urban Health*. 2000 Mar;77(1):50-67.

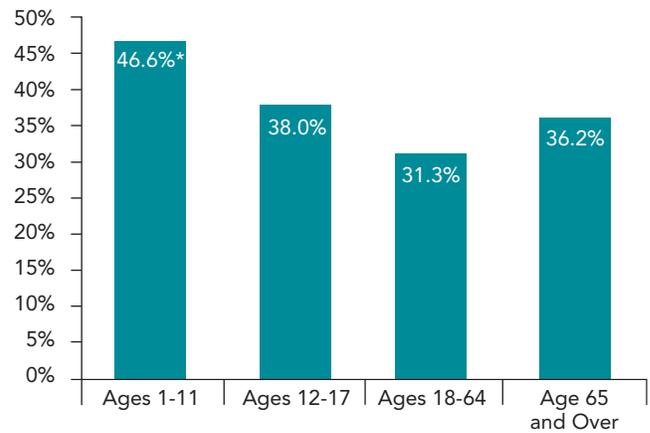
12 Gunier RB, Hertz A, Von Behren J, Reynolds P. Traffic density in California: socioeconomic and ethnic differences among potentially exposed children. *Journal of Exposure Analysis and Environmental Epidemiology*. 2003 May;13(3):240-246. Green RS, Smorodinsky S, Kim JJ, et al. Proximity of California public schools to busy roads. *Environmental Health Perspectives*. 2004;112:61-66. Korc ME. A socioeconomic assessment of human exposure to ozone in the South Coast Air Basin of California. *Journal of the Air & Waste Management Association*. 1996 Jun;46(6):547-57.

Low-Income Californians with Asthma Are More Likely to be Children and People of Color

The proportion of individuals with incomes below 200% FPL varies by race/ethnicity and age group. Among Californians with current asthma, nearly half of young children are low-income compared to just under one-third of non-elderly adults (46.6% vs. 31.3%). Elderly adults are also more likely to be low-income (36.2%; Exhibit 11).¹³

¹³ The difference between the proportion of elderly adults (age 65 and over) and non-elderly adults (ages 18-64) with incomes below 200%FPL (36.2% vs. 31.3%) was significant with $p=0.056$.

Exhibit 11.
Percent with Incomes Below 200% FPL by Age, Children and Adults, California, 2007

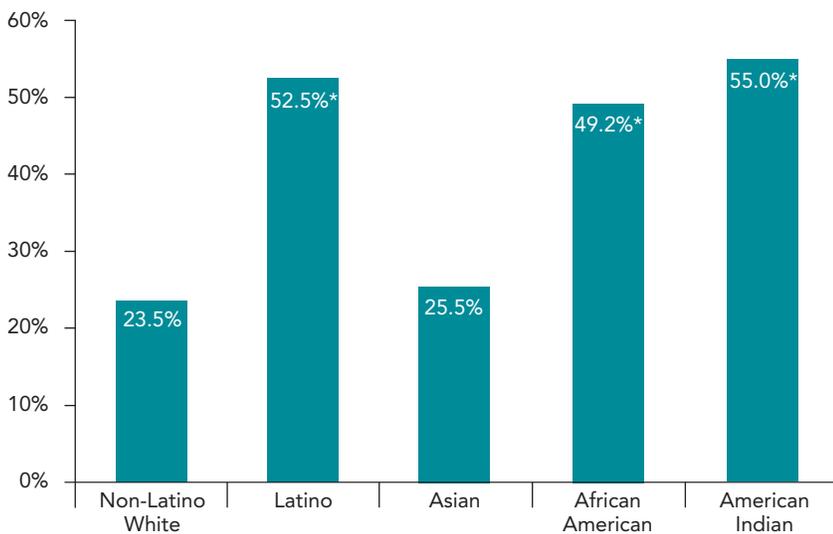


* Indicates significantly different from ages 18-64; $p<0.05$.

Source: 2007 California Health Interview Survey

Exhibit 12.

Percent with Incomes Below 200% FPL by Race, Children and Adults, California, 2007



* Indicates significantly different from Non-Latino White; $p < 0.05$.

Source: 2007 California Health Interview Survey

More than half of Latinos (52.5%) and American Indians (55%), and nearly half of African Americans (49.2%) with current asthma are low-income compared with less than one-quarter of whites (23.5%; Exhibit 12).

Conclusions and Recommendations

Although asthma is a potentially debilitating condition, it can be effectively controlled; exacerbations and attacks can be prevented through appropriate medical care and disease management. However, low-income Californians are less likely to achieve optimal prevention, control and management of asthma. They are more likely to miss work and school, suffer from frequent symptoms, visit the ED and/or be hospitalized. These disparities are likely due to a number of factors including inadequate access to health insurance coverage, lack of continuity and quality of health care, and an increased likelihood of exposure to asthma triggers. Reducing these asthma

disparities requires clinical, policy and public health efforts. Recommendations include the following:

Expand health care coverage and benefit package for low-income Californians

Health insurance coverage with an appropriate benefit package is essential for people with asthma, especially for low-income adults and children. The current and proposed health care policy changes, such as expanding Medi-Cal income-eligibility criteria, expansion of managed care to California's Medi-Cal beneficiaries, and plans for the full implementation of federal health care reform policies, should consider the special health care needs of low-income Californians with chronic conditions, such as asthma. In addition to increasing the insurance coverage for the population, a comprehensive benefit package, including coverage for home- or community-based asthma education, should be developed to assure that low-income Californians with asthma have adequate financial access to timely and continuous care.

Assure quality of care for low-income Californians

Provision of quality care is vital to effective asthma management and control. Efforts should be made at the health care delivery system (e.g., health plan) and provider levels to assure that low-income Californians with asthma have access to quality primary care. This includes access to a patient-centered medical home, regularly scheduled asthma visits, disease or case management programs, appropriate specialist referrals, as well as access to advice from a health professional twenty-four hours a day. It is also important to adapt patient care and education programs to meet different cultural and language needs, as well as literacy levels, to overcome communication barriers. Compensation for such services should be established to assure that providers for low-income Californians, such as safety-net providers, are adequately reimbursed, especially given the current economic climate.

Improve living environments for Californians with asthma

To reduce the overall burden of asthma among low-income Californians, policies and interventions are needed to improve living conditions and environments for low-income Californians. Low-income Californians are more likely to be exposed to living conditions that contribute to asthma exacerbations. For example, low-income Californians are more likely to be exposed to second-hand smoke and to live in substandard housing where asthma triggers such as mold and cockroaches are more prevalent. In addition, low-income communities are more likely to be located in areas with greater exposure to air pollution from traffic and other sources. Some triggers, such as smoking, can be partially reduced through behavior change, whereas others require policy change and environmental improvements. Local and community-based interventions are needed to raise awareness about the importance of controlling environmental triggers, such as air pollutants, tobacco smoke and indoor allergens. Public policies and private efforts to reduce exposures to indoor and outdoor asthma triggers, to prevent exposures to smoke and chemicals, to prohibit smoking indoors and in public spaces, and to discourage children and adults from smoking can help create asthma-friendly environments.

Data Source

All statements in this report that compare rates for one group with another group reflect statistically significant differences ($p < 0.05$) unless otherwise noted. The findings in this report are based primarily on data from the 2007 California Health Interview Survey (CHIS 2007). However, data from the 2001, 2003 and 2005 surveys were also used. CHIS 2007 completed interviews with over 50,000 adults and 13,500 children and adolescents, drawn from every county in the state, in English, Spanish, Chinese (both Mandarin and Cantonese), Vietnamese and Korean. CHIS 2001 data were re-weighted to be consistent with the weighting methodology adopted for CHIS 2003 and CHIS 2005. As a result, CHIS 2001 estimates presented here may differ from some previously published estimates. The California Health Interview Survey is a collaboration of the UCLA Center for Health Policy Research, the California Department of Public Health, the California Department of Health Care Services and the Public Health Institute. Funding for the CHIS 2007 statewide survey was provided by the California Department of Public Health, the California Department of Health Care Services, The California Endowment, the National Cancer Institute, First 5 California, the California Office of the Patient Advocate, the California Department of Mental Health and Kaiser Permanente. For local funders and other information on CHIS, visit www.chis.ucla.edu.

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Acknowledgements

The authors wish to thank Lijie Di, Leanne Streja, Hongjian Yu, Gwen Driscoll and Celeste Maglan for their assistance. The authors would also like to thank the following individuals for their thoughtful reviews and helpful comments:

Allison L. Diamant, MD, MSHS
Faculty Associate
UCLA Center for Health Policy Research
Associate Professor, UCLA School of Medicine

Anne Kelsey Lamb, MPH
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Regional Asthma Management & Prevention (RAMP)

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This UCLA Center for Health Policy Research report was funded by The California Endowment.



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