Asthma Prevalence in California

A Surveillance Report

CDPH California Department of PublicHealth

CALIFORNIA BREATHING

January, 2017

Table of Contents

What is asthma prevalence?

This report summarizes asthma prevalence in California. Asthma prevalence is the percentage of people who have asthma. The data are from a large statewide telephone survey called the California Health Interview Survey (CHIS). The CHIS asks about whether adults and children have been diagnosed with asthma and whether they still suffer from asthma (not everyone with asthma continues to have asthma symptoms). 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 had a prior diagnosis of asthma and reports still having asthma or having asthma symptoms in the last year. For more information about the data in this report, please see the Technical Notes on page 19. Data on asthma prevalence for each California county can be found in the County Asthma Profiles at www.californiabreathing.org. To learn about recommended strategies for reducing asthma, see the Strategic Plan for Asthma in California (also at www.californiabreathing.org).

How many people have asthma in California?

In 2014, 13.8% of adults reported that they had ever been diagnosed with asthma (lifetime asthma) and 8.1% said they still have asthma (current asthma). Among children under age 18, 13.7% had lifetime asthma and 9.4% had current asthma. This translates to approximately 4 million adults and 1.2 million children in California who have been diagnosed with asthma, and 2.3 million adults and 851,000 children in California who have current asthma. The prevalence has not changed significantly since 2001, though increases have been shown in earlier decades.

Are there disparities in who has asthma in California?

Many people in California have asthma, but some groups have higher prevalence than others. By age, school-aged children (5-17) have higher asthma prevalence than other age groups. By race/ethnicity, the groups with the highest asthma prevalence are Blacks, American Indians/Alaska Natives (AI/AN), Puerto Ricans, Filipinos, and Japanese. Gay/lesbian and bisexual men and women also have particularly high asthma prevalence. People born in the U.S. are more likely to have asthma than their racial/ethnic counterparts born outside of the country.

Summary

Overall asthma prevalence

- Approximately 5.2 million people in California have asthma.
- In 2014, 13.8% of adults and 13.7% of children had been diagnosed with asthma at some point in their lives (lifetime asthma); 8.1% of adults and 9.4% of children had current asthma.
- Asthma prevalence has not changed significantly since 2001.

Asthma prevalence among different populations

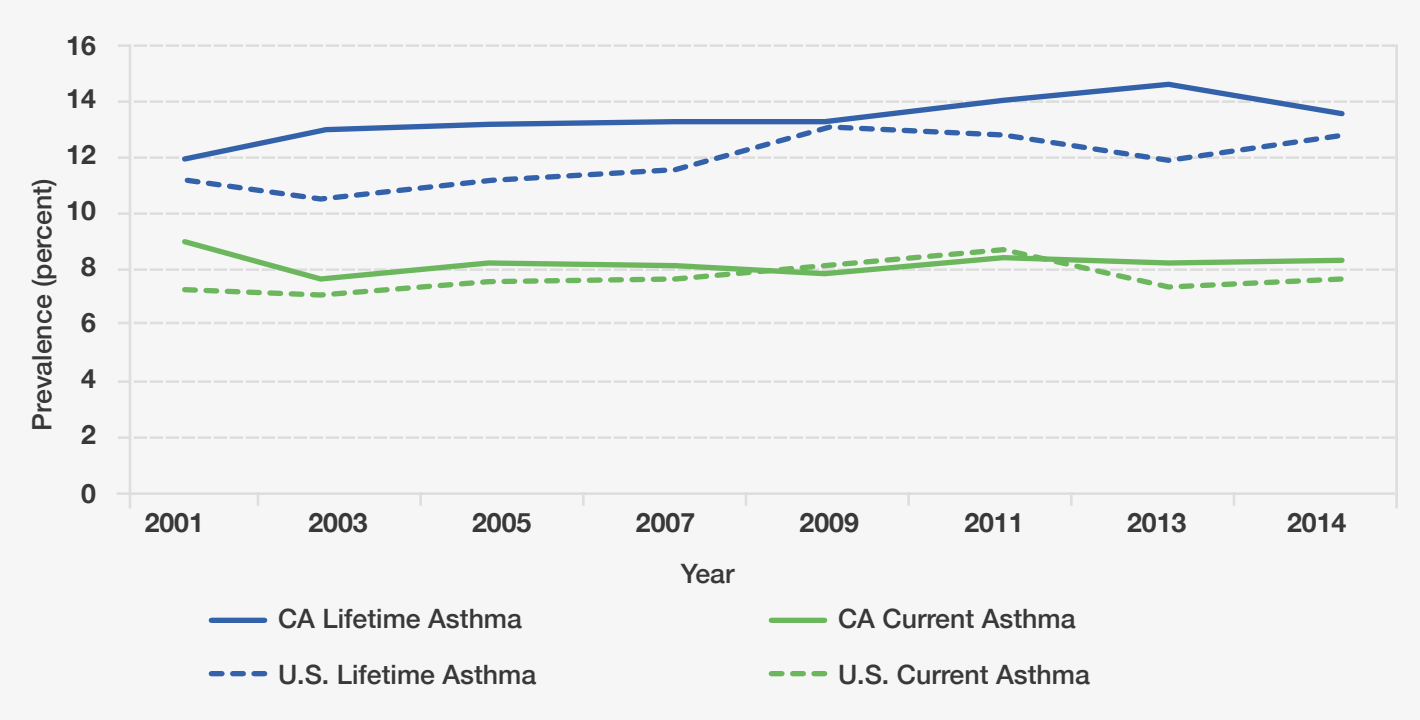
- Asthma prevalence among children ages 5-17 is 20-40% higher than among adults.
- Among adults, both lifetime and current asthma prevalence are higher for females than males.
- Gay/lesbian and bisexual men and women have 40-60% higher asthma prevalence than straight men and women.
- Hispanics and Asians born in the U.S. are more than twice as likely to have current or lifetime asthma than Hispanics and Asians born outside of the U.S.

Asthma prevalence by race/ethnicity

- Asthma prevalence among Blacks is about 30% higher than among Whites.
- Asthma prevalence among AI/AN is more than 40% higher than among Whites.
- There are variations in asthma prevalence within the Hispanic ethnic group. Lifetime asthma prevalence ranges from 35.8% among Puerto Ricans (2.3 times higher than among Whites) to 6.5% among South Americans.
- There are also variations in asthma prevalence within the Asian racial/ethnic group. Lifetime asthma prevalence ranges from 16.9% among Filipinos to 5.7% among Koreans.

Lifetime and Current Asthma Prevalence, California and the U.S., 2001-2014

Data Source: CA data from CHIS 2001-2014 (healthpolicy.ucla.edu/chis); U.S. data from the National Health Interview Survey (www.cdc.gov/asthma/nhis)



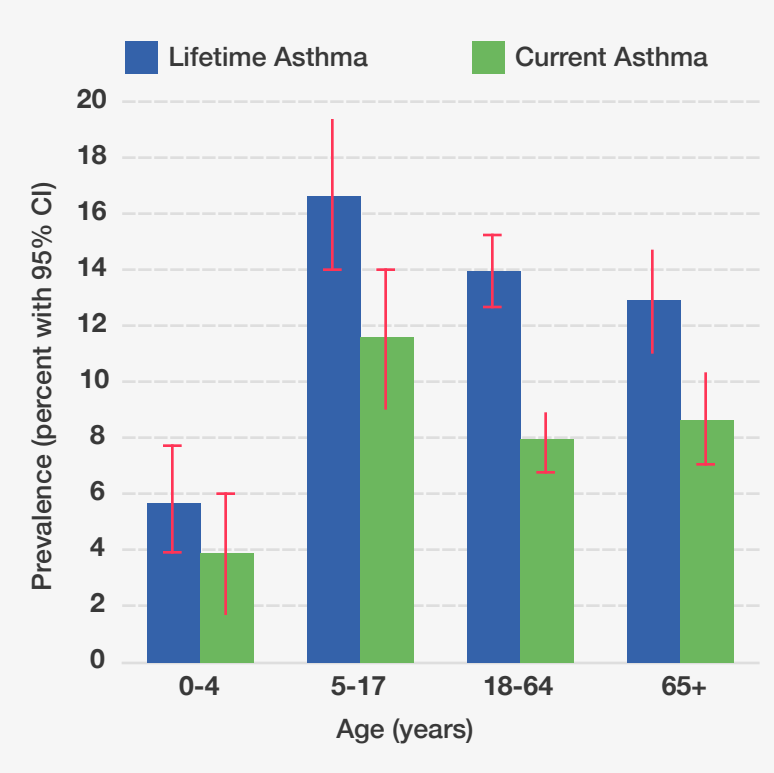
In 2014, 13.8% of Californians had been diagnosed with asthma (lifetime asthma prevalence) and 8.4% still have asthma or have had symptoms in the past year (current asthma prevalence). The prevalence has not changed significantly since 2001, though increases have been shown in earlier decades.

Note: From 2001-2011, CHIS data were collected every other year. Beginning in 2013, data are available annually.

See Data in Appendix Table 1.

Lifetime and Current Asthma Prevalence by Age, California 2014

Data Source: CHIS 2014

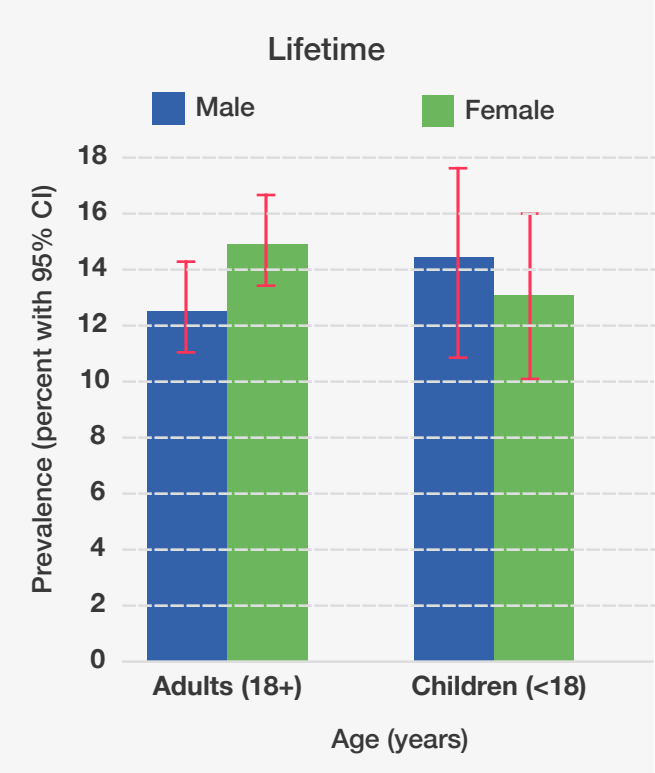


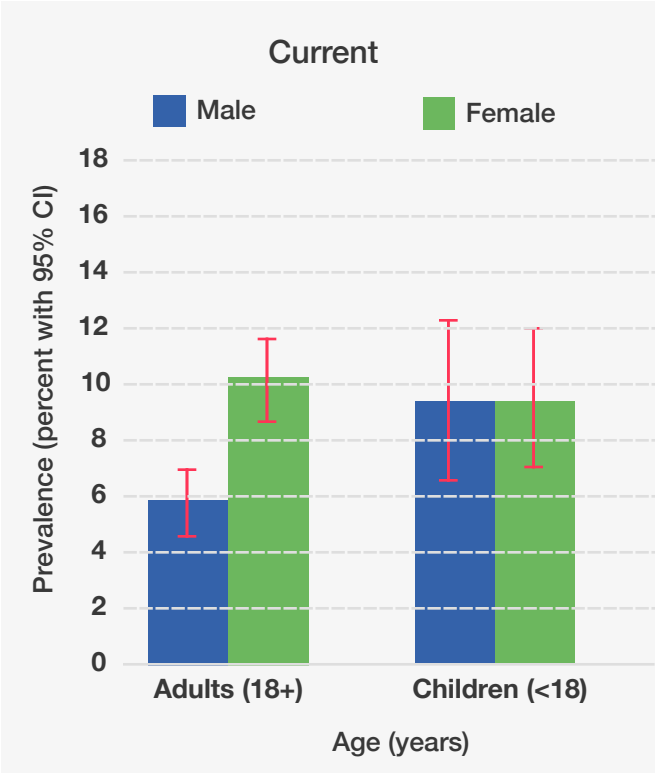
Both lifetime and current asthma prevalence are highest among children age 5-17. Young children, ages 0-4, have the lowest asthma prevalence (both lifetime and current). Accurate asthma diagnosis in this group is difficult because other common conditions can be responsible for asthma-like symptoms and measuring lung function is difficult in very young children.

See Data in Appendix Table 2.

Lifetime and Current Asthma Prevalence by Gender and Age, California 2014

Data Source: CHIS 2014



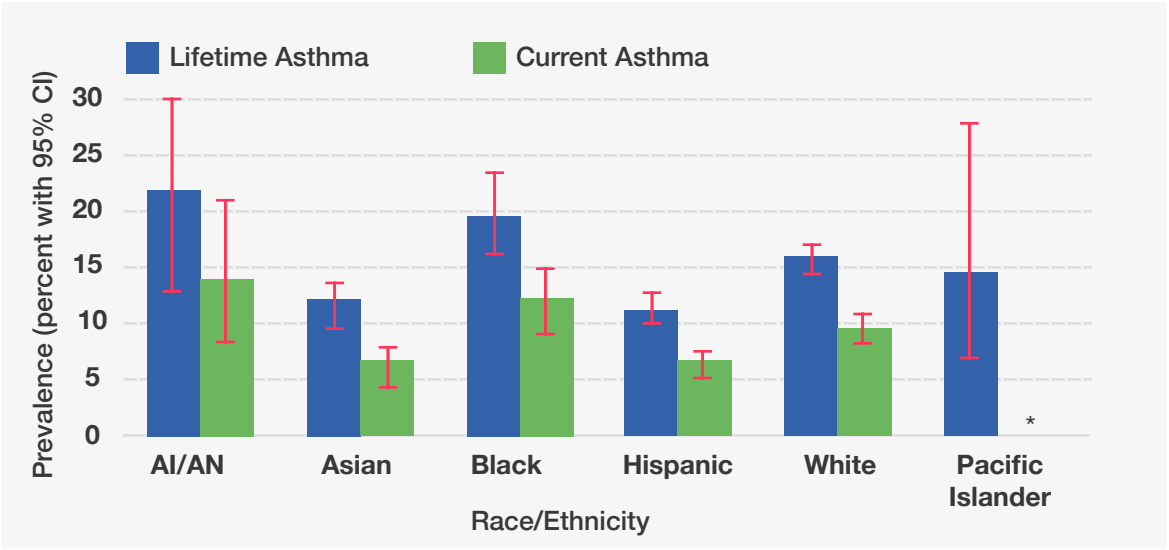


In 2014, lifetime and current asthma prevalence for female adults (18+ years) was higher than for male adults (lifetime asthma was 20% higher in females, Chi-square p=0.05; current asthma was 75% higher in females, Chi-square p<0.01). In children, asthma prevalence was not significantly different by gender, though various asthma studies find higher prevalence among male children than female children.

See Data in Appendix Table 3.

Lifetime and Current Asthma Prevalence by Race/Ethnicity, California 2013 and 2014 Combined

Data Source: CHIS 2013 and 2014



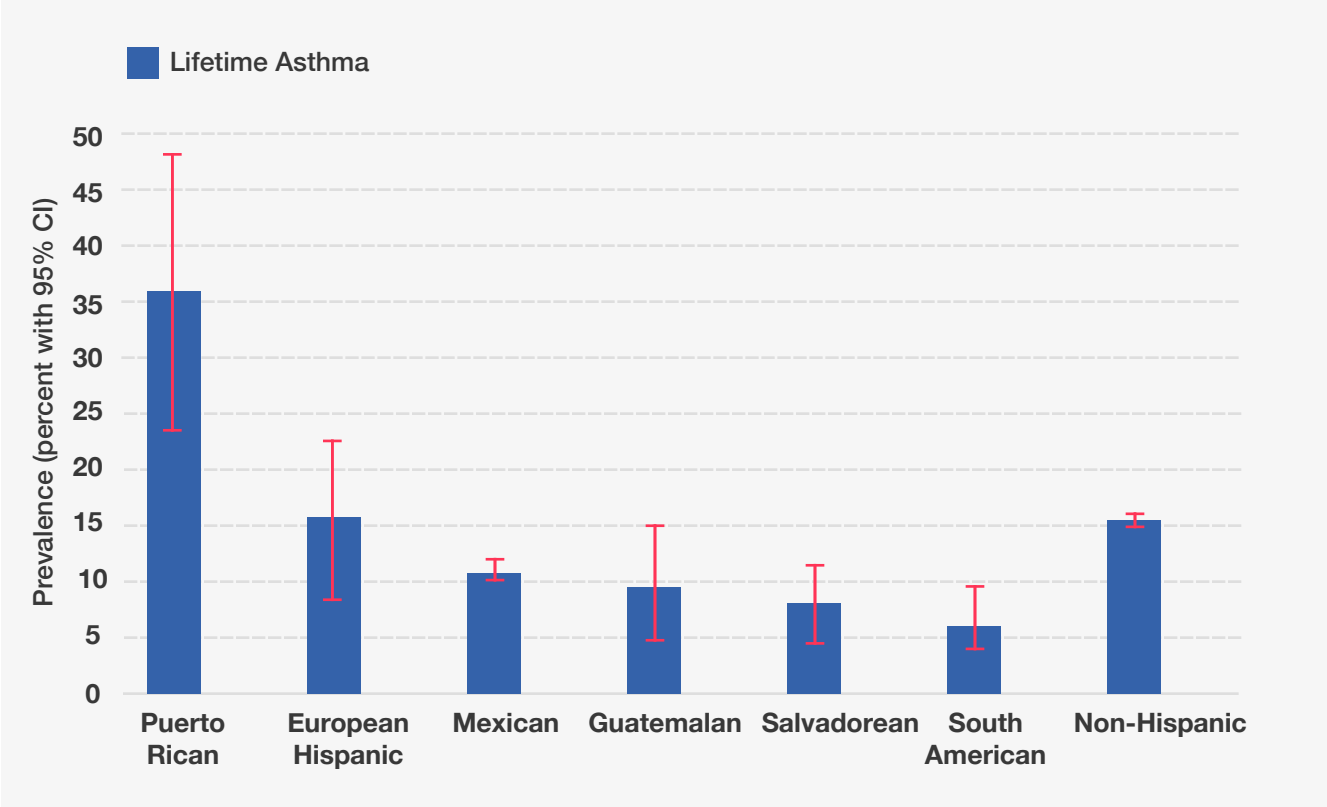
The prevalence of lifetime and current asthma is highest for American Indians/Alaska Natives (AI/AN) and Blacks--significantly higher than Asians and Hispanics (Chi-square $p<0.01$ for all comparisons). Lifetime asthma prevalence among Blacks is also significantly higher than among Whites (Chi-square $p=0.01$).

* Data not available for current asthma among Pacific Islanders.

See Data in Appendix Table 4.

Lifetime Asthma Prevalence among Hispanics, by Hispanic Subgroup, California 2013 and 2014 Combined

Data Source: CHIS 2013 and 2014



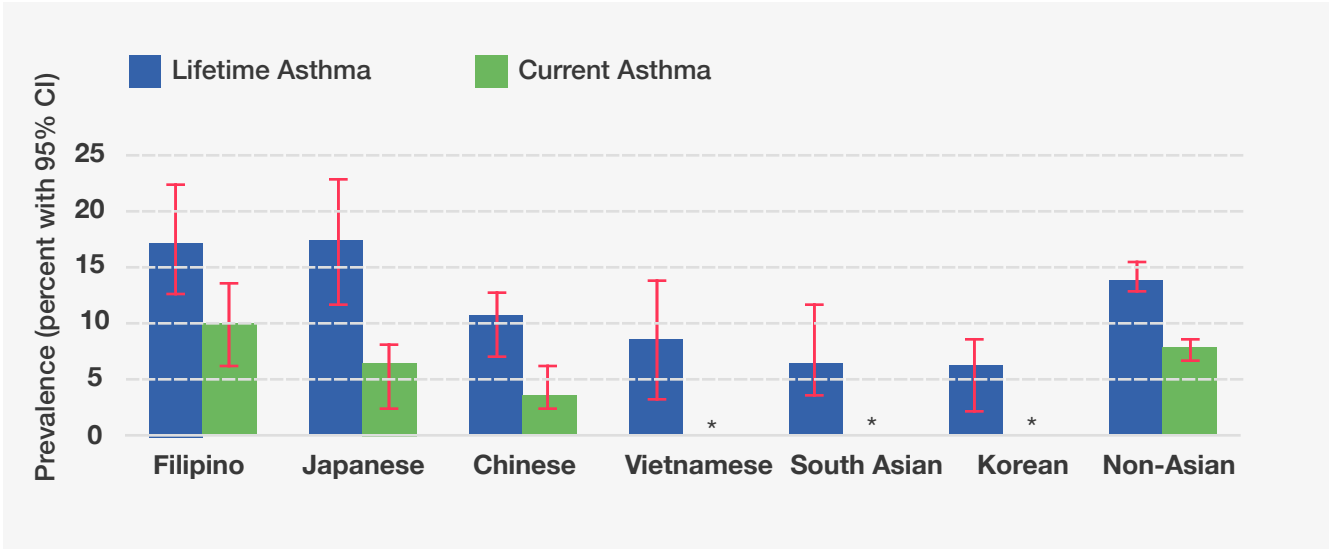
Overall, Hispanics have among the lowest asthma prevalence of all race/ethnicity groups (see previous page). But, combining all Hispanics into one group masks important differences among Hispanic subgroups. The CHIS asks respondents about Hispanic ancestry or origin, allowing for analysis of asthma prevalence by subgroup. Puerto Ricans have the highest lifetime asthma prevalence--significantly higher than all other groups including non-Hispanics (Chi-square $p<0.01$ for all comparisons).

Sufficient data were not available to look at Hispanic subgroups and current asthma prevalence.

See Data in Appendix Table 5.

Lifetime and Current Asthma Prevalence among Asians, by Asian Subgroup, California 2013 and 2014 Combined

Data Source: CHIS 2013 and 2014



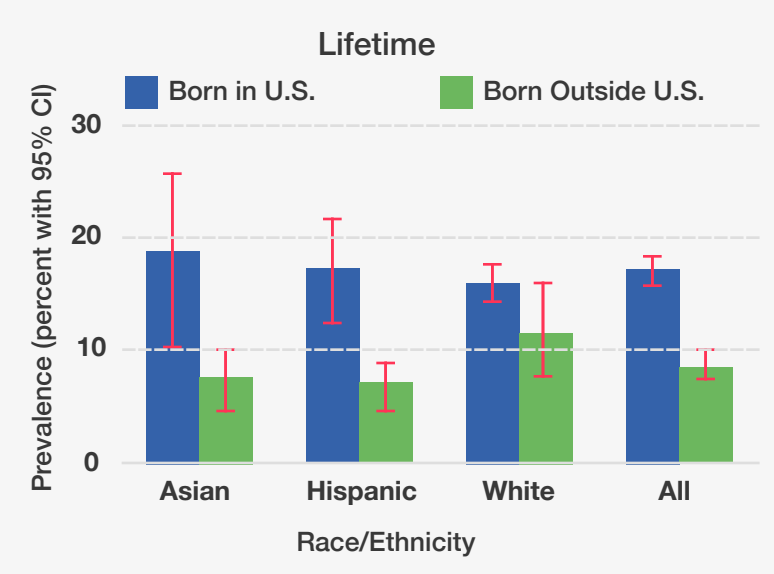
Asians also have a low overall asthma prevalence, but variations among subgroups are similarly masked when all Asians are combined together. Filipino and Japanese groups have the highest lifetime asthma prevalence--significantly higher than the Chinese, South Asian, and Koren groups (Chi-square $p<0.01$ for all comparisons). Filipinos also have high current asthma prevalence--significantly higher than the lowest group, Chinese (Chi-square $p=0.002$).

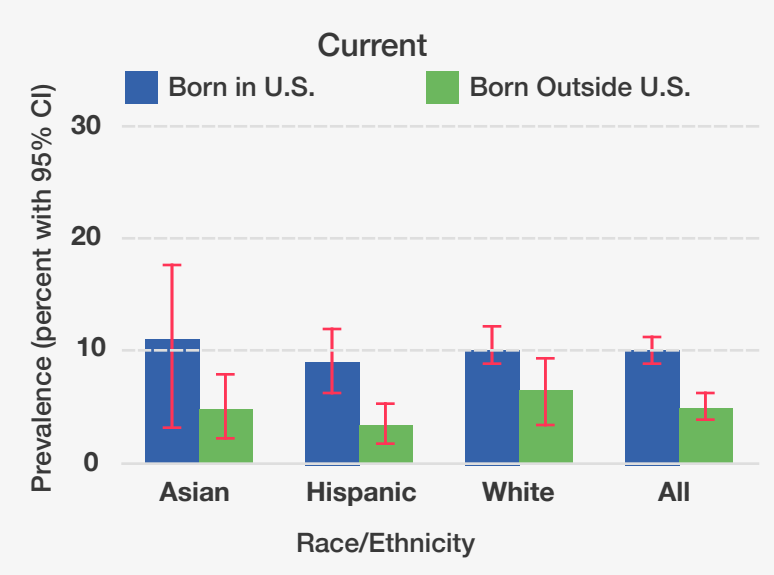
*Sufficient data not available for current asthma among Vietnamese, South Asian, and Korean groups.

See Data in Appendix Table 6.

Lifetime and Current Asthma Prevalence among Adults, By Race/Ethnicity and Country of Birth, California 2014

Data Source: CHIS 2014



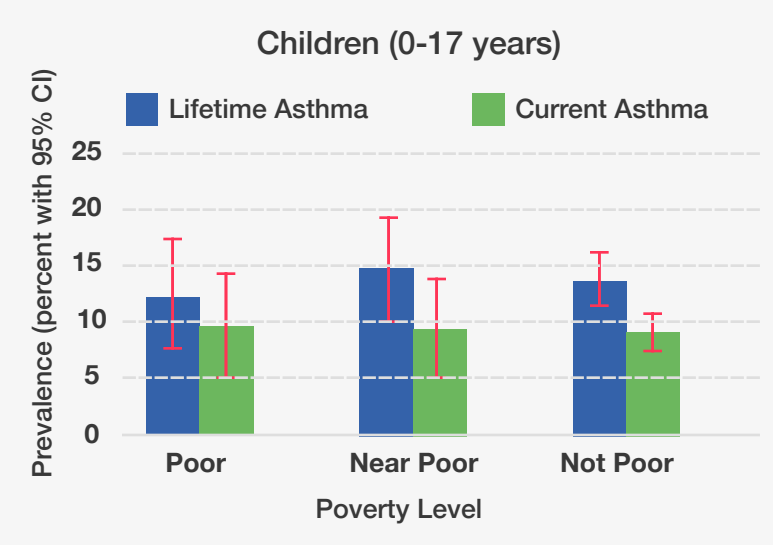


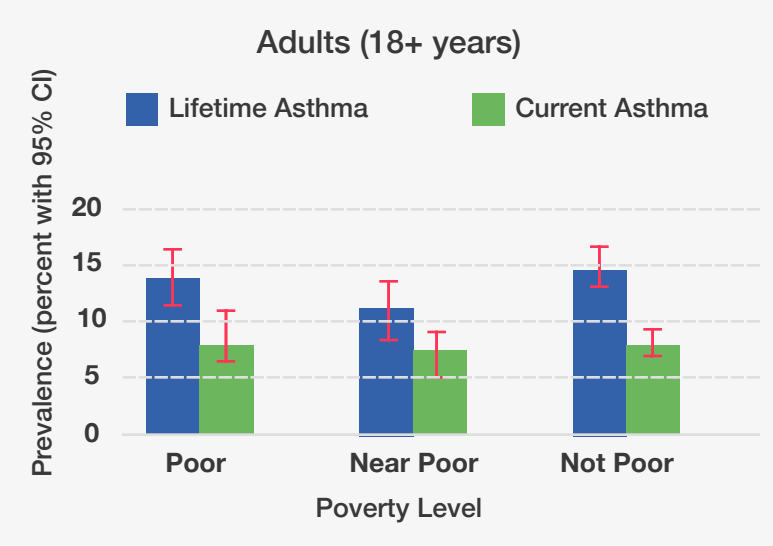
People born in the U.S. are more likely to have current or lifetime asthma than people born outside of the U.S. (Chi-square $p<0.01$). The disparity is largest for Hispanics and Asians, who are more than two times more likely to have current or lifetime asthma if they were born in the U.S. (Chi-square $p<0.01$ for Hispanic lifetime and current comparison and for Asian lifetime comparison).

See Data in Appendix Table 7.

Lifetime and Current Asthma Prevalence by Poverty Level and Age, California 2014

Data Source: CHIS 2014





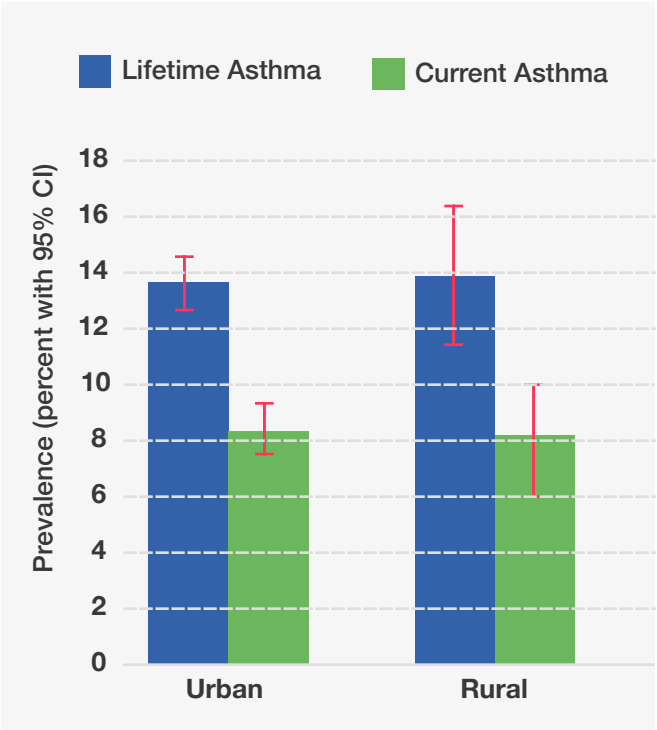
These data do not show an association between income level and asthma prevalence. However, other studies have shown that low-income Californians experience more asthma symptoms, use the emergency room more for asthma care, miss more school due to asthma, and are more likely to encounter asthma risk factors.

Note: Poverty level is based on family income and family size and categorized using the U.S. Census Bureau's poverty thresholds. "Poor" persons are defined as those below the poverty threshold; "near poor" persons have incomes of 100% to less than 200% of the poverty threshold; and "not poor" persons have incomes of 200% of the poverty threshold or greater.

See Data in Appendix Table 8.

Lifetime and Current Asthma Prevalence By Urban/Rural Residence, California 2014

Data Source: CHIS 2014

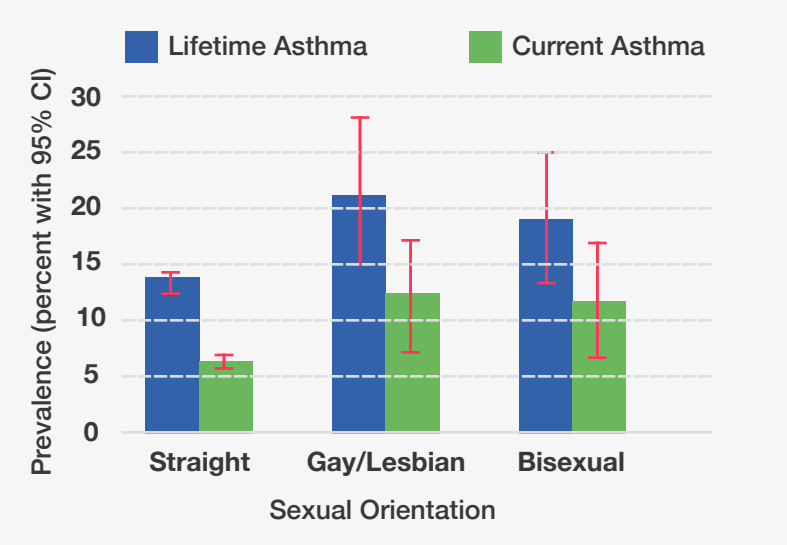


These data do not show any association between asthma prevalence and urban/rural residence in California.

See Data in Appendix Table 9.

Lifetime and Current Asthma Prevalence among Adults (Age 18-70), by Sexual Orientation, California 2013 and 2014 Combined

Data Source: CHIS 2013 and 2014



Gay/Lesbian and bisexual men and women have higher lifetime asthma prevalence than straight men and women (Chi-square $p<0.05$ for both comparisons). Current asthma prevalence is also higher among gay/lesbian and bisexual men and women, but this difference was not statistically significant.

See Data in Appendix Table 10.

Table 1: Lifetime and Current Asthma Prevalence, California and the U.S., 2001-2014

	California					
	Lifetime Asthma Prevalence			Current Asthma Prevalence		
Year	%	(95%CI)		%	(95%CI)	
2001	12.0	11.7	12.4	8.9	8.6	9.2
2003	13.0	12.5	13.4	7.9	7.5	8.2
2005	13.4	12.9	13.9	8.3	7.9	8.7
2007	13.5	13.1	13.9	8.1	7.8	8.4
2009	13.5	12.8	14.1	7.9	7.4	8.4
2011	14.0	13.5	14.5	8.3	7.9	8.7
2013	14.3	13.5	15.2	8.2	7.5	8.9
2014	13.8	13.0	14.7	8.4	7.6	9.1

Table 2: Lifetime and Current Asthma Prevalence by Age, California 2014

		Lifetime Asthma Prevalence			Current Asthma Prevalence		
	Age (years)	%	(95%CI)		%	(95%CI)	
Children	0-4	5.6	3.7	7.6	3.8	1.7	6.0
	5-17	16.7	14.0	19.4	11.5	9.0	14.0
Adults	18-64	14.0	12.8	15.3	7.9	6.9	8.9
	65+	12.9	10.9	14.8	8.7	7.0	10.4
Totals	0-17	13.7	11.7	15.7	9.4	7.5	11.3
	18+	13.8	12.8	14.9	8.1	7.2	9.0
	All Ages	13.8	13.0	14.7	8.4	7.6	9.1

Table 3: Lifetime and Current Asthma Prevalence by Gender and Age, California 2014

	Adults (18+ years)				Children (0-17 years)			
	Lifetime Asthma Prevalence		Current Asthma Prevalence		Lifetime Asthma Prevalence		Current Asthma Prevalence	
Gender	%	(95%CI)	%	(95%CI)	%	(95%CI)	%	(95%CI)
Male	12.6	11.0 14.2	5.8	4.7 7.0	14.4	11.2 17.6	9.4	6.5 12.3
Female	15.0	13.4 16.6	10.2	8.8 11.6	13.0	10.0 15.9	9.4	6.8 12.0

Table 4: Lifetime and Current Asthma Prevalence by Race/Ethnicity, California 2013 and 2014 Combined

	Lifetime Asthma Prevalence			Current Asthma Prevalence		
Race/ Ethnicity	%	(95%CI)		%	(95%CI)	
AI/AN	21.8	13.5	30.2	14.3	8.0	20.7
Asian	11.7	9.7	13.7	6.1	4.7	7.6
Black	19.8	16.3	23.4	12.3	9.5	15.1
Hispanic	11.3	9.9	12.7	6.1	5.0	7.2
White	15.4	14.5	16.3	9.8	9.0	10.6
Pacific Islander	14.9	6.7	23.0	—	—	—

Table 5: Lifetime Asthma Prevalence among Hispanics, by Hispanic Subgroup, California 2013 and 2014 Combined

	Lifetime Asthma Prevalence		
Hispanic Subgroup	%	(95%CI)	
Puerto Rican	35.8	23.3	48.3
European Hispanic	15.5	8.0	23.1
Mexican	11.7	10.5	12.9
Guatemalan	9.7	4.4	15.0
Salvadorean	8.1	4.3	11.8
South American	6.5	3.3	9.7
Non-Hispanic	15.4	14.6	16.2

Table 6: Lifetime and Current Asthma Prevalence among Asians, by Asian Subgroup, California 2013 and 2014 Combined

	Lifetime Asthma Prevalence			Current Asthma Prevalence		
Asian Subgroup	%	(95%CI)		%	(95%CI)	
Filipino	16.9	11.8	22.0	9.9	5.8	14.0
Japanese	16.8	11.0	22.7	5.6	2.6	8.6
Chinese	10.2	7.4	12.9	3.9	2.2	5.7
Vietnamese	8.9	3.6	14.3	—	—	—
South Asian	7.5	3.8	11.2	—	—	—
Korean	5.7	2.2	9.2	—	—	—
Non-Asian	14.4	13.8	15.1	8.6	8.1	9.2

Table 7: Lifetime and Current Asthma Prevalence among Adults, By Race/Ethnicity and Country of Birth, California 2014

	Lifetime Asthma Prevalence				Current Asthma Prevalence			
	Born in U.S.			Born Outside U.S.			Born in U.S.			Born Outside U.S.		
Race/Ethnicity	%	(95%CI)		%	(95%CI)		%	(95%CI)		%	(95%CI)	
Asian	18.2	10.3	26.1	7.2	4.5	10.0	10.7	3.8	17.6	5.1	2.7	7.5
Hispanic	17.0	12.7	21.3	6.7	4.5	8.9	9.0	6.0	12.0	3.5	1.9	5.0
White	15.9	14.4	17.4	11.3	6.6	16.0	10.2	8.8	11.5	6.0	2.9	9.2
All	16.9	15.6	18.3	8.1	6.5	9.7	9.8	8.6	10.9	5.0	3.6	6.3

Table 8: Lifetime and Current Asthma Prevalence by Poverty Level and Age, California 2014

	Children (0-17 years)				Adults (18+ years)			
	Lifetime Asthma Prevalence		Current Asthma Prevalence		Lifetime Asthma Prevalence		Current Asthma Prevalence	
Poverty Level	%	(95%CI)	%	(95%CI)	%	(95%CI)	%	(95%CI)
Poor	12.6	7.5 17.6	9.9	5.1 14.6	13.8	11.2 16.4	8.6	6.6 10.6
Near Poor	14.7	10.2 19.2	9.7	5.3 14.1	11.1	8.7 13.5	7.2	5.2 9.3
Not Poor	13.7	11.3 16.1	9.0	7.4 10.7	14.8	13.4 16.1	8.2	7.1 9.3

Table 9: Lifetime and Current Asthma Prevalence By Urban/Rural Residence, California 2014

	Lifetime Asthma Prevalence		Current Asthma Prevalence	
	%	(95%CI)	%	(95%CI)
Urban	13.8	12.9 14.7	8.4	7.6 9.2
Rural	13.9	11.4 16.4	8.1	6.2 9.9

Table 10: Lifetime and Current Asthma Prevalence among Adults (Age 18-70), by Sexual Orientation, California 2013 and 2014 Combined

	Lifetime Asthma Prevalence		Current Asthma Prevalence	
	%	(95%CI)	%	(95%CI)
Straight	13.8	13.0 14.6	7.7	7.0 8.3
Gay/Lesbian	21.4	14.8 27.9	12.4	7.4 17.3
Bisexual	18.9	13.0 24.8	11.9	6.9 17.0

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 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 13.8 percent. This is the point estimate—it is our best approximation of the true value for the California population—but it may not be the actual true value simply 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 value. In the example of lifetime asthma among adults in California, the 95% CI is 12.8-14.9. So, our best estimate of lifetime asthma prevalence among adults in California is 13.8 percent, but we are 95 percent certain that the true value is at least 12.8 percent and at most 14.9 percent.

The width of the confidence interval provides useful information about the stability or reliability of the point estimate. A narrower confidence interval means that there is less variability within 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. We also use a more precise tool for assessing the reliability of an estimate—the relative standard error (RSE). The RSE tells us how big the margin of error is in relation to the estimate itself. It is calculated by dividing the standard error of the estimate (an enumeration of the margin of error) by the estimate itself, then multiplying that result by 100. For example, if the estimate of asthma prevalence is 20 percent and the standard error is 3 percent, the RSE is (3/20)*100, or 15 percent. Estimates with large RSEs are considered less reliable than estimates with small RSEs. We follow guidelines from the National Center for Health Statistics recommending that estimates with RSEs above 30 percent should be considered unstable. When the RSE of an estimate is 30-50 percent, we mark these estimates with an asterisk (*) to denote that they are unstable and should be interpreted with caution. When the RSE of an estimate is greater than 50 percent, the estimates are too unstable to even present and are marked with dashes (--).

Significance Testing

When confidence intervals from two groups do not overlap, the difference between the two groups is considered to be statistically significant and not likely due to chance. When they do overlap, we cannot conclude that they are significantly different—further statistical testing is needed to make this determination. We use chi-square tests to assess whether the differences between groups are statistically significant. The chi-square test is a commonly used statistical tool that produces a p-value. The p-value (e.g., $p<0.01$) is a statement of the probability that the difference observed could have occurred by chance if the groups were really alike. As is common in epidemiology, we consider a probability of 5 percent or less sufficiently unlikely to have occurred by chance and therefore $p<0.05$ is considered 'statistically significant.'

To test for trends over time, we use simple linear regression. This method fits the best straight line to the data and determines the slope of that line, which in this case is the average change in the estimate per year. This test also produces a p-value for the probability that the slope could have occurred by chance, and again, we consider $p<0.05$ to be statistically significant.

California Health Interview Survey

Description

The California Health Interview Surevy (CHIS) is the nation's largest state health survey. It is a random-dial telephone survey conducted on a continuous basis. CHIS covers a wide variety of health topics. The survey uses a scientific sampling methodology and extensive questionnaires to collect consistent information that accurately represents California's diverse populations and geographic areas. CHIS data are weighted to reflect the non-institutionalized population of California. The survey is administered in six languages: English, Spanish, Chinese (Mandarin and Cantonese dialects), Tagalog, Vietnamese, and Korean. Adults (18+) and adolescents (12-17) are interviewed directly; for children (<12), the adult most knowledgeable about the child's health is interviewed as a proxy. From 2001-2009, CHIS was conducted every two years. Starting in 2011 CHIS transitioned to a continuous survey, which allows annual releases of data. In 2014, CHIS surveyed 20,207 households, including 19,516 adults, 1,052 adolescents and 2,592 children. CHIS is conducted by the UCLA Center for Health Policy Research in collaboration with the California Department of Public Health, and the Department of Health Care Services. Funding for CHIS comes from state and federal agencies and from several private foundations. More information about CHIS can be found at http://www.chis.ucla.edu.

The CHIS includes a variety of questions related to asthma. Those used to estimate asthma prevalence are: "Has a doctor ever told you (or your parent) that you have asthma?"; "Has a doctor ever told you that (CHILD) has asthma?"; "Do you still have asthma?/Does {he/she} still have asthma?"; and "During the past 12 months, have you (or has {he/she}) had an episode of asthma or an asthma attack?"

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. The survey response rate was rather low at 14.8 and 16.6 percent for landline and cellphone surveys, respectively. Telephone surveys exclude people living in institutionalized settings (e.g., college dorms and nursing homes) and people who speak languages other than those offered. 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.

Inquiries may be directed to:

Meredith Milet, MPH
Research Scientist III
Environmental Health Investigations Branch
California Department of Public Health
850 Marina Bay Parkway
Building P, 3rd Floor
Richmond, CA 94804
(510) 620-3634
meredith.milet@cdph.ca.gov
www.californiabreathing.org

> Milet M. *Asthma Prevalence in California: A Surveillance Report.* Richmond, CA: California Department of Public Health, Environmental Health Investigations Branch, January 2017.

This work is supported by grant 1U59EH001250-01 from the Centers for Disease Control and Prevention (CDC). The contents of this report are solely the responsibility of the authors and do not necessarily represent the official views of the CDC. In addition, any analyses, interpretations, or conclusions reached from the data are credited to the authors and not the data provider, California Health Interview Survey.