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Nearly Six Million Californians Suffer from Asthma Symptoms or Asthma-like Breathing Problems

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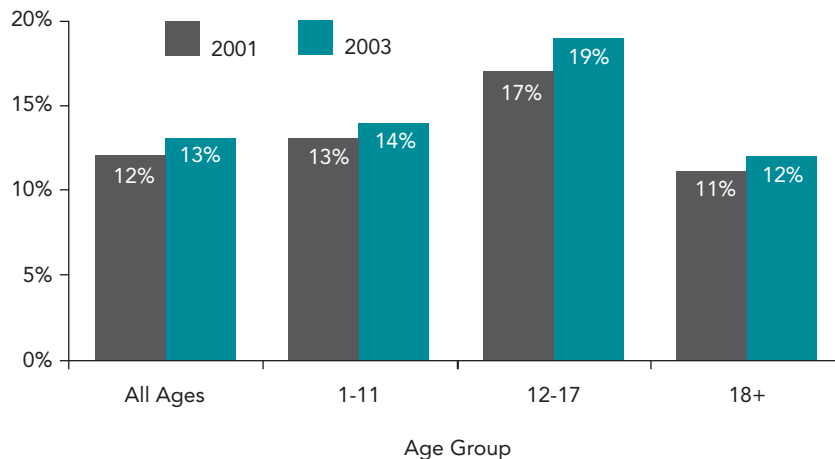
In California, 4.5 million adults, adolescents and children had been diagnosed with asthma (13% of all Californians) in 2003, up from four million (12%) in 2001. This increase is consistent in younger children, adolescents and adults (Exhibit 1).¹ Nationally, 10% of the population has been diagnosed with asthma.² Among the 4.5 million Californians diagnosed with asthma, more than 2.5 million suffered from an asthma attack or other asthma symptoms in 2003 (56% of those diagnosed).

An additional 3.4 million Californians who have not been diagnosed with asthma—10% of all Californians—suffer from asthma-like breathing problems. Some of these respondents might have other respiratory conditions, while others are likely to have asthma that has not been diagnosed.

Based on data from the 2003 California Health Interview Survey (CHIS 2003), this policy brief examines the prevalence of lifetime asthma diagnoses and asthma symptoms, as well as the prevalence of asthma-like breathing problems in the absence of an asthma diagnosis. Where possible, it also describes

Exhibit 1

Lifetime Asthma Prevalence by Age and Year, California, 2001 and 2003

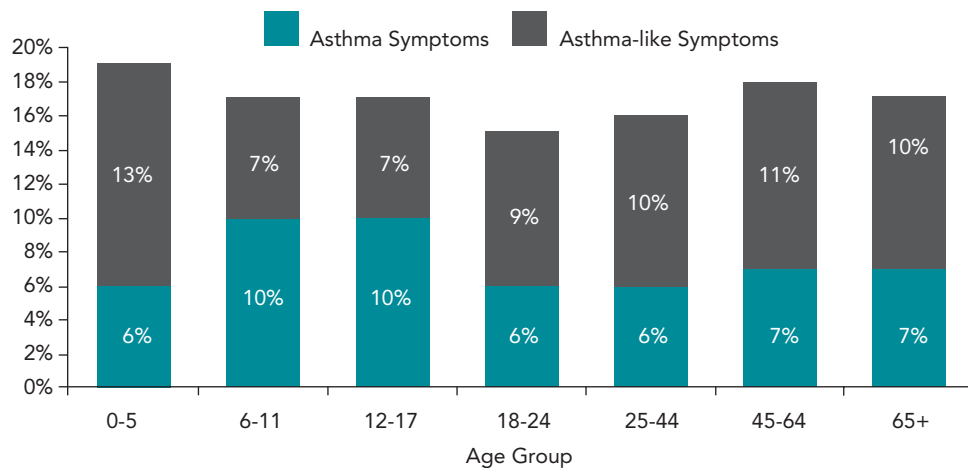


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Note: Lifetime asthma prevalence refers to people who have ever been diagnosed with asthma.
Source: 2001 and 2003 California Health Interview Surveys

Exhibit 2

Prevalence of Asthma Symptoms and Asthma-like Symptoms by Age, California, 2003



Note: The prevalence of asthma symptoms refers to people diagnosed with asthma who also reported an asthma attack or other asthma symptoms in the past year. The prevalence of asthma-like symptoms refers to people not diagnosed with asthma but who experienced breathing problems—such as wheezing—in the past year.

Source: 2003 California Health Interview Survey

how prevalence has changed since 2001, based on data from CHIS 2001. Lifetime prevalence refers to people who have ever been diagnosed with asthma by a doctor. The prevalence of asthma symptoms refers to people who report having been diagnosed with asthma and who also reported experiencing an asthma attack or other asthma symptoms in the past year. The prevalence of asthma-like symptoms refers to people who have not been diagnosed with asthma but who experienced breathing problems, such as wheezing or whistling in the chest in the past year.

Asthma Symptoms and Asthma-like Breathing Problems Disproportionately Affect Young Children, African Americans and American Indian/Alaska Natives

In California over 800,000 children (9%) and over 1.7 million adults (7%) suffered from an asthma attack or other asthma symptoms in 2003. An additional 800,000 children (9%) and 2.6 million adults (10%) suffered from asthma-like symptoms—such as wheezing—but have not been diagnosed with asthma. The precise cause of these symptoms is not known. Common respiratory conditions that might cause asthma-like symptoms include viral infections, bronchiolitis, pneumonia, COPD, emphysema and asthma. However,

some proportion of these adults and children who reported wheezing or whistling in the past year are likely to have undiagnosed, and therefore, under-treated asthma. There is evidence that asthma is under-diagnosed—particularly in racial/ethnic minority populations and in those of low socioeconomic status—and that individuals with undiagnosed asthma do not receive adequate treatment for the condition or guidance in how to reduce symptoms.^{3,4,5} There is also some evidence suggesting a different conclusion.⁶

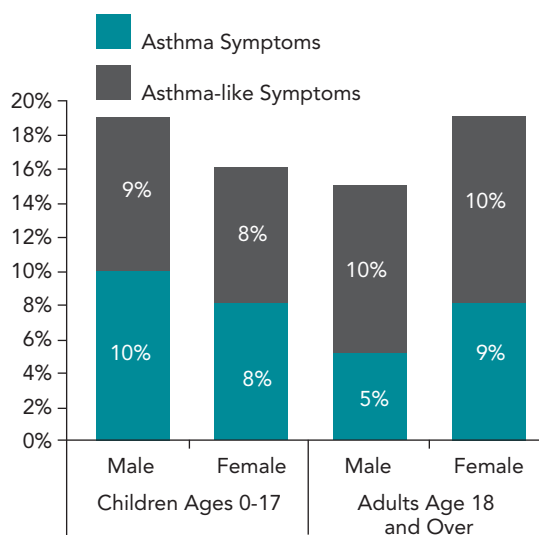
In California, the prevalence of asthma symptoms varied with age, with one in ten school-age children suffering from asthma symptoms compared to 6-7% of other age groups (Exhibit 2). The prevalence of asthma-like symptoms in the absence of an asthma diagnosis also varied with age, but the pattern was different. The prevalence of asthma-like symptoms was highest among young children under age six (13%) and lowest among school-age children (7%). The high prevalence of asthma-like symptoms among young children may be due in part to the difficulty of diagnosing asthma in young children and to the high prevalence of viral-mediated wheezing in young children.^{7,8}

The prevalence of asthma symptoms varied by gender among both children and adults, but the prevalence of asthma-like symptoms in the absence of an asthma diagnosis did not vary by gender (Exhibit 3). Among children, a greater percentage of boys experienced asthma symptoms (10%) than girls (8%). However among adults, a greater percentage of women suffered from asthma symptoms (9%) than men (5%).

The prevalence of asthma symptoms varied by race and ethnicity among both children and adults (Exhibit 4). Among children, one out of six African Americans (16%) suffers from asthma symptoms, significantly higher than whites (9%), Latinos (7%) and Asians (6%). One out of six American Indian/Alaska Native (AI/AN) children (16%) also suffers from asthma symptoms, significantly higher than Latinos and Asians. Among adults, AI/ANs have the highest prevalence of asthma symptoms (12%), significantly higher than whites (8%), Asians (5%) and Latinos (4%). African-American adults also have a significantly higher prevalence of asthma symptoms (9%) than Asians and Latinos.

Prevalence of Asthma Symptoms and Asthma-like Symptoms by Gender and Age, California, 2003

Exhibit 3

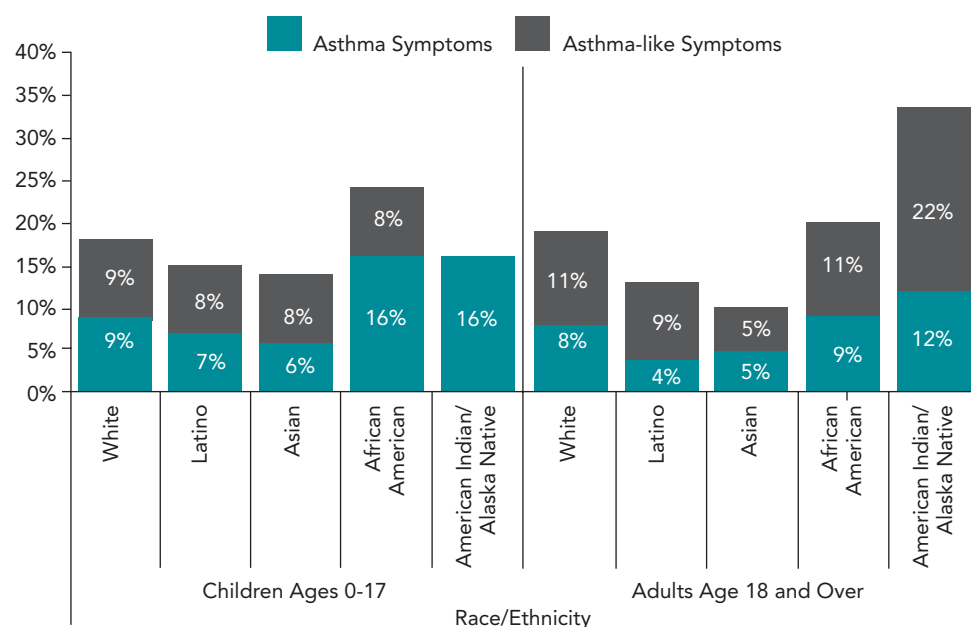


Note: The prevalence of asthma symptoms refers to people diagnosed with asthma who also reported an asthma attack or other asthma symptoms in the past year. The prevalence of asthma-like symptoms refers to people not diagnosed with asthma but who experienced breathing problems—such as wheezing—in the past year.

Source: 2003 California Health Interview Survey

Prevalence of Asthma Symptoms and Asthma-like Symptoms by Race/Ethnicity and Age, California, 2003

Exhibit 4



Note: The estimate for asthma-like symptoms among American Indian/Alaska Native children is not reliable. The prevalence of asthma symptoms refers to people diagnosed with asthma who also reported an asthma attack or other asthma symptoms in the past year. The prevalence of asthma-like symptoms refers to people not diagnosed with asthma but who experienced breathing problems—such as wheezing—in the past year.

Source: 2003 California Health Interview Survey

The prevalence of asthma-like symptoms in the absence of an asthma diagnosis varied by race and ethnicity among adults but not among children (Exhibit 4). Approximately 8-9% of children suffered from these symptoms with little variation by race and ethnicity. Among adults, more than one out of five AI/ANs (22%) experienced asthma-like symptoms, significantly more than whites (11%), African Americans (11%), Latinos (9%) and Asians (5%). Asians had the lowest prevalence (5%), significantly lower than whites, African Americans and Latinos.

The prevalence of asthma symptoms varied by Asian ethnic group. Among Asian children and adults, 7% of Filipinos, 6% of Japanese, 5% of South Asians, 4% of Chinese and 4%

of Vietnamese had asthma symptoms. The prevalence was significantly higher among Filipinos than among Chinese and Vietnamese.

The prevalence of asthma-like symptoms in the absence of an asthma diagnosis also varied by Asian ethnic group. Vietnamese had the highest prevalence (9%) followed by South Asians (8%), Filipinos (6%), Chinese (5%) and Koreans (3%). The prevalence among Vietnamese children and adults was significantly higher than among Chinese or Koreans. The prevalence among Koreans was significantly lower than among Filipinos or South Asians.

Among Latino children and adults, Puerto Ricans report the highest prevalence of asthma

Exhibit 5

Asthma Symptoms and Asthma-like Symptoms by County or County Group, All Ages, California, 2003

	Asthma Symptoms			Asthma-like Symptoms		
	%	95% CI	Number	%	95% CI	Number
Northern and Sierra Counties	9	8-10	119,000	13	12-14	169,000
Butte	13	10-16	27,000	11	8-14	22,000
Shasta	9	6-12	16,000	14	10-17	23,000
Humboldt, Del Norte	9	6-11	13,000	15	12-18	22,000
Siskiyou, Lassen, Trinity, Modoc	10	7-13	9,000	11	8-14	10,000
Mendocino, Lake	7	5-10	10,000	12	9-15	18,000
Tehama, Glenn, Colusa	10	7-14	11,000	13	9-16	13,000
Sutter, Yuba	8	6-11	12,000	15	11-18	21,000
Nevada, Plumas, Sierra	10	7-13	12,000	9	6-12	11,000
Tuolumne, Calaveras, Amador, Inyo, Mariposa, Mono, Alpine	6	3-8	10,000	16	12-20	28,000
Greater Bay Area	8	7-8	521,000	9	8-10	612,000
Santa Clara	7	6-9	119,000	8	7-10	140,000
Alameda	8	7-9	118,000	9	8-10	127,000
Contra Costa	9	7-11	91,000	9	7-11	89,000
San Francisco	5	4-7	40,000	9	7-11	68,000
San Mateo	6	4-8	39,000	10	7-13	71,000
Sonoma	8	6-11	38,000	11	8-14	52,000
Solano	12	9-15	46,000	8	5-10	31,000
Marin	6	4-8	14,000	10	7-12	23,000
Napa	12	9-16	15,000	9	6-11	11,000
Sacramento Area	9	8-11	177,000	10	8-11	187,000
Sacramento	10	8-12	125,000	10	8-12	127,000
Placer	7	5-9	20,000	10	7-13	28,000
Yolo	8	6-11	14,000	10	7-12	17,000
El Dorado	11	8-14	18,000	9	7-12	15,000

symptoms (11%) followed by Mexicans, Central Americans and South Americans (at 5% each). However, these differences are not statistically significant, most likely due to the relatively small sample size for Puerto Ricans. The pattern was slightly different for the prevalence of asthma-like symptoms: South American (13%), Puerto Rican (11%), Mexican (9%) and Central American (8%); differences are not significant.

Asthma Symptoms and Asthma-like Breathing Problems Vary Across California Counties

The prevalence of asthma symptoms varied across California counties, ranging from 5% in Orange, Riverside and San Francisco Counties to 13% in Butte County (Exhibit 5);

however, many counties have wide, overlapping confidence intervals. Due to overlapping confidence intervals and differences in sample size by county, this list should not be seen as a ranking of counties. Regionally, 10% of residents of the San Joaquin Valley experienced asthma symptoms, higher than the prevalence among residents of the Bay Area (8%), Central Coast (8%), Los Angeles County (7%) and other Southern California counties (6%).

The counties with the highest prevalence of asthma-like symptoms in the absence of an asthma diagnosis were all in the Northern and Sierra region of the state: Humboldt and Del Norte (15%), Sutter and Yuba (15%) and Tuolumne, Calaveras, Amador, Inyo,

Asthma Symptoms and Asthma-like Symptoms by County or County Group, All Ages, California, 2003 (continued)

Exhibit 5

	Asthma Symptoms			Asthma-like Symptoms		
	%	95% CI	Number	%	95% CI	Number
San Joaquin Valley	10	9-11	331,000	11	10-12	381,000
Fresno	10	8-12	83,000	11	8-13	88,000
Kern	10	7-13	70,000	12	9-15	84,000
San Joaquin	11	8-14	65,000	9	7-12	55,000
Stanislaus	8	5-10	36,000	12	9-15	56,000
Tulare	8	6-11	32,000	11	9-14	43,000
Merced	9	7-12	21,000	13	10-16	29,000
Kings	10	7-12	12,000	12	9-15	14,000
Madera	10	8-13	13,000	9	6-11	11,000
Central Coast	8	7-9	163,000	10	9-12	216,000
Ventura	7	5-10	58,000	10	7-12	74,000
Santa Barbara	7	4-9	27,000	10	7-12	38,000
Santa Cruz	10	7-13	26,000	11	8-14	28,000
San Luis Obispo	9	7-12	22,000	12	9-16	30,000
Monterey, San Benito	7	5-9	30,000	10	7-13	46,000
Los Angeles	7	6-7	650,000	9	9-10	931,000
Los Angeles	7	6-7	650,000	9	9-10	931,000
Other Southern California	6	6-7	583,000	10	9-10	903,000
Orange	5	4-6	156,000	8	7-10	246,000
San Diego	6	5-7	168,000	9	8-10	261,000
San Bernardino	9	7-10	157,000	11	9-13	196,000
Riverside	5	4-6	89,000	11	9-13	184,000
Imperial	9	6-11	13,000	11	9-14	16,000
California	7	7-8	2,544,000	10	9-10	3,399,000

Note: The prevalence of asthma symptoms refers to people diagnosed with asthma who also reported an asthma attack or other asthma symptoms in the past year. The prevalence of asthma-like symptoms refers to people not diagnosed with asthma but who experienced breathing problems—such as wheezing—in the past year. Due to overlapping confidence intervals and differences in sample size by county, this list should not be seen as a ranking of counties.

Source: 2003 California Health Interview Survey

Mariposa, Mono and Alpine Counties (16%). The lowest prevalence of asthma-like symptoms was in Santa Clara, Solano and Orange Counties (at 8% each).

Discussion and Policy Recommendations

More than 4.5 million California adults, adolescents and children have been diagnosed with asthma, including 2.5 million who suffer from asthma attacks or other symptoms every year. An additional 3.4 million are not diagnosed with asthma but suffer from wheezing or other asthma-like symptoms. Asthma and related breathing problems incur a substantial cost in medical care and lost earnings for families and the state's economy. Nationally, asthma cost an estimated \$16.1 billion in hospitalizations, doctor visits, medications, lost productivity and time lost from school in 2004.⁹ Young children, African Americans, and American Indian/Alaska Natives disproportionately bear the burden of asthma symptoms and asthma-like breathing problems.

The prevalence of asthma-like breathing problems in California suggests that there are residents with asthma that may be undiagnosed and untreated; however, some of them may have been treated for other respiratory conditions. Asthma-like symptoms cannot be interpreted as a proxy for undiagnosed asthma, but the prevalence of asthma symptoms and asthma-like breathing problems combined may indicate the overall burden of breathing problems in a community or population group.

Variation in the prevalence of asthma symptoms and asthma-like symptoms is likely due to a combination of factors, including demographic factors such as age, gender and race/ethnicity; socioeconomic factors such as income and education levels; environmental factors such as indoor and outdoor air pollution and climate; genetics, physician diagnostic practices and access to care. In addition to the factors just listed, the regional variation in the prevalence of asthma symptoms and asthma-like symptoms may relate to the migration of families with members who suffer from

asthma, such as moving away from highly polluted areas or to areas with more accessible health care. In addition, areas with a greater proportion of people living in poverty and uninsured residents may have higher rates of undiagnosed asthma. Additional analyses of CHIS 2003 data suggest that the prevalence of asthma-like symptoms among adults is higher among those living below the poverty line, those uninsured all year and those with no usual source of health care. Among children, however, the prevalence of asthma-like symptoms does not differ by household income, insurance coverage or usual source of care.

Asthma symptoms and asthma-like breathing problems are controllable in many cases. Californians experiencing these problems can live symptom-free if appropriate interventions take place. The prevention and control of asthma and asthma-like symptoms require clinical, policy and public health efforts. These efforts should include policies designed to prevent asthma and control its symptoms by reducing environmental triggers and exposures to these triggers, improving access to health care, reducing disparities in the burden of asthma, and promoting asthma surveillance at the state and local level.

- **Reduce exposure to environmental triggers.** Environmental triggers such as air pollutants (ozone and particulate matter), tobacco smoke and indoor allergens may play a role in the development and exacerbation of asthma or asthma-like symptoms.¹⁰ Of the many asthma triggers in the environment, air pollution is one of the few that can be influenced by policies and regulations. While air quality improvements in the last few decades are impressive, additional emission controls will be needed to offset population growth and increases in vehicle miles traveled.¹¹ Policies also may prohibit building homes, schools or day care centers near freeways or other major traffic thoroughfares to reduce exposure to emissions—an additional source of triggers for persons with asthma.¹² There have also been recent policy efforts to improve indoor air quality in homes, schools and the work place.

- **Improve access to quality health care.** Timely access to comprehensive, culturally relevant health care services is critical for both diagnosing asthma and improving control of asthma. Affordable health insurance coverage with appropriate benefits is essential for people with asthma because it is related to access to both appropriate care and improved outcomes. In addition, continuing education and quality improvement efforts are needed to improve health care provider understanding and utilization of diagnostic criteria and tools (such as spirometry, allergen sensitization and clinical risk indices¹³) to improve the timely and accurate diagnosis of asthma in individuals with asthma-like symptoms.
- **Reduce disparities in the burden of asthma.** Community-based, culturally-appropriate interventions that assure adequate education about asthma management—along with efforts to improve access to quality health care and to improve living environments—are needed to reduce the disproportionate burden of asthma and wheeze among young children and certain racial/ethnic groups.^{14,15}
- **Promote asthma surveillance at the state and local levels.** Timely data on the impact of asthma at the state and local levels are needed to support the design and implementation of effective public health and clinical interventions. Federal and state agencies have called for a systematic local, state and national system for asthma surveillance that tracks occurrences of asthma—in addition to possible causes such as hazardous environmental exposures.

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 brief are based on data from the 2001 and 2003 California Health Interview Surveys (CHIS 2001 and CHIS 2003). CHIS 2003 completed interviews with over 42,000 households, including adults, adolescents and children drawn from every county in the state. Interviews were conducted 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. As a result, CHIS 2001 estimates presented here may differ from previously published estimates.

The findings included in this policy brief are subject to some limitations. First, some measures used in CHIS 2003 were slightly different from those used in CHIS 2001 and as a result, only estimates of lifetime asthma prevalence can be compared between the two years. Second, the asthma estimates included in this brief are dependent on having physician-diagnosed asthma. This may result in an underestimation of the prevalence of asthma and asthma-like symptoms because some people with asthma may not have received a diagnosis. Third, the findings presented in this report are based on self-reported, cross-sectional data. It is possible that respondents' self-reports were influenced by a recall bias. As a cross-sectional survey, caution should be taken in drawing conclusions about causal relationships based on statistical relationships found in this study.

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Notes

- 1 Estimates comparing data from CHIS 2001 and CHIS 2003 exclude children under age one; however, all other estimates in this brief using data from CHIS 2003 include these children.
- 2 Source: 2003 National Health Interview Survey, National Center for Health Statistics, CDC.
- 3 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.
- 4 Crain EF, Weiss KB, Bijur PE, Hersh M, Westbrook L, Stein RE. An estimate of the prevalence of asthma and wheezing among inner-city children. *Pediatrics*. 1994; 94:356-562.
- 5 Joseph CLM, Foxman B, Leickly F, et al. Prevalence of possible undiagnosed asthma and associated morbidity among urban school children. *Journal of Pediatrics*. 1996;129:735-742.

- 6 Akinbami LJ, Rhodes JC and Lara M. Racial and ethnic differences in asthma diagnosis among children who wheeze. *Pediatrics*. 2005;115:1254-1260.
- 7 Wright AL, Taussig LM, Ray CG, Harrison HR, Holberg CJ. The Tucson Children's Respiratory Study. II. Lower respiratory tract illness in the first year of life. *American Journal of Epidemiology*. 1989;129:1232-46.
- 8 Martinez FD, Wright AL, Taussig LM, Holberg CJ, Halonen M, Morgan WJ. Asthma and wheezing in the first six years of life. *New England Journal of Medicine*. 1995. 19; 332:133-138.
- 9 American Lung Association. Epidemiology & Statistics Unit, Research and Program Services. Trends in Asthma Morbidity and Mortality, May 2005.
- 10 Gold DR, Wright R. Population disparities in asthma. *Annual Review of Public Health*. 2005; 26:89-113.
- 11 CARB. (2005). The California Almanac of Emissions and Air Quality. <http://www.arb.ca.gov/aqd/almanac/almanac05/almanac05.htm>.
- 12 Meng YY, Rull RP, Wilhelm M, Ritz B, English P, Yu H, Nathan S, Kuruvilla M and Brown ER. *Living Near Heavy Traffic Increases Asthma Severity*. Los Angeles: UCLA Center for Health Policy Research, 2006.
- 13 Castro-Rodriguez JA, Holberg CJ, Wright AL, Martinez FD. A clinical index to define risk of asthma in young children with recurrent wheezing. *American Journal of Respiratory Critical Care Medicine*. 2000; 162(4 Pt 1):1403-1406.
- 14 Gold DR, Wright R. Population disparities in asthma. *Annual Review of Public Health*. 2005; 26:89-113.
- 15 Lanphear BP, Kahn RS, Berger O, Auinger P, Bortnick SM, Nahhas RW. Contribution of residential exposures to asthma in U.S. children and adolescents. *Pediatrics*. Jun 2001;107(6):E98.

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