

February 2007

Pets and Smoking in the Home Associated with Asthma Symptoms and Asthma-Like Breathing Problems

Theresa A. Hastert, Susan H. Babey, E. Richard Brown and Ying-Ying Meng

Many Californians with asthma are exposed to environmental conditions in the home—such as the presence of tobacco smoke and furry pets—which can trigger asthma symptoms. In addition, many who have not been diagnosed with asthma experience asthma-like breathing problems when exposed to these same indoor conditions.

Nearly 1.9 million California adults and 890,000 children have active asthma (7.3% of all adults and 10.4% of all children). Among those with active asthma, 970,000 adults and 300,000 children suffered from symptoms at least monthly in 2003.

An additional 2.6 million California adults and 810,000 children who had not been diagnosed with asthma suffered from asthma-like symptoms such as wheezing in 2003 (11.1% of all adults and 9.3% of all children).

Using results from the 2003 California Health Interview Survey (CHIS 2003), this policy brief examines the association of asthma symptoms and asthma-like breathing problems with smoking and the presence of tobacco smoke in the home, and with the presence of dogs and cats in the home. This brief presents the prevalence of monthly asthma symptoms among adults and children with active asthma and the prevalence of wheezing and other asthma-like symptoms in the previous year among

Exhibit 1

Percent of Current Smokers and Non-Smokers with Active Asthma Who Experience Monthly Symptoms and Percent Not Diagnosed with Asthma Who Experience Asthma-Like Symptoms, Ages 18 and Over, California, 2003

	Monthly Asthma Symptoms Among Adults with Active Asthma	Asthma-Like Symptoms Among Adults Not Diagnosed with Asthma
Non-smokers	48.7%	9.0%
Current Smokers	65.0%*	24.1%*

* Indicates statistical significance of $p < 0.05$ compared with Non-smokers

Source: 2003 California Health Interview Survey



Support for this policy brief was provided by a grant from The California Endowment.

Exhibit 2

Prevalence of Monthly Asthma Symptoms by the Presence of Smoking in the Home Among Children and Non-Smoking Adults with Active Asthma, California, 2003

	Monthly Asthma Symptoms Among Children (Ages 0-17)	Monthly Asthma Symptoms Among Non-Smoking Adults (Age 18 and Over)
No Smoking in the Home	33.0%	48.0%
Smoking in the Home	43.0%	62.6%*

* Indicates statistical significance of $p < 0.05$ compared with No Smoking in the Home

Source: 2003 California Health Interview Survey

those not diagnosed with asthma. Active asthma refers to being diagnosed with asthma and also reporting that one still has asthma and/or that one experienced an asthma attack in the past year. There are a number of known environmental triggers in the home, including environmental tobacco smoke, animal dander, dust mites, cockroaches, molds and pollens.¹ This brief discusses those triggers for which CHIS 2003 collected useful data. Other triggers have also been found to significantly contribute to breathing problems.

Smoking Exacerbates Asthma Symptoms and Asthma-Like Breathing Problems

Smoking can exacerbate asthma and lead to worsening of asthma symptoms, and it is also associated with decreased effectiveness of some forms of asthma treatment.² Despite the health risks associated with smoking for those with asthma, 340,000 adults with active asthma (18.1%) are current smokers, significantly higher than among adults not diagnosed with asthma (16.1%). Furthermore, among adults with active asthma, nearly two thirds of the current smokers experienced asthma symptoms at least once a month (65%) compared to less than half of non-smokers (48.7%; Exhibit 1).

Smoking is also associated with increases in breathing problems among adults not diagnosed with asthma. The prevalence of

asthma-like symptoms for adults not diagnosed was more than twice as high among current smokers (24.1%) as among non-smokers (9%).

Exposure to Second-Hand Smoke Also Exacerbates Breathing Problems

Smoking affects others besides the smokers themselves. Exposure to second-hand smoke is associated with respiratory problems, including coughing, phlegm, breathlessness and decreased lung function in both children and adults.³ In addition, evidence suggests a causal relationship between exposure to second-hand smoke and development of child and adult-onset asthma, as well as worsening of asthma control in children and adults.⁴

In California, 75,000 adults and 69,000 children with active asthma do not smoke but live in households where others are allowed to smoke in the home, putting them at increased risk of asthma exacerbations. Among non-smoking adults with active asthma, nearly two-thirds (62.6%) of those who live in homes where tobacco smoke is present suffer from monthly asthma symptoms compared to less than half of those who live in smoke-free households (48%; Exhibit 2). This association remains significant when controlling for age, sex, race/ethnicity and household income. Among children with active asthma, 43% of those exposed to second-hand smoke at home suffer from

Prevalence of Asthma-Like Symptoms in the Previous Year by the Presence of Smoking in the Home Among Children and Non-Smoking Adults Not Diagnosed with Asthma, California, 2003

Exhibit 3

	Asthma-Like Symptoms Among Children (Ages 0-17)	Asthma-Like Symptoms Among Non-Smoking Adults (Age 18 and Over)
No Smoking in the Home	9.9%	8.8%
Smoking in the Home	14.1%*	13.3%*

* Indicates statistical significance of $p < 0.05$ compared with No Smoking in the Home
Source: 2003 California Health Interview Survey

monthly symptoms, compared to 33% of those in smoke-free homes, although this difference is not statistically significant.

Nearly one million non-smoking adults and 430,000 children not diagnosed with asthma live in households where someone smokes, putting them at increased risk of wheezing and other asthma-like symptoms. Among non-smoking adults not diagnosed with asthma, the percent experiencing asthma-like symptoms is significantly higher for those living in households where tobacco smoke is present compared to those living in smoke-free homes (13.3% vs. 8.8%; Exhibit 3). This association remains significant after controlling for age, sex, race/ethnicity and household income.

A similar association is found among children not diagnosed with asthma: 14.1% of children exposed to second-hand smoke suffer from asthma-like symptoms compared with 9.9% of those living in smoke-free homes.

Pets—Particularly Cats—Are Associated with Breathing Problems for Many Californians

The presence of furry pets in the home, such as cats and dogs, has been associated with the risk of asthma and asthma-like symptoms for many persons with asthma.⁵ A link is suspected between environmental factors, such as exposure to allergens early in life, and the development of asthma and

Prevalence of Monthly Asthma Symptoms by the Presence of Cats and/or Dogs in the Home Among Those with Active Asthma, California, 2003

Exhibit 4

	Monthly Asthma Symptoms Among Children (Ages 0-17)	Monthly Asthma Symptoms Among Adults (Age 18 and Over)
Neither Cats nor Dogs	32.5%	49.3%
Dogs Only	32.1%	51.7%
Cats Only	33.9%	57.6%*
Both Cats and Dogs	44.0%*	56.0%**

* Indicates statistical significance of $p < 0.10$ compared with Neither Cats nor Dogs

** Indicates statistical significance of $p < 0.05$ compared with Neither Cats nor Dogs

Source: 2003 California Health Interview Survey

Exhibit 5

Prevalence of Asthma-Like Symptoms in the Previous Year by the Presence of Cats and/or Dogs in the Home Among Those Not Diagnosed with Asthma, California, 2003

	Asthma-Like Symptoms Among Children (Ages 0-17)	Asthma-Like Symptoms Among Adults (Age 18 and Over)
Neither Cats nor Dogs	9.9%	10.8%
Dogs Only	9.5%	11.4%
Cats Only	11.9%	14.0%*
Both Cats and Dogs	10.7%*	13.8%*

* Indicates statistical significance of $p < 0.05$ compared with Neither Cats nor Dogs

Source: 2003 California Health Interview Survey

allergic diseases.⁶ Among Californians with active asthma, 870,000 adults and 360,000 children live in households where cats, dogs or both are allowed in the home, putting those sensitive to these allergens at increased risk of asthma exacerbations.

Among adults with active asthma, those with cats but no dogs, or both cats and dogs in the home are more likely to suffer from monthly asthma symptoms (57.6% and 56%, respectively) than those who have dogs but no cats (51.7%), or those with neither cats nor dogs (49.3%; Exhibit 4). Only the association of having cats in the home with the prevalence of monthly asthma symptoms among adults with active asthma remains significant after controlling for age, sex, race/ethnicity and household income, suggesting that it is primarily cats rather than dogs that are associated with asthma symptoms in adults.

Among California children with active asthma, those who live in homes with both cats and dogs are more likely to experience monthly asthma symptoms than those living in homes without cats or dogs. The prevalence of monthly asthma symptoms is similar for children living in homes with neither cats nor dogs (32.5%), with only dogs (32.1%), and with cats only (33.9%), but the prevalence of symptoms is higher

among children living in homes with both cats and dogs (44%; Exhibit 4).

8.6 million California adults who have never been diagnosed with asthma (38.3%) currently live in homes with cats or dogs. Some of these individuals are more likely to suffer from asthma-like symptoms than those living in homes with neither cats nor dogs.

Among adults not diagnosed with asthma, 14% of those with cats but not dogs and 13.8% of those with both cats and dogs in the home suffered from asthma-like symptoms in the previous year, slightly higher than for those with dogs but not cats (11.4%) and for those with neither cats nor dogs (10.8%; Exhibit 5). Only the association between having cats in the home and asthma-like symptoms remained significant after controlling for race, sex, age and household income. This suggests that it is primarily exposure to cats that is associated with asthma-like symptoms among adults not diagnosed with asthma.

Among children not diagnosed with asthma, there is no statistical difference in the prevalence of asthma-like symptoms between those who live in homes with cats or dogs and those who do not.

Conclusions and Policy Recommendations

Asthma is a common condition affecting nearly three million Californians. In addition, 3.5 million Californians who have not been diagnosed with asthma suffer from wheezing and other asthma-like breathing problems. Even after accounting for demographic factors (age, sex, race/ethnicity and family income) household characteristics continue to be significantly associated with breathing problems experienced by these Californians.

People with asthma can take steps to reduce such symptoms, but public health leaders and policymakers should strengthen efforts designed to reduce the risks of such symptoms. These efforts should include education and policies to prevent and control asthma symptoms, and other breathing problems, by identifying individuals who are sensitized to indoor environmental triggers and reducing exposures to these triggers, as well as more strongly promoting smoking-cessation efforts.

- **Strengthen efforts to combat smoking and exposure to second-hand smoke.** In California, 4.4 million adults and teens smoke (4.2 million adults, 190,000 teens). Smoking can exacerbate asthma and is associated with decreased effectiveness of some forms of asthma treatment. In California, adults with asthma who currently smoke are more likely to suffer from monthly asthma symptoms than non-smokers, and adults not diagnosed with asthma who smoke are more than twice as likely to experience asthma-like breathing problems as non-smokers. As a result, people with asthma are strongly encouraged to avoid smoking. Additionally, exposure to tobacco smoke in the home is associated with increased asthma symptoms and other breathing problems; however, 520,000 California children and 1.1 million non-smoking adults live in homes where tobacco smoke

is present. Reducing smoking rates through expanded smoking-cessation efforts could result in a substantial decline in asthma symptoms and other breathing problems, both for those who smoke and those who live with someone who smokes. Physicians are encouraged to discuss smoking-cessation with patients who smoke, particularly those who have asthma and those living in homes where someone suffers from asthma or asthma-like symptoms. Health plans and public health agencies can also highlight the link between smoking and breathing problems, both for smokers and for those who live in homes where tobacco smoke is present.

- **Raise awareness of and reduce exposure to household triggers.** In addition to tobacco smoke, other household triggers may exacerbate asthma symptoms and other breathing problems. The presence of furry pets, particularly cats, is associated with increased prevalence of asthma symptoms and other asthma-like breathing problems in adults, and the presence of both cats and dogs together in the home is associated with increased asthma symptoms in children. Previous research has demonstrated that other environmental asthma triggers include dust mites, cockroaches, molds and pollens.^{7,8} Reducing or eliminating exposures such as these is likely to reduce symptoms in individuals sensitive to these allergens. Although avoiding tobacco-smoke is a well-documented recommendation to prevent breathing problems, the role of other environmental factors, such as the presence of furry pets, in the development and exacerbation of asthma is less clear. There is limited evidence to support the theory that pet allergen exposure early in life might actually be protective against the development of asthma.⁹ Given the current data, a practical approach is to propose

interventions to remove potential allergens from a home only if allergen exposure is associated with breathing problems for a resident of that home and allergen sensitization is documented.

- **Improve access to health care to properly address asthma symptoms and other breathing problems.** Because of the ambiguity around the association of some household factors with asthma and asthma-like symptoms, and whether exposure to certain factors is harmful or beneficial, it is especially important for those suffering from asthma symptoms and other breathing problems to have access to appropriate health care. Access to appropriate and affordable health care will allow those suffering from asthma symptoms and other asthma-like breathing problems to work with health care professionals to identify and reduce exposure to specific problematic environmental triggers. The National Heart, Lung, and Blood Institute developed comprehensive guidelines for the diagnosis and management of asthma.¹⁰ These guidelines recommend, for example, that clinicians determine an asthma patient's sensitivity to allergens to develop recommendations for environmental controls that will reduce exposure. In order for patients to benefit from these standards, they must have appropriate access to medical care.

Data Source

The findings in this brief are based on data from the 2003 California Health Interview Survey (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.

The findings included in this policy brief are subject to some limitations. First, the asthma estimates are dependent on having physician-diagnosed asthma. This may result in an underestimation of the prevalence of asthma and asthma attacks because some people with asthma may not have received a diagnosis due to access barriers or no appropriate test being conducted. In addition, the cause of wheeze and other breathing problems in respondents not diagnosed with asthma is not clear. Some of these respondents likely have asthma that has not been diagnosed; however many others likely suffer from wheezing and other breathing problems as the result of a cold or other illness not associated with asthma. Second, because the findings presented in this report are based on self-reported data, it is possible that respondents' self-reports were influenced by a recall bias. Finally, as a cross-sectional survey, caution should be taken in drawing conclusions about causal relationships based on statistical relationships found in this study.

CHIS is a collaboration of the UCLA Center for Health Policy Research, the California Department of Health Services and the Public Health Institute. Funding for CHIS 2003 was provided by the California Department of Health Services, The California Endowment, the National Cancer Institute, the Centers for Disease Control and Prevention (CDC), the Robert Wood Johnson Foundation, the California Office of the Patient Advocate, Kaiser Permanente, L.A. Care Health Plan and the Alameda County Health Care Agency. For more information on CHIS, visit www.chis.ucla.edu.

Author Information

Theresa A. Hastert, MPP, is a senior research associate at the UCLA Center for Health Policy Research. Susan H. Babey, PhD, is a research scientist at the UCLA Center for Health Policy Research. E. Richard Brown, PhD, is the director of the UCLA Center for Health Policy Research and a professor in the UCLA School of Public Health. Ying-Ying Meng, DrPH, is a senior research scientist at the UCLA Center for Health Policy Research.

Acknowledgements

The authors wish to thank Winnie Huang, Sungching Glenn, Ruxi Zhang, Jason Monroe, Jenny Chia, PhD, Hongjian Yu, PhD, Garrison Frost, Celeste Maglan and Sheri Penney for their assistance. The authors would also like to thank the following individuals for their helpful comments: Anne Kelsey Lamb, MPH, Director, Regional Asthma Management and Prevention Initiative; David Núñez, MD, MPH, Chief, California Asthma Public Health Initiative, Chronic Disease Control Branch, California Department of Health Services; and Allison L. Diamant, MD, MSHS, associate professor in the Division of General Internal Medicine and Health Services Research at the David Geffen School of Medicine at UCLA.

Suggested Citation

Hastert TA, Babey SH, Brown ER and Meng YY. *Pets and Smoking in the Home Associated with Asthma Symptoms and Asthma-Like Breathing Problems*. Los Angeles: UCLA Center for Health Policy Research, 2007.

Notes

- 1 In 2003 the Federal Poverty Level was \$12,384 for a Institute of Medicine Committee on the Assessment of Asthma and Indoor Air. 2000. *Clearing the Air: Asthma and Indoor Air Exposures*. Washington, DC: Institute of Medicine.
- 2 Lemiere C, Boulet LP. Cigarette smoking and asthma: a dangerous mix. *Canadian Respiratory Journal*. Mar 2005;12(2):79-80.
- 3 U.S. Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General – Executive Summary*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.
- 4 Thorn J, Brisman J, Toren K. Adult-onset asthma is associated with self-reported mold or environmental tobacco smoke exposures in the home. *Allergy*. Apr 2001;56(4):287-292. Lanphear BP, Aligne CA, Auinger P, Weitzman M, Byrd RS. Residential exposures associated with asthma in US children. *Pediatrics*. Mar 2001;107(3):505-511.
- 5 Apelberg BJ, Yutaka A, Jaakola J. Systematic review: Exposure to pets and risk of asthma-like symptoms. *Journal of Allergy and Clinical Immunology*. Mar 2001;107(3):455-460.
- 6 Lau S. Allergen avoidance as primary prevention: *Clinical Reviews in Allergy and Immunology*. Feb 2005;28(1):17-23.
- 7 Institute of Medicine Committee on the Assessment of Asthma and Indoor Air. 2000. *Clearing the Air: Asthma and Indoor Air Exposures*. Washington, DC: Institute of Medicine.
- 8 Gold DR, Wright R. Population disparities in asthma. *Annual Review of Public Health*. 2005; 26:89-113.
- 9 Bjorksten B. Primary prevention of atopic asthma. *Current Opinion in Allergy and Clinical Immunology*. Dec 2001;1(6):545-548.
- 10 National Asthma Education and Prevention Program. Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma Update on Selected Topics – 2002. *Journal of Allergy and Clinical Immunology*. Nov 2002;110(5 Suppl):S141-219.



The UCLA Center
for Health Policy Research
is affiliated with the
UCLA School of Public Health
and the UCLA School of Public Affairs.

The views expressed in this policy brief
are those of the authors and do not
necessarily represent the UCLA Center for
Health Policy Research, the Regents of the
University of California, or collaborating
organizations or funders.

PB2007-2

Copyright © 2007 by the Regents of the
University of California. All Rights Reserved.

Editor-in-Chief: E. Richard Brown, PhD

Phone: 310-794-0909
Fax: 310-794-2686
Email: chpr@ucla.edu
Web Site: www.healthpolicy.ucla.edu

UCLA Center for Health Policy Research

10960 Wilshire Blvd., Suite 1550
Los Angeles, California 90024

First Class
Mail
U.S. Postage
PAID
UCLA