

Impact of Environmental Chemicals on Childhood Asthma

This focus sheet is to inform policy makers, government agencies, and disease prevention programs about the potential contribution of environmental chemicals to childhood asthma.

Asthma is Common in Children

Asthma is the most common chronic disease in kids, affecting nearly 1 in 10 U.S. children under age 18.¹ Rates of childhood asthma continue to rise in the U.S.²

Asthma makes it hard to breathe. People with asthma have episodes of wheezing, chest tightness, difficulty breathing, and coughing. Asthma varies greatly in severity. Some children have only mild symptoms while others suffer serious attacks that lead to hospital stays and visits to emergency rooms.

In Washington:

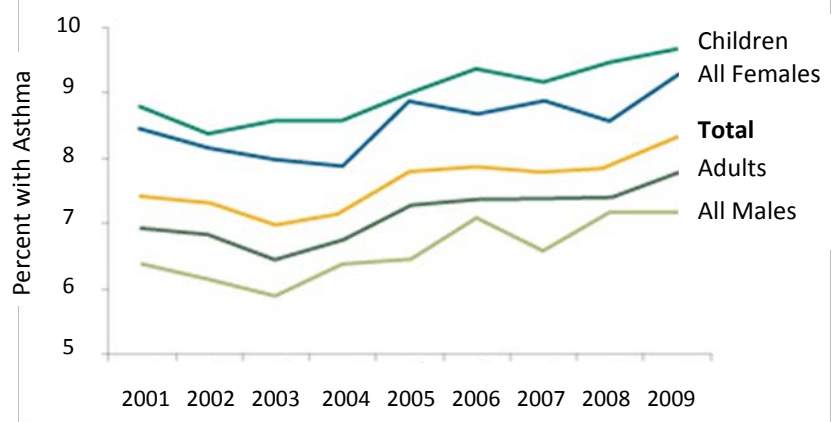
- Almost 110,000 children have asthma.³
- Asthma is the leading cause of hospitalization for children under 15 years of age.⁴
- About 5 percent of high school students surveyed missed school in the last year because of their asthma.⁵
- Children in households with annual incomes less than \$20,000 are about 60 percent more likely to have asthma than children from families with incomes above \$50,000.⁶

Environmental Chemicals Contribute to Childhood Asthma

Chemicals and particles in the air can trigger asthma attacks in children with the disease.⁷ Common examples include:

- Tobacco smoke.
- Wood smoke.
- Particulate matter (PM_{2.5}, PM₁₀).⁸
- Diesel exhaust.
- Respiratory irritants in urban air pollution such as ozone, nitrogen oxides, and sulfur dioxide.
- Chemicals such as formaldehyde, solvents, fragrances, and pesticides that are released from products used in homes.

Asthma by Age and Sex, United States, 2001-2009



Source: CDC National Center for Health Statistics, 2010

A panel of experts in environmental and pulmonary medicine estimated that 10 to 35 percent of asthma attacks could be attributed to outdoor environmental pollutants such as those in vehicle exhaust or factory emissions. The actual percentage of asthma attacks triggered by chemicals is expected to be higher since this estimate did not include known indoor chemical triggers such as second-hand smoke and formaldehyde. Other important non-chemical environmental triggers were also excluded from the estimate (such as allergens, molds, infections, or climatic conditions).⁹

Risk Factors for Children Developing Asthma

Scientists continue to identify environmental and genetic factors that increase a child's risk of developing asthma.

- Children of asthmatics are more likely to have asthma than children of parents without asthma.⁷
- Children with allergies to indoor allergens are more likely to develop asthma.⁷
- Mothers who smoke increase their child's asthma risk. Both prenatal exposure and early childhood exposure to second-hand smoke are associated with increased risk of asthma.⁷
- Emerging health research suggests that early life exposures to tobacco smoke, wood smoke, and traffic pollutants, such as ozone and diesel exhaust may contribute to the development of asthma in children.^{7,10}

Costs

Current costs of childhood asthma in Washington are not readily available. In 2002, the total cost of asthma in Washington (all ages) was estimated at \$406 million, with direct medical costs at \$240 million.¹¹ Nationwide, the annual cost of asthma was estimated at \$56 billion from 2002 to 2007.¹²

Both estimates include indirect costs such as missed school. In 2008, asthma accounted for an estimated 14.4 million lost school days in U.S. children.¹³ When children miss school, they fall behind academically, their parents often miss work, and absenteeism can affect school reimbursement and budgets.

Summary

The number of children with asthma is rising. The costs associated with care for children with asthma are high for individuals and Washington State. Many indoor and outdoor environmental pollutants are associated with asthma. Public health efforts that reduce indoor and outdoor air pollution can reduce asthma attacks in children with asthma and may prevent asthma from developing in the first place.

Reduce Asthma through Pollution Prevention

Improving air quality is one way to reduce asthma triggers in homes and in communities. Below are asthma prevention strategies to reduce the levels of harmful environmental chemicals in air.

- Improve outdoor air quality by reducing traffic emissions and wood smoke in areas with poor air quality. Strategies include:
 - Promote public transit.
 - Promote cleaner cars and trucks.
 - Ban burning if air quality is poor.
 - Replace old wood stoves with new cleaner burning stoves.
- Improve indoor air by reducing smoking in the home and encouraging smoke-free policies in multi-unit housing and workplaces.
- Improve indoor air by encouraging green cleaning methods, scent-free workplaces, and minimizing pesticide use.
- Focus on community-based strategies to change the environments of those who are most at risk.

Adapted from Washington State Asthma Plan 2011-2015, May 2011.¹⁴

For More Information

- Children and Youth with Asthma in Washington State, 2012 Report: www.doh.wa.gov/Portals/1/Documents/Pubs/345-269-CYAsthmaReport.pdf
- Asthma, Washington State Department of Health: www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Asthma.aspx
- Kids and Asthma, CDC: www.cdc.gov/asthma/children.htm
- Children's Environmental Health: <http://ephtracking.cdc.gov/showChildEHMain.action>

References

- ¹CDC. 2010 National Health Interview Survey: Current asthma prevalence percents by age. January 3, 2012. www.cdc.gov/asthma/nhis/2010/table4-1.htm
- ²CDC. Asthma in the U.S. CDC Vital Signs. May 2011. www.cdc.gov/VitalSigns/Asthma/
- ³CDC. National Asthma Control Program. Asthma in Washington. Child current asthma prevalence by age, 2007 NSCH data. www.cdc.gov/asthma/stateprofiles/Asthma_in_WA.pdf
- ⁴WA State Department of Health, Comprehensive Hospitalization Abstract Reporting System (CHARS), 2010.
- ⁵WA State Department of Health, Washington State Health Youth Survey 2010 Analytical Report. June 2010. Pub No. 210-084.
- ⁶WA State Department of Health, Behavioral Risk Factor Surveillance System, Asthma Random Child Selection and Prevalence Module, 2009-2010.
- ⁷American Academy of Pediatrics, Chapter 43: Asthma. In Etzel, RA ed. Pediatric Environmental Health, 3rd edition. Elk Grove Village, IL. Jan. 2012.
- ⁸Particulate matter, also called PM, is a term for particle pollutants in air. For more information, see www.epa.gov/pm/basic.htm.
- ⁹Landrigan et al. (2002) Environmental pollutants and disease in American children: estimates of morbidity, mortality, and costs for lead poisoning, asthma, cancer, and developmental disabilities. *Environmental Health Perspectives*. 110 (7): 721-728.
- ¹⁰University of California, Pediatric Environmental Health Specialty Unit, Asthma and the environment. <http://coeh.berkeley.edu/uspspehsu/asthma.htm>
- ¹¹WA State Department of Health, Washington State Asthma Plan, 2005. Pub No 345-22.
- ¹²Barnett SB, Nurmagambetov TA. Costs of Asthma in the US: 2002-2007. *Journal of Allergy and Clinical Immunology*. 2011; 127:145-52.
- ¹³American Lung Association. Trends in Asthma Morbidity and Mortality. July 2011. www.lungusa.org/finding-cures/our-research/trendreports/asthma-trend-report.pdf
- ¹⁴Washington State Asthma Plan 2011-2015 by the WA State Department of Health and the WA Asthma Initiative, May 2011. www.doh.wa.gov/Portals/1/Documents/Pubs/345-290_AsthmaPlan2011-15.pdf