

## Childhood health implications of second and thirdhand smoke

There is no safe level of exposure to tobacco smoke,<sup>i</sup> and prohibiting smoking during operating hours does not protect children from the residual chemicals from second and thirdhand smoke.

### Exposure to any tobacco smoke—either second or thirdhand—is dangerous.

- Secondhand smoke refers to the pollutants emitted into the air by smokers' exhalations and the burning end of a cigarette, pipe or cigar.
- Thirdhand smoke consists of secondhand smoke pollutants that combine in the air to form compounds that adhere to surfaces<sup>ii</sup> such as furniture, carpets, bedding, drapes, upholstery, car seats and toys. If you've ever been in an empty elevator and smelled cigarette smoke or smelled smoke on your clothes after leaving a smoky room, you've experienced thirdhand smoke.
- Tobacco smoke contains over 7,000 chemicals—69 of which cause cancer.
- Some of the chemicals in tobacco smoke include formaldehyde, benzene, vinyl chloride, arsenic, ammonia and hydrogen cyanide.<sup>iii</sup>

### Tobacco smoke is especially harmful for children.

- Children and infants are more susceptible to the effects of second and thirdhand smoke than adults due to their small size and rapid breath rate, which causes them to take in and absorb more pollutants.<sup>iv v</sup>
- Secondhand smoke intake is associated with a multitude of childhood health problems, including acute respiratory tract and middle ear infections, induction and exacerbation of asthma, low birth weight, and predisposition to Sudden Infant Death Syndrome (SIDS).<sup>vi</sup>
- Further, secondhand smoke exposure is associated with behavioral<sup>vii</sup> and cognitive deficits<sup>viii</sup> in children due to neurotoxin poisons.

### Second and thirdhand smoke contamination can linger for many hours.<sup>ix</sup>

- The amount of time that secondhand smoke contaminants linger depends on a number of factors, including the size of the environment and number of cigarettes consumed. The concentration of pollutants is greatest immediately after a cigarette is extinguished and slowly decreases during the pollutant decay period.
- Even powerful ventilation systems and fans cannot fully protect against exposure to these chemicals.<sup>x xi</sup>
- Thirdhand smoke particulates can remain on surfaces for weeks.<sup>xii</sup>

### The residue from thirdhand smoke is full of harmful toxic particles.

- New research indicates that thirdhand smoke may be more toxic than secondhand smoke due to the secondary chemical reactions that occur when smoke and chemicals oxidize.<sup>xiii</sup>
- Some poisons from thirdhand smoke attach to surfaces and dust, building up for months on clothing, walls, carpets, furniture, curtains, pillows, drapes, skin, and hair.
- Children and infants are at greater risk for exposure to toxins from thirdhand smoke because they touch, crawl, eat and play near contaminated surfaces.

For more information call 206-296-7613  
or go to: [www.kingcounty.gov/tobacco](http://www.kingcounty.gov/tobacco)

**Public Health**   
Seattle & King County

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- <sup>ii</sup> Winickoff, J.P.; Friebely, J.; Tanski, S.E.; Sherrod, C.; Matt, G.E.; Hovell, M.F.; and McMillen, R.C. “Beliefs About the Health Effects of ‘Thirdhand’ Smoke and Home Smoking Bans” *Pediatrics*, 2009;123:e74-e79 DOI: 10.1542/peds.2008-2184.
- <sup>iii</sup> California Environmental Protection Agency. Proposed Identification of Environmental Tobacco Smoke as a Toxic Air Contaminant Part B: Health Effects. As approved by the Scientific Review Panel, June 24, 2005. Available at: [http://oehha.ca.gov/air/environmental\\_tobacco/pdf/app3partb2005.pdf](http://oehha.ca.gov/air/environmental_tobacco/pdf/app3partb2005.pdf)
- <sup>iv</sup> <http://www.epa.gov/asthma/shs.html>
- <sup>v</sup> U.S. Department of Health and Human Services. Children and Secondhand Smoke Exposure. Excerpts from The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General. Atlanta, GA: 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, 2007.
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- <sup>ix</sup> <http://tobaccosmoke.exposurescience.org/book/export/html/4>
- <sup>x</sup> [http://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/secondhand\\_smoke/protection/ventilation/index.htm](http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/protection/ventilation/index.htm)
- <sup>xi</sup> American Society of Heating, Refrigerating and Air-Conditioning Engineers. *Environmental Tobacco Smoke: Position Document*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, 2010.
- <sup>xii</sup> [http://www.aap.org/richmondcenter/pdfs/Thirdhand\\_smoke\\_exposure\\_another\\_threat\\_to\\_children.pdf](http://www.aap.org/richmondcenter/pdfs/Thirdhand_smoke_exposure_another_threat_to_children.pdf)
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