# Thirdhand Smoke Resource Center

## Who is most likely to be exposed to thirdhand smoke?

### The Short Answer

Thirdhand smoke is the chemicals left behind when someone smokes tobacco. Thirdhand smoke is unhealthy for people and pets. It can stick around for a long time in homes and cars. It gets into your body if you inhale, swallow, or touch the chemicals. Getting rid of it is really hard and can cost a lot of money.

Infants and young children are the most likely to breathe in, swallow, or touch thirdhand smoke chemicals for three reasons:

1. They spend most of their time indoors, especially on the floor. This means they are nearer to carpets and dust contaminated with thirdhand smoke chemicals.
2. They explore by putting things into their mouths. This means they can put toys, blankets, and other objects contaminated with thirdhand smoke chemicals into their mouths.
3. Their bodies are developing. Young children breathe more frequently. This means that they have more chances to breathe in thirdhand smoke chemicals. Also, their skin is thinner than adults, so it does not create a barrier to keep the chemicals out.

### The Long Answer

Thirdhand smoke is the chemical residue from tobacco smoke. It is also called “tobacco smoke residue” or “stale tobacco smoke.” The chemicals in thirdhand smoke are toxic to humans, especially children. It can linger for years in dust and on household surfaces. It can also become embedded in carpets, furniture, clothes, and building materials. It is difficult and expensive to remove.

Infants and young children are the most likely to be exposed to thirdhand smoke for these three reasons:

#### 1. Time Spent Indoors

Infants and young children spend more time on average indoors than adults. Human activity surveys have shown that infants spend 90% of their time indoors at home. If their home environments are polluted with thirdhand smoke, infants are at a higher risk of exposure.

#### 2. Child Behavior

Infants and young children explore their environment with their hands and bodies. Before they can walk, they move around by crawling along the floor, where they can touch polluted objects and pick up polluted dust and particles along the way. Their small size lets them fit into tight spaces where dust and particles might collect. Through crawling and exploring their environment, their hands, mouths, hair, clothes, and toys can collect thirdhand smoke.

As part of exploring their environment, children and infants put many objects into their mouths: their own hands, toys, blankets, their parents' fingers, a car seat strap, and more. Just about anything they discover goes into their mouths, including everyday objects parents may use to distract a child, such as a cell phone, car keys, or TV remote.

If their environment contains surfaces, objects, or dust contaminated with toxic thirdhand smoke, the chemicals can enter their bodies through touching, inhaling, or swallowing them.

**3. Growth and Development**

The respiratory systems of infants and young children are developing, and they breathe more times each minute than adults do. This increased respiratory rate means that in relation to their size, they can breathe in more thirdhand smoke than adults can. Their other organ systems are immature and growing too—this includes their skin. The skin of an infant or child is thinner than the skin of adults, meaning that their skin creates less of a barrier to keep thirdhand smoke chemicals from being absorbed into their bodies. Their immune systems are also developing, making them more vulnerable to the effects of tobacco pollutants than adults. A weakened immune system makes it more difficult to fend off infections.

Do you have more questions about the toxic legacy of tobacco smoke, how it affects human health, and what we can do about it? Learn more here.

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**Sources:**

Breunis LJ, Versteylen M, Radó MK, et al. Pediatric patients' views regarding smoke-free hospital grounds compared to those of adults: A survey study. *Tobacco Prevention & Cessation*. 2022;8:7. doi: 10.18332/tpc/145311

Jenssen BP, Walley SC, Boykan R, et al. Protecting children and adolescents from tobacco and nicotine. *Pediatrics*. 2023;151(5):e2023061806. doi: 10.1542/peds.2023-061806

Kelley ST, Liu W, Quintana PJE, et al. Altered microbiomes in thirdhand smoke-exposed children and their home environments. *Pediatric Research*. 2021;90(6):1153-1160. doi: 10.1038/s41390-021-01400-1

Mahabee-Gittens EM, Merianos AL, Jandarov RA, et al. Differential associations of hand nicotine and urinary cotinine with children's exposure to tobacco smoke and clinical outcomes. *Environmental Research*. 2021;202:111722. doi: 10.1016/j.envres.2021.111722

Mahabee-Gittens EM, Merianos AL, Matt GE. Preliminary evidence that high levels of nicotine on children's hands may contribute to overall tobacco smoke exposure. *Tobacco Control.* 2018;27(2):217-219. doi: 10.1136/tobaccocontrol-2016-053602

Mahabee-Gittens EM, Merianos AL, Quintana PJE, et al. Nicotine on children's hands: Limited protection of smoking bans and initial clinical findings. *Tobacco Use Insights*. 2019;12:1-6. doi: 10.1177/1179173X18823493

Mahabee-Gittens EM, Merianos AL, Stone L, et al. Hand nicotine as an independent marker of thirdhand smoke pollution in children's environments. *Science of The Total Environment.* 2022;849;157914. doi: 10.1016/j.scitotenv.2022.157914

Matt GE, Quintana PJE, Hovell MF, et al. Households contaminated by environmental tobacco smoke: sources of infant exposures. *Tobacco Control*. 2004;13:29–37. doi: 10.1136/tc.2003.003889

Merianos AL, Jandarov RA, Gordon JS, et al. Healthcare resources attributable to child tobacco smoke exposure. *PLOS ONE*. 2021;16(2):e0247179. doi: 10.1371/journal.pone.0247179

Merianos AL, Mahabee-Gittens EM, Choi K. Tobacco smoke exposure and inadequate sleep among U.S. school-aged children. *Sleep Medicine*. 2021;86:99-105. doi: 10.1016/j.sleep.2021.08.012

Northrup TF, Khan AM, Jacob P, et al. Thirdhand smoke contamination in hospital settings: Assessing exposure risk for vulnerable pediatric patients. *Tobacco Control*. 2016;25:619-623. doi: 10.1136/tobaccocontrol-2015-052506

Parks J, McLean KE, McCandless L, et al. Assessing secondhand and thirdhand tobacco smoke exposure in Canadian infants using questionnaires, biomarkers, and machine learning. *Journal of Exposure Science and Environmental Epidemiology*. 2022;32:112–123. doi: 10.1038/s41370-021-00350-4