Thirdhand Smoke Resource Center

How can I 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 through your lungs, skin, and mouth. Getting rid of it is really hard and can cost a lot of money.

People can be exposed to thirdhand smoke by:

1. Breathing in thirdhand smoke chemicals and particles that are released into the air from surfaces.
2. Absorbing thirdhand smoke residue through their skin when touching polluted objects or surfaces, such as floors, rugs, or blankets.
3. Swallowing thirdhand smoke residue when putting polluted objects, such as silverware or toys, in their mouths. Teething children are at high risk for this.

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.

There are three main ways that people can be exposed to thirdhand smoke.

Breathing

People can breathe in thirdhand smoke chemicals and particles suspended in the air. Thirdhand smoke can off-gas into the air from surfaces such as clothing, furniture, carpets, walls, or pillows. When this happens, we can sometimes smell stale tobacco smoke – but not always. When you smell stale tobacco smoke, it is not just a foul odor. It is a mixture of toxic chemicals that enter your body through your lungs. If you do not smell stale tobacco smoke, that does not necessarily mean there is not any thirdhand smoke present because some thirdhand smoke chemicals are odorless.

Touching

People can be exposed to thirdhand smoke chemicals when their skin comes in contact with a polluted surface. These include the clothes, blankets, toys, furniture, or the steering wheel of a car. Thirdhand smoke in the air can also stick to your skin. Once these chemicals get into your body through the skin, they enter your bloodstream and circulate through your body. They can harm your DNA, immune system, lungs, liver, and cardiovascular system.

Entering the Mouth

People can swallow thirdhand smoke when they put objects polluted with thirdhand smoke residue, such as utensils, cups, toys, or fingers, into their mouths. Young children are at the highest risk of swallowing thirdhand smoke because they put many objects in their mouths, particularly when teething.

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.

Updated February 2025

Sources:

Matt GE, Merianos AL, Quintana PJE, et al. Prevalence and income-related disparities in thirdhand smoke exposure to children. *JAMA Network Open.* 2022;5(2):e2147184. doi: 10.1001/jamanetworkopen.2021.47184

Matt GE, Quintana PJ, Zakarian JM, et al. When smokers move out and non-smokers move in: Residential thirdhand smoke pollution and exposure. *Tobacco Control.* 2011;20.e1. doi: 10.1136/tc.2010.037382

Matt GE, Merianos AL, Stone L, et al. Changes and stability of hand nicotine levels in children of smokers: Associations with urinary biomarkers, reported child tobacco smoke exposure, and home smoking bans. *Environment International*. 2023;181:108239. Epub 20230927. doi: 10.1016/j.envint.2023.108239. PubMed PMID: 37852151

Jacob P, Benowitz NL 3rd, Destaillats H, et al. Thirdhand smoke: New evidence, challenges, and future directions. *Chemical Research in Toxicology*. 2017;30:270–294. doi: 10.1021/acs.chemrestox.6b00343.

Tang X, Benowitz N, Gundel L, et al. Thirdhand exposures to tobacco-specific nitrosamines through inhalation, dust ingestion, dermal uptake, and epidermal chemistry. *Environmental & Science Technology.* 2022;56(17). doi: 10.1021/acs.est.2c02559