Thirdhand Smoke Resource Center

What tobacco products contribute to thirdhand chemical residue?

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.

All tobacco products leave behind a thirdhand chemical residue. These products include:

- Cigarettes, cigars, cigarillos, little cigars, and tobacco pipes
- E-cigarettes and vapes
- Water pipes (hookah or shisha)
- Smokeless tobacco products (chew, spit, snuff, and snus)

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.

Tobacco products are manufactured from the leaves of the tobacco plant. Some toxic chemicals in tobacco smoke occur naturally in the tobacco plant, others are added or created during the manufacturing process, and others form when tobacco is burned. Cigarettes are not the only product that creates a toxic thirdhand chemical residue. Any tobacco product that is burned, including cigars, cigarillos, little cigars, tobacco pipes, and water pipes (hookah or shisha), can leave behind a toxic thirdhand chemical residue.

Even tobacco products that do not burn can leave a toxic thirdhand chemical residue, such as electronic cigarettes and vaping products. This is because e-cigarette “vapor” is not just harmless water vapor. The liquid that gets heated includes nicotine, propylene glycol, vegetable glycerine, flavor chemicals, substances left over from the extraction of nicotine from tobacco plants, and compounds created during the heating of the vaping fluid. Scientists refer to the “vapor” as aerosols, the tiny particles or droplets of nicotine, propylene glycol, vegetable glycerine, flavor chemicals, and other toxic substances suspended in the air.

A recent study of vapor from JUUL e-cigarettes and vaping shops found that the thirdhand chemical residue from vape aerosols build up on nearby surfaces when people vape. Further, thirdhand chemical residue from nicotine and cannabis has been found in indoor environments after these products were vaped. While thirdhand chemical residue from vape aerosols may not smell like thirdhand smoke from tobacco smoke, their chemicals linger on surfaces and in dust. Similar to tobacco smoke residue, some of the chemicals in the vape residue (e.g., nicotine) further react with airborne oxidants (e.g., ozone, nitrous acid) to create even more toxic compounds (e.g., tobacco-specific nitrosamines). This is why tobacco smoke and thirdhand chemical residue from vape aerosols become more toxic over time.

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

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