Do electronic cigarettes create 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 if you inhale, swallow, or touch the chemicals. Getting rid of it is really hard and can cost a lot of money.

Electronic cigarettes (also called e-cigarettes, vapes, or ENDS products) heat up a liquid that contains nicotine and other chemicals, becoming clouds of tiny aerosols. These clouds act like secondhand smoke, sticking to surfaces and household objects. They become thirdhand chemical residue from vape aerosols that exposes people to toxic chemicals. This residue includes carcinogens called TSNAs.

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.

Electronic cigarettes (also called e-cigarettes, vapes, or ENDS products) do not burn tobacco. Instead, e-cigarettes heat a fluid that contains nicotine, nicotine by-products, a chemical solvent, and flavor chemicals. This heated fluid creates a vapor made up of tiny droplets, called aerosols, that look like cigarette smoke.

Aerosols from vapes act similarly to aerosols and gases from smoking cigarettes. They move through the air, can spread to other rooms, and collect in dust. They also stick to surfaces and household objects, creating thirdhand chemical residue and exposing people to the chemicals. This thirdhand chemical residue from vape aerosols can interact with other chemicals in the air to form new cancer-causing substances. They can also transfer from room to room, such as from a vape shop into a neighboring business. They can also be transported on people who vape into a smokefree and vapefree environment. Researchers have found thirdhand chemical residue from vape aerosols on indoor surfaces days after vaping had stopped. In one study looking at thirdhand chemical residue from vape aerosols in vape shops, the researchers found nicotine as well as

additional toxic nicotine-related chemicals on surfaces in the shops. They also found the chemicals to stick to paper, clothing, and glass after these materials sat in the vape shops for 14 days. Another study of JUUL e-cigarettes confirmed that exhaled vapor leaves toxic thirdhand chemical residue from vape aerosols on surfaces. A recent study also showed that vaping generates potent carcinogens known as TSNAs. Some TSNAs quickly formed during and right after vaping occurred. Over the following 36 hours, the amount of all TSNA's grew. This suggests TSNAs formed from nicotine in thirdhand chemical residue from vape aerosols.

Children can inhale secondhand vape aerosols and pick up thirdhand chemical residue from vape aerosols on their hands. Like thirdhand smoke residue, children are the most vulnerable to the toxic chemicals in thirdhand chemical residue from vape aerosols.

To prevent the build-up of thirdhand chemical residue from vape aerosols in your home and car, do not allow anyone to vape in those spaces.

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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