

THIRDHAND

SMOKE Resource Center

Do electronic cigarettes create thirdhand smoke?

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, or e-cigarettes, do not burn tobacco. Instead, e-cigarettes heat a fluid that contains nicotine, a chemical solvent, and flavor chemicals. This heated fluid creates a vapor made up of tiny droplets that looks like cigarette smoke. Just like tobacco smoke, e-cigarette vapor sticks to clothes, furniture, and other surfaces creating thirdhand smoke.

Research has found nicotine residue from e-cigarettes on indoor surfaces days after vaping had stopped. Researchers have shown that children can pick up this nicotine on their hands. Nicotine on surfaces reacts with other chemicals in the air to produce new compounds that can cause cancer and worsen asthma.

In places where vaping is allowed, such as vape shops, the air quality is poor, exposing patrons and workers to toxic secondhand and thirdhand vapor. To prevent the build-up of e-cigarette residue in your home and car, do not allow anyone to vape in those spaces.

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Sources

- Goniewicz, M. L., & Lee, L. (2015). Electronic cigarettes are a source of thirdhand exposure to nicotine. *Nicotine & Tobacco Research*, 17(2), 256–258. <https://doi.org/10.1093/ntr/ntu152>
- Khachatoorian, C., Jacob III, P., Benowitz, N. L., & Talbot, P. (2019). Electronic cigarette chemicals transfer from a vape shop to a nearby business in a multiple-tenant retail building. *Tobacco Control*, 28(5), 519–525. <https://doi.org/10.1136/tobaccocontrol-2018-054316>
- Li, D., Shi, H., Xie, Z., Rahman, I., McIntosh, S., Bansal-Travers, M., Winickoff, J. P., Drehmer, J. E., & Ossip, D. J. (2020). Home smoking and vaping policies among US adults: Results from the Population Assessment of Tobacco and Health (Path) study, wave 3. *Preventive Medicine*, 139, 106215. <https://doi.org/10.1016/j.ypmed.2020.106215>
- Marcham, C. L., Floyd, E. L., Wood, B. L., Arnold, S., & Johnson, D. L. (2019). E-cigarette nicotine deposition and persistence on glass and cotton surfaces. *Journal of Occupational and Environmental Hygiene*, 16(5), 349–354. <https://doi.org/10.1080/15459624.2019.1581366>
- Pozuelos, G. L., Rubin, M., Vargas, S., Ramirez, E., Bandaru, D., Sha, J., Wohlschlegel, J., & Talbot, P. (2022). Nicotine affects multiple biological processes in epidermal organotypic tissues and keratinocyte monolayers. *Atmosphere*, 13(5), 810. <https://doi.org/10.3390/atmos13050810>
- Son, Y., Giovenco, D. P., Delnevo, C., Khlystov, A., Samburova, V., & Meng, Q. (2020). Indoor air quality and passive e-cigarette aerosol exposures in vape-shops. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, 22(10), 1772–1779. <https://doi.org/10.1093/ntr/ntaa094>



