

A new worry for smokers' families: 'thirdhand smoke'

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Credit: Vera Kratochvil/public domain

Michael Miller does what many smokers do to protect his sons and daughter from cigarette smoke. He takes it outside.

After his 7 a.m. coffee, he walks out of his home in Cincinnati to smoke his first cigarette of the day. Then, as a branch manager of a road safety construction company, he smokes dozens more on street curbs.

The tobacco never appears when Miller is coaching on the baseball or football field, or when he's in the car with his children. But when he's alone on the road, he sometimes rolls the windows down and lights up.

"I know (cigarettes are) bad," Miller said. "I know I need to quit."

New findings have identified potential dangers of another byproduct of cigarettes that may slip past Miller's precautions and affect his children: ["thirdhand smoke."](#)

A recent study in the journal *Tobacco Control* found high levels of nicotine on the hands of children of smokers, raising concerns about thirdhand smoke, a name given to the nicotine and chemical residue left behind from cigarette and cigar smoke that can cling to skin, hair, clothes, rugs and walls. This thin film can be picked up by touch or released back into the air when disturbed.

The researchers examined 25 children who arrived at emergency rooms with breathing problems associated with [secondhand smoke exposure](#).

They found that the average level of nicotine on the children's hands was more than three times higher than the level found on the hands of nonsmoking adults who live with smokers. They said determining the amount of nicotine on the skin of a nonsmoker is a good way to measure exposure to thirdhand smoke.

"Because nicotine is specific to tobacco, its presence on children's hands may serve as a proxy of tobacco smoke pollution in their immediate environment," the researchers wrote.

They also found that all but one of the children had detectable levels in their saliva of cotinine, a biomarker for exposure to nicotine. All the children in the study had parents who smoked but did not smoke

themselves.

The high nicotine readings on the children's hands, and the "light [smoking](#)" habits of most of their parents, signaled to lead author E. Melinda Mahabee-Gittens that the toxins could have arrived from a source other than direct access to cigarette smoke.

"Clearly they're getting it from somewhere, and perhaps it may be this thirdhand smoke connection," Mahabee-Gittens said.

Researchers noted that their conclusions are based on a small sample and will need to be studied in larger populations to verify the findings.

Children face a higher risk of developing health complications from thirdhand smoke than adults. Infants tend to spend more time indoors and can be surrounded by contaminated objects like rugs and blankets, according to a 2004 study by Georg Matt, a professor of psychology at San Diego State University. Infants' tendency to place their hands in their mouths increases the likelihood of the young ingesting the toxic residue.

Thirdhand smoke can linger in an area long after a cigarette or cigar is put out - for up to five years, Matt said.

"Tobacco smoke doesn't go up in the air and it disappears and it's gone," Matt said. "That's the illusion."

The health consequences of secondhand smoke are well-established.

Researchers at the U.S. Centers for Disease Control and Prevention estimate that since 1964 at least 2.5 million nonsmokers have died of diseases linked to their exposure to [cigarette smoke](#).

Research on thirdhand smoke gained wide recognition only a decade ago, but several studies suggest that the mix of toxins can lead to adverse health outcomes. An animal model simulating thirdhand-smoke-contaminated homes found the chemicals harmed mice's livers, lungs and healing abilities. A separate 2010 study showed that thirdhand smoke mixed with nitrous acid - a gas sometimes emitted from leaky stoves - can form cancer-causing chemical compounds. These toxins have also been shown to damage human DNA.

"All in all, I think the evidence that we've gathered is basically pointing to potentially high levels of risk to young [children](#) and toddlers, and also expectant mothers," Anwer Mujeeb, program officer for the Tobacco-Related Disease Research Program.

Removing thirdhand smoke from a child's environment is not easy. The variety of compounds that make up cigarette residue react to cleaning products differently, Matt said, making it difficult to purge a space of pollutants.

Governments and agencies across the nation have attempted to curb the threat of smoke exposure with tobacco bans. Forty-one states and the District of Columbia have smoke-free laws, according to the lobbying group Americans for Nonsmokers' Rights.

Although most of those laws are meant to address secondhand smoke exposure, an unintended benefit is a reduction in thirdhand smoke, said Stanton Glantz, professor of medicine and director of the Center for Tobacco Control Research and Education at University of California-San Francisco.

Reynolds American, the second-largest tobacco company in the United States, declined to comment on the study. The Altria Group, the leading U.S. cigarette manufacturer, did not respond to requests for comment.

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