

Study: 'Thirdhand smoke' may be hidden asthma trigger in kids

May 21, 2025 12:18 PM Andrew Yawn

ayawn@tulane.edu

(504) 247-1443



Although 60% of parents surveyed said their children had no exposure to tobacco smoke, 100% of children tested positive for biomarkers linked to tobacco smoke exposure. (Photo by Shutterstock)

A new study from Tulane University found that parents may underestimate their children's exposure to environmental tobacco smoke, and a newly identified phenomenon called thirdhand smoke may be to blame.

Thirdhand smoke occurs when chemical residue from smoking lingers in carpets, furniture and walls long after the cigarette was lit. Children can inhale these particles by disturbing fabric fibers while playing or ingest them by touching contaminated surfaces and then putting their hands in their mouths.

The study, published in the [*Journal of Clinical and Translational Science*](#), surveyed caregivers of 162 children in three major U.S. cities. Although 60% said their children had no exposure to environmental tobacco smoke (ETS), urine testing showed that all of the children tested positive for low levels of cotinine, which forms when nicotine is broken down in the body and is a biomarker of tobacco exposure. More than 90% of the children tested positive for intermediate levels of cotinine.

While the study couldn't conclusively distinguish if the children were exposed to secondhand or thirdhand smoke, the caregiver surveys point to a less obvious source of tobacco smoke exposure, said lead author Katherine McKeon, PhD candidate at Tulane University's Celia Scott Weatherhead School of Public Health and Tropical Medicine.

"These findings do not imply that the parents are lying but rather speak to the invasive nature of thirdhand smoke and how difficult it is to remove from buildings, cars and furniture," McKeon said. "Thirdhand smoke is a newer concept, but ongoing research points to it posing a highly toxic silent threat to children, particularly to children with asthma."

While exposure to smoking poses a variety of health consequences for all, children with asthma are particularly susceptible, and environmental tobacco smoke can trigger asthma attacks.

The findings also highlighted the potential for information bias if researchers rely on caregiver surveys for ETS assessments. While the study found a correlation between high levels of cotinine in asthmatic children and prevalence of asthma attacks, there was no association between caregivers who reported ETS exposure for their children and asthma attacks.

All children in the study were between the ages of 7-12 and lived in federally subsidized public housing in New Orleans, Cincinnati and Boston at the time of the study. Data was collected three times over the course of a year. Caregivers were asked two questions: “Do you or any visitor smoke in your home?” and “Do any household members use tobacco products?”

In recent years, other studies have found evidence that the tobacco smoke residue responsible for thirdhand smoke may become more toxic over time and can be resistant to conventional cleaning methods.

The findings point to a need for more research around thirdhand smoke prevalence and health risks. Additionally, the study underscores a need for alternate methods of assessing children’s exposure to tobacco smoke, such as screening for biomarkers like cotinine.

“Our research confirms that relying on caregiver surveys to assess children’s tobacco smoke exposure is inadequate and leads to significant underreporting due to an underestimated prevalence of ETS,” McKeon said. “This misclassification may hinder proper asthma management and delay critical interventions.”



Thirdhand smoke poses a "highly toxic silent threat to children," said lead author Katherine McKeon, PhD candidate at Tulane University's Celia Scott Weatherhead School of Public Health and Tropical Medicine.

"Thirdhand smoke is a newer concept but ongoing research points to it posing a highly toxic silent threat to children, particularly to children with asthma."

Katherine McKeon