

NYC toddlers exposed to potentially harmful flame retardants

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Researchers at the Columbia Center for Children's Environmental Health (CCCEH) within the Mailman School of Public Health report evidence of potentially harmful flame retardants on the hands and in the homes of 100 percent of a sample of New York City mothers and toddlers. The study also found that on average toddlers in New York City had higher levels of common flame-retardants on their hands compared to their mothers.

The Center's previous research has linked early life exposure to a common class of flame-retardants called PBDEs with attention problems and lower scores on tests of mental and physical development in children. Results appear in the journal *Emerging Contaminants*.

Beginning in the 1970s, manufacturers added PBDEs, persistent brominated flame-retardants, to couches, textiles, electronics and other consumer products to comply with flammability standards. They began phasing out PBDEs in 2004 and started using newer alternative flame-retardants, including TBB and TBPH, which are components of the commercial mixture Firemaster 550. TBB and TBPH are brominated flame retardants for which little is known about their health effects in humans, though they have been linked to reduced fertility and endocrine disruption in animal models.

Researchers visited the homes of 25 mother-child pairs enrolled in the CCCEH Sibling-Hermanos birth cohort, which began in 2008. When children were 3 years old, dust was collected from their homes and hand

wipes were collected from the mother and child; these samples were analyzed for flame retardant compounds.

Signaling the widespread persistence of the phased out PBDEs and the prevalence of their potentially toxic substitutes, investigators found that both PBDEs and the newer brominated flame-retardants, TBB and TBPH, were detected in 100 percent of [house dust](#) samples. On average, levels of TBB and TBPH in house dust were higher than PBDEs. Likewise, PBDEs and TBB were found in 100 percent of hand wipe samples and TBB was found in 95 percent of samples. Paired mother and child hand wipe concentrations were correlated; however, children typically had [higher levels](#) of all flame-retardants on their hands than their mothers.

Results are consistent with other studies, which demonstrate that toddlers tend to have higher exposure to flame retardants when compared with adults, likely because of the amount of time they spend on the floor.

"The extent to which young children are exposed to these chemicals is cause for concern given the known neurodevelopmental risk of PBDEs and the potential toxicity of their substitutes," says Whitney Cowell, the study's first author and a PhD candidate in the Department of Environmental Health Sciences at Columbia's Mailman School.

The study is the first comparison of PBDEs, TBB, and TBPH in house dust and handwipe samples from maternal-child pairs. The investigators detected flame retardant chemicals on the hands and in the homes of all participants. The detected compounds included both historic [flame-retardants](#) that have been phased out of use due to health effects and their newer replacements.

"Toddlers are being exposed to replacement flame retardant chemicals that we know little about," says senior author Julie Herbstman, associate

professor of Environmental Health Sciences. "Future research needs not only to focus on understanding the toxicity of these compounds, but also on how exposure occurs in the home and what behaviors and policies can be used to reduce personal exposure."

Provided by Columbia University's Mailman School of Public Health

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