

Childhood exposure to flame retardant chemicals declines following phase-out

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Exposure to flame retardants once widely used in consumer products has been falling, according to a new study by researchers at the Columbia Center for Children's Environmental Health at Columbia's Mailman School of Public Health. The researchers are the first to show that levels of polybrominated diphenyl ethers (PBDEs) measured in children significantly decreased over a 15-year period between 1998 and 2013, although the chemicals were present in all children tested. The Center previously linked exposure to PBDEs with attention problems and lower scores on tests of mental and physical development in children.

Results appear in the *Journal of Exposure Science and Environmental Epidemiology*.

Manufacturers used PBDEs as the primary flame retardant chemical in furniture between 1975 and 2004 to comply with fire safety standards, with the highest use of these chemicals occurring in North America. Due to their persistence in the environment and evidence of [human health effects](#), pentaBDE, a specific technical mixture of PBDEs was phased out of use in couches, mattresses, carpet padding, and other upholstered products beginning in 2004. Since PBDE chemicals are stable, they tend to build up indoors and are found in house dust; humans are mainly exposed through ingestion of dust and have some exposure through dietary sources.

Researchers followed 334 mother-child pairs, a subset of CCCEH's ongoing urban birth cohort study in New York City, from prenatal life

through adolescence. Researchers collected [umbilical cord blood](#) at birth and blood from the children at ages 2, 3, 5, 7 and 9. Over time, levels of BDE-47, the most frequently detected component of the pentaBDE mixture in humans, decreased by about 5 percent per year from 1998 to 2013. When examining only blood samples collected postnatally, researchers observed a 13 percent decrease per year between 2000 and 2013.

Children that were toddlers (ages 2-3) before the phase-out took effect in 2004-2005, had significantly higher levels of BDE-47 in their blood than children who turned age 2-3 following the phase out. Phase-out aside, 2-3 year olds had the highest concentrations of BDE-47 in their blood than at any other age, possibly because they spend more time on the floor and have more contact with dust at this age.

Though levels of these [flame retardants](#) are decreasing over time, investigators found PBDEs in every child blood sample. "These findings suggest that while pentaBDE levels have been decreasing since the phase-out, they continue to be detected in the blood of young children nearly 10 years following their removal from U.S. commerce," says first author Whitney Cowell, PhD, pediatric [environmental health](#) research fellow at Mt. Sinai and former doctoral student from the Columbia Center for Children's Environmental Health.

"These findings reinforce the decision to phase-out PBDEs from [consumer products](#)," says senior author Julie Herbstman, PhD, associate professor of Environmental Health Sciences. "However, it's important to remain vigilant. Since the phase-out of PBDEs, we have begun to detect other flame-retardant chemicals in [children](#), which are likely being used as replacements."

Provided by Columbia University's Mailman School of Public Health

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