

Prenatal exposure to flame retardants linked to poorer behavioral function in children

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Credit: Robert Kraft/public domain

New research from the University of Cincinnati (UC) College of Medicine suggests that prenatal exposure to flame retardants and perfluoroalkyl substances (PFASs) commonly found in the environment may have a lasting effect on a child's cognitive and behavioral development, known as executive function.

The Cincinnati study, published this week in *Environmental Research*, evaluated levels of polybrominated diphenyl ethers (PBDEs) and PFASs present in mothers during pregnancy and conducted assessments in their children for several years using parent-reported questionnaires to capture impairments in executive function, the mental processes used in focus, working memory, delegation of tasks and emotional control.

Used as synthetic flame retardants in a number of consumer products, including polyurethane foams found in couches and upholstery, carpet pads, electronics, and some textiles, PBDEs have been detected in the environment - entering the air, water and soil from wear and tear of [consumer products](#). Humans are exposed to PBDEs via ingestion of dust and diet. PBDEs accumulate in fats, and several studies have indicated that [prenatal exposure](#) to PDBEs is toxic to the developing nervous system. PFASs, also tested in the study, can be found in water and stain repellent products, including fast-food wraps, cleaning products, firefighting foams, upholstery, and non-stick cookware.

"We examined the relationship between prenatal exposure to PBDEs and PFASs and executive function in children at 5 and 8 years of age," said Ann Vuong, DrPH, a postdoctoral fellow at the University of Cincinnati in the Department of Environmental Health. "The findings suggest that maternal serum concentrations of PBDEs and perfluorooctane sulfonate (PFOS), one of the most commonly found PFASs in human blood, may be associated with poorer executive functioning in school-age children."

The study sample consisted of 256 mother-child pairs enrolled in the Health Outcomes and Measures of the Environment (HOME) Study, an ongoing prospective birth cohort in the Greater Cincinnati area. It includes a collaborative group of investigators from Cincinnati Children's Hospital Medical Center, Simon Fraser University, Brown University, and the University of Cincinnati, who seek to quantify the impact of low-level prenatal and childhood exposures to environmental

chemicals on health, growth, and neurobehavioral outcomes. The HOME study has followed its participants from approximately 16 weeks gestation to eight years of age, examining their associations with endocrine function, cognition, learning and memory, motor skills, attention, executive function, and behavior.

"Given the persistence of PBDEs and PFASs in the environment and in human bodies, the observed deficits in [executive function](#) may have a large impact at the population level. Further research is needed to understand and clarify the population impact of their potential neurotoxicity," said Vuong.

Provided by University of Cincinnati Academic Health Center

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