Medical Xpress

You're breathing potential carcinogens inside your car, says study

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The air inside all personal vehicles is polluted with harmful flame retardants—including those known or suspected to cause cancer—according to a new study published in *Environmental Science &*

Technology. Car manufacturers add these chemicals to seat foam and other materials to meet an outdated federal flammability standard with no proven fire-safety benefit.

"Our research found that interior materials release harmful chemicals into the cabin air of our cars," said lead author Rebecca Hoehn, a scientist at Duke University. "Considering the average driver spends about an hour in the car every day, this is a significant public health issue. It's particularly concerning for drivers with longer commutes as well as child passengers, who breathe more air pound for pound than adults."

The researchers detected flame retardants inside the cabins of 101 cars (model year 2015 or newer) from across the U.S. In total, 99% of cars contained tris (1-chloro-isopropyl) phosphate (TCIPP), a flame retardant under investigation by the U.S. National Toxicology Program as a potential carcinogen. Most cars had additional organophosphate ester flame retardants present, including tris (1,3-dichloro-2-propyl) phosphate (TDCIPP) and tris (2-chloroethyl) phosphate (TCEP), two California Proposition 65 carcinogens. These and other flame retardants are also linked to neurological and reproductive harms.

About half of the cars were tested in both summer and winter. Warmer weather was linked to higher flame retardant concentrations because off-gassing from interior components like seat foam is increased by higher temperatures. Vehicle interiors can reach up to 150 degrees Fahrenheit.

The researchers also analyzed samples of seat foam from 51 of the cars in the study. Vehicles that contained the suspected carcinogen TCIPP in their foam tended to have higher concentrations of TCIPP in their air, confirming foam as a source of this flame retardant in cabin air.

Flame retardants are added to seat foam to meet the U.S. National

Highway Traffic Safety Administration (NHTSA) Federal Motor Vehicle Safety Standard (FMVSS) 302, an open-flame flammability standard that was first introduced in the 1970s and remains unchanged.

"Firefighters are concerned that flame retardants contribute to their very high cancer rates," said Patrick Morrison, who oversees Health and Safety for 350,000 U.S. and Canadian firefighters at the International Association of Fire Fighters. "Filling products with these harmful chemicals does little to prevent fires for most uses and instead makes the blazes smokier and more toxic for victims, and especially for first responders. I urge NHTSA to update their flammability standard to be met without flame retardant chemicals inside vehicles."

Such an update would mirror changes to California's flammability standard for furniture and baby products, which a decade ago was updated to a modern standard that is met without flame retardants. Notably, this update has maintained, or even modestly increased, furniture fire safety and led to lower levels of flame retardants in U.S. homes.

Epidemiological studies have shown that the average U.S. child has lost three to five IQ points from exposure to one flame retardant used in cars and furniture. Further, a recent research paper estimated that those with highest levels of this flame retardant in their blood had about four times the risk of dying from cancer compared with people with the lowest levels.

"You may be able to reduce your exposure to flame retardants in your car by opening your windows and parking in the shade," said co-author Lydia Jahl, a senior scientist at the Green Science Policy Institute. "But what's really needed is reducing the amount of flame retardants being added to cars in the first place. Commuting to work shouldn't come with a cancer risk, and children shouldn't breathe in chemicals that can harm

their brains on their way to school."

More information: Flame Retardant Exposure in Vehicles is Influenced by Use in Seat Foam and Temperature, *Environmental Science & Technology* (2024). DOI: 10.1021/acs.est.3c10440

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