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New study: Many flame retardants in house dust—unsafe levels

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A peer-reviewed study of the largest number of flame retardants ever tested in homes found that most houses had levels of at least one flame retardant that exceeded a federal health guideline. The journal *Environmental Science & Technology* will publish the study online on November 28.

The study led by scientists at Silent Spring Institute tested for 49 flame retardant chemicals in household dust, the main route of exposure for people and especially for children. Forty-four flame retardant chemicals were detected and 36 were found in at least 50% of the samples, sometimes at levels of health concern. The flame retardants found in house dust are in furniture, textiles, electronics, and other products and include hormone disruptors, carcinogens, and chemicals with unknown safety profiles.

The highest concentrations were found for chlorinated organophosphate flame retardants. This chemical group includes TCEP and TDCIPP (or chlorinated "Tris"), which are listed as carcinogens under California's Proposition 65.

TDBPP (or brominated "Tris") was banned from children's pajamas in 1977 due to health concerns but is still allowed in other products, and was present in 75% of homes tested in 2011.

There are no federal rules requiring that flame retardants be safety tested. Among the limited number of flame retardants with EPA health

risk guidelines, the study found five at levels higher than those guidelines—BDE 47, BDE 99, TCEP, TDCIPP and BB 153.

"Our study found that people are exposed to toxic flame retardants every day. These hazardous chemicals are in the air we breathe, the dust we touch and the couches we sit on. Many flame retardants raise health concerns, including cancer, hormone disruption, and harmful effects on brain development. It is troubling to see that a majority of homes have at least one flame retardant at levels beyond what the federal government says is safe. Infants and toddlers who spend much time on the floor are at higher risk for exposure," said Dr. Robin Dodson, a co-author of the study and a scientist with the Silent Spring Institute.

The study was conducted in California homes, because furniture manufacturers use flame retardants in products sold throughout the U.S. in order to meet California's stricter flammability standard. Many health experts have called on California Governor Jerry Brown to make good on his promise to amend the requirement, which affects the health of people around the country.

This study complements a separate study, also being published in Environmental Science *& Technology* today (Nov. 28), that found many potentially problematic flame retardants in couches. Both studies break new ground by revealing the wide range of flame retardants in use. The Silent Spring Institute study demonstrates that flame retardant chemicals in couches and other products wind up in house dust at levels of health concern.

Two PBDE formulations have been phased out due to health concerns, but other flame retardants with considerable evidence of toxicity, such as chlorinated organophosphates and HBCYD, appear to remain at high or increasing levels of use. Every home tested had HBCYD, which was prioritized by regulators in the US and Europe because of its persistence

and concerns about human reproductive, neurological, and developmental effects.

Other flame retardants being used as replacements for PBDEs have unknown health implications. The study found that levels of chemicals in Firemaster® 550 increased from 2006 to 2011, likely because it is being used as a replacement for PentaPBDE, which was phased out.

"When one toxic flame retardant is phased out, it's being replaced by another chemical we either know is dangerous or suspect may be. It's not comforting to swap one hazardous chemical for its evil cousin. Instead, we should test chemicals before they are allowed on the market," said Dr. Julia Brody, executive director of the Silent Spring Institute and co-author of the study.

Many of the detected chemicals show evidence of hormone disruption; in particular the PBDEs, HBCYD, and TBBPA affect thyroid hormone, which is important for brain development. The breakdown products of TDBPP (brominated "Tris") damage DNA and cause mammary tumors in animal studies, raising concern about breast cancer in people.

"The potential harm from fire retardant chemicals used in furniture is very concerning. My research found that the California fire standard provides no meaningful protection against the hazard it addresses – furniture ignited by small flames. In view of the toxicity of substances put into furniture foam to meet the California standard, the rule does more harm than good," according to Dr. Vytenis Babrauskas, an independent fire safety scientist.

More information: "Novel and High Volume Use Flame Retardants in US Couches Reflective of the 2005 PentaBDE Phase Out" *Environmental Science & Technology* 2012.

Provided by Silent Spring Institute