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## PBDES, CATS, AND CHILDREN

[Rachel's introduction: In recent years, house cats in the U.S. have been experiencing an epidemic of thyroid disease. Now it seems that exposure to certain flame-retarding chemicals (PBDEs) may be the culprit. Scientists say cats provide early warnings of chronic exposure of both children and adults.]

By [Kellyn Betts](#)

[New ES&T research](#) documents that house cats can have extraordinarily high concentrations of [polybrominated diphenyl ether](#) (PBDE) flame retardants in their blood. [Janice Dye](#), a veterinary internist at the U.S. EPA's [National Health and Environmental Effects Research Laboratory](#) (NHEERL), and her colleagues say their findings suggest that "chronic [cumulative] low-dose PBDE exposure may be more endocrine-disrupting than would be predicted by most short-term or even chronic PBDE exposure studies in laboratory rodents." They contend that cats can serve as sentinels for chronic human exposure -- of both children and adults -- to the persistent, bioaccumulative, and toxic compounds.

PBDEs are known to impair thyroid functioning. They have been used since the late 1970s as flame retardants in household products, including upholstered furniture, carpet padding, and electronics. During that same time period, the incidence of a cat thyroid ailment, known as [feline hyperthyroidism](#), has risen dramatically. "Feline hyperthyroidism... was never reported" 35 years ago, but "now it is very common," explains coauthor [Linda Birnbaum](#), director of NHEERL's experimental toxicology division. The disease's cause has been a mystery, Dye says.

PBDE concentrations in blood serum of the 23 house cats participating in the study were 20-100 times higher than the median levels of PBDEs in people living in North America, who have been shown to have the world's highest human PBDE levels. Eleven of the cats in the study suffered from feline hyperthyroidism, and the study "points the finger at the association" between the endocrine-disrupting compounds and the disease, Dye says.

Dye and her colleagues observed that the median PBDE concentrations in their study group's young cats were on a par with the levels reported in [a sampling](#) of North American children. The paper shows that both cat food and house dust are likely sources of the cats' PBDEs. Although scant research has examined PBDE uptake in small children, studies from Australia, Norway, and the U.S. document that children younger than 4 years can have far higher levels of the compounds than adults.

Scientists hypothesize that this is because PBDEs can be found in house dust and young children are exposed to far more dust than older people. Cats' meticulous and continuous grooming habits could conceivably result in PBDE uptake similar to what toddlers are exposed to through their increased contact with floors and "mouthing" behaviors, Birnbaum says. Laboratory animals exposed to PBDEs before and after birth can have problems with [brain development](#), including learning, memory, and behavior.

The PBDE uptake pattern of the cats in the study mirrors that of North American people, Dye points out. Both have unusually large "[outlier populations](#)" of individuals with PBDE levels that are four to seven times greater than the median concentrations.

The paper makes a convincing case that cats can be "a useful sentinel species for both [human] exposure to PBDEs and examination of endocrine disruption," notes [Tom Webster](#), an associate professor at the Boston University School of Public Health's department of environmental health. [Ake Bergman](#), chair of Stockholm University's environmental chemistry department, agrees, adding that the paper is noteworthy for showing that many cats harbor high quantities of the only PBDE compounds still being used in North America and Europe, which are associated with the Deca formulation used to flame retard electronics products. As of 2004, the lighter weight PBDEs associated with the Penta and Octa PBDE formulations used in polyurethane foam and other plastics were banned in Europe and discontinued in the U.S. However, these

compounds are still found in older furniture and household furnishings, including upholstered furniture and carpeting.

For all of these reasons, the new research "supports the need for more studies on [PBDE] exposure to children from house dust," says [Heather Stapleton](#), an assistant professor at Duke University's Nicholas School of the Environment.

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