

Abstract # 913

Elevated House Dust and Serum Concentrations of PBDEs in California: Unintended Consequences of Furniture Flammability Standards?

Zota AR,* Rudel RA,* Morello-Frosch RA,† Brody JG* **Silent Spring Institute, Newton, MA, USA; and* †*Department of Environmental Science, Policy and Management & School of Public Health, University of California, Berkeley, Berkeley, CA, USA.*

Background: Studies have shown higher house dust and body burden levels of PBDE flame retardants in North America relative to Europe, yet little is known about regional variation within North America, where California is the only state that requires that foam furniture meet fire safety standards.

Objective: To assess whether elevated house dust and serum PBDE concentrations are associated with California residence.

Methods: For the California Household Exposure Study, dust samples were collected from 49 homes in two communities and analyzed for BDE congeners -47, -99, and -100. Regional variation in PBDE serum concentrations was assessed in 2,040 samples from participants in the 2003-2004 National Health and Nutrition Examination Survey (NHANES), a cross-sectional survey of a random sample representative of the U.S. population. The serum concentrations of six BDE congeners (-28, -47,-99,-100,-153, and -154) associated with the pentaBDE product were summed to create a summary measure for pentaBDE (Σ PBDEs).

Results: Dust concentrations [Median (Range) ng/g] in California homes of BDE-47, -99, and -100 were 2,700 (112-107,000), 3,800 (102-170,000), and 684 (<MRL-30,900), respectively, and were four to ten times higher than previously reported levels in North America. Maximum concentrations were the highest ever reported in an indoor dust study. Multivariate regression models showed that residing in California was associated with a nearly two-fold increase in Σ PBDE serum levels [Least square geometric mean (LSGM) ng/g lipid, 95% CI: (69.4 (67.1-71.7) vs. 38.9 (36.8-41.0), $p=0.004$)]. Elevated Σ PBDE serum levels were also associated with male sex, younger age, lower income, and being born in the U.S.

Conclusions: Elevated house dust and human serum concentrations of PBDEs in California may reflect the unintended consequences of furniture flammability standards and foreshadow future exposures from chemicals introduced to replace banned PBDE products.