

Exposure to PBDEs and Other Flame Retardants in Commercial Aircraft

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Abstract

Background

Flame retardant chemicals represent a broad range of compounds used in a wide variety of consumer and commercial products, including those used on commercial aircraft. Toxicological and epidemiological evidence suggests that several of these classes of compounds are neurotoxicants and disrupt hormone regulation.

Limited information is available regarding exposure to flame retardants on commercial aircraft. A study of exposure to polybrominated diphenyl ethers (PBDEs) in aircraft found that while body burdens of PBDEs in air travelers were similar to levels measured in the general population, the post-flight body burdens were higher than pre-flight body burdens suggesting travel-related exposure. That study, the only peer-reviewed paper specific to environmental exposures to flame retardants on commercial aircraft, also reported concentrations of PBDEs in dust from aircraft that often exceed the highest dust concentrations found in homes.

Methods

In research associated with the U.S. Federal Aviation Administration (FAA) Airliner Cabin Environment Research (ACER), and in cooperation with the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., we collected air samples from commercial aircraft cabins (n=22) and analyzed them for four PBDE congeners – BDEs 47, 99, 100 and 209.

Results

Median concentrations for the four congeners were 2.0, <dl, <dl and 0.68 ng/m³, respectively. For BDE 47, the median and maximum concentrations (max = 12.7 ng/m³) were an order of magnitude greater than median and maximum levels typically found in U.S. homes. For BDE

209, the median concentration was similar to median levels in homes and the maximum concentration (2050 ng/m³) was an order of magnitude greater than maximum air concentrations measured for occupationally-exposed workers (and several orders of magnitude greater than the maximum found in US homes). Ongoing research includes analysis of additional air samples and dust samples for PBDEs and other flame retardants.

Conclusion

The data presented here are preliminary data from a larger study of exposure to flame retardants in commercial aircraft. Along with consideration of potential exposures to the public, flight attendants' potential for prolonged exposures highlights the need for continued assessment of exposure to these compounds in commercial aircraft.

Although the FAA has sponsored this project, it neither endorses nor rejects the findings of this research. Results of Cooperative Research between the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., and Battelle Memorial Institute.