Sources of Airborne PCB Congeners

The long-term goal of Project 4 is to quantify the relationship between observed concentrations of PCBs in air, their specific sources, and the potential to reduce PCB exposure to sensitive populations. The objective of Project 4 is to examine two major categories of airborne PCB sources: materials found in schools and homes; and highly contaminated waterways. We will be doing this by:

1) Developing novel passive sampling materials. We hypothesize that tailored electrospun nanofiber mats (ENMs) are efficient and adaptable passive sampler materials to detect and measure PCB congeners in the environment. We will design, calibrate, and deploy ENMs in various application scenarios for quantitative determination of PCB congeners.

2) Identifying specific sources in schools and homes. We hypothesize that building materials contaminated with Aroclors, brightly colored products, and polymer coatings contaminated with non Aroclor congeners account for the high levels of PCBs in indoor air. We will conduct measurements in schools, homes, and in the laboratory to quantify specific sources using well-known sampling methods and newly developed methods.

3) Characterizing emissions from contaminated waters nation-wide. We hypothesize that contaminated waters are a major outdoor source of airborne PCB exposure nation-wide. We will use existing public data to predict dispersion and annual median air concentrations in communities surrounding these waters. We will test our prediction through local measurements of airborne PCBs and communicate our findings to local communities and environmental protection officials, including the Environmental Protection Agency.

Outcomes of the proposed studies will provide a novel passive sampling approach, and assessment of both Aroclor and non-Aroclor PCB sources in schools and communities. The findings will provide strategies to remediation options that focus on reduction of exposure to PCBs and that are technically and economically practical.

Recent Publications:

Herkert, N.J. and K.C. Hornbuckle, Effects of room airflow on accurate determination of PUF-PAS


Project Leader: Keri C. Hornbuckle, PhD is a Professor and Chair of the Department of Civil & Environmental Engineering at the University of Iowa. Dr. Hornbuckle's research concerns the fate and transport of pollutants in the environment. She is particularly interested in persistent organic pollutants including PCBs and other legacy industrial pollutants, perfluorinated compounds related to the production of surface protectants, fragrances and other persistent chemicals in household products, and pollutants related to large-scale agriculture.

Dr. Andres Martinez, Research Scientist and Adjunct Professor in the College of Engineering, has nearly 10 years of scientific research experience, during which he has developed expertise in the areas of field sampling, development of analytical method and analysis of hydrophobic organic compounds in complex environmental matrices, environmental modeling, and data analysis. Distribution, transport, and fate of polychlorinated biphenyls (PCBs) in air, water and sediment/soil have been his main areas of interest.

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