



PFAS, Environmental Contaminants & Human Health

Changes to our environment and environmental contamination from natural and human sources can have an enormous impact, particularly on vulnerable populations such as children, women, and older adults. Environmental epidemiology is a critical tool in preventing and responding to a multitude of resulting health challenges. Abt has extensive experience investigating and addressing the complex effects of per- and polyfluoroalkyl substances (PFAS) and other natural and environmental contaminants on human health. Our multidisciplinary team of health professionals and environmental scientists design, implement, conduct, and manage a wide range of assessments, evaluations, and investigations to find solutions to difficult problems and protect vulnerable populations.

Methods

Abt has more than 50 years of experience supporting national, regional, and local environmental and public health projects across the U.S. and around the world. Our multidisciplinary team has the expertise to support a wide range of other environmental health-related tasks, including:

- Epidemiology
- Participant recruitment, retention, and communication
- Community engagement & health communication
- Hazard characterization
- Site assessment
- Toxicological evaluations
- Natural resource damage assessment
- Statistical support
- Study coordinating centers
- Sampling designs to integrate complex, environmental-level data with human health endpoints
- Program evaluation
- Regulation and litigation support
- Groundwater characterization & water treatment technologies
- Advanced modeling including toxicological PBPK modeling, groundwater, analytical and numerical models

Sample of Relevant Work

Pease PFAS Health Study – Proof of Concept

Client: Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Centers for Disease Control and Prevention

Abt implemented an epidemiologic study to assess the health effects of possible exposure to PFAS contaminated drinking water at the Pease International Tradeport before May 2014. Abt developed an outreach strategy to enroll potentially exposed adults and children and a small comparison group. Once enrolled, Abt collected a blood sample and a range

of data from participants. Abt also abstracted additional information from medical and school records. In addition, Abt collected PFAS sampling data on supply wells and the water system serving the Pease Tradeport and City of Portsmouth. To characterize the historical presence of PFAS, we collected well construction and production logs, aquifer tests, and water-level data for local supply wells. We also obtained historic hydrogeologic contamination reports and records of the use of aqueous film-forming foam (AFFF), a PFAS contaminant, at the former Air Force Base.

Blood PFAS Estimator

Client: Federal Agency

Abt developed a series of physiologically-based pharmacokinetic (PBPK) models to estimate blood PFAS levels due to consumption of contaminated drinking water. These models incorporate background exposures and variability across the life-stages in exposure and pharmacokinetic parameters. The models also underwent extensive calibration and validation using Bayesian methodologies. After validation, the models were incorporated into a web tool designed to guide concerned citizens through a series of questions that help estimate their own blood serum PFAS levels in lieu of direct blood testing.

Investigating Complex Toxicological Effects

Client: Multiple State and Federal Agencies

The ability to accurately measure toxicological exposures is an essential and challenging component of environmental health research. Our toxicologists design, implement, conduct, and manage a wide range of laboratory and field-based bioassays, investigations, and other tests to fill key data gaps and develop biomarkers of exposure. Working across sectors, we use our in-house expertise and strategic collaborations and partnerships with university, private, federal, and state laboratories while applying state-of-the-art toxicity metrics. We offer a holistic approach to assessing toxicity that includes a range of endpoints, including standard, molecular, physiological, and health metrics.

Health Effects from Exposure to Aerosolized Cyanobacterial Toxins

Client: CDC National Center for Environmental Health

Toxic algal blooms are becoming increasingly problematic, but the health effects of toxin exposure, particularly from airborne toxins, are not well known. Using a multidisciplinary team of health scientists, ecologists, and clinical staff, Abt conducted a cross-section, field-based epidemiology study to assess the exposure and potential health impacts of blue-green algal blooms, including recruitment, air monitoring, water sampling, biological specimen collection, and participant surveys.



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