



PFAS Multi-site Study: Community-Level Blood Test Results

based on the paper by Pavuk and others (2025)



KEY FINDINGS

- We found 4 PFAS compounds in the blood of almost every adult and child in the study.
- The levels of these 4 PFAS varied from site to site, as different sites had different PFAS sources and levels of contamination.
- Adults in the study had higher average levels of PFOA and PFHxS than adults in the general U.S. population.
- Children in the study had higher average levels of PFHxS than children in the general U.S. population.
- Among participants ages 12 to 49 years, males had higher levels of most PFAS than females.

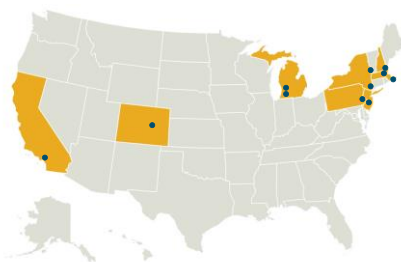
What is the Multi-site Study?

This is the first national study designed to learn how exposure to PFAS from contaminated water may affect health.

- The study includes communities with known contamination of drinking water.
- These communities are geographically diverse and differ in their demographics and types of PFAS contamination.
- The study was designed and funded by the Centers for Disease Control and Prevention (**CDC**) and the Agency for Toxic Substances and Disease Registry (**ATSDR**).

The study includes communities in 8 states:

California
Colorado
Massachusetts
Michigan
New Hampshire
New Jersey
New York
Pennsylvania



What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are human-made chemicals used since the 1940s in a variety of products, including waterproof, non-stick, and grease-resistant consumer items and some firefighting foams.



Prior studies have found PFAS in the blood of nearly every person in the U.S. tested to date.

Exposures to PFAS have been associated with many harmful health effects, including:

- increased cholesterol
- pregnancy-induced hypertension and preeclampsia
- changes in liver enzymes
- decreased vaccine response
- small decreases in birth weight
- increased risk of kidney and testicular cancer

Information about study participants

5,826 adults and 710 children (ages 4-17 years) participated.

Participants were asked to:

- Complete a questionnaire about demographics, health history, residential history, and water consumption.
- Provide body measurements, such as height, weight, and blood pressure.
- Provide a blood sample to test for 7 PFAS and markers of immune response, lipid metabolism, kidney function, thyroid and liver disease, glycemic parameters, and other effects.
- Provide a urine sample for possible future testing.
- Complete neurobehavioral tests (children 5-17 years).

Study demographics

Average age*

- Adults: 54 years
- Children: 11 years

Sex

- Adults: 60% female, 40% male
- Children: 49% female, 51% male

Race and ethnicity (adults)

- 77% non-Hispanic White
- 11% non-Hispanic Black
- 6.2% Hispanic or Latino
- 4.2% other non-Hispanic

Highest level of education (adults)

- 20% high school graduate or less
- 25% some college
- 55% college graduate

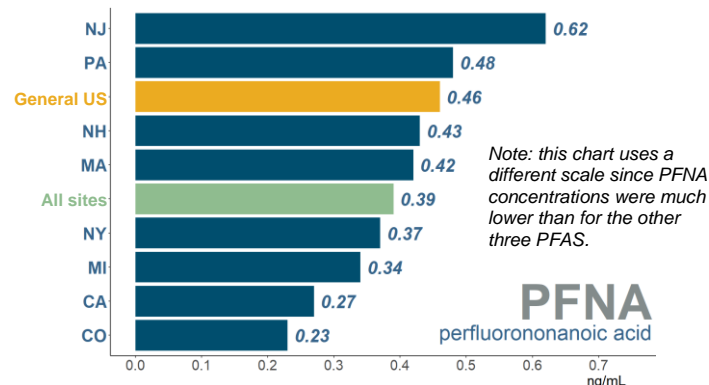
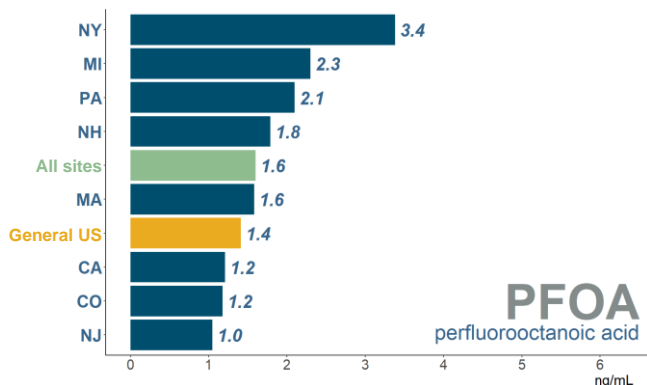
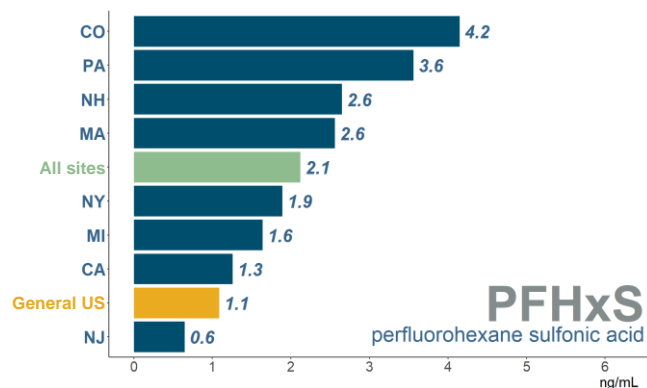
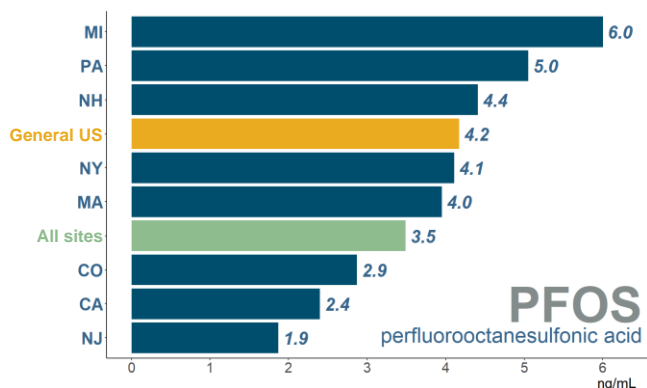
*based on geometric mean

What did we find?

- We found 4 PFAS (PFOS, PFOA, PFHxS, and PFNA) in over 96% of adults in the study.
 - The levels of these 4 PFAS varied among the 8 sites in the study (see below graphs). These differences are because of differences in the type of contamination and historical levels of PFAS in drinking water.
- We found 3 other PFAS in 30% to 55% of adult participants.

- Across all sites, adults in the study had higher average levels of PFOA and PFHxS than adults in the general population (see below).
- Children in the study had lower PFAS levels than adults in the study. Compared to children in the general population, children in the study had higher levels of PFHxS.
- Premenopausal females (ages 12-49 years) had lower levels of most PFAS than males. In older adults, levels in females and males were similar.

PFAS levels in blood



About the charts

The bar charts show the average (geometric mean) PFAS blood levels for adults across the different study sites (blue bars) compared to national levels. These averages are adjusted for the distributions of age and sex in the general US population. Gold bars show adults in the general U.S. population (2017-2020) in CDC's National Health and Nutrition Examination Survey (NHANES). Green bars represent all study sites combined.

Next steps for the PFAS Multi-site Study

Researchers from ATSDR and the Multi-site Study teams are analyzing results from all the study sites to understand how exposures to PFAS may affect the health of adults and children. Part of this work will include estimating past exposures from historical drinking water contamination.

Once these analyses are complete, results will be published in peer-reviewed scientific journals and shared with the public.

Future papers will focus on:

- changes in lipids
- diabetes
- blood pressure
- metabolic syndrome
- cardiovascular disease
- thyroid function
- antibodies in children
- pregnancy complications
- neurobehavioral outcomes

For more information about the PFAS Multi-site Study

Visit: <https://www.atsdr.cdc.gov/pfas/health-studies/multi-site-study.html>

Study publication

M Pavuk et al. 2025. Multi-site study of communities with PFAS-contaminated drinking water: Methods, demographics, and PFAS serum concentrations. *Environment International*. 202:109589. doi: <https://doi.org/10.1016/j.envint.2025.109589>

