



# PFAS Multi-Site Study: Methods, Demographics, and PFAS Serum Concentration

M Pavuk et al. 2025, Environment International



This fact sheet presents key findings from “Multi-Site Study of PFAS-Contaminated Drinking Water: Methods, Demographics, and PFAS Concentrations”. This research paper:

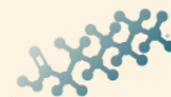
- Describes how CDC/ATSDR conducted the per- and polyfluoroalkyl substances (PFAS) Multi-site Study (MSS).
- Describes who participated in the MSS.
- Summarizes blood PFAS results across all MSS communities.

The full text of this research paper is **freely available** at this link:

[Multi-site study of communities with PFAS-contaminated drinking water: Methods, demographics, and PFAS serum concentrations - ScienceDirect](#)

## What are PFAS?

PFAS (or “per- and polyfluoroalkyl substances”) are a family of man-made chemicals that have been used in industry and consumer products since the 1940s.



PFAS do not occur naturally but are widespread in the environment. Most PFAS (including PFOA, PFOS, PFHxS, and PFNA) are either very resistant to breaking down or degrade into other PFAS that do not degrade further. Certain PFAS will therefore remain in the environment indefinitely. Some studies have shown that PFAS exposure may harm human health.

## How was the MSS conducted and who participated?

The map below shows communities that were selected to participate. These communities are geographically diverse, and they differ in their demographic characteristics and historical PFAS contamination of drinking water. Each community is described in detail in Table 1 of the research paper.

Staff at each site recruited participants (ages 4 years and older) from each community using a variety of methods, including mail, phone calls, door-knocking, social media, and local advertisements. Interested individuals were then screened for eligibility.

**5,826 adults and 710 children** (ages 4-17 years) completed a questionnaire that included information about their health, residential history, and the water they consumed.

Study participants also visited local study offices where they provided blood and urine samples and had body measurements (height, weight) and blood pressure taken. CDC/ATSDR used these blood samples to measure seven different PFAS and for health tests (like cholesterol and thyroid hormone levels). Urine samples were stored for future analyses.

Tables 3 and 4 in the research paper break down the demographics of the over 6,500 community members that participated in the MSS. Some key demographic characteristics are shown to the right.



### Key Demographic Characteristics

- The average ages were 54 years for adult participants and 11 years for children.
- 60% of adult participants were female, whereas 48% of child participants were female.
- Over 77% of adult participants reported being non-Hispanic white.
- Over 80% of adult participants had more than a high school education.
- Over 72% of study participants used public water systems as their main source of tap water at their current home.

## What were the blood PFAS levels in those who participated?

The research paper goes into detail on the PFAS in the blood of participants.

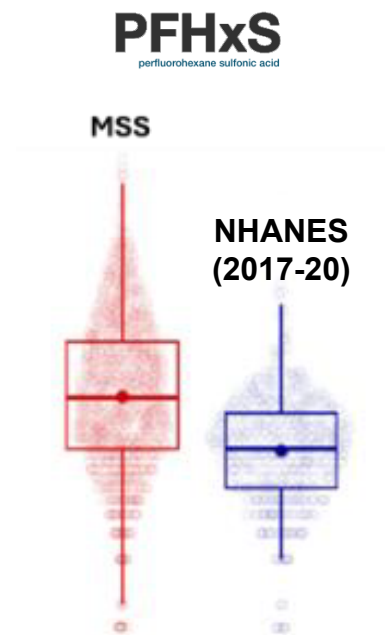
Here are a few key findings from the MSS:

- CDC/ATSDR detected some level of PFAS in the blood of almost all MSS participants.
- What PFAS and at what level they were found varied among the communities that participated.
- Overall, children in the study had consistently lower PFAS levels than adult participants.
- Female participants (aged 12-49 years) had lower levels of most PFAS than male participants of the same age.

This research paper also compares PFAS between MSS participants and the U.S. population.\* A few key findings for this comparison are:

- Adult participants in the MSS have higher average levels of two PFAS (PFOA and PFHxS) than adults in the U.S. population.
- Children in the MSS had higher average levels of one PFAS (PFHxS) than children in the U.S. population.

Many of these differences are shown with more detail and by community in the figures and tables in the research paper.



**Piece of Figure 3 from research paper:** Comparison of higher PFHxS levels for MSS participants

### Understanding the graphs in this research paper

The figures combine both a quick summary (the box plot) and all the individual measurements (the dots) in a group of participants.

**The dots give you an idea of how common the different PFAS levels are within that group.** Participants with higher levels are represented as dots towards the top. The more participants with similar levels the wider the dots are plotted.

**The boxes show the same thing but simplified.** The different parts of the boxes, like the bar in the center (which can be thought of as average), or height of the solid bar (95 percentile) can be compared across the groups.

## 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*. <https://doi.org/10.1016/j.envint.2025.109589>

\* Starting with the 1999-2000 cycle, the National Health and Nutrition Examination Survey (NHANES) has measured PFAS levels in blood in the U.S. population

Abbreviations: PFHxS = perfluorohexane sulfonic acid, PFOA = perfluorooctanoic acid, PFOS = perfluorooctane sulfonic acid, PFNA = perfluorononanoic acid.