Communities of color disproportionately exposed to PFAS pollution in drinking water

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People who live in communities with higher proportions of Black and Hispanic/Latino residents are more likely to be exposed to harmful levels of per- and polyfluoroalkyl substances (PFAS) in their water supplies than people living in other communities, according to a new

study led by researchers from Harvard T.H. Chan School of Public Health. The researchers link this finding to the disproportionate siting of sources of PFAS pollution—such as major manufacturers, airports, military bases, wastewater treatment plants, and landfills—near watersheds serving these communities.

The study will be published online May 15, 2023, in *Environmental Science & Technology*.

In March, the EPA proposed the first-ever national drinking water regulation for six PFAS, which it anticipates finalizing by the end of 2023. The regulation would establish maximum contaminant levels of two PFAS compounds, PFOA and PFOS, at 4 parts per trillion (4 ng/L) and limit the other four. The public comment period ends on May 30.

"Our work suggests that the sociodemographic groups that are often stressed by other factors, including marginalization, racism, and poverty, are also more highly exposed to PFAS in drinking water," said first author Jahred Liddie, a Ph.D. student in population health sciences at Harvard Chan School. "Environmental justice is a major emphasis of the current administration and this work shows it should be considered in the upcoming regulations for PFAS in drinking water."

This is the first peer-reviewed study to show sociodemographic disparities in drinking water PFAS exposures and to statistically link sources such as landfills and airports to PFAS concentrations in community water systems over broad geographic scales.

PFAS—dubbed "forever chemicals" because of their extreme persistence in the environment due to their characteristic fluorine-carbon backbone—are artificial compounds widely used for their stain-resistant and water-resistant properties. PFAS exposure has been associated with numerous adverse health outcomes, including diabetes, cardiovascular

disease, and cancer.

The researchers used PFAS monitoring data from 7,873 U.S. community water systems in the 18 states in which such data is widespread: California, Colorado, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Utah, Vermont, and Wisconsin. Their analysis included 44,111 samples collected between January 2016 and August 2022. They also looked at the geographic locations of PFAS sources from multiple databases.

The study found that PFAS detection was positively associated with the number of PFAS sources and proportions of people of color who are served by a water system. Each additional industrial facility, military fire training area, and airport in a community water system's watershed was associated with a 10%–108% increase in perfluorooctanoic acid and a 20%–34% increase in perfluorooctane sulfonic acid in drinking water.

According to the researchers, about 25% of the population in the 18 states considered in their study were served by community water systems that had levels of PFAS above 5 ng/L. Per this estimate, if the EPA's new proposed level of 4 ng/L is implemented, more than 25% of all Americans are likely to be considered exposed to dangerous levels of PFAS.

"Our findings are particularly concerning because past work on environmental disparities for other pollutants shows marginalized populations are susceptible to greater risks of adverse health outcomes compared to other populations, even at the same exposure levels," said senior author Elsie Sunderland, Fred Kavli Professor of Environmental Chemistry and professor of earth and planetary sciences at the Harvard John A. Paulson School of Engineering and Applied Sciences and professor of environmental science and engineering in the Department

of Environmental Health at Harvard Chan School. "Regulating releases from PFAS sources and ensuring that people have safe drinking water is especially important in the most vulnerable communities to protect public health."

Laurel Schaider at Silent Spring Institute was a co-author.

More information: Sociodemographic Factors Are Associated with the Abundance of PFAS Sources and Detection in U.S. Community Water Systems, *Environmental Science & Technology* (2023). DOI: 10.1021/acs.est.2c07255

Provided by Harvard T.H. Chan School of Public Health

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