

# Drinking water in US prisons may have dangerously high levels of PFAS

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As calls increase for better water quality monitoring and mitigation in rural and economically disadvantaged communities, emerging research adds prisons, jails and detention centers to the areas of concern. A new paper [published](#) in the *American Journal of Public Health* finds that 47% of America's carceral facilities are in a watershed likely contaminated with "forever chemicals" known as PFAS.

Because of limited [water](#) testing, only 5% of the facilities are in a watershed already known to carry dangerously high levels of these non-biodegradable molecules, but the study shows the true number is likely to be much higher.

Incarcerated populations are of particular concern for toxic drinking water because they have reduced access to mitigating a known exposure. Incarcerated people are generally already in worse health and therefore more vulnerable to acute health impacts compared to the free population. They are also disproportionately [people of color](#) and LGBT+, so exposures may heighten preexisting health inequities.

"If you think of the incarcerated population as a city spread out over this vast archipelago of carceral facilities, it would be the fifth largest city in the country, with potentially very high levels of toxicants in its water and no ability to mitigate exposure," said senior author and medical anthropologist Nicholas Shapiro, an assistant professor in the Institute for Society and Genetics at UCLA.

Per- and polyfluoroalkyl substances—PFAS for short—include around 12,000 synthetic chemicals used since the 1940s in nonstick cookware, firefighting foam, waterproof makeup, shampoos, electronics, food packaging and countless other commercial and industrial products. They contain a bond between carbon and [fluorine atoms](#) that nothing in nature

can break, and they can accumulate in the tissues of people and animals over time and cause harm in ways that scientists are just beginning to understand.

Exposure to PFAS is associated with reproductive and developmental effects, certain cancers, liver harm and hormone disruption. The paper notes that in 2023, the EPA proposed to set the maximum allowable level for six PFAS at zero parts per trillion, highlighting the toxicity of these and the government's concern and interest in regulating them.

Shapiro and co-author Lindsay Poirier, an assistant professor of statistical and data sciences at Smith College, assembled a list of the country's 6,118 carceral facilities from the Department of Homeland Security and engaged geospatial data analysis to identify those located within watersheds known or likely to be contaminated with PFAS.

Co-authors with the PFAS Project Lab at Northeastern University led the identification of PFAS sites, drawing on their database of known PFAS contamination sources, in addition to a previously published model that can identify presumptive contamination.

The presumptive model includes three categories of sites: sources that release firefighting foam, such as airports; fire training sites; industrial sources where PFAS are typically used; and sources related to PFAS waste, such as wastewater treatment sites and landfills. The paper's authors also considered whether the watershed boundary was at a higher elevation than the carceral facility, in which case this water would be more likely to enter the facility's water supply.

When all the data was analyzed, 310, or 5% of the carceral facilities were found to be within a watershed and at a lower elevation than at least one known source of PFAS contamination. A minimum of 150,000 people, including at least 2,200 juveniles, reside in these facilities.

Nearly half of all facilities—47%—have at least one presumptive source of PFAS contamination within the same watershed boundary and at a higher elevation than the facility, including over half (56%) of the juvenile facilities.

These facilities house around 990,000 people, including at least 12,800 juveniles. The majority of these people—890,000—are incarcerated in state and county-run facilities.

The authors note that because about a third of the carceral facilities were missing population data, the total number of people who could be exposed to the chemicals is probably higher.

"It's important that this is a nationwide study because analysis up to now in studies similar to ours have been at very hyperlocal levels," said Poirier. "It was challenging largely because of substantial data gaps when it came to water quality monitoring, and gaps in the data, such as for population, on the carceral side. We're trying to draw attention to areas that have been underassessed."

The study did not attempt to determine whether water from these contaminated or potentially contaminated sources reaches the facilities' water supplies. The authors stressed that this is where more research is desperately needed, because contaminated water, especially for young people, can have lifelong consequences for health.

"The most rigorous and consistent water testing is done in well-resourced or particularly engaged communities, and these are also the communities with the most ability to mitigate their exposure to contaminants when they're found," Shapiro said. "Incarcerated populations have a lot in common with marginalized populations elsewhere in the country that lack the resources and political clout to get their water cleaned up. That needs to change."

**More information:** Lindsay Poirier et al, Per- and Polyfluoroalkyl Substance Exposure Risks in US Carceral Facilities, 2022, *American Journal of Public Health* (2024). [DOI: 10.2105/AJPH.2024.307571](https://doi.org/10.2105/AJPH.2024.307571)

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