

QUESTIONS AND ANSWERS: PERFLUOROALKYL SUBSTANCES (PFAS)

UNDERSTANDING RISK, SOURCES OF CONTAMINATION, AND PREVENTATIVE MEASURES

What are PFAS?

Perfluoroalkyl substance (PFAS) are a group of over 12,000 manmade chemicals that have been used in both consumer and industrial products. PFAS water-repelling properties made them useful in household products such as non-stick cookware, weather-resilient clothing, and stain resistant fabrics. PFAS were first produced in 1947 for industrial use to create firefighting foams and slick coatings. In the past, the two most commonly produced PFAS types were PFOS and PFOA. They have since been phased out but have been replaced in consumer products and industrial uses with other PFAS compounds, which are currently being researched.

Where are PFAS found?

PFAS may exist in household products such as: non-stick pans, stain protection on upholstery, and coated dental floss. PFAS are also released during industrial production, firefighting foam application, wastewater treatment plant discharge, biosolids land application washing into surface waters, and surface waste (i.e. landfills) leaching into groundwater. Vulnerable drinking water systems are typically in close proximity to land contamination sites surrounding facilities using perfluoroalkyls, firefighting training areas, and wastewater treatment plants. Military bases have been noted as sources of drinking water PFAS contamination. Groundwater sources around the Davis Monthan Air Force Base, which are not currently used in public water systems, have elevated levels of PFAS. In Pima County, the primary source of PFAS contamination in public water systems have yet to be confirmed.

Why are PFAS a concern?

PFAS are a concern for 3 main reasons: they persist in the environment, they are highly likely to be associated with negative health outcomes, and human exposure is likely and frequent.

PFAS are mobile in the environment, do not degrade readily under natural conditions, and bioaccumulate in wildlife. PFOS, PFOA, and other PFAS have been detected in 98% of human serum samples in widespread population studies and in remote environments.

What are common ways that people are exposed to PFAS?

- Food containers and wrappers are commonly coated in PFAS. This includes the inside of microwave popcorn bags.
- Can be found in cosmetics or personal care products including dental floss.
- Food can become contaminated when cooked in non-stick pans, including Teflon
- Clothing that is stain or water repellent including Scotchguard or Gore-tex
- Contaminated drinking water
- Many household products that are stain resistant including furniture, upholstery and carpets. Visit [here](#) for more sources of exposure.

What are the health effects caused by PFAS?

PFAS may potentially:

- Affect growth, learning, vaccine effectiveness and behavior of children
- Lower a women's chance of getting pregnant
- Interfere with the body's natural hormones
- Cause dyslipidemia (abnormally elevated cholesterol or lipids in blood)
- Decrease immune response (There are on-going studies to assess if PFAS impacts COVID spread, symptoms, and vaccine effectiveness)
- Cause kidney disease

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-Increase the risk of multiple types of cancer (kidney, bladder, breast, prostate, and testicular)

Who is most vulnerable to PFAS exposure and/or the associated negative health effects?

Currently known vulnerable populations include those living near or working in a PFAS manufacturer, fetuses of pregnant women, infants, and immunocompromised individuals.

How much PFAS does it take to get sick?

According to the recently updates [NASEM](#) clinical guidelines, there is no specific limit that guarantees sickness. Vulnerable people with 2-20 ng/mL of PFAS in their serum are at increased risk for health effects while all people with >20 ng/mL are at increased risk for health effects.

How can I reduce my risk of exposure to PFAS?

Individuals can also reduce their exposures to PFAS by avoiding fabrics treated with water-resistant treatments like Polartec, and Gore-tex, using stainless steel and cast-iron cookware instead of non-stick cookware like Teflon, skipping optional stain-repellant treatment on new carpets and furniture like Scotchguard, avoiding personal care products with PTFE or “fluoro” ingredients, and eating less fast food and microwave popcorn as the wrappers and bags are often coated in PFAS.

Can I get tested for PFAS in my body?

A blood test can tell you how much of each PFAS is in your body, but results are not conclusive of a particular health risk or outcome. A clinical blood test for PFAS is not available at a standard healthcare laboratory facility. The CDC and other scientists have developed methods for measuring PFAS in blood. They have used these methods to look at the general US population, and over 98% of people have

some level of PFAS in their blood. The [NASEM](#) clinical guidelines contain more information on what levels in the blood are associated with increased risk, and what labs provide testing.

Where can I find background information about Arizona’s drinking water sources, properties, contaminants, quality, and treatment?

Current databases regarding water management are available through the Arizona Department of Environmental Quality [here](#).

What measures are in place to protect drinking water quality?

The US Environmental Protection Agency (EPA) regulates microorganisms, disinfectants, disinfection byproducts, inorganic chemicals, organic chemicals, and radionuclides. Regulated contaminants have established maximum contaminant levels (MCLs). An MCL is an acceptable concentration level reasonably low enough to protect human health. The MCLs for PFAS are not currently established, however the EPA plans to by 2023.

There exists a separate Health Advisory Program for contaminants that do not have an established MCL. Health Advisories are defined drinking water contaminant exposure concentrations for adults and children which are related to health risks based on cancer risk. More information for Drinking Water Health Advisories is available [here](#). The DWHAs are currently established for 4 PFAS chemicals; PFOA (0.004 ppt), PFOS (0.02 ppt), GenX Chemicals (10 ppt) and, PFBS (2,000 ppt).

How much PFAS has been detected in local drinking water?

PFAS’ presence in drinking water is a widespread issue that is not limited to a single county or water provider. Even within Pima County, it is a complex picture built from

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reporting information from multiple entities, local and federal government, including Marana Water, Tucson Water, the Arizona Department of Environmental Quality, Davis-Monthan Air Force Base, Arizona Air National Guard, Pima County Regional Wastewater Reclamation District, and the US EPA. PFAS has been detected in local groundwater by these entities in concentrations from 12 to >10,000 parts per trillion, yet *none* of these wells are being served to the public directly. Efforts are being made, even without federal regulation, to address these concerns.

What is the treatment plan for the water?

At the local level, City of Tucson and The City of Marana are both in the process of improving their drinking water treatment procedures after discovering contamination issues. The City of Marana has built two new plants designed to remove PFAS from the contaminated water. The City of Tucson Water Department has upgraded the carbon used to remove contaminants, including PFAS, at the Tucson Airport Remediation Project where the highest levels of PFAS have been found.

How can the public receive more information about PFAS levels in their drinking water?

Households served by public water systems typically receive information about water quality from the water provider. Tucson Water keeps the public informed about PFAS on their [website](#) as does [Marana Water](#). Households that use private water wells must complete their own testing to find out if a PFAS contamination issue exists, which should be done through an EPA approved facility.

What local actions have been taken to address PFAS contamination of drinking water?

The State of Arizona does not currently have any regulatory standards in place. The City of

Tucson Water Department has adopted the internal operating target level of non –detect (less than 2 ppt) for PFOA, non-detect (less than 2 ppt) for PFOS, 7 ppt for PFHxS, 7 ppt for PFHpA, 420 ppt for PFBS, 200,000 ppt for PFHxA, and 10 ppt for GenX.

Will “blending” contaminated water make it safer?

Blending contaminated water with water with lower contaminant levels can reduce and dilute the concentrations to below guideline levels.

Are there home water filtration systems that can remove PFAS chemicals?

The National Sanitization Foundation (NSF) has established standards for PFAS filtration. Some approved systems include the Hydrovoid under sink water filter, A.O. Smith AO-CMW Clean water machine pitcher filter, AOW- 3000 sink reverse osmosis water filter, and the Cyclopure Purefast Brita compatible filter. These systems range from \$45-\$400. Visit [here](#) for the NSF water filter search engine to see other available options.

Once PFAS are eliminated from the water using a treatment method, how should filters or cartridges be disposed of? Could they re-contaminate the environment and water sources?

Currently, water filter cartridges that have been used to filter PFAS-contaminated water can be disposed of in regular household garbage.