

PFAS (Per- and Polyfluoroalkyl Substances)

What are PFAS?

PFAS are a group of man-made chemicals used in a variety of industrial applications and consumer products because of their heat, water, and stain-resistant properties. The common use of PFAS includes food packaging material, nonstick cookware, water-resistant clothing, stain-resistant carpets, and firefighting foam used to put out petroleum fires.

Some examples of PFAS are:

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonic acid (PFOS)
- Perfluorobutane sulfonic acid (PFBS)
- Perfluorononanoic acid (PFNA)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorodecanoic acid (PFDeA)
- GenX Chemicals: Hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt

Why are there increasing concerns about PFAS?

PFAS is a group of emerging contaminants that we have new awareness and/or understanding of how they may affect public health and the environment. PFAS have been used worldwide since the 1940s. Public health concerns started to arise after several studies showed that PFOS and PFOA have adverse health effects in experimental animals.

PFAS can be present in the environment for long periods of time because they are not easily broken down. PFAS are widely detected in soil, air, water, and food. Some forms of PFAS can accumulate in the food chain. Exposure can occur when someone uses products that contain PFAS, eats PFAS-contaminated food, or drinks PFAS-contaminated water. Although certain PFAS are no longer produced in the US, in some instances, they are still produced internationally and can be imported into the US in consumer products.

People that have been exposed to PFAS may have been exposed from one or more sources. For example, drinking contaminated water, eating contaminated food, or using

consumer products that contain PFAS. In addition, babies and young children can uptake PFAS through hand-to-mouth behavior. Babies and young children often put their hands and objects into their mouths. If the object is contaminated with PFAS, it will enter the body.

Some PFAS can stay in the body for long periods of time and are linked to certain health outcomes. PFAS are the focus of active research and new information is currently being released. Local, state, and federal agencies also are working together to better understand and address public health concerns.

How can PFAS affect my health?

Scientists do not fully understand the health effects that may be caused by PFAS. There are many different chemicals in the PFAS family, and not all PFAS have the same health effects. Although more research is needed, some studies suggest that exposure to high enough levels of certain PFAS may:

- Increase cholesterol level
- Reduce immune response
- Interfere with the body's hormones
- Lower a woman's chance of getting pregnant
- Affect growth, learning, and behavior of infants and older children, and
- Increase the risk of kidney and testicular cancer

How are PFAS regulated?

At this time, there are no state or federal regulatory limits for PFAS levels in drinking water in Arizona.

In June 2022, the Environmental Protection Agency (EPA) issued interim updated health advisory levels for PFOS and PFOA and final health advisory levels for PFBS and GenX Chemicals in public drinking water based on new data and analyses. EPA's Health Advisories are not enforceable standards and provide guidelines that policymakers can use to address contaminants in drinking water.

EPA's health advisory values are based on multiple safety factors to protect the most vulnerable populations (e.g., developing fetuses and breastfed infants) from a lifetime exposure to these PFAS in drinking water. These health advisories take into account other potential sources of exposure (e.g., food, consumer products, air, etc.)

- Interim health advisory level for PFOA = 0.004 ppt (parts per trillion)
- Interim health advisory level for PFOS = 0.02 ppt
- Final health advisory level for GenX Chemicals = 10 ppt
- Final health advisory level for PFBS = 2,000 ppt

How do I find out if PFAS has been detected in my drinking water?

You can check with your water provider or the Arizona Department of Environmental Quality to see if they have PFAS testing results. If you are on private well water, having your water tested is the only way to know if PFAS are present.

What should I do if I am concerned about PFAS in my tap water?

If your tap water contains measurable levels of PFOA/PFOS or GenX Chemicals/PFBS above the EPA's advisory levels,

- Use an alternative (clean) or treated water source for drinking, cooking, making baby formula, washing fruits or vegetables, and brushing teeth. Take the same precautions for pets or livestock.
- Reverse osmosis and granular activated carbon filter systems can reduce PFAS levels in drinking water.
- Boiling will NOT remove PFAS from drinking water.
- Don't rely on bottled water as an alternative, because bottled water companies are NOT required to test for PFAS.

If your tap water contains no measurable levels of PFOA/PFOS or GenX Chemicals/PFBS below the EPA's advisory levels,

- You may wish to consider taking measures to reduce your exposure from drinking water. Reverse osmosis and granular activated carbon filter systems can reduce PFAS levels in drinking water.

Can I shower, bathe, or swim if there are PFAS in my tap water?

- Yes, showering, bathing, and swimming are not major sources of PFAS exposure. PFAS are not easily absorbed by the skin, and very little PFAS are breathed in while showering. If you are still concerned, shorter showers/baths may help reduce the time of potential exposure. Make sure children do not swallow water while bathing/swimming.

Can I do the laundry or wash my dishes if there are PFAS in my tap water?

- Yes, doing laundry or washing dishes is not a major source of PFAS exposure. If you are still concerned, wearing rubber gloves while performing these tasks may reduce the exposure.

Can I irrigate the fruits and vegetables in my garden if there are PFAS in my tap water?

- It is best to avoid PFAS exposure whenever possible due to potential negative health effects
- Studies showed that crops can uptake PFAS from soil, water, and biosolids.
 - At this time, we do not have enough information to determine a safe level for irrigation water.
 - The amount of PFAS that will end up in plants depends on many factors, such as the type of plants, the concentration level of PFAS in soil and water, and the type of soil.
 - PFAS in irrigation water may accumulate in garden soil because they do not break down easily.
- Things you can do to reduce the exposures from homegrown fruits and vegetables:
 - Use a clean source of water for your garden
 - Use a raised bed with clean soil if your soil contains PFAS
 - Add clean compost (organic matter) to the soil to reduce the plants' uptake of PFAS
 - Wash your produce in clean water before eating them
 - Peel and thoroughly clean root vegetables before eating them

Can I breastfeed my baby if there are PFAS in my tap water?

- Yes, however, if your tap water contains PFAS above the EPA LTHA, we recommend you consume an alternative (clean) water source and continue to breastfeed your baby.
- PFAS can be passed to your baby from breastmilk. Based on the current science, the benefits of breastfeeding outweigh the risk of infants exposed to PFAS in breast milk. If you are still concerned, you should talk to your health care provider.

What should I know about PFAS blood tests?

- It is not a routine test. Some people in the U.S. have one or more types of PFAS in their blood, and normal ranges have not been established.
- It is a good tool for researchers to know the levels of PFAS exposure in a community or different populations.
- PFAS blood test results can only tell you the amount of PFAS in your blood at the time of the test, which indicates whether you have been exposed to PFAS.
- PFAS blood test results cannot tell you if PFAS have affected your health or predict your health outcomes in the future.
- PFAS blood test results cannot be used to identify sources of exposure.
- Currently, there is no treatment to reduce PFAS levels in the blood.

Where can I get more information?

- [ATSDR](#) (Agency for Toxic Substances and Disease Registry)
- [US EPA](#) (the United States Environmental Protection Agency)
- [US FDA](#) (U.S. Food and Drug Administration)
- EPA. [Brownfields and Urban Agriculture: Interim Guidance for Safe Gardening Practices](#)

Resources for Clinicians and Environmental Health Professionals

- [An Overview of the Science and Guidance for Clinicians on PFAS](#)
- [PFAS: A Short Review and Guidance for Clinicians](#)

- [PFAS, GenX, and Other Forever Chemicals: An Update for Clinicians](#) (Free CEU)
- [PFAS and Breastfeeding Fact Sheet](#)
- [PFAS toxicological profile](#)
- [Family Tree of PFAS](#)
- [Community Stress Resource Center](#)