General FAQ

1. What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are a group of thousands of manmade chemicals.

PFAS have been used to produce:

Consumer and industrial products like cookware, food packaging, and stain repellants, as well as aqueous film forming foams for firefighting at airports and military installations.

PFAS molecules consist of a chain of carbon and fluorine atoms. Because the carbon-fluorine bond is so strong, these chemicals do not easily break down and can stay in the environment for long periods of time.

PFAS have been used since the 1940s. Certain PFAS such as perfluorooctanoic acid (**PFOA**), perfluorooctane sulfonate (**PFOS**), and perfluorohexane sulfonic acid (**PFHxS**) are no longer manufactured in the U.S. because of phase-outs in the early 2000s. In 2006, the U.S. Environmental Protection Agency (EPA) initiated the PFOA Stewardship Program which formed an agreement among eight major chemical manufacturers to eliminate the use of PFOA and similar long-chain PFAS in their products and in the emissions from their facilities. However, PFOA, PFOS, and PFHxS can still be imported to the U.S. in consumer goods and manufacturers have developed numerous other PFAS chemicals (e.g., hexafluoropropylene oxide dimer acid [HFPO-DA; **GenX**]) to replace the long-chain PFAS.

2. How are PFAS detected in drinking water?

PFAS may be detected through labratory testing.

EPA recommends contacting your state environmental or health agency for a list of laboratories that are certified to test for certain PFAS using EPA's verified testing methods.

From 2013-2015, EPA conducted a study of six PFAS in large U.S. public water systems (i.e., those serving more than 10,000 people). Some states are also testing public drinking water supplies for PFAS. Residents of homes served by private wells may have their drinking water tested, especially if they live near industrial facilities that may have used PFAS; large or small airports, including military installations; or a public water system that has detected PFAS. Private labs can test the well samples to determine if PFAS are present and at what concentrations, or some states may provide those residents support for testing. EPA recommends contacting your state environmental or health agency for a list of laboratories that are certified to test for certain PFAS using EPA's verified testing methods.

There are thousands of PFAS that may not have verified methods for detection. Non-targeted analysis, a detection method for known and unknown chemicals, is available at some laboratories, but not all.

For more information on sampling in specific media, see the Interstate Technology and Regulatory Council's (ITRC's) factsheet on site characterization. For more information on laboratory testing, see the Association of State Drinking Water Administrators' PFAS Lab Testing Primer.

3. How can you be exposed to PFAS?

Humans are exposed to PFAS through a wide variety of pathways, and most people in the U.S. have detectable amounts of one or more specific PFAS in their blood. PFAS accumulate and can stay in the human body for long periods of time. There is evidence that exposure to certain PFAS may lead to adverse health effects.

The most common sources of human exposure to PFAS include:

- Drinking water, especially in areas where the water source is close to landfills where PFAS are disposed, industrial facilities where PFAS are produced or used, or airfields where PFAS are used for firefighting or training.
- Contact with (e.g., hand to mouth, or breathing in dust from) surfaces treated with PFAS-containing stain protectants, such as carpets, furniture, or clothing.
- Foods that have been shown to contain PFAS, such as fish, deer meat, dairy products, or produce.
- Food that is packaged in materials that contain PFAS such as fast food wrappers or microwave popcorn bags.
- Breast milk or umbilical cord blood from mothers with detectable PFAS in their blood or formula made with water that contains PFAS.
- Industrial exposure to workers and firefighters who manufacture or utilize PFAS-containing products.

4. What level of PFAS are safe?

In 2016, EPA established a lifetime health advisory of 70 parts per trillion for PFOA and PFOS, individually or in combination, in drinking water.

In the absence of an enforceable federal standard, many states are establishing their own health-based regulatory or guidance values for several PFAS compounds in different media including drinking water, groundwater, and surface water.

Environmental professionals have arrived at different conclusions when reviewing scientific information on the health effects of PFAS, leading to different federal guidance values and state regulations. For example, in 2016, EPA established a lifetime health advisory of 70 parts per trillion for PFOA and PFOS, individually or in combination, in drinking water. EPA states that this health advisory is calculated "to provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water." **The advisory is not legally enforceable and is subject to change.** In February 2020, EPA announced its proposed regulatory determination to initiate the rulemaking process to set a National Primary Drinking Water Regulation (e.g., an enforceable Maximum Contaminant Level) for PFOA and PFOS.

In 2018, the Agency for Toxic Substances and Disease Registry (ATSDR) developed draft minimal risk levels for

four PFAS compounds. Minimum Risk Levels (MRLs) are screening tools to identify contaminants of concern at hazardous waste sites and estimate exposure (e.g., how much of a chemical a person can eat, drink, or breathe each day) expected to result in health risks. If someone is exposed to an amount of PFAS above the minimum risk levels, it does not necessarily mean that the health problems will occur. Also, MRLs are presented as dosage amounts rather than concentration like EPA's health advisories, but are similarly unenforceable. EPA and ATSDR developing different measures of risk has have resulted in public confusion, emphasizing the need for improved risk communication.

In the absence of an enforceable federal standard, many states are establishing their own health-based regulatory or guidance values for several PFAS compounds in different media including drinking water, groundwater, and surface water. State standards may be more stringent than the EPA health advisory due to differences in risk assessment factors, such as targeted populations and consumption rates, as well as pressure from the public to take regulatory action. Other states have adopted EPA's health advisories for PFOA and PFOS to guide their efforts after detecting PFAS in their communities.

5. Why are PFAS harmful, and what specific health risks are associated with PFAS?

Researchers have only developed health effects data for some of the most common of the long-chain PFAS, such as PFOA, PFOS, PFHxS, and perfluorononanoic acid (PFNA). Studies show that different PFAS can cause different types of toxicity, including:

- Impacts on reproduction and infant birth rates.
- Effects on the immune system and development.
- Impacts to the liver, thyroid, or kidney.
- Increased cholesterol levels.

Scientists have linked PFOA and PFOS exposures to tumors in laboratory animals and EPA classifies them as having "suggestive" evidence of human carcinogenicity.

6. What happens when PFAS are detected in a public drinking water system?

Public health officials need to take steps to limit exposure and issue advisories to consumers with information on PFAS—especially for populations that may be more sensitive to exposure—and explain what they can do to lower their risk.

Per EPA guidance, if sampling results confirm that drinking water in a public water system contains PFAS above a state's standard or federal advisory level (if that is what the state follows), water systems should notify their state drinking water agency and conduct additional sampling. In some cases, drinking water systems may close wells or change water sources to reduce exposure to PFAS. They may also choose to treat the contaminated water with available technologies like granular active carbon (GAC), which has been shown to be the most effective at removing certain PFAS from drinking water sources (see next question).

Furthermore, public health officials need to take steps to limit exposure and issue advisories to consumers with information on PFAS—especially for populations that may be more sensitive to exposure—and explain what they can do to lower their risk. Available health advisories may provide information on levels of PFAS that can cause human health effects and are known or anticipated to occur in drinking water. States may issue "do not drink" or "do not eat" advisories for drinking water or specific foods (fish or milk, etc.) and should clarify the level of PFAS exceedance in relation to test results from other communities. In order to promote effective risk communication around PFAS, public health officials may need to take initiative in explaining public health risks to elected officials, public officials, and other key partners.

7. What kinds of PFAS environmental treatment options are available?

The most common treatment option for PFAS in drinking water is to install a GAC filter directly on the water source or tap.

To reduce risks of PFAS exposure, residents should refer to their states' drinking water treatment protocols and avoid exposure to, and recreational activity in, sites where PFAS is detected. There are currently no medical interventions that will remove PFAS from the body, but identifying sources of PFAS and preventing known exposures may help to lower risks.

Several technologies have proven effective at removing contaminated environmental media. The most common treatment option for PFAS in drinking water is to install a GAC filter directly on the water source or tap. Water systems may also employ ion exchange resins or high-pressure membranes that use reverse osmosis to treat contaminated drinking water. These methods have shown applicability; however, there is less historical information on these technologies than there is for GAC filters for PFAS removal.

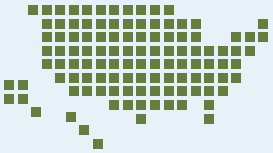
Methods to remove PFAS from solid waste or similar media include incineration, energy application technologies to destroy the chemicals, or installation of caps over the waste (i.e., landfill leachate or soil). However, these technologies remove different PFAS with different efficiencies, and the science is evolving. Therefore, no single option guarantees complete PFAS removal or destruction.

To reduce risks of PFAS exposure, residents should refer to their states' drinking water treatment protocols and avoid exposure to, and recreational activity in, sites where PFAS is detected. As a note, boiling drinking water does not remove or destroy PFAS; in fact, it can concentrate the PFAS as the water boils off. There are currently no medical interventions that will remove PFAS from the body, but identifying sources of PFAS and preventing known exposures may help to lower risks.

For more information on treatment options, see Section 12 on treatment technologies in ITRC's PFAS Technical and Regulatory Guidance Document or EPA's Drinking Water Treatability Database.

8. How can I get updated information about PFAS?

For more resources and information on PFAS and risk communication, please visit the following websites for groups working on this topic area:



Your state environmental and health agency counterpart.

Consumer Product Safety Commission:

Contact 1-800-638-2722 for questions about the products you use in your home.

National Associations:

Association of State and Territorial Health Officials

Environmental Council of the States

Interstate Technology and Regulatory Council

Federal Agencies:

Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry

U.S. Environmental Protection Agency

U.S. Department of Defense

U.S. Food and Drug Administration

National Institute of Environmental Health Sciences

Keep in mind that PFAS contamination is rarely managed by one entity. Therefore, consistency of messaging between all stakeholders is key to ensuring that accurate information is shared.