



MassDEP Fact Sheet

Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water: Questions and Answers for Consumers

What are PFAS and how are people exposed to them?

PFAS are fluorinated organic chemicals. Two PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were extensively produced and are the most studied and regulated of these chemicals. Several other PFAS that are similar to PFOS and PFOA exist. These PFAS are contained in some firefighting foams used to extinguish oil and gas fires. They have also been used in a number of industrial processes and to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease and stains. Because these chemicals have been used in many consumer products, most people have been exposed to them.

While consumer products and food are the largest source of exposure to these chemicals for most people, drinking water can be an additional source of exposure in communities where these chemicals have contaminated water supplies. Such contamination is typically localized and associated with a specific facility, for example, an airfield at which they were used for firefighting or a facility where these chemicals were produced or used.

What are the levels of concern?

Scientific information and regulatory actions on PFAS are rapidly evolving. Currently, there are no enforceable federal standards for these substances in public drinking water. However, in May 2016, the United States Environmental Protection Agency (EPA) issued a lifetime drinking water Health Advisory (HA) of 70 nanograms (ng) per liter (L) (70 ng/L which equals 70 parts per trillion or ppt) for any combination of PFOA and PFOS. In June 2018, MassDEP extended this advisory to include three additional related PFAS chemicals - perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS) and perfluoroheptanoic acid (PFHpA). This Massachusetts value, called a MassDEP Office of Research and Standards Guideline (ORSG), is a maximum recommended level for drinking water. It is set to be protective against adverse health effects for all people consuming the water for a lifetime and also applies to shorter-term exposures of weeks to months during pregnancy and breast-feeding.

On December 27, 2019 MassDEP proposed revisions to the Massachusetts drinking water regulations that would establish a regulatory drinking water standard or Massachusetts Maximum Contaminant Level (MMCL) for per and polyfluoroalkyl substances (PFAS). These revisions would establish a MMCL of 20 ng/L (or parts per trillion) for the sum of the concentrations of six specific PFAS: perfluorooctane sulfonic acid (PFOS); perfluorooctanoic acid (PFOA); perfluorohexane sulfonic acid (PFHxS); perfluorononanoic acid (PFNA), perfluoroheptanoic acid (PFHpA), and perfluorodecanoic acid (PFDA). The proposed standard is supported by recent scientific developments in understanding the health effects of PFAS and is aligned with PFAS cleanup standards promulgated by the Waste Site Cleanup Program. For information on the proposed MMCL see: <https://www.mass.gov/regulations/310-CMR-22-the-massachusetts-drinking-water-regulations>

On January 27, 2020, MassDEP issues an updated Office of Research and Standards Guideline (ORSG) for

drinking water of 20 ng/L for these six PFAS compounds. The ORSG and the technical support document explain the basis of both the MassDEP revised cleanup standards and the proposed MMCL for drinking water. The updated ORSG replaces the June 2018 guideline for PFAS in drinking water. See the updated ORSG and technical support document here: <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas#health-advisories-and-downloadable-fact-sheets->

Based on the current ORSG, MassDEP recommends that:

- 1) consumers in sensitive subgroups (pregnant women, nursing mothers and infants) not consume water when the level of the six PFAS substances, individually or in combination, is above 20 ppt; and,
- 2) public water suppliers take steps expeditiously to lower levels of the six PFAS, individually or in combination, to below 20 ppt for all consumers.

What does MassDEP currently recommend while the standard is being finalized?

If you are a sensitive consumer (pregnant women, nursing mothers, and infants) you can minimize your exposure by using bottled water that has been tested for PFAS for drinking, making infant formula and cooking of foods that absorb water or use a home water treatment system that is certified to remove PFAS by an independent testing group such as National Sanitation Foundation (NSF), Underwriters Laboratories (UL), Water Quality Association or the CSA Group. See MassDEP's website on PFAS (under "Bottled water and home water filters") for more information <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas>.

What health effects are associated with exposure to PFAS?

The MassDEP ORSG and proposed MMCL are based on studies of the 6 PFAS substances in laboratory animals and studies of exposed people. Overall, these studies indicate that exposure to sufficiently elevated levels of the 6 PFAS compounds, may cause developmental effects in fetuses during pregnancy and in breastfed infants. Effects on the thyroid, the liver, kidneys, hormone levels and the immune system have also been reported. Some studies suggest a cancer risk may exist in people exposed to levels well above the EPA Health Advisory.

It is important to note that consuming water with PFAS above the recommended limits does not mean that adverse effects will occur. The degree of risk depends on the level of the chemicals and the duration of exposure. The recommended limit assumes that individuals drink only contaminated water, which typically overestimates exposure, and are also exposed to PFAS from sources beyond drinking water, such as food. To enhance safety, several uncertainty factors are additionally applied to account for the differences between animals and humans, and to account for the differences between people. Scientists are still working to study and better understand the health risks posed by exposures to PFAS. If your water has been found to have PFAS and you have specific health concerns, you may wish to consult with your doctor.

How can I find out about contaminants in my drinking water?

If you get your water from a public water system, you should contact them for this information. For a contact list for all public water systems in the Commonwealth you may visit: <https://www.mass.gov/lists/drinking-water-health-safety#contacts> then under "Contacts" click on "MA Public Water Supplier contacts sorted By Town."

For private well owners, you may want to contact your local Board of Health, Town government or town

public water supplier for information specific to your Town. For water testing for PFAS compounds, MassDEP recommends the use of a state “Approved” or certified analytical laboratory. Local Private Well Regulations may specify the use of a state certified lab. Massachusetts is currently developing state PFAS lab certification, but until available, it recognizes other third party approvals with an “Approved” designation. A searchable list of MassDEP certified labs can be found at: <http://eeaonline.eea.state.ma.us/DEP/Labcert/Labcert.aspx>

What options should be considered when PFAS in drinking water is above MassDEP’s drinking water guideline (ORSG) or proposed MMCL?

- ✓ Sensitive subgroups, including pregnant women, nursing mothers and infants, should consider using bottled water that has been tested for PFAS, for drinking, cooking of foods that absorb water (like pasta) and to make infant formula. Bottled water that has been tested for PFAS, or formula that does not require adding water, are alternatives.
- ✓ For older children and adults, the recommended guideline is applicable to a lifetime of consuming the water. For these groups, shorter duration exposures present less risk. However, if you are concerned about your exposure while steps are taken to assess and lower the PFAS concentration in your drinking water, use of bottled water that has been tested for PFAS will reduce your exposure.
- ✓ Water contaminated with PFAS can be treated by some home water treatment systems that are certified to remove PFAS by an independent testing group such as NSF, UL, Water Quality Association or the CSA Group. These may include point of entry systems, which treat all the water entering a home, or point of use devices, which treat water where it is used, such as at a faucet.
- ✓ In most situations the water can be safely used for washing and rinsing foods and washing dishes.
- ✓ For washing items that might go directly into your mouth, like dentures and pacifiers, only a small amount of water might be swallowed and the risk of experiencing adverse health effects is very low. You can minimize any risk by not using water with PFAS greater than the MassDEP guideline to wash such items.
- ✓ The water can be safely used by adults and older children for brushing teeth. However, use of bottled water should be considered for young children as they may swallow more water than adults when they brush their teeth. If you are concerned about your exposure, even though the risk is very low, you could use bottled water for these activities.
- ✓ Because PFAS are not well absorbed through the skin, routine showering or bathing are not a significant concern unless PFAS levels are high. Shorter showers or baths, especially for children who may swallow water while playing in the bath, or for people with skin conditions (rashes, cuts, etc.) would limit any absorption from the water. Based on information from the Connecticut Department of Health, which is the only State to have issued guidance on this issue, water should not be used, long-term, for showering and bathing if the PFAS level exceeds 210 ppt.
- ✓ For pets or companion animals, the health effects and levels of concern to mammalian species, like dogs, cats and farm animals, are likely to be similar to those for people. However, because these animals are different sizes, have different lifespans, and drink different amounts of water than people it’s not possible to predict what health effects an animal may experience from drinking water with PFAS concentrations greater than the MassDEP guideline. There is some evidence that birds may be more sensitive to PFAS. There is little data on PFAS effects on other species like turtles, lizards, snakes and fish. As a precaution, if you have elevated levels of PFAS in your water, you may wish to consider using alternative water for your pets. If you have concerns, you may also want to consult with your veterinarian.
- ✓ For gardening or farming, certain plants may take up some PFAS from irrigation water and soil. Unfortunately, there is not enough scientific data to predict how much will end up in a specific crop.

Since people eat a variety of foods, the risk from the occasional consumption of produce grown in soil or irrigated with water contaminated with PFAS is likely to be low. Families who grow a large fraction of their produce would experience higher potential exposures and should consider the following steps, which should help reduce PFAS exposures from gardening:

- Maximize use of rainwater or water from another safe source for your garden.
 - Wash your produce in clean water after you harvest it.
 - Enhance your soil with clean compost rich in organic matter, which has been reported to reduce PFAS uptake into plants.
 - Use raised beds with clean soil.
- **NOTE ON BOILING WATER:** Boiling water will not destroy these chemicals and will increase their levels somewhat due to water evaporation.
 - **NOTE ON BOTTLED WATER:** Even though bottlers are not required to test for PFAS, some bottlers have tested. The best way to know if the bottled water you are drinking or plan to drink has been tested for PFAS is to contact the bottler and ask for the latest testing results. Contact information should be available on the bottle or you may need to search the internet. For more information, see MassDEP's website on PFAS (under "Bottled water and home water filters") <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas>.

Where can I get more information on PFAS?

MassDEP PFAS Information. <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas>

Interstate Technology and Regulatory Council (ITRC). PFAS.
<https://www.itrcweb.org/Team/Public?teamID=78>

Association of State Drinking Water Administrators PFAS webpage <https://www.asdwa.org/pfas/>

EPA's Drinking Water Health Advisories for PFOA and PFOS can be found at: <https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

The Centers for Disease Control and Prevention's Public Health Statement for PFOS and PFOA can be found at: <https://www.atsdr.cdc.gov/pfas/index.html>

For additional information on possible health effects, you may contact the Massachusetts Department Environmental Protection, Office of Research and Standards at 617-556-1165.

For information on the MassDEP Drinking Water Program, you may visit <https://www.mass.gov/drinking-water-program> or contact the program at program.director-dwp@state.ma.us or 617-292-5770.