

Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water

This fact sheet answers frequently asked questions about the detection of Per- and Polyfluoroalkyl Substances (PFAS) in drinking water. It includes information about a new drinking water Health Advisory (HA) guideline for PFAS issued by the Massachusetts Department of Environmental Protection (MassDEP) in June 2018.

WHAT ARE PFAS?

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals manufactured and used in a variety of consumer products and industries throughout the world. Two of these PFAS chemicals, Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS), have been the most extensively produced and studied. They have been used to make carpets, clothing, fabrics for furniture, paper packaging for food, and other materials (e.g., cookware) that are resistant to water, grease or stains. They are also used in aqueous firefighting foam and in a number of industrial processes. Because these chemicals have been used in an array of consumer products, most people have been exposed to them.

Many PFAS are no longer being produced in this country; the largest manufacturer completely stopped PFOA/PFOS production in 2002. PFAS are still being produced in other countries and may be imported into the US in limited quantities. The US Environmental Protection Agency (EPA) and the PFAS industry launched the PFOA Stewardship Program in 2006 to work toward ending the production of PFOA and other PFAS.

While consumer products and food are a large source of exposure for most people, drinking water can be an additional source in the small percentage of communities where these chemicals have contaminated water supplies. Such contamination is typically localized and associated with a specific facility, (e.g. an



industrial facility where these chemicals were produced or used to manufacture other products or where firefighting foam was used).

HOW ARE PFAS REGULATED?

There are currently no established state or federal regulatory limits for levels in drinking water. The US EPA set a health advisory level (HA) of 0.070 micrograms per liter ($\mu\text{g/L}$) for both PFOA and PFOS in May 2016. The US EPA HA is based on a level that is safe to drink for an entire lifetime.

The Massachusetts Department of Environmental Protection (MassDEP) recently expanded the US EPA HA to address three additional PFAS detected in drinking water, perfluorohexane sulfonate (PFHxS), perfluorononanoic acid (PFNA), and

perfluorooctanoic acid (PFHpA). MassDEP recommends a level of 0.070 µg/L in drinking water for PFOA, PFOS, PFHxS, PFNA, and PFHpA, individually or added together.

MassDEP also recommends compliance with this level for short-term (weeks to months) PFAS exposures during pregnancy and breastfeeding. This recommendation means that pregnant women, nursing mothers, and infants should not consume water when the level of the five PFAS, individually or added together, is above 0.070 µg/L.

HOW CAN PFAS AFFECT MY HEALTH?

There are many gaps in the current scientific literature, but it is believed that PFAS may affect human health. Most research is based on animal studies and scientists are still unsure of the difference between how animals and humans respond to PFAS. PFAS exposures in these studies have been associated with changes in thyroid, liver, and kidney function, as well changes in hormone levels. PFOA and PFOS have also been shown to cause developmental effects to fetuses during pregnancy and in breastfed infants.

CAN PFAS CAUSE CANCER?

There is no conclusive evidence that PFAS cause cancer, though several animal studies and legal cases have identified a possible link between them. The EPA reports there is suggestive evidence that PFOA and PFOS can increase the risk of cancer. Both the EPA and the National Toxicology Program are continuing research on the cancer potential of PFAS.

WHAT IS MY RISK IF I DRANK WATER ABOVE THE MassDEP HEALTH ADVISORY LEVEL?

Drinking water at a level above MassDEP's HA does not necessarily mean that health risks are expected. This is because the HA is based on a level that is safe to drink for an entire lifetime. By convention, a value such as the HA is used as a "screening" value that is designed to overestimate exposure and ensure that sensitive individuals are protected. For example, the HA assumes that individuals drink only contaminated water and are also exposed to PFAS from sources beyond drinking water, such as food. Several safety factors are additionally applied to account for the differences between animals and humans and the differences from one human to another human. Under this scenario, a risk would be expected only if an individual continuously drinks only contaminated water at a level significantly higher than the HA.

WHAT SHOULD I DO TO LIMIT EXPOSURE?

PFAS are found at low levels in the environment, consumer products, and food, so it is nearly impossible to eliminate all exposure. If PFAS contamination has been identified in your drinking water, there are several ways to limit your exposure such as drinking and cooking with bottled water, and using pre-mixed baby formula, or bottled water for reconstituting powdered formula. Routine showering and bathing are not significant sources of exposure.



WHERE CAN I GET MORE INFORMATION?

For questions about drinking water quality contact the:

MassDEP Drinking Water Program

617-292-5770

Program.Director-DWP@state.ma.us

<https://www.mass.gov/drinking-water-program>

<https://www.mass.gov/lists/contaminants#pfas-per-and-polyfluoroalkyl-substances-including-pfos-and-pfoa>



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For health-related questions contact the:

Environmental Toxicology Program

Bureau of Environmental Health, MDPH

250 Washington Street, 7th Floor, Boston, MA 02108

Phone: 617-624-5757 | Fax: 617-624-5777 | TTY: 617-624-5286

US EPA's Drinking Water Health Advisories

<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

Images courtesy of Richard Duncan and Debora Cartagena at the Centers for Disease Control and Prevention.

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