

Per- and polyfluoroalkyl Substances (PFAS) in Drinking Water: Health Concerns

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What are these chemicals and where do they come from?

Per- and polyfluoroalkyl substances (PFAS) are a family of over 5,000 man-made chemicals with many useful properties including the ability to repel water, prevent staining and increase heat resistance. PFAS have many industrial and consumer uses including the coating of fabrics, carpets, electrical wire, and non-stick cookware, in food packaging (e.g., microwave popcorn bags), as a mist suppressant in metal plating, and in firefighting foam used by firefighters to put out petroleum fires, but not typically in home fire extinguishers.



The four most studied PFAS, perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorononanoic acid (PFNA) and perfluorohexane sulfonic acid (PFHxS), are found with the highest frequencies and concentrations in the environment and in humans and wildlife. We know the most about the harmful effects and environmental fate of these four PFAS and are learning more about several other PFAS including perfluoroheptanoic acid (PFHpA). While PFOS and PFOA have been phased out of production, they are very persistent chemicals which can remain in the environment for long periods after being removed from the marketplace.

How do PFAS get into drinking water?

The way in which these chemicals reach groundwater is still being investigated. Drinking water contamination has occurred near industries manufacturing or using these chemicals to make consumer products. PFAS use at metal plating facilities for mist suppressant can also be a source of groundwater contamination. Because of their use in firefighting foams, it is possible that fire training schools, airports and sites where there was a major fire may have releases of PFAS. Once on the ground, these chemicals can gradually migrate down through the soil when it rains and affect groundwater.

Does Connecticut have a widespread PFAS problem?

During the period 2013 –2015, Connecticut public water supply systems participated in the federal government’s testing program (Unregulated Contaminant Monitoring Rule or UCMR) for 6 PFAS, including the five PFAS included in the Connecticut Department of Public Health (DPH) drinking water Action Level. None of the 29 large water systems tested at 129 locations had detectable levels of the 6 PFAS, which suggests that Connecticut does not have a widespread problem. However, there may be localized areas of contamination where these chemicals were more heavily used. Therefore, DPH and the Department of Energy and Environmental Protection (DEEP) are investigating where PFAS contamination of groundwater may have occurred and potentially affected local drinking water supplies.

What are PFAS health effects?

The main health concerns from ingestion of PFOS, PFOA, PFNA, PFHxS and related PFAS come from studies in laboratory animals which consistently show effects on the liver and immune system, and on growth, reproduction and fetal development. PFAS can also affect the endocrine and hormonal systems and can disturb blood lipids. Studies of human populations exposed to elevated levels of PFOS, PFOA, PFNA, and PFHxS generally support the effects seen in animals. Some studies have also shown an increased risk for kidney cancer, and at very high exposure levels, for testicular cancer. Our bodies eliminate these chemicals very slowly, so with continued exposure they can build up over time. Therefore even low levels in drinking water may increase your risk of developing a variety of health risks if exposure is long term (months to years). Exposure to PFAS above the CT Action Level does not necessarily mean that health effects will happen.

How can I be exposed to PFAS?

Nearly everyone has low levels of PFOA, PFOS, PFNA and PFHxS in their blood. These background levels likely come from consumer products and food packaging. You may still have some PFAS in your body years after the chemicals have been phased out because of their slow removal from the body.



Additional exposure can occur from eating PFAS-contaminated foods and consuming drinking water contaminated with PFAS. The CT DPH and DEEP are investigating where these chemicals may have been used in Connecticut to understand which groundwater supplies may be at risk. However, let your local health department, DPH, or DEEP know if you have reason to believe that there is a source of these chemicals in your neighborhood or workplace.

PFAS are not readily absorbed by your skin, so bathing, showering, swimming and washing dishes in water containing PFAS is not a significant source of exposure.

Should I get my blood tested for PFAS?

There is no need to have your blood tested for these chemicals. As noted above, nearly everyone has low levels of the four most studied PFAS in their blood. A PFAS blood test can tell you how much of each specific PFAS is in your body at the time of the test. However, finding measurable amounts of PFAS in your blood does not imply that the levels of PFAS have caused, or will cause adverse health effects. Also, PFAS blood tests cannot tell you where or how you were exposed to the PFAS in your body, and the test results cannot be used by your doctor to guide treatment decisions.

What is the drinking water standard?

There is no federal enforceable standard (Maximum Contaminant Level or MCL) for any chemical in the PFAS family. However, the US Environmental Protection Agency (EPA) issued a drinking water lifetime Health Advisory in 2016 for PFOS and PFOA of 70 parts per trillion (ppt) for either contaminant alone or for the sum of the two. EPA intended for the advisory level to be protective of all health effects (including cancer) for all potential consumers of the water.

Also in 2016, CT DPH set a drinking water Action Level in for PFAS that is the same as the EPA Health Advisory (70 ppt) but added three additional PFAS (PFNA, PFHxS, PFHpA) to the group. The sum of this group of 5 PFAS must be below the target concentration of 70 ppt. These additional PFAS have produced some of the same health effects as PFOS and PFOA.

Action Levels are not enforceable standards. DEEP and local health departments use Action Levels to help them evaluate groundwater contamination and identify private wells that may need an alternative drinking water source or treatment to reduce contaminant concentrations. Action Levels may also be used as guidelines for public water in the absence of enforceable standards.

CT DPH is tracking the rapidly evolving science on PFAS exposure and health effects and is aware that several states have recently set their own drinking water guidelines and standards for individual PFAS chemicals that are more stringent than CT DPH's current Action Levels. CT DPH is currently evaluating the need to update its 2016 PFAS Action Level.

Should I test my water for these chemicals?

No. If you drink from a public water supply, your water system may have already been tested during the 2013-2015 round of UCMR testing or through other proactive sampling conducted by your water supplier. If you have reason to believe your private well needs to be tested, let DEEP, DPH, or your local health department know of your concerns.

For More Information:

Questions about drinking water from Public Supplies:

DPH [Drinking Water Section](#): 860-509-7333 or email to dwdcompliance@ct.gov

Questions on drinking from Private Wells and treatment options:

DPH [Private Well Program](#): 860-509-8401 or email to DPH.PrivateWellProgram@ct.gov

Questions about PFAS Health Effects:

DPH [Environmental & Occupational Health Assessment Program](#): (860) 509-7740 or email to DPH.EOHA@ct.gov

Questions on PFAS Sources:

DEEP [Remediation Division](#): 860-424-3705