Perfluoroalkyl Substances (PFAS) in Drinking Water:

Health Concerns

Environmental & Occupational Health Assessment Program • October 2017

What are These Chemicals?

Perfluoroalkyl substances (PFAS) are a family of 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 and non-stick cookware, in food packaging (e.g., microwave popcorn bags), as a mist suppressant in chrome plating, and in firefighting foam used by firemen to put out petroleum fires, but not typically in home fire extinguishers.

The most studied PFAS are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). While we know the most about the harmful effects and environmental fate of these two PFAS, several others of high concern are also discussed in this fact sheet, perfluorononanoic acid (PFNA), perfluorohexane sulfonate (PFHxS) and perfluoroheptanoic acid (PFHpA). PFOS and PFOA have been phased out of production but the other three PFAS have not. Further, these 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 chrome 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.

Connecticut Department of Public Health
PO Box 340308, Hartford, CT 06134-0308
http://www.ct.gov/dph

What are their Health Effects?

The main health concerns regarding PFOS, PFOA and related PFAS come from studies in laboratory animals which consistently show effects on the liver and immune system, and on fetal development. Studies also suggest a cancer risk (liver, testicular), especially for PFOA. PFAS can also affect the endocrine and hormonal systems and can disturb blood lipids which may increase risks for vascular and heart disease. Studies of human populations exposed to elevated levels of PFOS and PFOA generally support the effects seen in animals. These chemicals are removed from the body very slowly so they can build up over time. Therefore even low levels in drinking water can be a health risk if exposure is long term (months to years).

How Do I Know if I am Exposed to PFAS?

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

Additional exposure can occur if your drinking water is contaminated with PFAS. The Connecticut Departments of Public Health (DPH) and Energy and Environmental Protection (DEEP) are investigating where these chemicals may have been used in Connecticut to understand which groundwater supplies may be at risk. There is no need to have your blood tested for these chemicals. 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.

Does Connecticut Have a Widespread PFAS Problem in Groundwater?

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 PFOS and PFOA. 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 DEEP are investigating where PFAS contamination of groundwater may have occurred and potentially affected local drinking water supplies.

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 Health Advisory in 2016 for PFOS and PFOA of 70 parts per trillion (ppt). This target concentration in a water sample is 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. Some states have set their own drinking water targets based upon exposure assumptions and uncertainty factors that differ from those used by EPA.

DPH set a drinking water Action Level in 2016 for PFAS that is the same as the EPA Health Advisory (70 ppt) but has 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.

DPH agrees with the EPA that 70 ppt is an appropriate drinking water target concentration but also points out that detections below 70 ppt should be investigated and minimized to the extent possible to avoid the buildup of these contaminants in people drinking the water.

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 recent round of UCMR testing. In addition, DPH and DEEP are jointly evaluating the potential for PFAS releases to have affected public water supplies across Connecticut and will initiate testing of any vulnerable supplies. If you drink from a private well, you will be notified via your local health department or state officials if there is a concern for PFAS in your neighborhood. At that time, state and local officials would offer assistance and advice with getting your well tested and to help you identify available treatment options, should elevated concentrations be found.

For More Information:

Questions about drinking water from Public Supplies:
DPH Drinking Water Section: 860-509-7333

Questions on drinking from Private Wells and treatment options:
DPH Private Well Program: 860-509-7296

Questions about PFAS Health Effects:
DPH Environmental & Occupational Health Assessment Program: (860) 509-7740

Questions on PFAS Sources:
DEEP Remediation Division: 860-424-3705

This fact sheet is funded, in part, by funds from the Comprehensive Environmental Response, Compensation, and Liability Act trust fund through a cooperative agreement with the Agency for Toxic Substances and Disease Registry, U. S. Public Health Service.