Drinking Water Facts: Perfluorinated Chemicals (PFCs) in Drinking Water

NJ Health New Jersey Department of Health

- **Perfluorinated chemicals (PFCs) are a group of chemicals with many commercial and industrial uses.**
- **PFCs have been associated with a variety of adverse health effects in humans but it has not been established that PFCs directly cause these effects.**
- **PFCs are not regulated in drinking water but New Jersey is taking steps towards future regulation of PFCs.**

What are perfluorinated chemicals (PFCs)?

Products made from man-made perfluorinated chemicals (PFCs) can repel water and oil, and are resistant to heat and chemical reactions. They therefore have important industrial and commercial uses. PFCs are used in production of waterproof and stain proof fabric, in some stick-free cookware, in "leak-proof" coatings on packaging materials, in fire-fighting foams, and in other uses.

- **PFOS** – perfluorooctane sulfonate
- **PFOA** – perfluorooctanoic acid
- **PFNA** – perfluorononanoic acid
- **PFHxS** – perfluorohexane sulfonate

PFCs can enter drinking water through industrial release to water or air, discharges from sewage treatment plants, land application of contaminated sludge, and use of fire-fighting foam.

These compounds are not broken down in the body. Four types of PFCs have been found in the blood (serum) of greater that 98% of the United States population. These four PFCs stay in the body for many years. **PFCs build up and stay in the human body and the amount goes down very slowly over time.**

Where can PFCs be found?

Because PFCs do not break down, they remain in the environment for a long time. They have been found in water, air, soil, house dust, wildlife, and polar ice caps. Some PFCs, including PFOS and PFNA, accumulate in fish living in contaminated waters.

Some PFCs can dissolve in water. Therefore, drinking water may be a major source of exposure to PFCs for people living in communities with contaminated drinking water. Other sources of PFC exposure include food, food packaging, consumer products, house dust, indoor and outdoor air, and at workplaces where PFCs are made or used.

How can I be exposed to PFCs?

Exposure to PFCs in drinking water is primarily from ingestion. Exposure to PFCs through other household uses of water such as showering, bathing, laundry and dishwashing is not significant.

Are PFCs harmful to my health?

There is considerable information on the health effects of PFCs in humans and animals but more information is continually becoming available. In experimental animals, PFCs have been found to cause developmental, immune, neurobehavioral, liver, endocrine, and metabolic toxicity, generally at levels well above human exposures. Studies of the general population, communities with drinking water exposures, and exposed workers suggest that PFCs increase the risk of a number of health effects. The most consistent human health effect findings for PFOA – the most well-studied of the PFCs – are increases in serum cholesterol, some liver enzymes, and uric acid levels.

PFOA and PFOS studies revealed tumors in rodents. In a community significantly exposed to PFOA through drinking water, PFOA exposure was associated with higher incidence of kidney and testicular cancers.

How can PFCs affect children?

In experimental animals, PFCs cause developmental effects. In humans, exposure to PFCs before birth or in early childhood may result in decreased birth weight, decreased immune responses, and hormonal effects later in life. More research is needed to understand the role of PFCs in developmental effects.

Infants and children consume more water per body weight than older individuals, so their exposures may be higher than adults in communities with PFCs in drinking water. They may also be more sensitive to the effects of PFCs.

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When PFCs are elevated in a drinking water supply, it is advisable to use bottled water to prepare infant formula for bottle-fed babies. Beverages for infants, such as juice made from concentrate, should also be prepared with bottled water. PFCs are present in breast milk. **Based on the scientific understanding at this time, since the benefits of breastfeeding are well-established, infants should continue to be breastfed. Pregnant, nursing, and women considering having children may choose to use home water filters or bottled water for drinking and cooking to reduce PFCs in your water.** However, exposure to fetuses and nursing infants is influenced by past exposures, body burden, and slow excretion of these substances from the body, so risk reduction will not be immediate.

What levels of PFCs found in drinking water are safe to drink?

USEPA has issued a lifetime drinking water Health Advisory for **PFOA** and **PFOS** of **70 parts per trillion (ppt)** or (ng/L) either individually or when concentrations of PFOA and PFOS are combined. A Health Advisory identifies the concentration of a contaminant in drinking water at which adverse health effects are not anticipated to occur.

The New Jersey Department of Environmental Protection (NJDEP) developed a guideline for ***chronic (lifetime)*** exposures to **PFOA** of **40 ppt (ng/L)**. NJDEP has also established an interim specific ground water criterion for **PFNA** of **10 ppt (ng/L)**.

How do I know if I have PFCs in my drinking water?

Large public water systems in the U.S. and a subset of smaller water systems were required to test for PFCs as part of the USEPA Unregulated Contaminant Monitoring program. Each of the water systems which tested for PFCs have reported their PFC results in your annual Consumer Confidence Report (CCR). The CCR is often available online or you can reach out to your water provider.

The only way to know whether your private well has PFCs is to have it tested. To find a laboratory certified to test for PFCs you can contact NJDEP Office of Quality Assurance at 609-292-3950 or access the information at: **http://www.nj.gov/dep/enforcement/oqa/certlabs.htm**

What should I do if I am concerned about PFCs in my drinking water?

PFCs are **not** removed from water by boiling. **If tap or well water is found to contain PFCs, people may choose to use home water filters or bottled water for drinking and cooking to reduce PFCs in their water.**

Granular activated carbon filters or reverse osmosis water treatment devices are technologies which can reduce the level of PFCs in drinking water. However, these technologies currently commercially available in point-of-use (POU) filters (filters attached to a tap) or whole house filters are not specifically certified by the National Sanitation Foundation (NSF) to remove PFCs. The Minnesota Department of Health tested several POU water treatment devices and found many to be effective, more information is available at the following link (http://www.health.state.mn.us/divs/eh/wells/waterquality/poudevicefinalsummary.pdf). If a treatment is used, it is important to follow the manufacturer's guidelines for maintenance and operation.

What can I learn from getting my blood tested for PFCs?

PFCs can be measured in your blood serum, but this is not a routine test. While a blood test may indicate whether you have been exposed to PFCs, results cannot be used to predict health effects nor can they be linked to specific health problems. Also test results cannot, in general, be used to specifically predict sources of exposure once exposed and there is no treatment to reduce levels of PFCS in blood.

Since 2003, a national biomonitoring program has been measuring PFCs in blood among the U.S. population. This information can be used to determine whether the levels of PFCs in your blood are higher than national background levels.

More information and resources about PFCs can be found at:

http://nj.gov/health/eohs/index.shtml

Updated May 2016

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