PERFLUOROOCTANOIC ACID (PFOA) IN DRINKING WATER, HOOSICK FALLS, NEW YORK

LONG FACT SHEET

UPDATED DECEMBER 18, 2015

What is PFOA?

Perfluorooctanoic acid (PFOA, also known as C8 or perfluorooctanoate) is a manufactured chemical that belongs to a group of fluorine-containing chemicals called perfluorinated chemicals (PFCs)[1]. These chemicals were and are used to make household and commercial products that resist heat and chemical reactions, and repel oil, stains, grease, and water.

What do we know about PFOA's use in consumer products?

PFOA was once widely used in nonstick cookware, in surface coatings for stain-resistant carpets and fabric, and in paper and cardboard food packaging (such as microwave popcorn bags and fast food containers). PFOA was also used in fire-fighting foam and in many products for the aerospace, automotive, building/construction, and electronics industries.

PFOA use in the manufacturing of consumer products in the U.S. is slowly declining. In 2006, eight major PFOA manufacturers agreed to participate in the U.S. Environmental Protection Agency's (US EPA) PFOA Stewardship Program. The participating companies made voluntary commitments to reduce product content and facility emissions of PFOA and related chemicals by 95%, no later than 2010. Companies also agreed to work toward eliminating use of these substances in their products by 2015. According to the US EPA, participating manufacturers are on track to reach the program's goal of phasing out these chemicals by the end of 2015. However, PFOA may still be found in products manufactured in other countries.

What do we know about PFOA in the environment?

PFOA gets into the environment from industrial facilities that make PFOA or use PFOA to make other products. It also enters the environment when released from PFOA-containing consumer products during their use and disposal (for example, through discharges from wastewater treatment plants or leakage from landfills). PFOA can also be formed from other related chemicals when they break down in the environment.

PFOA can remain in the environment, particularly in water, for many years. PFOA can move through soil and into groundwater, or be carried in air. PFOA has been found in soil, sediment, and water samples far away from where it was made or used. The highest levels of PFOA in the environment are typically found near industrial facilities that manufacture or use PFOA.

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[1] Scientists often refer to PFCs using different names, including perfluorochemicals, perfluoroalkyls, perfluorinated alkyl acids, polyfluorinated chemicals, polyfluorinated compounds, and polyfluoroalkyl substances.

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How might I be exposed to PFOA?

Although the levels of PFOA in food are generally low, food is expected to be the primary source of exposure to PFOA for most people. People can also be exposed to PFOA through water, air, soil, dust, and from various consumer products (for example, contact with rugs or furniture treated with PFOA-containing products). However, exposure from consumer products is expected to decline with the reduction and eventual elimination of PFOA in consumer products. Fetal exposure can occur via the placenta, and infants can be exposed via mother's breastmilk.

Is PFOA found in humans?

Studies show that human exposure to PFOA is widespread and that most people have low levels of PFOA in their blood. PFOA does not break down in the human body and can be present in blood for years after exposure. Thus, PFOA blood levels largely reflect total exposure over many years. The time it takes for PFOA blood levels to go down by half, on average, is about two to four years, assuming there is no additional exposure to the chemical.

What health effects are associated with PFOA exposure?

Humans

Human studies show associations between increased PFOA levels in blood and an increased risk for several health effects. Some of these effects were identified by a special study of a large number of people living near a PFOA manufacturing plant in the Ohio River Valley of Ohio and West Virginia. These effects include:

- high cholesterol levels,
- changes in thyroid hormone,
- ulcerative colitis (autoimmune disease),
- pre-eclampsia (a complication of pregnancy that includes high blood pressure), and
- kidney and testicular cancer.

Studies of other populations showed effects on the liver, the immune system, and high serum uric acid levels, which may be associated with an increased risk of high blood pressure.

Data on the effects of PFOA on children are mixed. Some studies show no association between increased blood PFOA levels and increased risk of stillbirths, premature birth, or birth defects. Other studies show an association between increased PFOA blood levels and increased risks for several health effects in children (for example, effects on birth weight, cognitive and behavioral development, immune function, and cholesterol levels).

There is no conclusive evidence that PFOA causes cancer in humans. The International Agency for Research on Cancer (IARC) classifies PFOA as "possibly carcinogenic in humans" based on limited evidence in humans and animals (see below).

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Overall, the human studies are difficult to interpret because results are not consistent among studies. Some studies found associations between increased PFOA exposure and a health effect, while other studies did not, even though the studies looked for the same type of health effect. Because of the scientific limitations of the studies, we cannot determine whether PFOA caused the effects seen in people with elevated PFOA levels, or whether other non-PFOA factors contributed to increased risks of health effects. Thus, we cannot be sure that PFOA caused the observed effects.

Animals

The primary non-cancer effects observed in animals exposed to high levels of PFOA include liver toxicity, developmental toxicity (birth defects, delayed development), and immune system toxicity. PFOA caused cancer of the liver, pancreas, and testis in male rats fed large amounts for their lifetimes. However, PFOA has not been tested for carcinogenic (cancer-causing) potential in mice or other animal species. Thus, the US EPA considers PFOA to have "suggestive evidence of carcinogenic potential" because only one species has been evaluated.

The primary way that PFOA causes effects in animals such as rats and mice is not fully understood. Some studies suggest that PFOA causes effects in rodents, particularly cancer in rats, by a specific biological process that is more active in rodents than humans (that is, humans are less sensitive than rodents to the process). This raises some uncertainty about how relevant the effects observed in rodents are to evaluating the human health risks from PFOA. It is possible, however, that PFOA may be harmful to humans via processes different than those in animals.

Are there federal or New York State regulations, standards, or guidelines for PFOA in drinking water?

The US EPA does not have an enforceable health-based drinking water standard (called a maximum contaminant level or MCL) for PFOA. The US EPA does have a temporary provisional health advisory level (a non-enforceable guidance value) for PFOA of 400 parts per trillion (ppt) for evaluating the risk of non-cancer effects from short-term PFOA exposure (weeks to months).

The New York State Department of Health (NYS DOH) does have an enforceable drinking water standard (MCL) of 50,000 ppt for any chemical (including PFOA) classified as an unspecified organic contaminant under Sub-part 5-1 of the State Sanitary Code. It only applies to chemicals, such as PFOA, that do not have a health-based standard derived from its toxicity data.

What did the NYS DOH's 2015 sampling results for the Hoosick Falls Public Water System and private wells show?

In the summer of 2015, the NYS DOH measured the PFOA levels in several water samples collected from the Village of Hoosick Falls Public Water System. The results are shown below. All but one sample were above the US EPA provisional health advisory of 400 ppt (see the below question for information on what an exceedance means). Sampling conducted by the Village of Hoosick Falls found similar levels of PFOA.

NYS DOH Village of Hoosick Falls Public Water Supply Sampling Results

Location	PFOA level (ppt)
Supply Well #3 Raw Water	151
Supply Well #7 Raw Water	620
Water Treatment Plant Finished Water	662
Tap Water from Building on Village Water System	612
Tap Water from Building on Village Water System	618

Previous NYS DOH sampling of eight private wells showed PFOA in four wells and no detectable PFOA in the others. In private wells where PFOA was detected, the levels ranged from 14.4 ppt to 194 ppt, and were below the US EPA provisional health guidance value of 400 ppt. Sampling of additional private wells was completed in November 2015 and the results are expected later this year.

What does an exceedance of the health advisory mean?

An exceedance of a health advisory indicates a potential threat to public health and is used as a signal to initiate actions to reduce exposure to the contaminant and to identify the sources of contamination. An exceedance also indicates the need for a further evaluation of the potential for health effects.

A health advisory is not a "bright line" between drinking water levels that cause health effects and those that do not. It is set at a water level at which estimated exposures are much lower than exposures known to cause effects in animals or assumed to cause effects in humans. This difference is called a margin-of-protection. Health-protective assumptions are used to determine the margin-of-protection because we do not have good information on important factors that are necessary to characterize human risk from the results of animal studies. An exceedance of a health advisory raises concerns not because health effects are likely or will occur, but because the associated exposure reduces the margin-of-protection provided by the health advisory.

Are health effects expected given the PFOA levels found in the Hoosick Falls Public Water System?

Based on our evaluation using data collected by NYS DOH in the summer of 2015, we do not expect health effects to occur from normal use of the water if PFOA levels in the past were similar to those seen in 2015, and future PFOA levels decrease or remain the same.

Our evaluation compared the PFOA exposures resulting from normal use of the water to PFOA exposures estimated to cause health effects in humans. We estimated (using mathematical models) the human PFOA exposure for health effects by using data from animal studies because there is some uncertainty (due to lack of adequate human studies) on what PFOA levels actually cause human health effects. Our evaluation indicated

that the estimated drinking-water exposures to PFOA are lower than the estimated exposures associated with health effects in both children and adults. Although the margins-of-protection are not as large as those provided by the health advisory, the margins-of-protection are still large enough to indicate that health effects are unlikely from short-term (weeks to months) or long-term (years) exposure to PFOA at the levels detected in the water system. One limitation of our analysis is that it is based only on sampling data for the summer of 2015, thus, we are unable to evaluate the risk of past exposures to PFOA.

What measures can be taken to reduce exposure to PFOA?

To reduce exposure from tap or well water found to contain PFOA people should use bottled water for drinking and food preparation or install water filters. Carbon filtration and reverse osmosis are two technologies that can remove low levels of organic contaminants, such as PFOA, from water. While there are currently no commercially available point-of-use (POU) filters (filters attached to a tap) or whole house filters specifically certified by the National Sanitation Foundation (NSF) to remove PFOA, it is expected that any activated carbon or reverse osmosis system will have the capability of reducing PFOA levels. The Minnesota Department of Health tested several POU water treatment devices and found many to be effective (visit http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/wateranalysis.html for a summary). If a treatment is used, it is important to follow the manufacturer's guidelines for maintenance and operation.

When should I or my children see a health care provider?

If you or your family have signs or symptoms that you think are caused by PFOA exposure, you should discuss your concerns with your or your family's health care provider.

Is there a medical test that can tell me if I have been exposed to PFOA?

PFOA can be measured in blood. In fact, data suggest that PFOA would be found at low levels in the blood of almost all Americans. However, the test for PFOA in blood is not routinely done. The results of blood tests can be used to determine if a person's PFOA blood level is lower than, similar to, or higher than blood levels found in the general population, or in groups where some people may have unusually high PFOA blood levels. These groups include workers in facilities that use or produce PFOA, and people who live near substantial PFOA sources (for example, manufacturing facilities, fire-fighting training areas, PFC waste disposal sites, farms where substantial amounts of PFC-containing sewage sludge were applied to soils).

However, other uses of PFOA blood test results are limited. Scientists do not have enough information yet to identify a level of PFOA in blood that is completely without health risk, or a level that is certain to cause illness. In addition, the results of blood tests reflect total exposure to PFOA and cannot be used to identify specific sources of exposure or timing of past PFOA exposures.

Where can I get more information?

If you have any questions about the information in this fact sheet or other questions about the 2015 NYS DOH PFOA sampling, please contact the appropriate NYS DOH resource listed below.

- If you have questions about potential health effects, please call 1-518-402-7800 or 1-800-458-1158, send an e-mail to btsa@health.ny.gov, or write New York State Department of Health, Bureau of Toxic Substance Assessment, Corning Tower, Room 1743, Empire State Plaza, Albany, NY 12237.

- If you have questions about the public water supply, please call Lloyd Wilson at 518-402-7650, send an e-mail to bpwsp@health.ny.gov, or write New York State Department of Health, Bureau of Water Supply Protection, Corning Tower, Room 1110, Empire State Plaza, Albany, NY 12237.

- If you have questions about private wells, please call Albert DeMarco at 518-402-7860, send an e-mail to beei@health.ny.gov, or write New York State Department of Health, Bureau of Environmental Exposure Investigation, Corning Tower, Room 1717, Empire State Plaza, Albany, NY 12237.

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