

Perfluorinated Chemicals (PFCs)

Frequently Asked Questions

What are PFCs?

PFCs are a large group of man-made chemicals that have been used since the 1950s. Use of these chemicals has greatly decreased in the United States over the last 10 years. People can still be exposed to PFCs because they are still present in the environment. PFCs do not break down easily in the environment. They also build up in the bodies of exposed humans and animals and stay there for long periods of time. Over the last decade, interest in PFCs has grown. ATSDR and our state health partners are studying exposure to PFCs at a number of sites.

How can I be exposed to PFCs?

PFCs are found near areas where they are manufactured or used. Listed below are places where they can be found.

- Public water systems and drinking water wells, soil, and outdoor air near industrial areas with frequent PFC use
- Indoor air in spaces that contain carpets, textiles, and other consumer products treated with PFCs to resist stains
- Surface water (lakes, ponds, etc.) and run-off from areas where aqueous (water-based) film-forming firefighting foam (AFFF) was often used (like military or civilian airfields)
- Locally caught fish from contaminated bodies of water
- Food items sold in the marketplace

Consumer products can be a source of lower exposures to PFCs. These products include

- Some grease-resistant paper, fast food wrappers, microwave popcorn bags, pizza boxes, and candy wrappers
- Nonstick cookware such as Teflon[®] coated pots and pans
- Stain resistant coatings such as Scotchguard[®] used on carpets, upholstery, and other fabrics
- Water resistant clothing such as Gore-Tex[®]
- Cleaning products
- Personal care products (shampoo, dental floss) and cosmetics (nail polish, eye makeup)
- Paints, varnishes, and sealants

Recent efforts to stop using some PFCs in consumer products appear to have lowered exposure in the U.S. population. CDC surveys have shown that blood levels of PFCs have dropped over time, and research shows that exposure from consumer products is usually low. People who work with PFCs are more likely to be exposed than the general population. Workers may be exposed to PFCs by inhaling them, getting them on their skin, and swallowing them, but inhaling them is the most likely route for exposure.

How can I reduce my exposure to PFCs?

PFCs are found in people and animals all over the world. They are found at low levels in some food products and in the environment (air, water, soil, etc.). Completely stopping exposure to PFCs is unlikely. But, if you live near sources of PFC contamination you can take steps to reduce your risk of exposure to PFCs:

- Some states have warnings about eating fish from bodies of water with high PFC levels. Check with your state public health and environmental quality departments to learn the types and local sources of fish that are safe to eat.
- Residents with wells with high levels of PFCs should find an alternative source of drinking water.

How can PFCs affect people's health?

Scientists are not sure about the health effects of human exposure to PFCs. Some studies show that animals given high levels of PFCs have changes in the liver, thyroid, pancreas, and hormone levels. Scientists are not sure what animal data means about human exposure. PFCs act differently in humans than they do in animals and may be harmful in different ways.

PFCs build up and stay in the human body and the amount goes down very slowly over time. So scientists and doctors are concerned about their effects on human health.

Studies in humans have shown that certain PFCs may affect the developing fetus and child. They may also decrease fertility, change the body's natural hormones, increase cholesterol, and affect the immune system. They may even increase cancer risk.

How can I learn more?

Contact 1-800-CDC-INFO (232-4636) for updated information on this topic.

Contact the Consumer Product Safety Commission at (800) 638-2772 if you have questions about the products you use in your home.

Visit the following websites for more information:

ATSDR Websites

<http://www.atsdr.cdc.gov/pfc/index.html>

<http://www.atsdr.cdc.gov/toxprofiles/tp200-c1-b.pdf>

<http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1116&tid=237>

<http://www.atsdr.cdc.gov/toxguides/toxguide-200.pdf>

<http://www.atsdr.cdc.gov/PHS/PHS.asp?id=1115&tid=237>

Environmental Protection Agency

<http://www2.epa.gov/chemical-research/perfluorinated-chemical-pfc-research>

<http://www.epa.gov/oppt/existingchemicals/pubs/actionplans/pfcs.html>

List of Common PFCs and
Their Abbreviations

Compound	Abbreviation
Perfluorobutane sulfonate	PFBS
Perfluorohexane sulfonate	PFHxS
Perfluorooctane sulfonate	PFOS
Perfluoroheptanoic acid	PFHpA
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnA
Perfluorododecanoic acid	PFDoA
Perfluorooctane sulfonamide	PFOSA
2-(N-Methyl-perfluorooctane sulfonamido) acetate	Me-PFOSA-AcOH
2-(N-Ethyl-perfluorooctane sulfonamido) acetate	Et-PFOSA-AcOH

Notes

¹Use of trade names is for identification only and does not imply endorsement by the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry, the Public Health Service, or the U.S. Department of Health and Human Services.