

Perfluoroalkyls - ToxFAQs™

What are perfluoroalkyls?

Perfluoroalkyls are a group of man-made chemicals that are not found naturally in the environment. Some chemicals that are in this group include: perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS), and perfluorodecanoic acid (PFDA).



The two perfluoroalkyls made in the largest amounts in the United States were PFOA and PFOS. Perfluoroalkyls were used to protect products like carpet and fabric, and as a coating for paper and cardboard packaging. They can also be found in some firefighting foams.

Where are perfluoroalkyls found in the environment?

Perfluoroalkyls can be found in air, soil, and water as a result of manufacture and use. They do not break down in the environment very easily. Perfluoroalkyls can seep through the soil into groundwater.

How can I be exposed to perfluoroalkyls?

You may be exposed to perfluoroalkyls in the air; in indoor dust, food, and water; and in some home products. However, the main sources of exposure to perfluoroalkyls, such as PFOA and PFOS, are usually from eating food and drinking water that are contaminated with these chemicals. Because exposure is widespread, blood tests can find PFOA, PFOS, PFNA, and PFHxS in most people. However, in general, human blood levels of these chemicals are going down as exposures in the environment goes down.

Babies born to mothers exposed to PFAS can be exposed during pregnancy and while breastfeeding. However, nursing mothers should continue to breastfeed. Based on current science, the benefits of breastfeeding appear to outweigh the risks for infants exposed to PFAS in breast milk. To weigh the risks and benefits of breastfeeding, mothers should contact their doctors. Children can be exposed to perfluoroalkyls in carpet since they are closer to the ground and play on the floor.

Exposure to perfluoroalkyls is widespread. The main sources in the environment is contaminated food and water.

Workers in facilities that make or use perfluoroalkyls can be exposed to higher amounts of these chemicals and may have higher levels in their blood. Some communities near factories that made PFOA and PFOS were exposed to high levels of these substances in drinking water.

How can perfluoroalkyls affect my health?

A large number of studies have examined possible relationships between levels of perfluoroalkyls in blood and harmful health effects in people. However, not all of these studies involved the same groups of people, the same type of exposure, or the same perfluoroalkyls, resulting in a variety of observed health outcomes. Research in humans suggests that high levels of certain perfluoroalkyls **may** lead to:

- increased cholesterol levels (PFOA, PFOS, PFNA, PFDA);
- changes in liver enzymes (PFOA, PFOS, PFHxS)
- decreased vaccine response in children (PFOA, PFOS, PFHxS, PFDA);
- increased risk of high blood pressure or pre-eclampsia in pregnant women (PFOA, PFOS);
- small decreases in infant birth weights (<20 grams (0.7 ounces) decrease in birth weight per 1 ng/mL increase in PFOA or PFOS in blood).

Perfluoroalkyls

One way to learn about whether perfluoroalkyls will harm people is to do studies on lab animals. Most of these studies have tested doses of PFOA and PFOS that are higher than levels found in the environment. These animal studies have found that PFOA and PFOS can cause damage to the liver and the immune system. PFOA and PFOS have also caused birth defects, delayed development, and newborn deaths in lab animals.

Humans and animals react differently to perfluoroalkyls, and not all effects observed in animals may occur in humans. Scientists have ways to estimate how the exposure and effects in animals compare to what they would be in humans. What they learn from this process helps them decide how to protect people from chemical exposures.

Can perfluoroalkyls cause cancer?

Studies do not clearly show whether perfluoroalkyls cause cancer in people. People exposed to high levels may have increased risk of kidney cancer or testicular cancer. However, these studies are not consistent and may not have looked at other factors like smoking.

Studies in animals have shown that PFOA and PFOS can cause cancer in the liver, testes, pancreas, and thyroid. However, some scientists believe that humans may not develop the same cancers as animals.

The Environmental Protection Agency (EPA) has classified PFOA and PFOS as having suggestive evidence of carcinogenic potential in humans. The International Agency for Research on Cancer has classified PFOA as possibly carcinogenic (causing cancer) to humans, but it has not evaluated whether other perfluoroalkyls may also cause cancer. The Department of Health and Human Services has not yet evaluated whether PFOA and other perfluoroalkyls can cause cancer.

Can I get a medical test to check for perfluoroalkyls?

A blood test can measure perfluoroalkyls in your blood, but this is not a test routinely done in a doctor's office. If you have perfluoroalkyls in your blood, you have been exposed to these chemicals and absorbed them into your body at some time. Most people have some level of perfluoroalkyls in their blood. The blood test can't predict if you will have health problems from exposure to perfluoroalkyls.

How can I protect myself and my family from perfluoroalkyls?

If you do not know about perfluoroalkyls levels in your water, ask your local health department. Do not use consumer products that contain perfluoroalkyls. Drink or cook with bottled water or install activated carbon water filters if your tap or well water contains perfluoroalkyls.

For more information:



Call **CDC-INFO** at 1-800-232-4636, or submit your question online at <https://wwwn.cdc.gov/dcs/ContactUs/Form>

Go to ATSDR's Toxicological Profile for perfluoroalkyls: <https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1117&tid=237>

Go to ATSDR's Toxic Substances Portal: <https://wwwn.cdc.gov/TSP/index.aspx>

Find & contact your ATSDR Regional Representative at http://www.atsdr.cdc.gov/DRO/dro_org.html