

# What You Need to Know About PFASs (PFOA/PFOS)

## What are PFASs?

Perfluoroalkyl and polyfluoroalkyl substances (together known as PFASs) are a class of man-made chemicals, not found naturally in the environment. PFOA (sometimes known as “C8”) and PFOS are the two PFASs that have been the most extensively produced and therefore are the most studied of these chemicals. Both of these chemicals are very persistent in the environment and in the human body.

## What are PFASs Used For?

Perfluoroalkyls were made in large amounts in the United States--by companies like DuPont and 3M--until they began to be phased out in 2006 because of concerns about the impact of PFOA and long-chain PFASs on human health and the environment. PFASs were widely used to make products more stain-resistant, waterproof and/or nonstick. For example, PFASs were used in the manufacture of products that:

- Make sofas, carpets and clothing resistant to soil, stains and water,
- Keep food from sticking to cookware (Teflon),
- Make shoes, clothes and mattresses more waterproof,
- Keep food packaging from sticking to food,
- Make some food packaging resistant to grease absorption,
- Help fight fires at airfields and other places where petroleum-product-based fires are a risk.

PFASs were also widely used in fire-fighting foams, lubricants, metal spray plating and detergent products, inks, varnishes, coating formulations, waxes, and water and oil repellents for leather, paper, and textiles. Because they help reduce friction, they were also used by a variety of industries, including automotive, aerospace, construction, and electronics factories or businesses.

Although the major manufacturers began winding down PFOA production in 2006, some facilities are replacing perfluoroalkyls with other similar substances.

## How Might I be Exposed to PFASs?

Exposure to PFASs is widespread and global. Most people in the United States and in other industrialized nations have measurable amounts of PFASs in their blood. The major pathways of human exposure to PFAS include:

- Drinking contaminated water.
- Ingesting food contaminated with PFAS, such as certain types of fish and shellfish.
- Breathing air that contains dust contaminated with PFAS (from soil, carpets, upholstery, clothing, etc.).
- Until recently, eating food packaged in materials containing PFAS (e.g., fast food containers, and pizza boxes). One important caveat: although PFAS compounds have been phased out of food packaging materials, similar compounds are still in use.
- Hand-to-mouth transfer from surfaces treated with PFAS-containing stain protectants, such as carpets. This is mostly a risk for infants and toddlers.
- Some communities near facilities where PFOA and PFOS were previously manufactured or near military bases that used firefighting foam in their training, have high levels of these substances in drinking water supplies, and this is the primary route of exposure for these populations.
- Workers in industries or activities that manufactured or used products containing PFAS may have been exposed to higher levels than the general population.

Finally, although PFOA and PFOS are no longer manufactured in the U.S., they are still produced in other locations around the globe, and they may continue to be imported into the United States in consumer goods such as textiles, carpets, leather and apparel, paper and packaging, coatings, and rubber and plastics. In addition, people may become exposed to PFASs manufactured years ago.

## **What Happens to PFAS in the Environment?**

Perfluoroalkyls can be released into the air, water, and soil near locations where they were manufactured or used. Because PFASs are very stable compounds that are resistant to typical environmental degradation, they are extremely persistent in the environment. Perfluoroalkyls have been found in both air and dust; surface water and groundwater; and soil and sediment. Although the highest levels of perfluoroalkyls in the environment are typically found near facilities that have made or used these substances, they have also been found at remote locations. This is attributable to the fact that, due to their persistence, PFASs can travel long distances through the air. Perfluoroalkyls may also be carried through soil by groundwater and flooding and become airborne during windy conditions.

## **How Can PFASs Affect My Health?**

The International Agency for Research on Cancer (IARC), a division of the World Health Organization, has classified PFOA as “possibly carcinogenic to humans” (Group 2B), based on limited evidence in humans that it can cause testicular and kidney cancer, and limited evidence

in lab animals. Furthermore, the EPA has concluded that both PFOA and PFOS are possibly carcinogenic to humans.

PFOS and PFOA accumulate in the human body and are eliminated slowly. This propensity to be stored in the body, increases concerns about the possible effects of these compounds on human health.

Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have caused tumors in animal according to studies, and human epidemiology studies of exposure to PFOA and PFOS show findings of increased:

- Kidney cancer (for PFOA),
- Testicular cancer (for PFOA)
- Pancreatic cancer (for PFOA)
- Liver cancer (for PFOA and PFOS)

In addition, peer-reviewed studies of the effects of PFASs on laboratory animals and epidemiological studies of human populations that have been exposed to PFASs have indicated that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including:

- High cholesterol,
- Developmental effects to fetuses during pregnancy (e.g., low birth weight),
- Liver damage,
- Immune effects (e.g., depressed antibody production in response to vaccination),
- Thyroid hormone disruption,
- Thyroid disease in adults and children,
- Pregnancy-induced hypertension and preeclampsia,
- Thyroid function (potential to affect T4 and TSH levels),
- Ulcerative colitis,
- Elevated liver enzymes, and
- High uric acid.

### **Is there a Medical Test That Shows Whether I Have Been Exposed to PFASs?**

Perfluoroalkyl compounds can be measured in blood, but this is not a routine test that can be performed in a doctor's office. The blood test for PFAS exposure indicates the levels of specific PFASs in your body at the time you were tested but does not predict future health effects.

### **How Can I Reduce my Family's Risk of Exposure to PFASs?**

Although PFASs are not manufactured in the U.S. anymore, older products and imported materials may still contain PFASs. In addition, PFASs have been found in the drinking water near facilities that manufactured the substances years ago and near military bases that used firefighting foam. Take the following steps to reduce your risk:

1. Throw out old Teflon pans and replace old stain resistant carpeting.
2. Avoid products with pre-treated stain repellent, or water repellent, especially foreign made products.
3. Get your private well tested.
4. Contact your local water supplier and request a copy of their Consumer Confidence Report which lists the levels of contaminants that have been detected in the water.
5. Avoid drinking water from contaminated sources. Drink and cook with bottled water until a solution is reached.
6. If the PFAS contamination is from an industrial site, military base or hazardous waste site, demand the polluter connect your family to a clean water source.
7. Demand that the polluter clean up the contaminated groundwater.
8. Most importantly demand that the polluter clean up all the contamination on their property.
9. Avoid eating fish from waters that may be contaminated with PFASs (To find out which fish are contaminated, look up your state's fish consumption advisory.)
10. Contact an experienced environmental attorney to help you deal with the polluter.

### **What Should I Do if I'm Concerned My Health May be Affected?**

1. See your family doctor or an occupational doctor familiar with chemical exposure. Let him or her know if you have been exposed to PFASs and bring any test results.

### **PFASs May Also be Labeled as:**

Perfluoroheptanoic acid (PFHpA) Perfluorooctanoic acid (PFOA) Perfluorononanoic acid (PFNA)  
Perfluorodecanoic acid (PFDeA) Perfluoroundecanoic acid (PFUA) Perfluorododecanoic acid  
(PFDoA) Perfluorobutane sulfonic acid (PFBS) Perfluorobutyric acid (PFBA) Perfluorohexane  
sulfonic acid (PFHxS) Perfluorooctane sulfonic acid (PFOS) Perfluorooctane sulfonamide  
(PFOSA) 2-(N-Methyl-perfluorooctane sulfonamide) acetic acid (Me-PFOSA-AcOH) 2-(N-Ethyl-  
perfluorooctane sulfonamide) acetic acid (Et-PFOSA-AcOH)

[https://www.atsdr.cdc.gov/pfc/docs/pfas\\_clinician\\_fact\\_sheet\\_508.pdf](https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf)

<https://www.epa.gov/pfas/basic-information-about-and-polyfluoroalkyl-substances-pfass#tab-1>

<https://www.epa.gov/pfas/basic-information-about-and-polyfluoroalkyl-substances-pfass#tab-3>

<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

