



---

## *National Report on Human Exposure to Environmental Chemicals*

### **Spotlight on Polyfluorochemicals**

The polyfluorochemicals (PFCs) referred to in this report include the perfluoroalkyl acids, amides, and alcohols. This broad class of manufactured chemicals has been produced since the 1950s and is used into make products that resist oil, stains, heat, water, and grease. These products include nonstick cookware, oil- and moisture-resistant paper coatings, stain-resistant carpets and fabrics, nail polishes, and fire-fighting foam. Apart from many consumer- product uses, the aerospace, automotive, construction, chemical-processing, electrical and electronics, semiconductor, and textile industries use them as well.

Two chemicals in this class, perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA or C8), have been a concern because they persist in the environment. Both PFOS and PFOA accumulate in wildlife such as bald eagles, mink, bears, sea mammals, and fish, and PFCs have been found in people. The chemical process that uses perfluorooctanesulfonyl fluoride and results in the formation of PFOS and several other PFCs was discontinued by 2002 in the United States. PFOA is currently used as a processing aid when making fluoropolymers.

#### **How People Are Exposed to PFCs**

How people can be exposed to PFCs is as yet unclear. Some PFCs persist in the environment, and people might be exposed by consuming PFC-contaminated water or food or by using commercial products that contain PFCs.

#### **How PFCs Affect People's Health**

Because human health effects are unknown, more research is needed to understand how PFCs affect people's health. Only limited animal studies are available, and not all PFCs have been tested. Some animal studies show that some types of PFCs can cause tumors, damage to the liver and other organs, and developmental and reproductive effects.

#### **Levels of PFCs in the U.S. Population**

- In 2007, the Centers for Disease Control and Prevention (CDC) published results of two studies of human exposure to 11 PFCs. In the first study, CDC scientists measured levels of PFCs in the serum of 1,562 people 12 years old and older who took part in CDC's National Health and Nutrition Examination Survey (NHANES) during 1999 and 2000. In the second study CDC scientists measured levels of 12 PFCs in the serum of 2,094 people 12 years old and older who took part in NHANES during 2003 and 2004.

- In both studies, PFOS and PFOA, as well as another PFC, perfluorohexane sulfonic acid (PFHxS), were detected in approximately 98% of the population. These findings confirm widespread PFC exposure in the U.S. population.
- Small differences in serum levels of PFCs were found among some demographic groups. This finding highlights the need for research on the pathways of human exposure to these chemicals.
- Although levels of PFOS, PFOA, and PFHxS in people seem to have decreased from 1999–2000 to 2003–2004, CDC needs more data to characterize this possible trend.

### For More Information

- U.S. Environmental Protection Agency  
**Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers**

Basic Information about PFOA is available at  
<http://www.epa.gov/opptintr/pfoa/pubs/pfoainfo.htm>

Perfluorooctanoic Acid (PFOA) available at  
<http://www.epa.gov/opptintr/pfoa/index.htm>

- Minnesota Department of Health  
**Perfluorochemicals and Health available at**  
<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcshealth.html>

---

August 2007

The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.