



## Per- and Polyfluoroalkyl Substances (PFAS)

Office of Land Quality — Science Services Branch

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### Description

Per- and polyfluoroalkyl substances (PFAS) are a classification of man-made chemicals with extremely strong carbon-fluorine bonds that make them very hard to break down. PFAS are sometimes referred to as “forever chemicals.” PFAS can repel water and oil, prevent staining, and increase heat resistance. As a result, PFAS have been used in various ways since the 1940’s, including: coating fabrics, on non-stick cookware, in food packaging, and in foam used for firefighting. Some well-known brands of PFAS-containing products are Teflon®, Stainmaster®, Scotchgard® and Gore-Tex®.

There are thousands of PFAS chemicals. The most studied are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Although companies in some countries continue to make PFOS and PFOA, manufacturing in the U.S. was discontinued in 2015. Other PFAS chemicals continue to be manufactured in the U.S. and abroad.

Not all PFAS chemicals have the same properties, so their environmental and potential health impacts may differ. PFAS are found throughout the environment, including in people, wildlife, and fish. Almost everyone has low levels of PFOS and PFOA in their blood. These low levels likely come from consumer products and food packaging. Factors like an individual’s metabolism, exposure history, and excretion rates can significantly influence blood levels and make it difficult to directly link them to specific health effects. The US Agency for Toxic Substances and Disease Registry (ATSDR) has provided [guidance to medical clinicians](#) to help patients who live, work or play in environments where PFAS levels are high.

### Potential Sources of Exposure

PFAS released in the environment can move through the soil, mix with groundwater, flow into streams and rivers, and be dispersed in the air. Potential sources of exposure to humans include:

- **Food:** PFAS may be found in food packaging, food processed with equipment that uses PFAS, or in food grown in contaminated soil or water. Fish in some bodies of water in Indiana may have higher levels of PFAS that make them unsafe to eat. To reduce your PFAS intake, follow the advice of the Indiana Fish Consumption Advisory, [health.IN.gov/eph/fish-consumption-advisory](http://health.IN.gov/eph/fish-consumption-advisory).
- **Household products:** Commonly found products that resist stains, oil, grease, water, and heat may contain PFAS. Such products can include non-stick cookware, stain resistant carpet and furniture, and water-resistant clothing. PFAS can also be found in some paints, cosmetics, and cleaning products.
- **Commercial products:** PFAS have been used in electronics, the automotive industry, and as a moisture-resistant paper coating. Individuals who work at facilities that produce or use PFAS during manufacturing could come into contact with PFAS through occupational exposures. For a more comprehensive list see: <https://pfas-1.itrcweb.org/2-5-pfas-uses/>

- **Drinking water:** Exposure to PFAS in drinking water typically occurs in an area associated with a specific facility such as a manufacturing facility, landfill, wastewater treatment plant, or firefighter training facility. Firefighting foams have been a major source of groundwater contamination at airports and military bases where firefighting training occurs. Indiana community water supply testing results are available at [idem.IN.gov/resources/nonrule-policies/per-and-polyfluoroalkyl-substances-pfas](https://idem.IN.gov/resources/nonrule-policies/per-and-polyfluoroalkyl-substances-pfas).

### **Potential Health Effects**

Research about the health effects of PFAS is on-going and there are still many unknowns. Not all PFAS have the same health effects; some may be more or less toxic. Some studies have linked the following to PFAS exposure:

- Changes in immune response, decrease in vaccine effectiveness
- Increased cholesterol
- Increased risk of cancer (kidney and testicular)
- Increased risk of thyroid disease
- Increase chance of high blood pressure in pregnant women
- Decreased fertility in women

However, exposure to PFAS or having PFAS in your body does not necessarily mean you will have health problems related to PFAS.

### **Reducing Exposure**

PFAS exposure most often occurs through ingestion of contaminated food or drinking water, and inhalation of dust, aerosols, or fumes. The following includes ways you can reduce PFAS exposure:

- Do not use non-stick cookware that is peeling.
- Many household products like carpeting, upholstery, and clothing may contain PFAS; ingestion or inhalation of household dust can be a route of exposure, especially for infants and young children. Clean household surfaces regularly to lower the amount of dust in the house. Avoid or reduce the use of stain-resistant sprays and treatments when possible.
- Read the ingredients list on cosmetics and personal care products, including dental floss, and limit the use of words beginning with “fluoro-”, “perfluoro-” or “polyfluoro-”. Note: Fluoride, a common toothpaste ingredient, is not a PFAS chemical.
- If your water is contaminated/suspected of being contaminated, use an alternative source of uncontaminated water for drinking, food preparation, cooking, preparing baby formula or any activity that may result in ingesting significant amounts of water. Studies have shown that only small amounts of PFAS can be absorbed through the skin, so activities like showering, bathing, washing dishes, washing clothes, and brushing teeth (with minimal ingestion of water) are unlikely to pose a significant risk of exposure. Drinking water containing PFAS can be treated using reverse osmosis or certified carbon filtration units. The IDEM Fact Sheet “PFAS Treatment for Private Wells”, located at [idem.IN.gov/fact-sheets](https://idem.IN.gov/fact-sheets), contains information on water treatment systems.

## IDEM's Role and Responsibility

IDEM is responsible for protecting human health and the environment while allowing for safe industrial, agricultural, commercial and governmental operations vital to a prosperous economy. Various offices at IDEM play a vital role in regulations applicable to PFAS:

- IDEM's Office of Water Quality enforces federal limits on PFAS in public drinking water suppliers and regulates industrial discharges of substances to our waterways.
- IDEM's Office of Air Quality utilizes permits to regulate the amount of chemicals emitted to the air.
- IDEM's Office of Land Quality provides cleanup requirements for regulated chemicals based on potential health effects. They also work with the U.S. EPA to ensure that entities are adhering to rules and regulations set forth by the federal government.

## References and Additional Information

- PFAS information provided by the U.S. EPA can be found at: [epa.gov/pfas](https://www.epa.gov/pfas).
- Information regarding IDEM's health-based guidelines can be found at: [idem.IN.gov/cleanups/resources/technical-guidance-for-cleanups](https://idem.IN.gov/cleanups/resources/technical-guidance-for-cleanups).
- IDEM does not regulate private wells. If you use a private well, you should be aware of health-based recommendations for contaminants in tap water, found here: [idem.IN.gov/cleanups/resources/technical-guidance-for-cleanups/idem-screening-and-closure-level-tables](https://idem.IN.gov/cleanups/resources/technical-guidance-for-cleanups/idem-screening-and-closure-level-tables).
- Information for reducing PFAS exposure provided by U.S. EPA can be found at: Meaningful and Achievable Steps You Can Take to Reduce Your Risk: [epa.gov/pfas/meaningful-and-achievable-steps-you-can-take-reduce-your-risk](https://www.epa.gov/pfas/meaningful-and-achievable-steps-you-can-take-reduce-your-risk).
- ATSDR guidance for medical clinicians can be found at: An overview of the science and guidance for clinicians on per- and polyfluoroalkyl substances (PFAS): <https://stacks.cdc.gov/view/cdc/84242>
- Additional Information for medical clinicians can be found at: Guidance on PFAS Exposure, Testing, and Clinical Follow-Up | The National Academies Press: <https://nap.nationalacademies.org/read/26156/chapter/2>.
- For more information on IDEM's CWS sampling program, PFAS sampling in fish tissue, and PFAS-containing firefighting foam collection initiative go to: [idem.IN.gov/resources/nonrule-policies/per-and-polyfluoroalkyl-substances-pfas/#activities](https://idem.IN.gov/resources/nonrule-policies/per-and-polyfluoroalkyl-substances-pfas/#activities).
- For questions about PFAS contamination or environmental cleanup, contact IDEM's Office of Land Quality at 317-234-0338 or 800-451-6027.
- To report an accidental release or spill, call IDEM's 24-hour Spill Line at 888-233-7745 (toll free).