



What are Per- and polyfluoroalkyl substances (PFAS)?

Background

The purpose of this document is to provide readers with information on chemicals called Per- and polyfluoroalkyl substances (PFAS). PFAS have been found in both the environment and the human body and represents an emerging environmental and health issue. PFAS science is evolving every day and is currently being investigated by both the federal and state governments. The Maryland Department of the Environment (MDE), in partnership with the Maryland Department of Health (MDH), may update this document in the future to account for updated information on potential health effects, sampling, analysis, treatment techniques, and changes in federal or state policies and guidance.

What are PFAS?

PFAS are a group of human-made (synthetic) compounds, including perfluorooctanoic acid (PFOA), perfluorooctanoic sulfonate (PFOS), perfluorohexane sulfonic acid (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA or GenX), and over 7,000 other compounds. PFAS have been detected in drinking water, groundwater, surface water, soils, and other environmental media across the country. Since the 1940's, PFAS have been present in a variety of industrial and commercial applications/products due to its ability to resist heat, oil, and water. Certain PFAS, such as PFOA and PFOS, are no longer manufactured in the U.S. because of their phase-outs in the early 2000's. PFAS compounds are very stable and do not typically break down in the environment and may accumulate in the human body.

Why are PFAS harmful? What specific health risks are associated with PFAS exposure?

The U.S. Environmental Protection Agency (EPA) and the U.S. Centers for Disease Control and Prevention Agency for Toxic Substances and Disease Registry (ATSDR) continue to investigate the human health impacts of chronic exposure to two particular PFAS compounds, PFOA and PFOS. Studies have suggested that chronic exposure to these two PFAS may be linked to: increased cholesterol levels, increased risk of high blood pressure or pre-eclampsia in pregnant women, changes in liver enzymes, decreased vaccine response, and small decreases in infant birth weights. Additionally, the EPA has classified PFOA and PFOS as having potential carcinogenic effects in humans. More information on the human health effects and routes of exposure to these compounds can be found through the following links:

CDC: wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1117&tid=237

ATSDR: atsdr.cdc.gov/pfas/health-effects/exposure.html

EPA: epa.gov/pfas/basic-information-pfas



What are Per- and polyfluoroalkyl substances (PFAS)?

How are individuals exposed to PFAS?

Individuals may be exposed to PFAS in a number of ways, including but not limited to:

- Drinking water containing PFAS
- Eating fish tissues from waters containing PFAS
- Accidental ingestion of contaminated soil or dust
- Consuming food packaged in PFAS-containing materials
- Using common consumer products treated with PFAS
- Workplace exposure (e.g., certain manufacturing facilities, Fire and Rescue services, electroplating facilities)

PFAS may enter the environment where they are made, used (e.g., certain industrial facilities, firefighting foam application site), disposed of (e.g., landfills, wastewater treatment plants), or spilled. Releases of PFAS may also affect nearby drinking and surface water resources.

Individuals may also be exposed to PFAS through their use in consumer products, which may include:

- Grease-resistant papers (e.g., fast food wrappers, containers, microwaveable popcorn bags, pizza boxes, etc.)
- Nonstick cookware
- Stain-resistant treatments on carpets, upholstery, and other fabrics
- Water-resistant treatment on clothing
- Cleaning products
- Paints, waxes, and polishes
- Personal care products (e.g., shampoo, conditioner, floss) and cosmetics

Where can I find more information?

Additional information on PFAS in drinking water can be accessed through the links below:

MDE's PFAS Action Plan and Updates: mde.maryland.gov/PublicHealth/Pages/PFAS-Landing-Page.aspx

EPA's 2016 Health Advisory Level for PFOA and PFOS: [epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos](https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos)

EPA Draft Documents Submitted to Scientific Advisory Board: https://sab.epa.gov/ords/sab/f?p=100:19:7777001557924:::19:P19_ID:963#doc

Additional USEPA PFAS Initiatives: [epa.gov/pfas](https://www.epa.gov/pfas)

National Governors Association PFAS Page: [nga.org/webinars/epa-pfas-standard-setting-process/](https://www.nga.org/webinars/epa-pfas-standard-setting-process/)