A Per-and Polyfluoroalkyl Substances (PFAS) Fact Sheet for the General DoW Population

Executive Overview

Scientists are continuing to study whether exposure to PFAS is harmful to human health. While evidence is growing to suggest that there may be risks to human health associated with exposure to certain PFAS, a direct link showing that PFAS exposure causes disease has not been proven. The Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) identify several health effects associated with high PFAS exposures. The CDC reports that most Americans have trace levels of certain PFAS in their blood, but there is currently no evidence to suggest that these PFAS levels are harmful or cause any health effects.

Introduction

This document provides an overview of what is known about PFAS, how you might be exposed to PFAS, and what we know about the health effects associated with high PFAS exposures.

The Department of War (DoW) has been involved in the investigation and remediation of PFAS in drinking water since 2016.

What are PFAS?



Image from ATSDR

The abbreviation PFAS stands for per- and polyfluoroalkyl substances. PFAS are a large group of man-made chemicals, containing thousands of unique substances. They have been used in many industrial and consumer items because of their unique resistance to chemicals, heat, water, oil, and stains and their electrical insulating and non-stick properties. PFAS uses include non-stick cookware, treatments for carpets, clothing, and upholstery, food packaging, and use in manufacturing processes, electrical insulation, and fire suppressants. Even though policies and regulations over the last two decades have reduced the use of PFAS in consumer and commercial products, many products continue to use PFAS until suitable alternatives are identified.

Many PFAS break down very slowly in the environment and in the human body. PFAS can accumulate in the human body by binding to blood proteins. Because of this, the analysis of blood-PFAS levels is often used to measure an individual's total PFAS exposure. Blood-PFAS levels cannot, however, be used to determine when, where, or how much PFAS a person is exposed to.

How do PFAS end up in the environment?

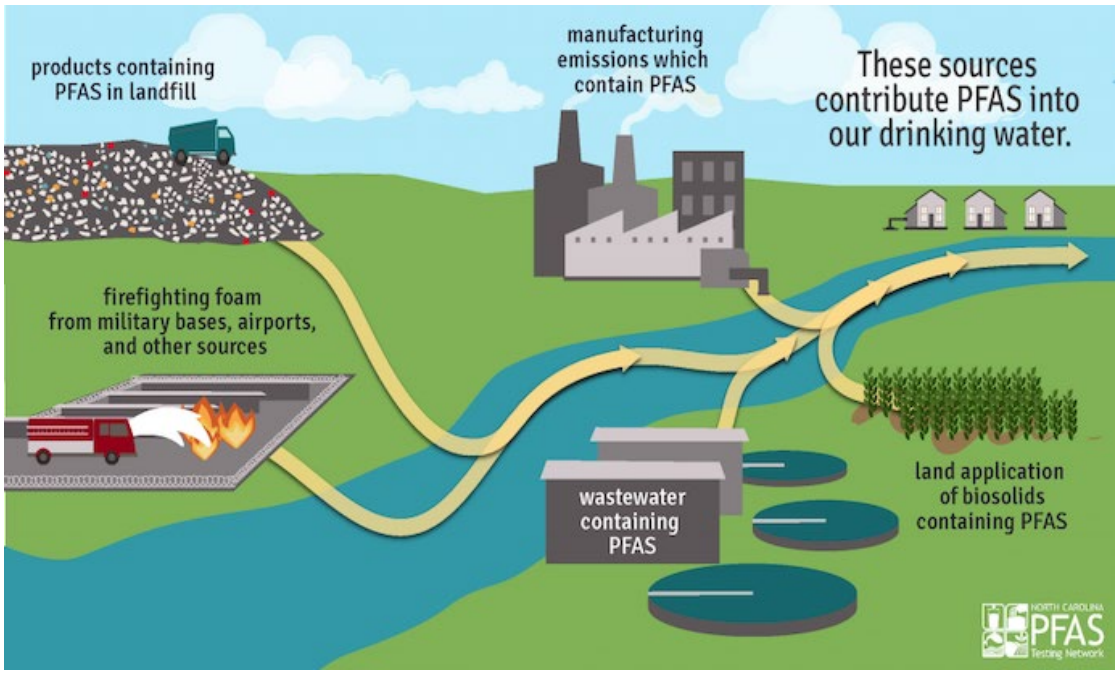


Image from North Carolina PFAS Tracking Network

Small amounts of PFAS can be found in air, soil, and water across the globe. PFAS do not easily break down in the environment; PFAS stick onto particles and surfaces and can travel through soil into groundwater. The US Environmental Protection Agency (EPA) is working to regulate PFAS in the environment and reduce the potential harm that might be caused by exposure.

How can I be exposed to PFAS?

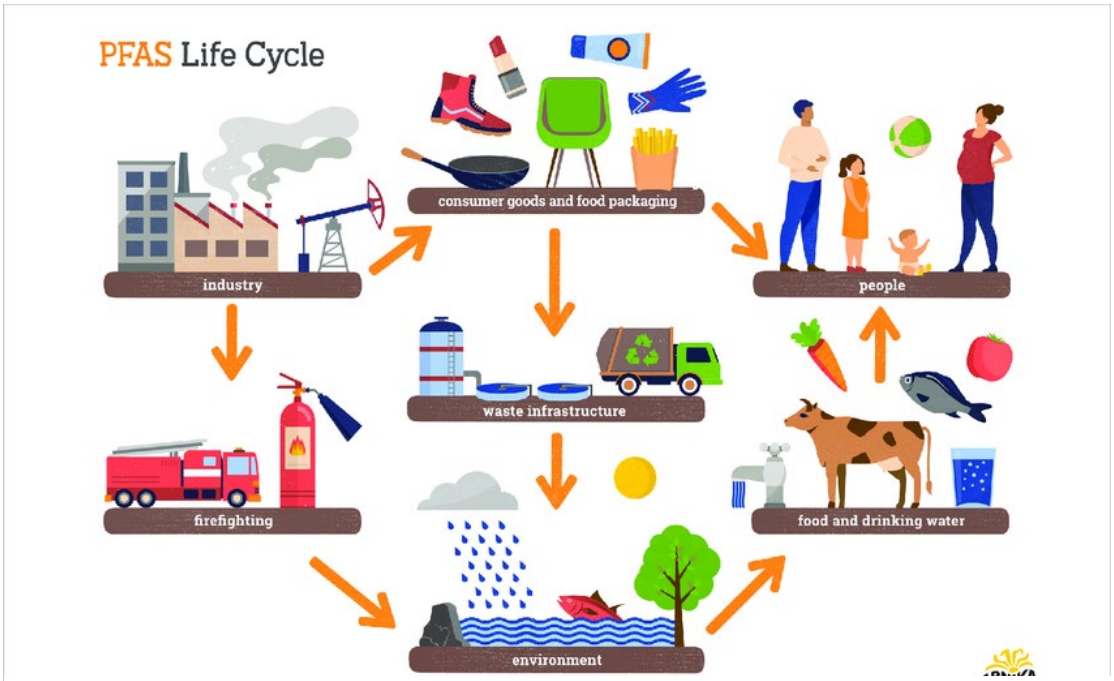


Image from Arnika

Mothers exposed to PFAS can expose their babies during pregnancy and while breastfeeding. However, the CDC notes that nursing mothers should continue to breastfeed since the benefits of breastfeeding outweigh the potential risk of harm to infants exposed to PFAS in breast milk.

Young children playing on the ground can be exposed to certain PFAS used to treat carpets, during contact with PFAS in dusts, and, through hand-to-mouth behavior, swallow dusts containing PFAS.

Over the last few decades, human blood-PFAS levels have been going down as policies, regulations, and site cleanups have reduced potential exposure to these chemicals.

How Do You Assess PFAS Exposure?

Most people in the United States have very small amounts of PFAS in their blood. Because it takes a long time to leave the human body, blood-PFAS testing tends to be the most reliable way of determining your total PFAS exposure. Blood-PFAS levels that are much higher than those typical in the U.S. population might be a reason to take steps to lower your exposure to PFAS.

Blood-PFAS levels cannot be used to identify the source, the amount (dose), and/or when PFAS exposure occurred. Because there is no level of PFAS in blood known to cause health effects, blood-PFAS testing cannot be used to predict if a person will develop any health effects.

What are the Exposure Limits for PFAS in Drinking Water?

The U.S. EPA has established legally enforceable limits called Maximum Contaminant Levels (MCLs) of 4 nanograms per Liter (ng/L) in drinking water for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

How can PFAS Potentially Affect Human Health?

Studies over the last 5 decades have reported associations between high PFAS exposures and some health effects, including high serum cholesterol, changes in liver enzymes, increased risk for testicular and kidney cancer, a reduced immune response to some vaccines, increased risk for high blood pressure in pregnant women, and lower infant birth weights. Scientists at the CDC and ATSDR are studying whether PFAS exposure causes these health effects.

The Department of War (DoW) works closely with and uses the current research findings from the CDC and ATSDR to determine the health effects caused by PFAS exposures.

Certain PFAS are associated with these health effects:

- Increases in cholesterol levels
- Small decreases in birth weight
- Lower antibody response to some vaccines in children
- Kidney and testicular cancer
- Pregnancy-induced hypertension or preeclampsia
- Changes in liver enzymes

Do PFAS cause cancer?

It is not yet clear if PFAS cause cancer in people. However, some studies show that people exposed to high levels of PFAS have a higher risk of kidney and/or testicular cancer. These findings are not, however, consistent and may not have looked at other contributing factors, like smoking. Studies in animals have shown that some PFAS can cause cancer in the liver, testes, pancreas, and thyroid, but the way PFAS cause cancer in animals does not appear to be

applicable to humans. The EPA and the International Agency for Cancer Research (IARC) have classified several PFAS as potentially causing cancer in humans. The Department of Health and Human Services (DHHS), CDC, and ATSDR have not yet evaluated whether certain PFAS cause cancer.

What can I do if I'm concerned?

- Talk to your healthcare provider, who can counsel you on your unique situation.
- Share ATSDR's PFAS Information for Clinicians with your provider: **https://www.atsdr.cdc.gov/pfas/hcp/clinical-overview/**
- Reach out to your local health department, which may provide additional resources and ways to reduce exposure.

How can I protect myself and my family from PFAS?

Your local health department or water supplier can tell you whether there are PFAS in your drinking water. If your drinking water contains PFAS, drink and cook with PFAS-free bottled drinking water or install an activated carbon water filter designed to remove PFAS from drinking water. Avoid using consumer products that contain PFAS, like stain-resistant treatments used to treat carpets, upholstery, and clothing. Currently there is no medically-approved treatment to reduce PFAS levels in the body.

How can I reduce my exposure?



Image from ATSDR

Sources of Additional Information

American Academy of Pediatrics (AAP). Key Points about Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS). https://www.aap.org/en/patient-care/environmental-health/promoting-healthy-environments-for-children/perfluoroalkyl-and-polyfluoroalkyl-substances/.

ATSDR. Estimating Levels of PFAS in Your Blood Based on Drinking Water Levels Estimating Levels of PFAS in Your Blood | Per- and Polyfluoroalkyl Substances (PFAS) and Your Health | ATSDR (cdc.gov).

ATSDR. How PFAS Impacts Your Health. https://www.atsdr.cdc.gov/pfas/about/health-effects.html

ATSDR. Per- and Polyfluoroalkyl Substances (PFAS) and Your Health https://www.atsdr.cdc.gov/pfas/about/pfas-infographic.html

ATSDR. PFAS and Breastfeeding. PFAS and Breastfeeding Fact Sheet (cdc.gov)

ATSDR. PFAS Information you can share with your provider. https://www.atsdr.cdc.gov/media/pdfs/2024/07/ATSDR-PFAS-Information-for-Clinicians.pdf

Sources of Technical Information

ATSDR ToxFAQs™ for Perfluoroalkyls Perfluoroalkyls | ToxFAQs™ ATSDR (cdc.gov)

US EPA. Human Health Toxicity Assessment for Perfluorooctanoic Acid (PFOA) https://www.epa.gov/sdwa/human-health-toxicity-assessment-perfluorooctanoic-acid-pfoa
US EPA. Human Health Toxicity Assessment for Perfluorooctane Sulfonic Acid (PFOS) https://www.epa.gov/sdwa/human-health-toxicity-assessment-perfluorooctane-sulfonic-acid-pfos