Making Sense of Forever Chemicals

About the microscopic chemicals that impact us all

Forever chemicals are often used to make products more durable and resistant to water or heat. They are commonly found in products like nonstick cookware, waterproof clothing, and furniture. Because forever chemicals are microscopic and do not break down, they are increasingly found in our water, soil, and air. There are thousands of different forever chemicals in the environment, and they build up in our bodies over time. Scientists and public health professionals are continuing to research their effects, but early studies have linked forever chemicals to cancer, heart and liver problems, and developmental damage to infants and children.

While PFAS (per- and polyfluoroalkyl substances) is the technical term, "forever chemicals" will be used throughout this resource.

People can be exposed to forever chemicals by:

Touching

Drinking

Eating

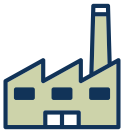
Breathing

Forever chemicals may be found in:

Drinking water that has been contaminated by other sources of forever chemicals.

Water sites near landfills, trash disposal sites, and hazardous waste sites.

Fire extinguisher foam used in emergency training and response.



Manufacturing facilities, especially for chrome plating, electronics, and certain paper and textiles.

Household products like stain- or water-repellant items, nonstick products, paints, water sealants, and some cosmetics.

Food packaging such as grease-resistant paper, microwave popcorn bags, pizza boxes, and candy wrappers.

Fertilizer or "biosolids" from wastewater treatment plants that is used on agricultural lands and can affect ground and surface water.

Food, especially fish, dairy, or livestock that has been exposed through contaminated water or soil.

Source: PFAS Explained (EPA)

Quick Facts About Forever Chemicals

- While it is difficult to know your exact exposure to forever chemicals, most people have been exposed. Over the past 20 years, there has been a general decline in the use of forever chemicals, which has led to a decline in exposure.
- Even if you live in a place without pollution, forever chemicals still affect you. Because they are microscopic and widespread, you are likely exposed through everyday consumer products or in your water, air, or food sources.
- While we know forever chemicals are common, researchers continue to study their effects and some states have passed new legislation and regulatory standards to protect our health. Public health officials will continue to share new information and recommendations as they become available.

Certain groups are more vulnerable to forever chemical exposure than others.

Firefighters who use aqueous film-forming foams (AFFF) and industrial workers who make or process forever chemicals will likely have a higher rate of exposure than the general public.

Children are more susceptible to forever chemicals for several reasons:

- They are more likely to put toys or fabrics in their mouths that contain materials with forever chemicals. You can limit exposure by choosing safer toys made of natural materials like wood versus plastic.
- Forever chemicals have been found in human breast-milk and can pass to infants when breastfeeding. Infants can also ingest forever chemicals through formula mixed with contaminated water.

Ways to Limit Your Exposure

Food and water are the most common ways people are exposed to forever chemicals.

1. Take steps to monitor forever chemicals in your drinking water or use an EPA-approved water filter at home.
2. Most nonstick pans can transfer forever chemicals into your food or air when on high heat. If possible, choose anodized aluminum, stainless steel, or cast iron instead.
3. Choose seafood from clean waterways to be sure the fish you eat does not have forever chemical buildup.

Public Health is Here to Help

Public health officials and environmental agencies continue to study forever chemicals to protect us from harm. In 2021, the Environmental Protection Agency released a strategic roadmap with three clear goals:

- **Research** to learn more about forever chemicals and their effects on our health.
- **Restrict** forever chemicals from entering air, water, and soil to limit our exposure.
- **Treat** areas that have been contaminated by forever chemicals to reduce harm.

Public health officials will act on evidence and revise regulations when new research or information is available.

Additional Resources

For more information on forever chemicals, visit:

- PFAS Explained, Environmental Protection Agency
- What's In My Water?, American Water Works Association
- How to Prevent PFAS Exposure, CDC