

# Per- and Polyfluoroalkyl Substances (PFAS): Guidance for New Hampshire Clinicians



## Introduction

This fact sheet is intended to provide information to clinicians to help address patient concerns. **The PFAS family of chemicals can contaminate air, water and soil across the United States (U.S.), and have been found at elevated concentrations in certain areas in New Hampshire (NH), including the former Pease Air Force Base and specific towns in southern New Hampshire.** The recommendations in this fact sheet are consistent with those provided in the Centers for Disease Control and Prevention (CDC)'s Agency for Toxic Substances and Disease Registry (ATSDR) clinical guidance, however, they include New Hampshire-specific information wherever possible. **Updates** to this information will be made when guidance changes or new data is available.

Clinicians should review ATSDR's clinical guidance to determine how to address health concerns in a person who has an identified PFAS exposure. **ATSDR is currently reviewing and updating this guidance** based on the July 2022 National Academies of Sciences, Engineering, and Medicine (NASEM) report, Guidance on PFAS Exposure, Testing and Clinical Follow-Up.

ATSDR asked NASEM to form a committee to advise on PFAS testing and clinical care for patients exposed to PFAS. Based on their review of epidemiological studies that have evaluated health impacts from population-level PFAS exposures, the NASEM committee found strong or moderate evidence for a connection between PFAS exposure and a number of health conditions or biomarkers. However, because of uncertainty about how PFAS exposure translates to individual health risk, the NASEM committee recommended providers offer and discuss the risks and benefits of certain medical screening practices with patients exposed to PFAS, through a process of shared decision making.

## PFAS Basics

PFAS are a family of thousands of synthetic chemicals characterized by a fully or partially fluorinated carbon chain. PFAS can persist in the environment for many years to decades, and certain PFAS can bioaccumulate in humans and animals.

PFAS have been widely used in **many** consumer products since the 1940s, **including but not limited to:** • non-stick cookware • food packaging • stain-repellant and water-repellant treatments for clothing, carpet, and furniture • certain firefighting foams (e.g., aqueous film forming foam (AFFF)).

## Who Is at Risk from PFAS Exposure?

Oral ingestion of PFAS is the primary route of exposure in adults and children. Most people have been exposed to some PFAS, but people who may have the highest levels of exposure include those who:

- Drink contaminated water, or beverages made with contaminated water (e.g., baby formula, coffee) as well as foods prepared with contaminated drinking water (boiling water does not remove PFAS)

- Eat foods grown or raised in PFAS contaminated areas (e.g., produce, fish, wild game)
- Eat food packaged in materials containing PFAS (e.g., microwave popcorn bags, fast food containers, pizza boxes)
- Put hands and objects in their mouth that contain PFAS (e.g., certain toys, household dusts, treated fabrics) or that have been contaminated with PFAS
- Work in industries that manufacture, manipulate, or use PFAS
- Live in a community near industrial or waste-related sources of PFAS

The New Hampshire [Tracking and Assessment of Chemical Exposures Study \(2019\)](#) provides information on PFAS concentrations from a statewide study (average and 95th percentile values are included). In addition, New Hampshire has several PFAS contamination sites where investigations are ongoing. More detailed information is available on the New Hampshire Department of Environmental Services (NHDES) [PFAS website](#) and in these reports: [Merrimack Village District Community Exposure Assessment Summary Report \(2017\)](#), [Pease PFC Blood Testing Program \(2015\)](#).

## Does New Hampshire Regulate PFAS?

Regulation of PFAS in consumer products and in our environment is changing at the regional and national level. To address the most common source of exposure, New Hampshire currently regulates certain PFAS in drinking water from public water systems and bottled water vendors.

The regulated limits for drinking water are provided in the table below. **These limits may change as new scientific information emerges or changes occur in how the U.S. Environmental Protection Agency (U.S. EPA) or U.S. Food and Drug Administration regulate PFAS at the national level.** In addition to drinking water, New Hampshire provides guidance about exposure to PFAS from fish consumption and contact with other sources in the environment (e.g., soil). Local regulations for PFAS may also change in response to New Hampshire legislation. For more information about these sources and potential regulatory changes, see the [NHDES PFAS Response website](#).

Per- and Polyfluoroalkyl Substance (PFAS)	NH Drinking Water Limits (nanograms/liter or parts/trillion)	Type of Drinking Water Limit*
Perfluorooctanoic acid (PFOA)	12	Required for public water utilities (enforced since 2020)
Perfluorooctane sulfonic acid (PFOS)	15	Required for public water utilities (enforced since 2020)
Perfluorohexane sulfonic acid (PFHxS)	18	Required for public water utilities (enforced since 2020)
Perfluorononanoic acid (PFNA)	11	Required for public water utilities (enforced since 2020)
Perfluorobutane sulfonic acid (PFBS)	2,000	Health Advisory from the U.S. EPA (non-enforceable)
GenX Chemicals	10	Health Advisory from the U.S. EPA (non-enforceable)

\*Drinking water regulations are enforced for public water utilities, but not for private well owners. These enforceable regulatory limits are known as Maximum Contaminant Levels or “MCLs.” Private well owners are strongly encouraged to test their well and pursue treatment options to meet these same health protective standards. See the [NHDES Private Wells webpage](#).

## How Can PFAS Potentially Affect Human Health?

Many studies have examined possible relationships between levels of PFAS in a person's blood and health effects. However, the types of studies vary significantly, making it difficult to draw firm conclusions as the studies evaluated different populations, exposure types, and different PFAS. Based on the totality of scientific research, PFAS exposure has been associated with:

- Increased cholesterol levels
- Elevation in liver enzymes in adults
- Changes in markers of immune system function
- Increased risk of pregnancy-induced hypertension or preeclampsia
- Small decreases in infant birth weights
- Increased risk of kidney and testicular cancer

Scientists are still learning about the possible health effects from PFAS exposure, and how exposure to different mixtures of PFAS might impact a person's health.

## Will a Blood Test for PFAS Provide Useful Information?

- Review [ATSDR Guidance on blood testing](#) for PFAS
- Most people in the U.S. have measurable amounts of PFAS in their blood
- Blood testing can show a person how the levels of PFAS in their body compare to average levels in people's bodies across the U.S. and in New Hampshire
- Finding PFAS in a person's body does not mean they will have any specific health impact from PFAS, but could indicate they may be at an increased risk for certain health effects; therefore, if a person has high PFAS levels, providers should address health concerns and discuss how a person can reduce their exposure (as discussed on page 4)
- There are no recommended treatments for removing PFAS from a person's body, and blood levels will decrease over time when sources of exposure are removed

Blood Level Estimation Tools can be used for adults, for PFAS exposure through water (not recommended for children). The estimation tool is intended to help clinicians and patients determine whether a blood test is advisable. It is not meant to replace an actual blood test.

- [ATSDR Blood Level Estimation Tool](#)
- [Serum PFAS Calculator, UC Irvine](#)
- [What's My Exposure? PFAS Exchange](#)

## How Can I Order PFAS Blood Testing for My Patient?

- If you and your patient decide to test serum or blood for PFAS levels, tests are commercially available. More information is available through this [PFAS REACH fact sheet](#)
- Review the [Frequently Asked Questions](#) document created by the New Hampshire Insurance Department about insurance coverage for PFAS blood testing

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# How can clinicians approach patient care for PFAS-exposed individuals?

## When addressing patient concerns about PFAS exposure, clinicians can do the following:

- Listen and discuss health concerns with your patient
- Recommend patients identify and reduce current potential sources of environmental exposure
- Evaluate other health risk factors based on family history or lifestyle
- Promote age-appropriate preventive care clinical recommendations (e.g., [U.S. Preventive Services Prevention Taskforce](#), [American Heart Association](#), [American Academy of Pediatrics](#))
- Review and implement other recommendations outlined in [ATSDR's clinical guidance](#)

## In addition, it is suggested that you:

### Assess potential sources of PFAS exposure and recommend steps to reduce exposure:

1. Ask about your patient's source of home drinking water:
  - ✓ If your patient has a **private well**, assess whether it been tested for PFAS and other contaminants
  - ✓ See [NHDES list of contaminants](#) that should be tested for routinely
  - ✓ See [NHDES PFAS webpage](#) for information on PFAS water testing
  - ✓ See [information on funding support for water treatment systems](#) to remove PFAS

**Note: Public water systems** are required to ensure PFAS and other contaminants are below maximum contaminant levels
2. Ask if your patient knows, or is worried about, potential sources of PFAS in their community:
  - ✓ Refer patient to the [New Hampshire DES PFAS Occurrences webpage](#) if concerns exist, for details on known PFAS sites
3. Ask if your patient works in an occupation that might expose them to PFAS:
  - ✓ See information on the [National Institute for Occupational Safety and Health webpage](#)
  - ✓ Use this information to help evaluate level of exposure, especially if other sources (drinking water, community, consumer product use, fish and shellfish consumption) are factors
4. Ask if your patient eats a lot of pre-packaged foods (i.e., microwave popcorn, fast food) or other foods that might have high levels of PFAS, and ask if your patient uses [products that might contain PFAS](#):
  - ✓ Recommend your patient read consumer product labels and avoid using those with ingredients that include the words “fluoro” or “polyfluoro” or “perfluoro” or the initials “PTFE,” (polytetrafluoroethylene)
  - ✓ Refer to [PFAS Central](#) for a list of PFAS-free products
  - ✓ Review New Hampshire's [fish consumption guidelines](#)

### Discuss breastfeeding concerns (if appropriate):

- ✓ Review information on the [ATSDR webpage on PFAS and breastfeeding](#)
- ✓ Because of the many benefits of breastfeeding, the CDC and the American Academy of Pediatrics recommend<sup>1</sup> that nursing mothers continue to breastfeed their babies despite the potential presence of environmental contaminants in breast milk
- ✓ Caregivers should avoid using PFAS-contaminated water for mixing infant formula

## How to handle the stress of community exposures

Feeling stress is a normal reaction to environmental contamination in a community. If a patient is worried about PFAS exposure, review the [ATSDR “Coping with Stress” fact sheet](#) with them, refer to the [ATSDR Community Stress Resource Center](#) and treat accordingly.

## For More Information:

Contact Laurie Rardin, Environmental Health Coordinator, Division of Public Health Services, New Hampshire Department of Health and Human Services, [laurie.r.rardin@dhhs.nh.gov](mailto:laurie.r.rardin@dhhs.nh.gov), 603-271-0357

## References:

<sup>1</sup>American Academy of Pediatrics, Council on Environmental Health. Breast Milk. In: Etzel, RA, ed. Pediatric Environmental Health, 4th Edition; Itasca, IL: American Academy of Pediatrics; 2019: P. 238

## Additional Resources:

- [\*PFAS in New Hampshire: What you need to know\*](#). Dartmouth College, 2021
- [ATSDR: PFAS Overview](#)
  - [ATSDR Toxicological Profiles](#)
  - [Toxic Substance Portal \(Tox FAQs\)](#)
  - [PFAS in the U.S. Population - Biomonitoring Studies](#)
- [PEHSU](#) - The Pediatric Environmental Health Specialty Units (PEHSU) are a national network of experts available to provide consultation and education to clinicians and communities wishing to learn more about PFAS and other hazardous substances. These units are staffed by clinicians with environmental health expertise in pediatrics, reproductive health, occupational and environmental medicine, medical toxicology, and other related areas of medicine.
- [U.S. EPA: PFAS](#)
- [Interstate Technology Regulatory Council \(ITRC\) Fact sheets](#)
- [National Toxicology Program \(NTP\) Monograph](#)
- [National Institute of Environmental Health Sciences: PFAS](#)
- Uncertainty Resources:
  - [Uncertainty and Stress in the Clinical Setting. Helping Patient and Clinician Manage Uncertainty During Clinical Care](#)
  - [Navigating the Unknown: Shared Decision-Making in the Face of Uncertainty](#)

