Northwest PEHSU Pediatric Environmental Health Specialty Units

ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON

Q&A: PFAS Information for Clinicians

Background

Per-and polyfluoroalkyl substances (PFAS) have become both a national and global concern as our understanding of their potential health impacts has evolved. The most recent PFAS guidance, published by the National Academies of Sciences, Engineering and Medicine (NASEM) in summer 2022, includes guidance on PFAS exposure, testing, and clinical follow-up based on the current evidence of associated human health effects. The Centers for Disease Control & Prevention Agency for Toxic Substances & Disease Registry (CDC/ATSDR) also updated their PFAS Information for Clinicians guidance in 2024. There remains a need to further study the effects of PFAS exposure on children. The information below reflects current understanding.

What are PFAS & why are they used?

PFAS are a group of nearly 12,000 manmade chemicals sometimes referred to as “forever chemicals" because they are persistent and slow to break down in both the body and environment. All PFAS contain a hydrocarbon chain bonded to fluorine atoms.

PFAS are resistant to water, oil, and fire, making them useful in a wide range of consumer and industrial products. Certain PFAS have been detected in the drinking water of millions of people across the country.

How are children exposed to PFAS?

The most likely route of exposure for children is ingestion of PFAS. PFAS in drinking water are non-volatile and do not cross the skin easily or evaporate into the air. However, some PFAS in consumer products (I.e., carpeting, apparel) can be volatile, meaning they can produce airborne emissions and permeate the skin barrier.

The highest and most concerning exposures have been associated with ingesting contaminated drinking water. Drinking water contamination can occur in systems near industrial sites or sites where aqueous film forming foams (AFFF) are or were used to control fires (ex. Military site, firefighting training centers). Lower-level, everyday exposures can occur from use of consumer goods that contain PFAS, such as non-stick cookware, grease-proof food packaging, water-repellent clothing, and furnishings/carpets that have been treated with stain- and water-resistant products (ex. Scotchgard). This widespread use of PFAS in everyday products makes it difficult for individuals to avoid exposure completely.

Young children may also ingest PFAS in indoor dust or soil through normal hand-to-mouth activity. PFAS can also be present in breastmilk (see below). Household members that work in settings where PFAS are made or used may incidentally take home PFAS and other chemicals in dust on their clothing or shoes.

What health conditions are associated with PFAS exposure in pediatric patients and pregnant individuals?

In a recent review of the evidence, NASEM concluded there is **sufficient evidence of an association** between PFAS exposure and decreased antibody response; dyslipidemia; and decreased fetal and infant growth. This reflects a strong evidence base.

Additionally, they found **suggestive evidence of an association** between PFAS exposure and liver enzyme alterations. There is also suggestive evidence for exposure during pregnancy and risk of gestational hypertension and preeclampsia. This reflects a more limited evidence base.

What is the clinician's role when a community or individual has concerns about PFAS exposure for children?

The most important thing a clinician can do is to help answer families' health questions and provide guidance on how to minimize further PFAS exposure.

One of the easiest and most effective ways to reduce exposure to PFAS in drinking water is to filter water used for drinking and cooking. Not all water filters are effective at removing PFAS. See this Washington DOH factsheet on water treatment for PFAS here.

Families who live in areas with known PFAS contamination in the local water or soil should be made aware that PFAS can be present in local fish, wildlife, crops, meat, eggs, and dairy products. Patients can contact their local health department to learn about any advisories.

For families that are not affected by higher exposure associated with contaminated drinking water or industrial contamination, counseling on common sources and ways to reduce those exposures is beneficial to reducing cumulative lifetime exposure.

The American Academy of Pediatrics has developed a helpful factsheet for families on reducing children's exposure to PFAS. We also have a PFAS factsheet designed for families.

Should PFAS-exposed parents continue to breastfeed?

The PEHSU, American Academy of Pediatrics, the American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists support and recommend breastfeeding for infants. Given the well-established health benefits for the breastfeeding parent and the infant, in almost every

circumstance the benefits are felt to outweigh the risks. When using powder formula, the water source used to mix formula should be carefully considered to prevent exposure to PFAS and other drinking water contaminants.

Should I test my patient for PFAS exposure?

Clinicians and patients should be aware of the pros and cons of obtaining a blood test for PFAS. If a pediatric patient is suspected to have a high exposure to PFAS, such as using a highly contaminated drinking water source, discussion of the pros and cons of testing is a critical part of coming to an informed, shared decision.

PROS	CONS
• Certain blood PFAS level results can be compared to results from samples obtained in the U.S. population (NHANES). Currently, there is data on 12 PFAS analytes for children ages 3 years and older in the United States. Patients may feel empowered having this insight, even though the health consequences of a specific PFAS blood level are not completely understood. • The NASEM report provides guidance on interpreting blood PFAS levels. The results can be used to inform the next step of medical decision-making. • If a parent suspects their child was highly exposed in the past, or they were highly exposed while pregnant (I.e., had an occupational exposure, lived in area with drinking water contamination that has been documented by a government agency or academic institution), a blood test may be informative of past exposure.	• PFAS test results cannot indicate or predict that an individual will develop a particular health condition. Results also cannot link existing health conditions with PFAS exposure. • For some parents, knowing their child's blood PFAS levels may lead to stress about potential health effects, as there is no specific 'treatment' available for PFAS exposure. • Laboratories that measure PFAS in blood may not measure the same PFAS analytes that are included in the NHANES data set and that the NASEM guidance is based on. However, laboratories do typically measure the most commonly encountered PFAS in U.S. populations. • There are currently limited blood test options available, and they can be very expensive. This may lead to large out-of-pocket costs, as state and private insurances may not cover PFAS testing. • The pregnancy and child health concerns associated with PFAS have many causes, and the blood test will not rule in or rule out a link to a current or future health concern.

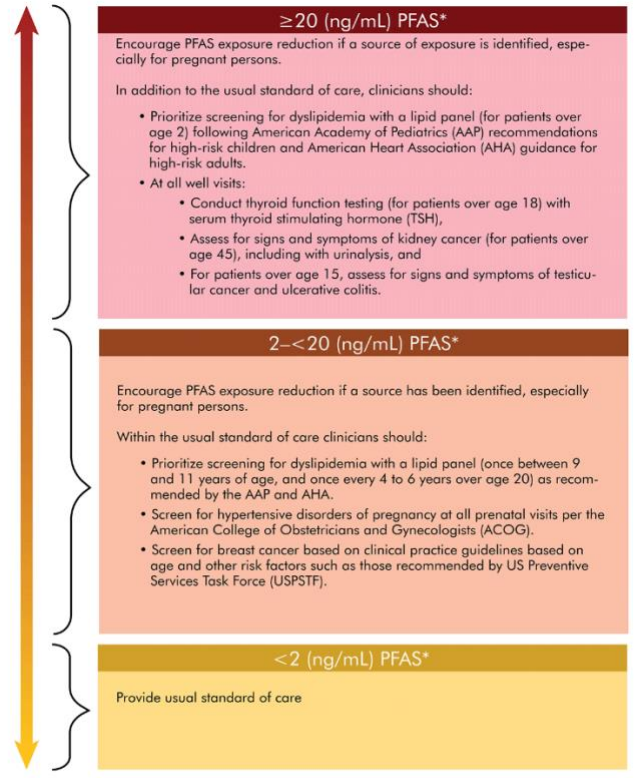
How do I order a PFAS blood test?

If you believe your patient (child or pregnant individual) has an elevated PFAS exposure, consult your regional PEHSU to discuss current PFAS blood testing options.

How do I interpret the result?

It is important to note that most people have detectable levels of PFAS in their blood. The NASEM committee estimated that if tested, 89% of the U.S. population would fall in the orange category (2-<20 ng/mL), and 9% would fall in the red category (≥ 20 ng/mL) in the graphic below.

Currently, changes to the usual standard of care are only recommended for patients with PFAS levels ≥ 20 ng/mL. Children aged 2 years or older with these higher levels should be screened for dyslipidemia with a lipid panel following the AAP lipid screening recommendations for high-risk children. Patients over 15 years of age should be evaluated for signs and symptoms of testicular cancer and ulcerative colitis. For more details, see the NASEM interactive guidance webpage, which includes the graphic below.



Credit: National Academies of Sciences, Engineering, and Medicine. 2022. Guidance on PFAS Exposure, Testing, and Clinical Follow-Up. Washington, DC: The National Academies Press. https://doi.org/10.17226/26156.

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To learn more about PFAS and medical monitoring, this Silent Spring Institute webinar provides a useful overview of key concepts for clinicians. It may also be of interest to patients and families. For clinicians, there is opportunity to obtain CME credit for viewing.

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