

PENNSYLVANIA DEPARTMENT OF HEALTH
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Per- and Polyfluoroalkyl Substances (PFAS) Exposure

DATE:	November 15, 2022
TO:	Health Alert Network
FROM:	Denise A. Johnson, M.D., FACOG, FACHE Acting Secretary of Health
SUBJECT:	Per- and Polyfluoroalkyl Substances (PFAS) Exposure
DISTRIBUTION:	Statewide
LOCATION:	Statewide
STREET ADDRESS:	n/a
COUNTY:	n/a
MUNICIPALITY:	n/a
ZIP CODE:	n/a

This transmission is a “Health Advisory”: provides important information for a specific incident or situation; may not require immediate action.

HOSPITALS: PLEASE SHARE WITH ALL MEDICAL, PEDIATRIC, NURSING, PHARMACY, AND LABORATORY STAFF IN YOUR HOSPITAL; EMS COUNCILS: PLEASE DISTRIBUTE AS APPROPRIATE; FQHCs: PLEASE DISTRIBUTE AS APPROPRIATE; LOCAL HEALTH JURISDICTIONS: PLEASE DISTRIBUTE AS APPROPRIATE; PROFESSIONAL ORGANIZATIONS: PLEASE DISTRIBUTE TO YOUR MEMBERSHIP; LONG-TERM CARE FACILITIES: PLEASE SHARE WITH ALL MEDICAL, INFECTION CONTROL, AND NURSING STAFF IN YOUR FACILITY; PHARMACIES: PLEASE SHARE WITH ALL PHARMACY STAFF

Summary

- Per- and polyfluoroalkyl substances (PFAS) are a class of thousands of widely used human-made chemicals that bioaccumulate in humans and animals and are persistent in the environment.
- People can be exposed to PFAS via products such as nonstick cookware, processed food packaging, certain cosmetics and soaps, and via contaminated drinking water when chemicals migrate into the water supply (public or well water).
- Health outcomes associated with PFAS exposures include dyslipidemia, decreased vaccine antibody responses, increased risk of ulcerative colitis, decreased infant and fetal growth, thyroid conditions, and increased risk of some cancers, such as kidney, testicular, and potentially breast.
- Healthcare providers should consult The National Academies of Science, Engineering, and Medicine (NASEM) physician’s report for guidance on PFAS exposure, testing, and follow-up.

Background

Per-and polyfluoroalkyl substances (PFAS) are human-made chemicals that do not naturally occur in the environment. Some examples of PFAS are perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), Perfluorodecanoic acid (PFDA), Perfluoroundecanoic acid (PFuDA), and Methyl-perfluorooctane sulfonamide (MeFOSAA). PFAS have been used in thousands of consumer, commercial, and industrial products since the 1950s. PFAS are used in a wide range of products, such as non-stick cookware, water and stain repellent fabrics, food packaging, ski wax, and fire-fighting foam. This is because these chemicals have properties that repel oil and water, reduce friction, and resist temperature changes. Because many PFAS breakdown in the environment very slowly, they have been referred to as “forever chemicals.”

People can be exposed to PFAS through use of various consumer, commercial, and industrial products. The primary route of exposure is likely ingestion, which can include ingestion of water, contaminated foods or beverages, hand-to-mouth transfer of PFAS from products containing PFAS, or incidental ingestion of dust containing PFAS. PFAS can transfer to the fetus during pregnancy, and in infancy through breastfeeding or formula made with contaminated water.

In addition to exposure via use of consumer, commercial, and industrial products, people can be exposed to PFAS in contaminated drinking water. In some communities across Pennsylvania and the United States, drinking water has been contaminated with PFAS, including public drinking water and well water. PFAS can migrate into water bodies and underground drinking water supplies near areas of industry production, use, disposal, or spills. Historically, PFAS have been used in firefighting foam, both in training exercises and actual firefighting activities. In Pennsylvania, many of these activities have taken place at airports and military bases.

Inhalation is another possible route of exposure to PFAS. Inhalation is the most common occupational-related exposure. Residents living near fluorochemical plants or incinerators can also be exposed to PFAS via inhalation. The dermal exposure pathway has not been well-studied.

PFAS exposure has been associated with adverse health effects in children and adults, including thyroid dysfunction, changes in cholesterol, hypertension disorders in pregnant women, certain cancers, liver enzyme alterations, and decreased antibody response to vaccinations. The National Academies of Science, Engineering, and Medicine (NASEM) has produced a physician's guidance report that reviewed the PFAS body of literature (epidemiological and toxicological data) to identify health outcomes with sufficient evidence and limited or suggestive evidence of an association with PFAS exposure. The NASEM committee provided guidance on PFAS testing and patient follow-up. This guidance also provides actionable information in healthcare treatment plans and opportunities for exposure reduction.

Recommendations for Healthcare Providers

- Review the NASEM [Report Highlights](#) for Guidance on PFAS Exposure, Testing, and Clinical Follow-up (briefly summarized or excerpts provided in the bullets below).
- Talk with patients to determine if and how they might be exposed to PFAS.
- Offer PFAS blood testing to patients who are likely to have a history of elevated exposure, such as those with occupational exposures or those who live near areas known to be contaminated, such as military bases or airports.
- For patients with a **total PFAS** level of less than 2 ng/mL, adverse health effects are not expected. Clinicians should provide the usual standard of patient care.
 - "Total PFAS" is the sum of the following PFAS: PFOA (linear and branched isomers), PFDA, PFUnDA, PFOS (linear and branched isomers), MeFOSAA, PFHxS, and PFNA in serum or plasma.
- For patients with a total PFAS level between 2 and 20 ng/mL, there is a potential for adverse effects especially in sensitive populations.
 - Prioritize screening for dyslipidemia with a lipid panel (once between 9 and 11 years of age, and once every 4 to 6 years over age 20) as recommended by the American Academy of Pediatrics (AAP) and American Heart Association (AHA).

- Screen for hypertensive disorders of pregnancy at all prenatal visits per the American College of Obstetricians and Gynecologists (ACOG).
- Screen for breast cancer based on clinical practice guidelines on age and other risk factors such as those recommended by US Preventive Services Task Force (USPSTF).
- For patients with a PFAS level greater than 20 ng/mL, there is an increased risk of adverse health effects.
 - Clinicians should prioritize screening for dyslipidemia with a lipid panel (for patients over age 2) following AAP recommendations for high-risk children and AHA guidance for high-risk adults.
 - At all well visits:
 - Conduct thyroid function testing (for patients over age 18) with serum thyroid stimulating hormone (TSH).
 - Assess for signs and symptoms of kidney cancer (for patients over age 45) including urinalysis.
 - Assess for signs and symptoms of testicular cancer and ulcerative colitis (for patients over age 15).
- Advise that those with occupational exposure to PFAS consult with occupational health and safety professionals about reducing exposure.
- Advise individuals with elevated PFAS in their drinking water to filter their water (activated carbon filters).
- Advise patients living in areas of known PFAS contamination that PFAS can be present in fish, wildlife, meat, and dairy.
- Counsel parents of infants about PFAS exposure and discuss infant feeding and steps that can be taken to lower sources of exposure to PFAS.

Additional Resources on PFAS:

- [NASEM Report Highlights](#) for Guidance on PFAS Exposure, Testing, and Clinical Follow-up
- [NASEM PFAS Resource Page](#)
- [PFAS \(PA Department of Health\)](#)
- [PFAS Fact Sheet \(PA Department of Health\)](#)
- [PFAS in PA \(PA Department of Environmental Protection\)](#)
- [CDC PFAS Fact Sheet](#)
- [ATSDR PFAS Fact Sheet](#)
- [EPA PFAS Explained](#)
- [American Waterworks Association Resources](#)
- [Environmental Working Group PFAS Resources](#)

Categories of Health Alert messages:

Health Alert: conveys the highest level of importance; warrants immediate action or attention.

Health Advisory: provides important information for a specific incident or situation; may not require immediate action.

Health Update: provides updated information regarding an incident or situation; unlikely to require immediate action.

This information is current as of November 15, 2022 but may be modified in the future. We will continue to post up