

PFAS EXPOSURES AND HEALTH EFFECTS: HEALTH EDUCATION AND RESOURCES FOR CLINICIANS

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Delaware PFAS Exposure and Patient Health Summit, 9/25/26



Northeastern University
Social Science Environmental Health
Research Institute

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PFAS-REACH team



Research Partners

Silent Spring Institute
Northeastern University
Michigan State University

Community Partners

Testing for Pease
MA Breast Cancer Coalition
Slingshot



OUTLINE

- PFAS 101
- Policy and marketplace responses
- Sources of exposure
- Health effects
- Community responses and needs
- Medical screening and PFAS blood testing resources

PFAS 101



For our team, this is a story about...

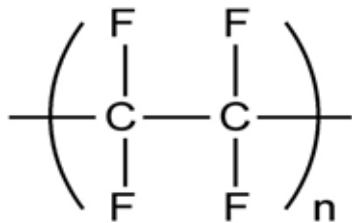
- The most talked-about chemical contamination at present
- A crisis that only recently emerged in the national attention
- A remarkable example of the public's environmental health literacy, combined with activism
- A rapidly changing regulatory climate
- A burgeoning scientific field
- A model of how community activists, environmental health scientists and social scientists can engage in environmental public health research and practice
- The need for more medical guidance



Environmental activist Andrea Amico named one of USA TODAY's Women of the Year

Andrea Amico, who sounded the alarm about toxic PFAS chemicals in contaminated drinking water, is one of USA TODAY's Women of the Year.

PFAS have a long history



1938

PTFE (Teflon) is discovered



1951

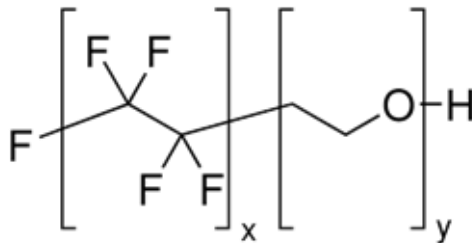
DuPont begins using **PFOA** in Teflon production in West Virginia



For Leather

1956

3M begins selling Scotchgard (**PFOS**)



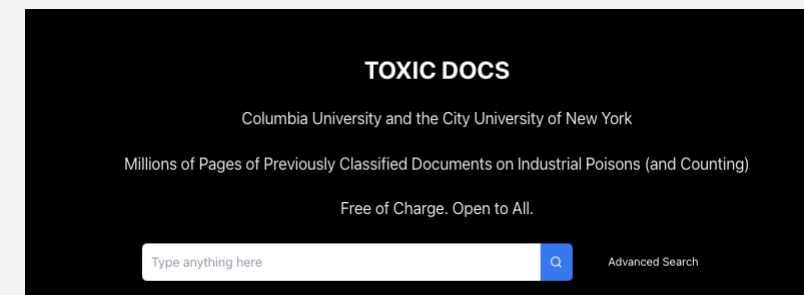
1967

FDA approves Zonyl Food packaging (**PFOA**)

Decades of industry research and secrecy

- 1961 DuPont finds evidence of liver toxicity in animals
- 1962 DuPont finds evidence of toxicity in humans
- 1976 3M finds PFOA in workers' blood
- 1981 3M finds PFOA causes rare birth defects in rats
- 1981 DuPont workers give birth to infants with similar rare birth defects; DuPont removes all women workers from Teflon unit but doesn't say why and doesn't share this data with EPA
- 1984 DuPont finds PFOA in community drinking water, doesn't disclose results
- 1987 3M looks for uncontaminated blood samples to compare to their workers and finds widespread global contamination

For more details: DuPont and 3M documents in EWG's Chemical Industry Archives; Callie Lyons *Stain-Resistant, Nonstick, Waterproof and Lethal: The Hidden Dangers of C8* (2007). We got EPA docket from the DuPont case and added to Columbia University's Toxic Docs database.

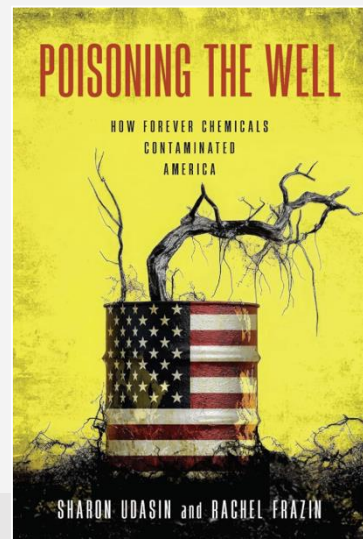
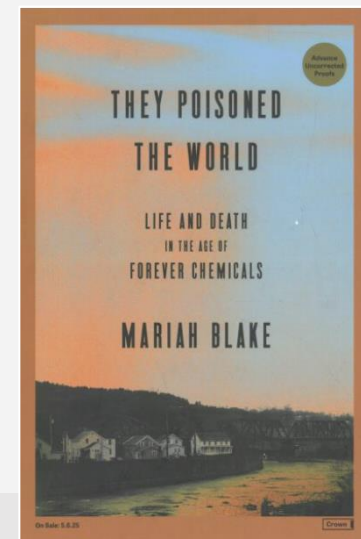


PFAS 101

Per- and polyfluoroalkyl substances

- Class of over 21,000 compounds
- “Forever chemicals” - resist degradation
- Mobile in environment
- Used in consumer products since 1950s
- Emerged as common drinking water pollutants around 2010-2015

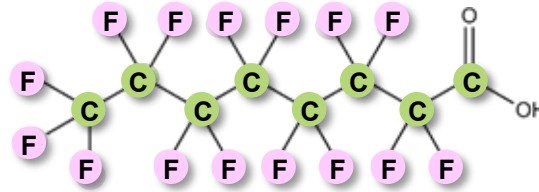
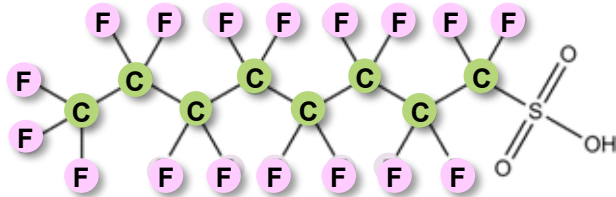
2 books published in 2025 ►



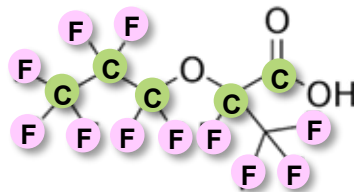
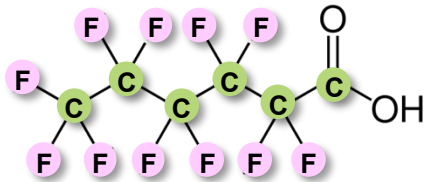
Examples of PFAS types

Non-polymers

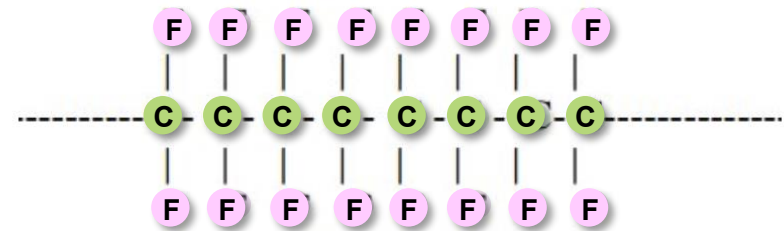
Long-chain PFAS (e.g., PFOS, PFOA)



Current-use PFAS (e.g., PFHxA, GenX)

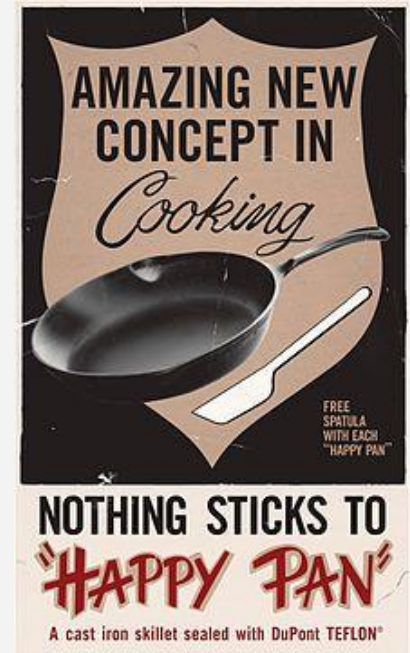
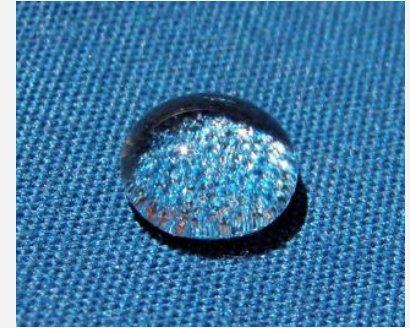


Fluorinated polymers (e.g., PTFE aka Teflon)



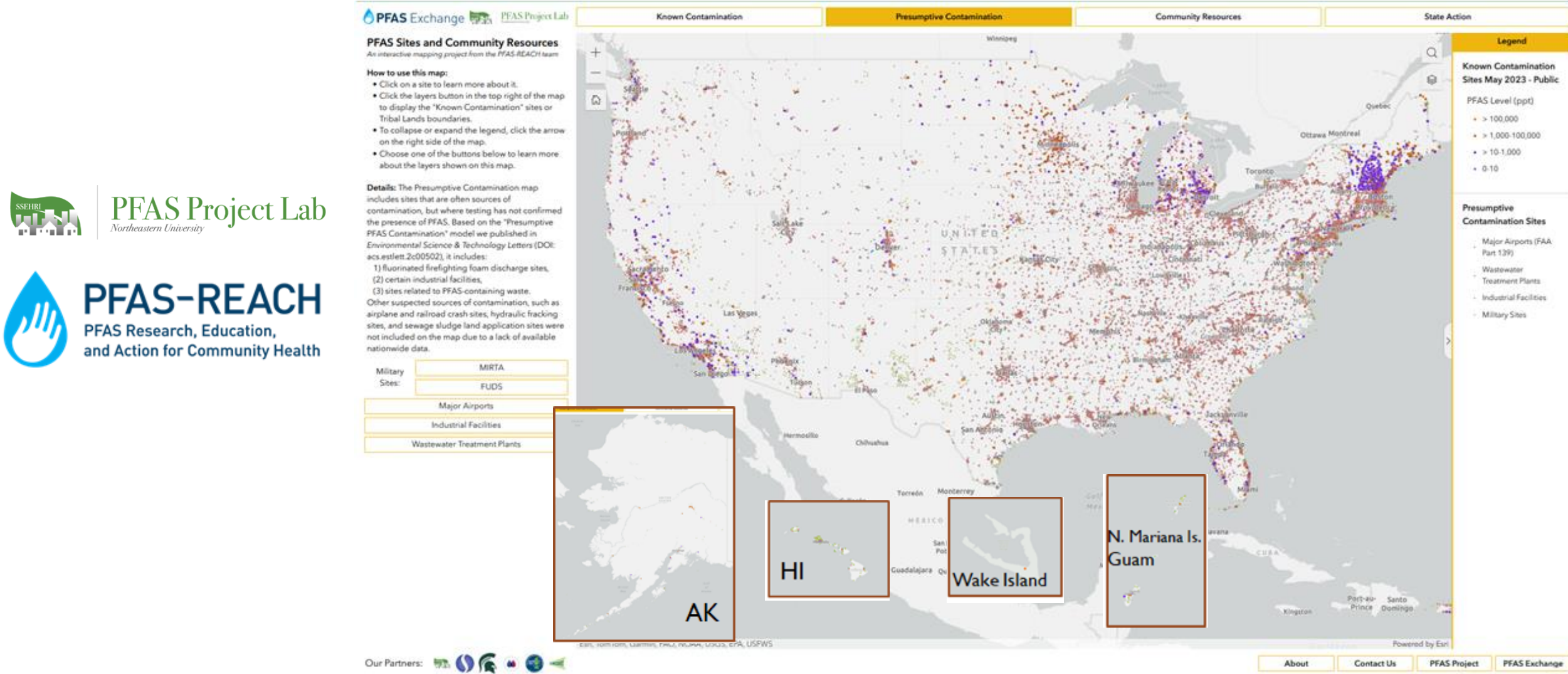
PFAS are used in many everyday products

- Carpets & upholstery
- Waterproof apparel
- Non-stick cookware
- Waxes (floor, skis)
- Grease-proof food packaging
- Cosmetics
- Dental floss
- Paints
- Building materials



PFAS Sites and Community Resources Map

<https://tinyurl.com/mappfas>



Mismatch between
where PFAS
contamination has
been identified and
where it likely exists

Over 57,000 sites and another
30,000 now being added

38,000 views

Altmetric score=891

Salvatore et al. 2022. ES&T Letters.
DOI: 10.1021/acs.estlett.2c00502

Presumptive Contamination: A New Approach to PFAS Contamination Based on Likely Sources

Derrick Salvatore, Kira Mok, Kimberly K. Garrett, Grace Poudrier, Phil Brown, Linda S. Birnbaum, Gretta Goldenman, Mark F. Miller, Sharyle Patton, Maddy Poehlein, Julia Varshavsky, and Alissa Cordner*



Cite This: <https://doi.org/10.1021/acs.estlett.2c00502>



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Supporting Information

ABSTRACT: While research and regulatory attention to per- and polyfluoroalkyl substances (PFAS) has increased exponentially in recent years, data are uneven and incomplete about the scale, scope, and severity of PFAS releases and resulting contamination in the United States. This paper argues that in the absence of high-quality testing data, *PFAS contamination can be presumed* around three types of facilities: (1) fluorinated aqueous film-forming foam (AFFF) discharge sites, (2) certain industrial facilities, and (3) sites related to PFAS-containing waste. While data are incomplete on all three types of presumptive PFAS contamination sites, we integrate available geocoded, nationwide data sets into a single map of presumptive contamination sites in the United States, identifying 57,412 sites of presumptive PFAS contamination: 49,145 industrial facilities, 4,255 wastewater treatment plants, 3,493 current or former military sites, and 519 major airports. This conceptual approach allows governments, industries, and communities to rapidly and systematically identify potential exposure sources.

KEYWORDS: per- and polyfluoroalkyl substances (PFAS), presumptive contamination, PFAS testing and investigation, AFFF, PFAS waste and disposal

Presumptive Contamination Sites (n=57,412)



PFAS sources in the environment: Continued expansion

When we started, the focus was on hotspots

- Fluoropolymer production facilities
- Other industries that use PFAS
- AFFF firefighting foams for fuel fires and fire training

Then more common waste-related sources

- Landfills
- Wastewater treatment plants
- Land-applied sludge
- Septic systems



Maine Farmers' Group Announces Plans to Sue the EPA Over PFAS in Sludge

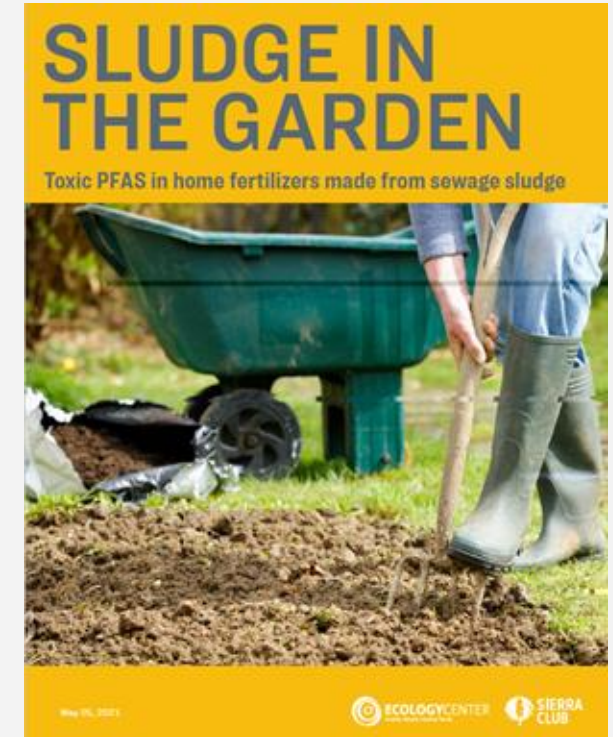
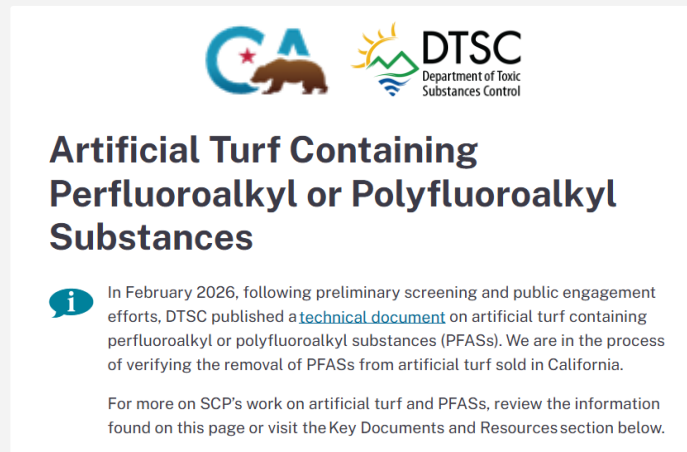
A recent CR investigation highlighted how 'forever chemicals' polluting U.S. farmland can contaminate our food supply

By Lauren Kirchner
Investigative Reporter



More recently recognized sources

- Chrome-plating and other metal-plating shops
- Refineries
- Oil rigs
- Bulk fuel storage
- Munitions facilities
- Artificial turf
- Pesticides
- Plastics
- Dry cleaners



Commentary

A Section 508–conformant HTML version of this article is available at <https://doi.org/10.1289/EHP13954>.

Forever Pesticides: A Growing Source of PFAS Contamination in the Environment

Nathan Donley,¹  Caroline Cox,² Kyla Bennett,³ Alexis M. Temkin,⁴ David Q. Andrews,⁴ and Olga V. Naidenko⁴

¹Center for Biological Diversity, Portland, Oregon, USA

²Center for Environmental Health (retired), Oakland, California, USA

³Public Employees for Environmental Responsibility, Silver Spring, Maryland, USA

⁴Environmental Working Group, Washington, District of Columbia, USA

Policy and marketplace responses

In April 2024, EPA finalized the first national PFAS drinking water standards for 6 PFAS compounds

LIMITING PFAS: STANDARDS DEFINED



EPA set legal limits for six PFAS chemicals known to be toxic to human health and the environment.

- PFOA and PFOS: 4 parts per trillion (ppt), individually
- PFNA, PFHxS, and GenX: 10 ppt, individually
- PFNA, PFHxS, GenX, and PFBS: hazard index of 1.0

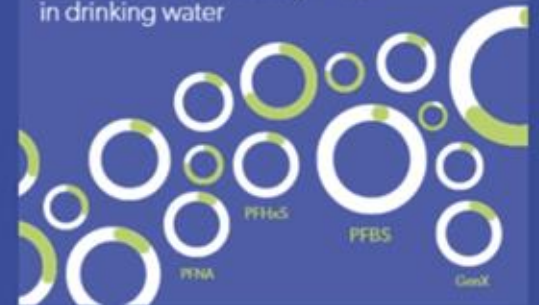
To learn more about the standards, check out the Resources section of the PFAS Exchange, including a visual guide to the hazard index.



TOOL



Learn about the
Hazard Index
EPA's tool for regulating PFAS
in drinking water



<https://pfas-exchange.org/pfas-us-drinking-water-standards/>

**In May 2025,
EPA announced
plans to rescind
limits on 4 PFAS
and delay
implementation
for PFOA and
PFOS until 2031**

LIMITING PFAS: STANDARDS DEFINED



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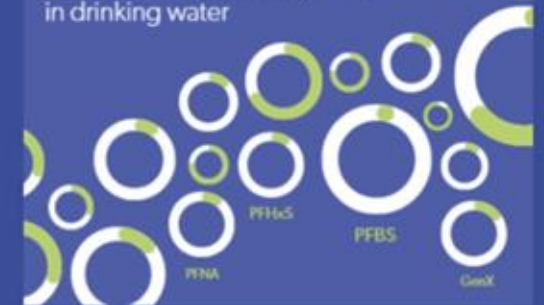
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<https://pfas-exchange.org/pfas-us-drinking-water-standards/>

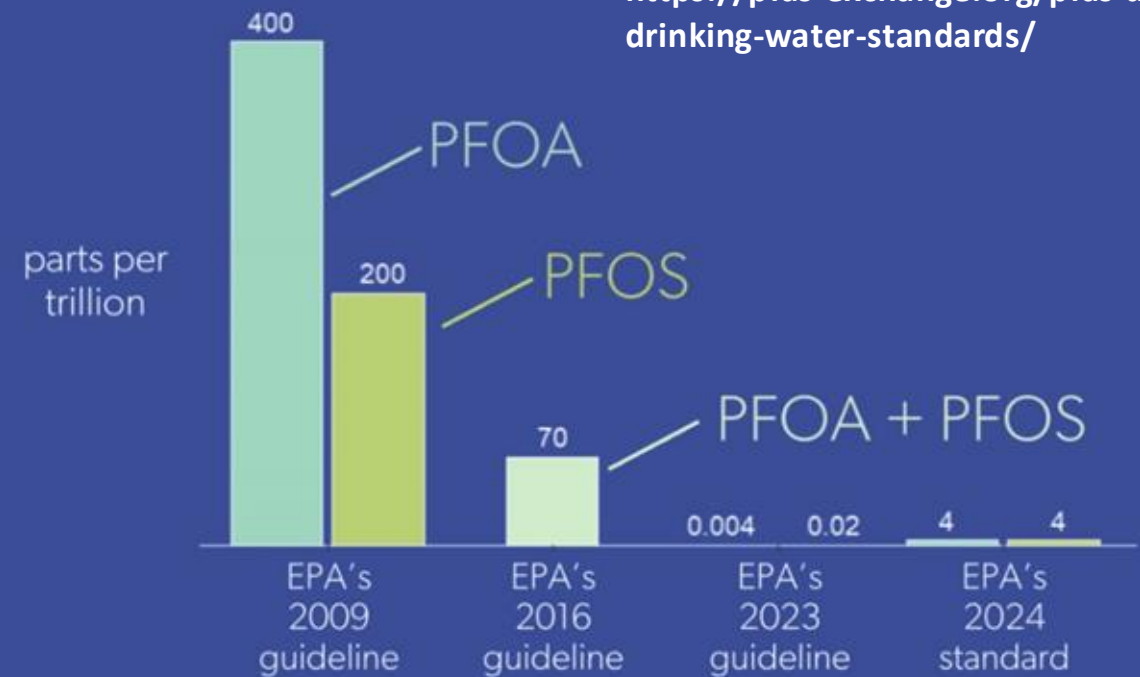
The PFOS and PFOA standards are much stricter than previous guidelines and reflect emerging science

LIMITING PFAS: SCIENCE IN ACTION



Over the years, EPA has lowered its advisory levels for PFAS in drinking water, as growing evidence has shown toxic effects at lower levels of exposure.

<https://pfas-exchange.org/pfas-us-drinking-water-standards/>



In April 2024, EPA added PFOS and PFOA as hazardous substances under CERCLA (Superfund)

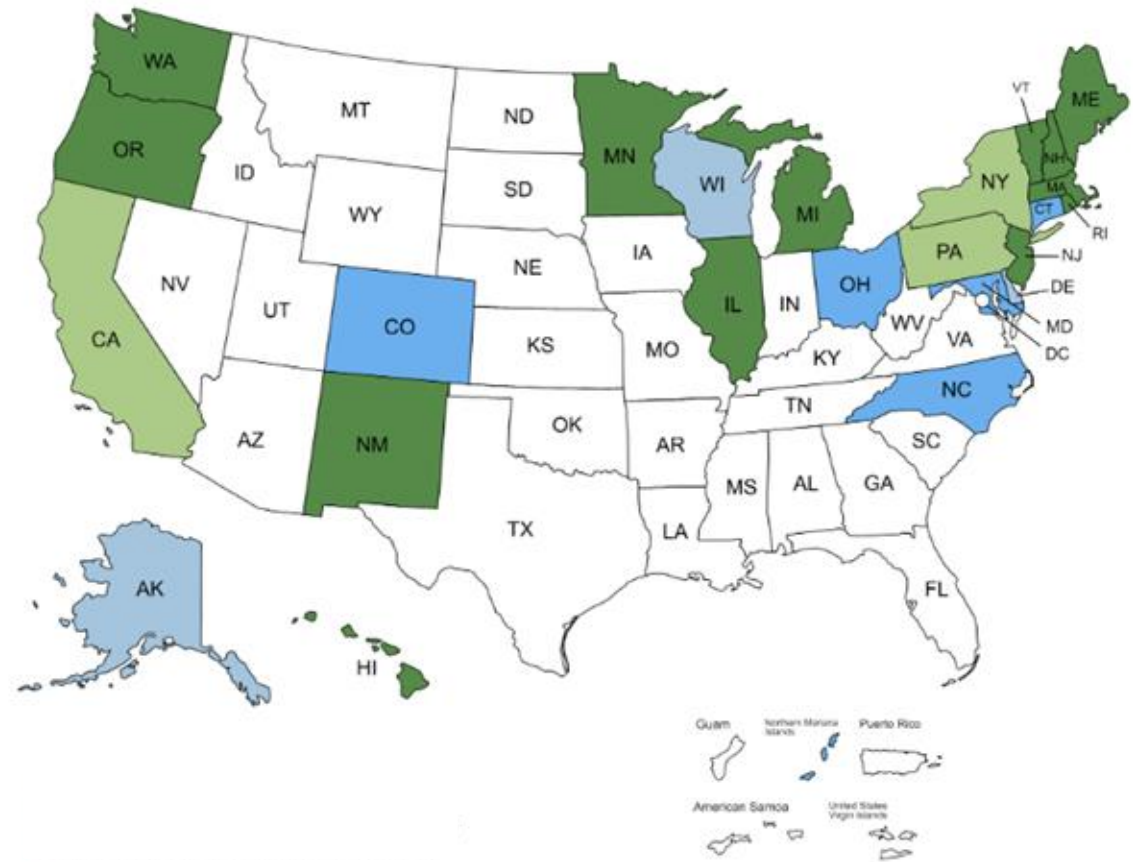
- First time PFAS added under the Superfund law
- Gives authority to EPA to:
 - Streamline cleanup of Superfund sites
 - Hold polluting parties responsible for cleanup
- Discretion in enforcement

State drinking water standards

Prior to 2024, 24 states and one U.S. territory established drinking water standards or guidelines for PFAS.

State responses to EPA's 2016 guidelines

- Adopted EPA's 2016 guidelines for PFOA and PFOS
- Adopted lower limits for PFOA and PFOS
- Adopted limits on more chemicals beyond PFOA and PFOS
- Adopted both lower limits and limits on more chemicals



<https://pfas-exchange.org/pfas-a-word-about-drinking-water-guidelines/>

Soil contamination from waste is a growing concern

Maine Legislature appropriated \$60 million for commercial farmers affected by PFAS.

Since the fund went into effect in March 2024, it has disbursed \$2.25 million, mostly as income replacement for farmers.

wbur

Home / NPR News



10:56

Organic compost is the likely culprit of PFAS contamination in a rural Massachusetts town

Concerns about chemicals in water and soil are part of what fuels the organic movement. So it came as a shock to residents of [Westminster, Mass.](#), that the likely cause of [PFAS](#) contamination in their town — affecting about 200 properties — is organic compost.

PFAS chemicals are known as “[forever chemicals](#)” because they don’t really decompose and removing them is complicated. Yet, they’re present in everything from flame retardants to non-stick cookware to athletic clothing.

In Westminster, many properties have been tested to show levels 50 times more than the state’s recommended levels. However, the Environmental Protection Agency recently issued a new warning that [no level in water is safe](#).

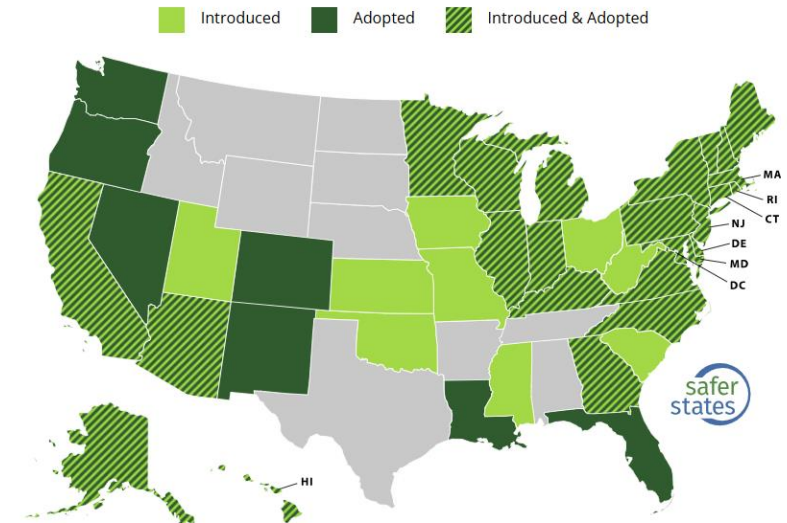
Recent legislative action

- MA and CT: 2024 ban on PFAS in firefighter PPE
- ME: Ban on selling any product with intentionally added PFAS by 2030
- CA: Ban on PFAS in textiles manufactured or sold within the state by 2025



www.saferstates.org/priorities/pfas/

33 states have introduced 193 policies to protect people from toxic chemicals.
197 state policies have been adopted in 31 states.



Retailer actions

Major restaurant chains commit to eliminating 'forever chemicals'



Home Depot to phase out some products containing PFAS chemicals

The home improvement company will stop purchasing and selling any carpets or rugs containing the toxics by the end of the year

But industry is fighting back

- **To exclude what it sees as essential uses:**
 - Computer chips
 - Medical equipment
 - Fossil fuel facilities
- **To exclude particular types of PFAS compounds:**
 - Polymers
 - F-gases

A class-based approach to PFAS is needed

When looking at legacy “long-chain” PFAS compared to alternatives, replacement with other PFAS is not the answer

Kwiatkowski et al. 2020. ES&T Letters.
DOI: 10.1021/acs.estlett.0c00255

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ENVIRONMENTAL
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Global Perspective

Scientific Basis for Managing PFAS as a Chemical Class

Carol F. Kwiatkowski,* David Q. Andrews, Linda S. Birnbaum, Thomas A. Bruton, Jamie C. DeWitt, Detlef R. U. Knappe, Maricel V. Maffini, Mark F. Miller, Katherine E. Pelch, Anna Reade, Anna Soehl, Xenia Trier, Marta Venier, Charlotte C. Wagner, Zhanyun Wang, and Arlene Blum

 Cite This: *Environ. Sci. Technol. Lett.* 2020, 7, 532–543

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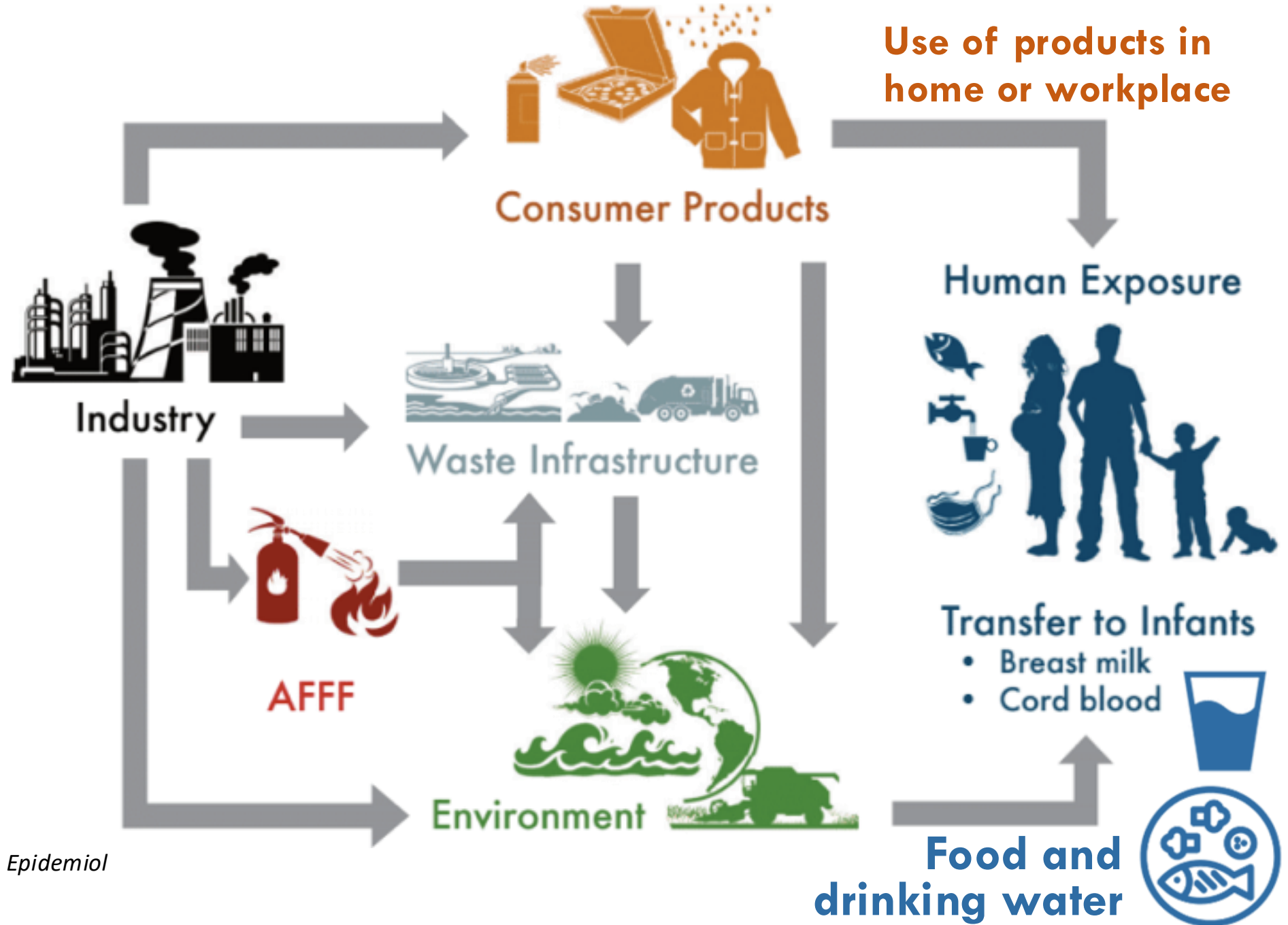
ABSTRACT: This commentary presents a scientific basis for managing as one chemical class the thousands of chemicals known as PFAS (per- and polyfluoroalkyl substances). The class includes perfluoroalkyl acids, perfluoroalkylether acids, and their precursors; fluoropolymers and perfluoropolyethers; and other PFAS. The basis for the class approach is presented in relation to their physicochemical, environmental, and toxicological properties. Specifically, the high persistence, accumulation potential, and/or hazards (known and potential) of PFAS studied to date warrant treating all PFAS as a single class. Examples are provided of how some PFAS are being regulated and how some businesses are avoiding all PFAS in their products and purchasing decisions. We conclude with options for how governments and industry can apply the class-based approach, emphasizing the importance of eliminating non-essential uses of PFAS, and further developing safer alternatives and methods to remove existing PFAS from the environment.



The diagram shows several chemical structures of PFAS, including a long-chain perfluoroalkyl acid, a perfluoroalkylether, and a fluoropolymer. To the right, the text 'PFAS' is written in large red letters, with the words 'Persistent', 'Accumulative', 'Mobile', and 'Hazardous' listed below it in blue, green, and red respectively.

PFAS exposures

How are people exposed to PFAS?

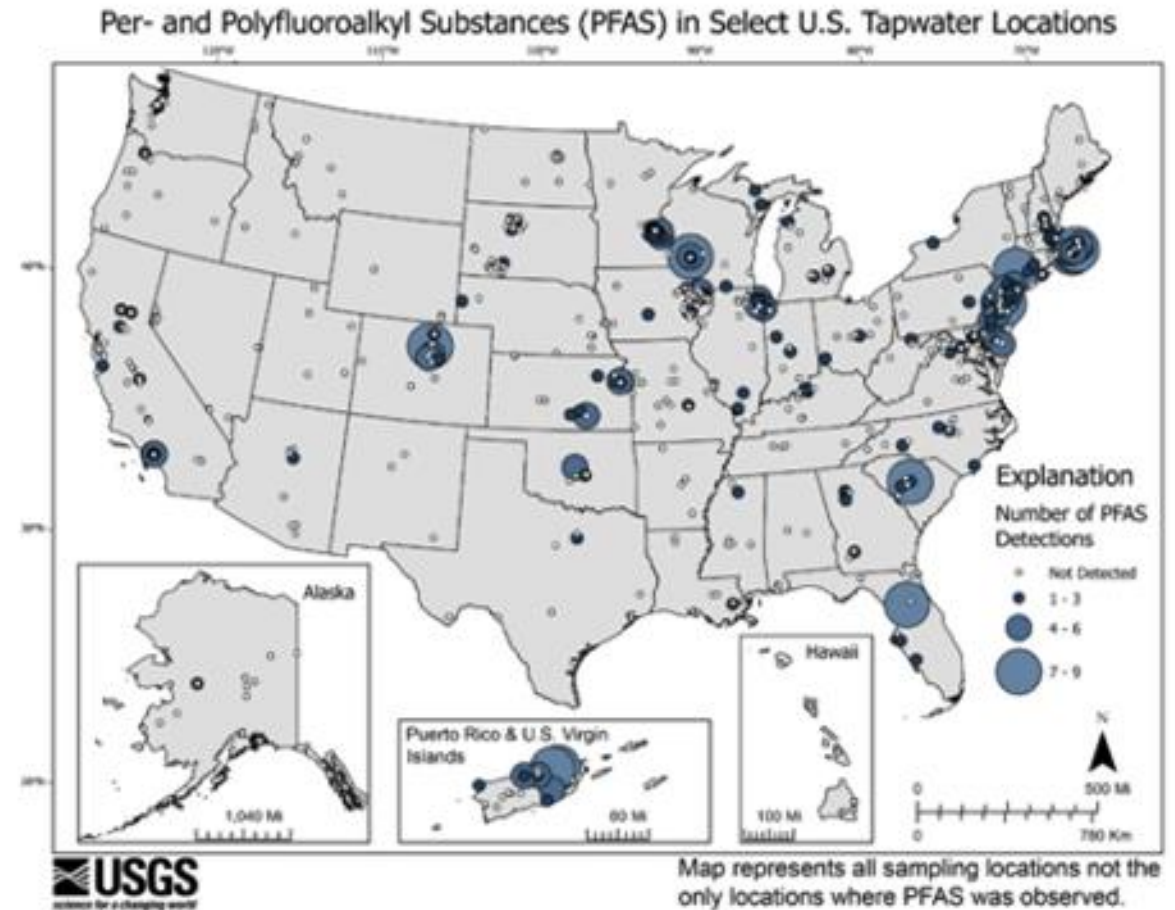


Sunderland et al. 2018. *J Exp Sci Environ Epidemiol*
DOI: 10.1038/s41370-018-0094-1

Widespread exposure from drinking water

2023 US Geological Study

- Estimated that at least 45% of the nation's tap water contains measurable levels of PFAS
- Concentrations were similar between public supplies and private wells



<https://www.usgs.gov/news/national-news-release/tap-water-study-detects-pfas-forever-chemicals-across-us>

What is our main source of PFAS exposure?

It depends on...

- Extent of water contamination
- Individual diet and product use
- Type of PFAS (long-chain vs. short-chain/current use)
- Product reformulation and market shifts

CONSUMER
PRODUCTS

DRINKING
WATER



DIET & FOOD PACKAGING

Chemicals in products don't stay in products

Many consumer product chemicals readily migrate out of products and partition between **surfaces, indoor air, and house dust.**



Exposures come from:

- **Inhalation** of dust and air
- **Ingestion** of dust and mouthing/chewing
- **Absorption** through skin

The presence of PFAS in consumer products and furnishings has been linked to higher PFAS levels in blood.

*National Academies of Sciences, Engineering, and Medicine. Why Indoor Chemistry Matters. 2022.
KE Boronow et al. 2019. JESEE. 29: 206-217. Y Zhu et al. 2021. Environ Res. 195:110758.*

PFAS exposures are widespread



- **PFAS found in blood of over 99% of US residents (CDC)**



- **Some PFAS are long-lived in the human body**

- Long-chain PFAS: years
- Some newer PFAS: weeks to months
- Many PFAS: not yet studied

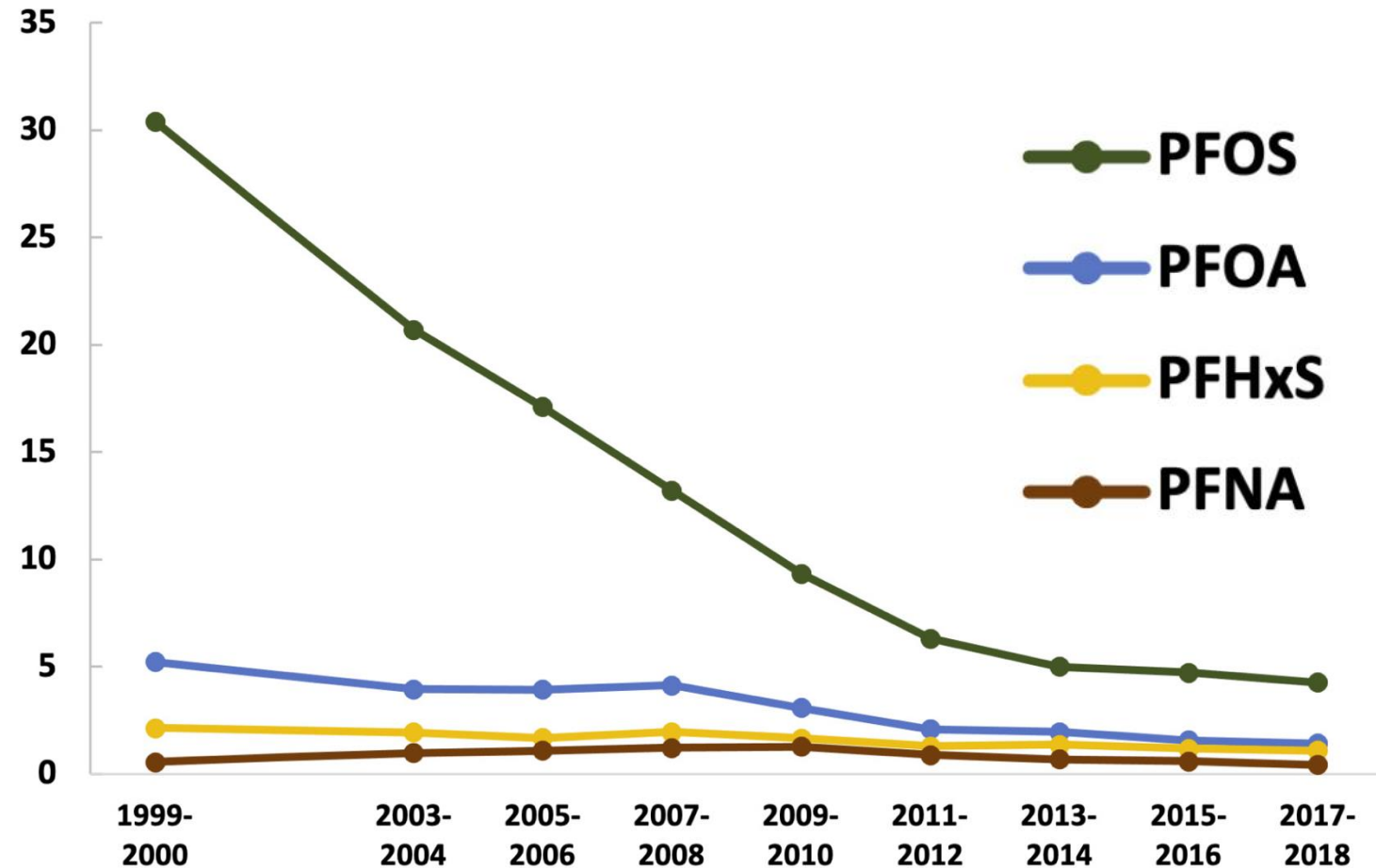


- **Who has higher levels?**

- Workers (PFAS-related industries, firefighters)
- Older people typically have higher levels than younger people
- Men typically have higher levels than women

Levels of some PFAS in blood have declined in the US since 1999...

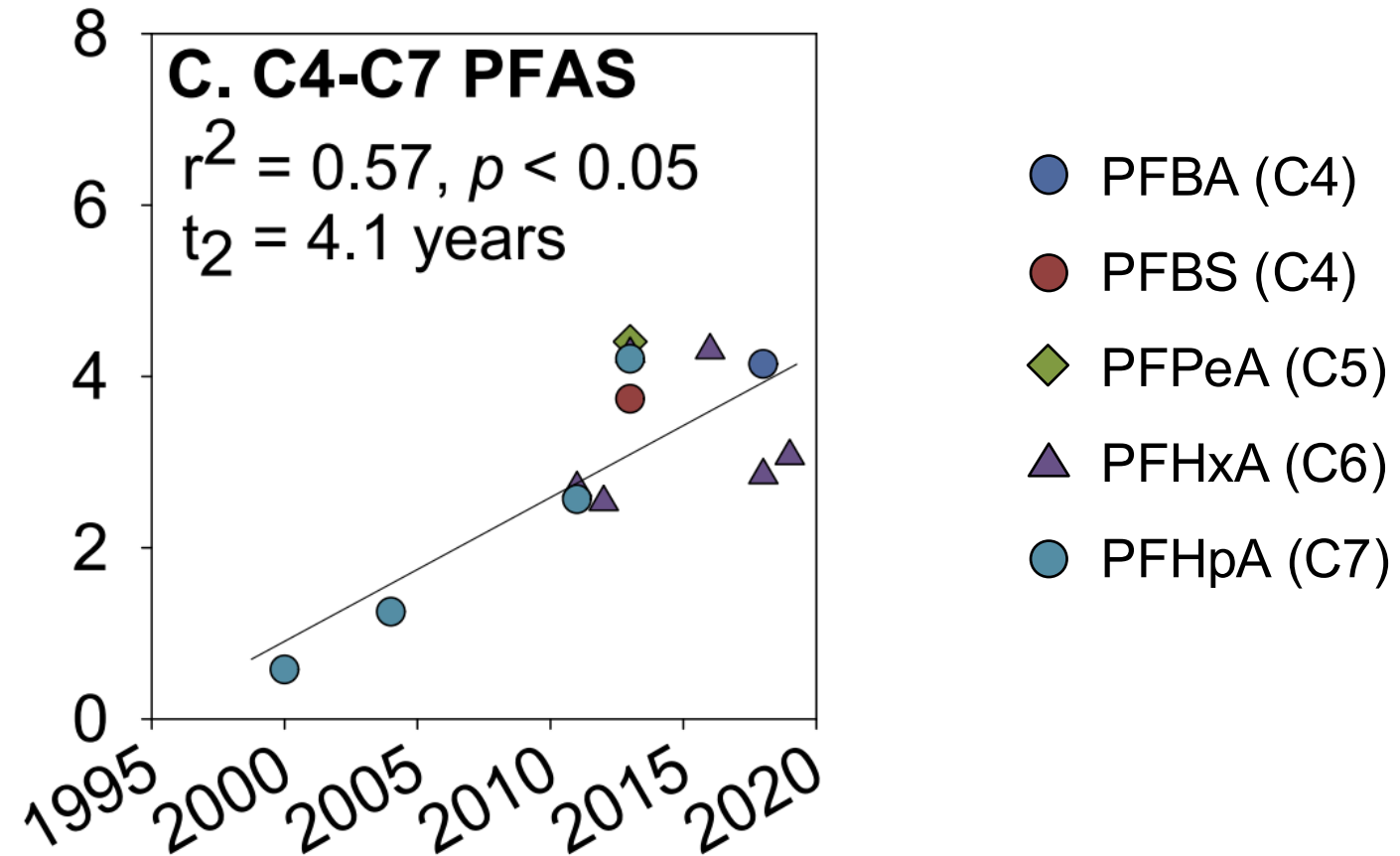
Geometric mean blood
PFAS level
micrograms per liter
($\mu\text{g/L}$)



Data and graph from NHANES:
<https://www.atsdr.cdc.gov/pfas/images/pfas-blood-levels-usa-chart.jpg>

...while occurrence of short-chain PFAS in breast milk appear to be increasing

natural log of
detection
frequency
(%) in breast
milk samples



Zheng et al. 2021. ES&T. 55:7510.

Environmental justice and exposure disparities



Drinking water exposures

Public water systems that serve higher proportions of Hispanic and non-Hispanic Black residents are more likely to have PFAS



Subsistence fishers and Tribal members

Fish, shellfish, and game can be contaminated by PFAS, so subsistence practices can lead to higher exposures



Access to safer products & workplaces

Lower income people may have less ability to purchase more expensive “greener” products and furnishings

Liddie et al. 2023. ES&T. 30: 7902-7912. Maruzzo et al. 2025. EHP. 133: 017002.

Health effects

How do we learn about toxic chemicals?

Epidemiological studies



- + Directly relevant to people
- + Accounts for human biology
- Hard to link to one chemical
- Takes a very long time

Toxicological studies



- + Directly link to 1 chemical
- + Can study >1 generation
- Physiology may be different
- Takes a long time

In vitro studies



- + Evaluate many chemicals
- + Rapid testing
- Harder to link to human physiology

How do we learn about toxic chemicals?

Epidemiological studies



Toxicological studies



In vitro studies



Combining evidence from multiple types of studies strengthens our confidence in understanding a chemical's toxicity and relevance for people

Documented health effects associated with PFOA (C8) exposure

C8 Health Panel 2005-2013 N=69,000

- Thyroid disease
- Kidney cancer
- High cholesterol
- Ulcerative colitis
- Pregnancy-induced hypertension
- Testicular cancer



C8 Science Panel

Exposures to PFAS have been associated with many harmful health effects

- Increased cholesterol & risk of obesity
- Immune system suppression, including suppressed vaccine response
- Changes in thyroid hormone levels
- Reproductive effects (preeclampsia, decreased fertility)
- Developmental effects (decreases in birth weight, changes in bone density)
- Impaired mammary gland development
- Cancer (kidney, testicular, prostate)

EPA: www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas

EFSA: <https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223>

Many harmful health effects associated with PFAS exposures in children

- Elevated cholesterol
- Immune suppression, including decreased vaccine response
- Asthma
- Reduced kidney function
- Changes in thyroid and sex hormone levels
- Delayed menarche (age of first menstruation)

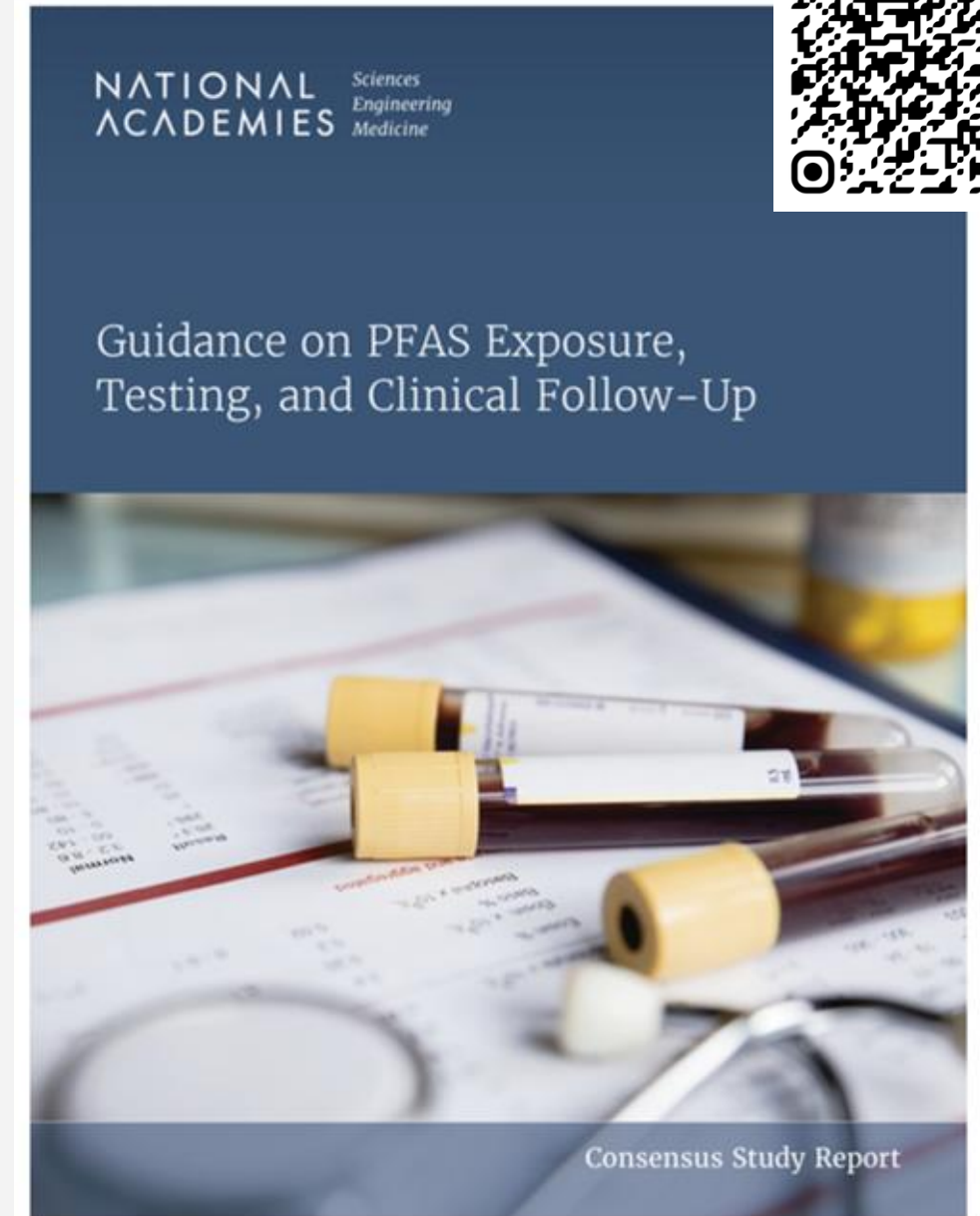


Rappazzo KM et al. 2017. Int J Environ Res Public Health. 14: 691.

DH Kim et al. 2016. Environ Res. 147:399. MJ Lopez-Espinosa et al. 2012. EHP. 124: 1269.

Groundbreaking report from National Academies in 2022

Extensive input from
community groups and from
scientists and medical
professionals supporting
them (including our team!)



NASEM report (2022)

Summary of evidence



Sufficient Evidence of an Association

“High confidence that there is an association...unlikely that the association is due to chance or bias”

- Decreased antibody response (adults, children)
- Dyslipidemia (adults, children)
- Decreased infant and fetal growth
- Increased risk of kidney cancer (adults)

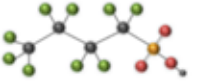


Limited or Suggestive Evidence of an Association

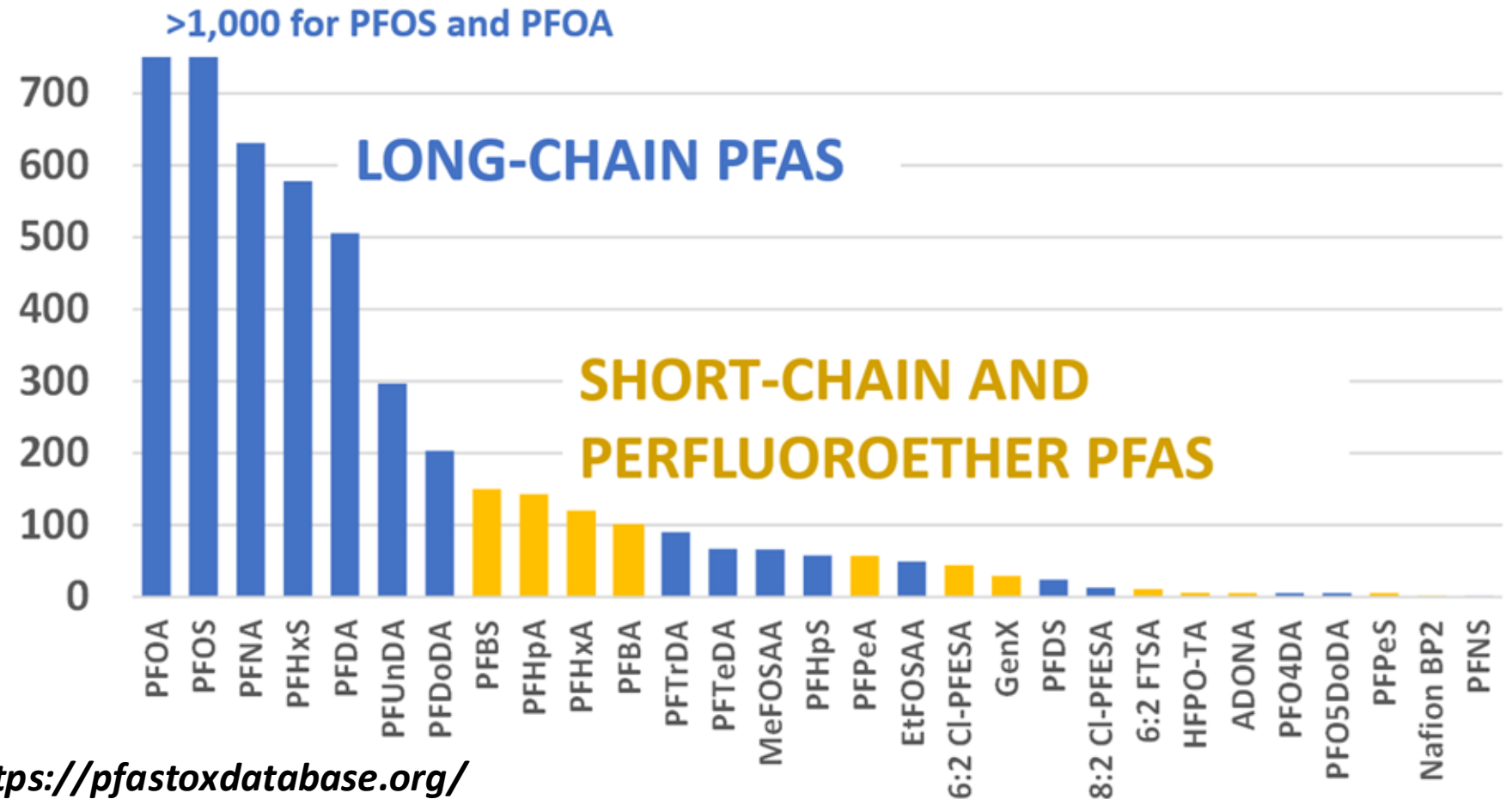
“Moderate confidence that there is an association...possible that the association is due to chance or bias”

- Increased risk of breast cancer (adults)
- Liver enzyme alterations (adults, children)
- Increased risk of pregnancy-induced hypertension (gestational hypertension and preeclampsia)
- Increased risk of testicular cancer (adults)
- Thyroid disease and dysfunction (adults)
- Increased risk of ulcerative colitis (adults)

Most studies have focused on long-chain PFAS, newer PFAS are far less studied

PFAS-TOX
DATABASE 

*Number of studies
on each PFAS*



Data from: PFAS-Tox Database: <https://pfastoxdatabase.org/>

Persistence in the human body

- Long-chain PFAS stay in the body for years
- Short-chain PFAS stay in body for days to weeks
 - Shorter than long-chain PFAS
 - Longer than some other chemicals of concern
- All extremely persistent in the environment

Even shorter half-life is concerning because of chronic exposure

Half-lives in the human body (geometric means)		
PFHxS	7.3 years	Long chain
PFOS	4.8 years	
PFOA	3.5 years	
PFHxA	32 days	Short chain
PFBS	26 days	
BPA	3-6 hours	

Olsen *et al.* 2007. *EHP*. 115:1298.

Olsen *et al.* 2009. *Toxicol.* 256:65.

Russell *et al.* 2013. *Chemosphere*. 93:2419.

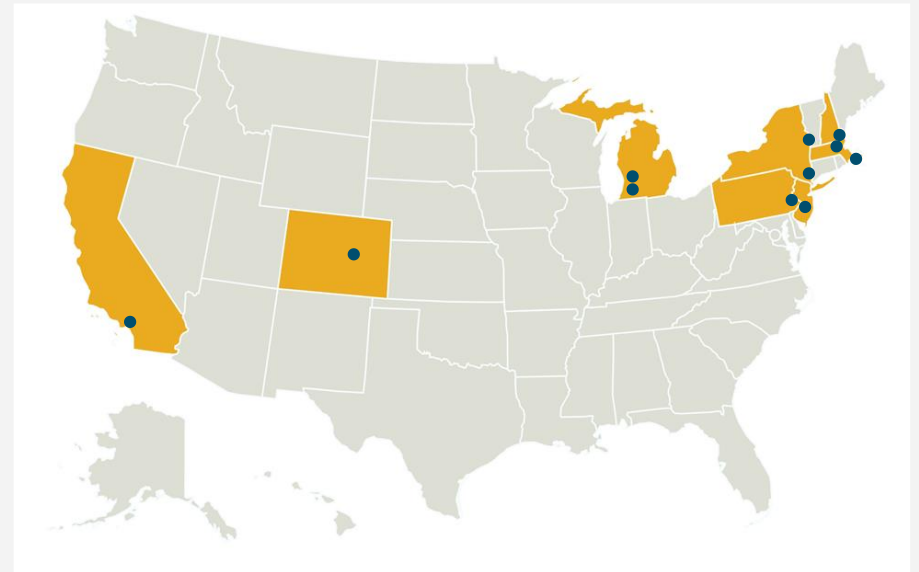
Taylor *et al.* 2011. *EHP*. 119:422.

Ongoing research:

PFAS Multi-site Health Study

- Funded and coordinated by **CDC's** Agency for Toxic Substances and Disease Registry (**ATSDR**)
- Goal: Improve our understanding of PFAS-related health effects
- Epidemiological analyses underway on wide range of outcomes, including:
 - Diabetes, blood pressure, metabolic syndrome, lipids, thyroid disease, CVD

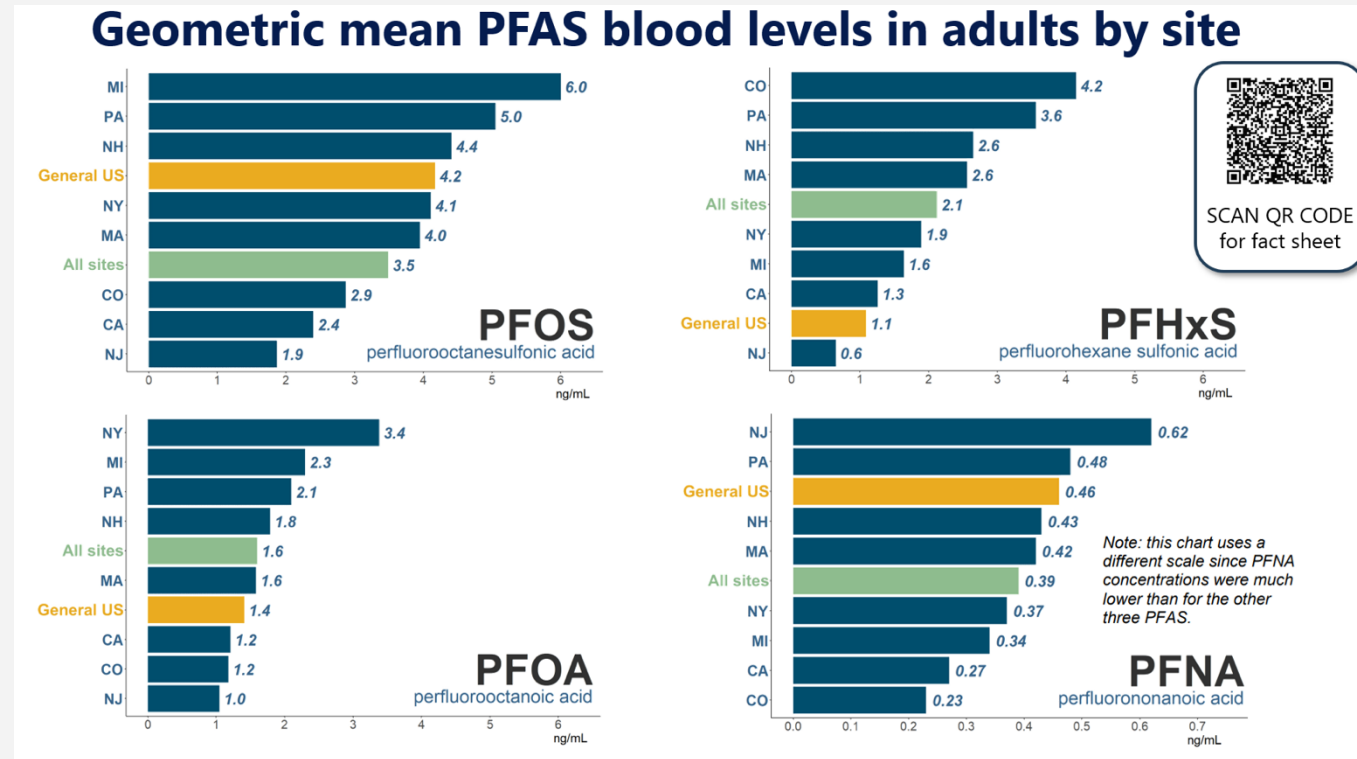
Includes communities in 8 states with a history of PFAS water contamination



Around 6,000 adults & 700 children

Key findings from blood test results

- PFOS, PFOA, PFHxS, and PFNA found in >96% of adults
- PFDA, PFUnDA, and MeFOSAA found in 30-55% of adults
- PFAS levels varied across sites, reflecting differences in types of contamination and historical levels of PFAS in drinking water



Pavuk et al. 2025. *Env. Int.*

Full length article

Multi-site study of communities with PFAS-contaminated drinking water: Methods, demographics, and PFAS serum concentrations



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PFAS Multi-site Study: Community-Level Blood Test Results

based on the paper by Pavuk and others (2025)



KEY FINDINGS

- We found 4 PFAS compounds in the blood of almost every adult and child in the study.
- The levels of these 4 PFAS varied from site to site, as different sites had different PFAS sources and levels of contamination.
- Adults in the study had higher average levels of PFOA and PFHxS than adults in the general U.S. population.
- Children in the study had higher average levels of PFHxS than children in the general U.S. population.
- Among participants ages 12 to 49 years, males had higher levels of most PFAS than females.

Peer-reviewed paper describing Multi-site Study protocols and PFAS blood test results



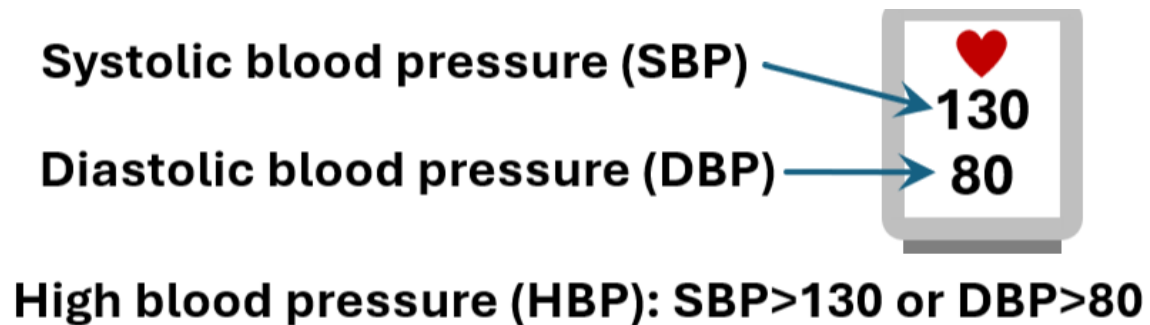
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Fact sheet with summary of paper's key findings



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Some PFAS were positively associated with blood pressure



Wang et al. *Submitted to Env. Int.*

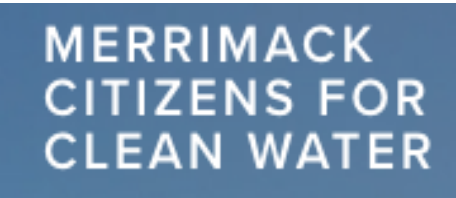
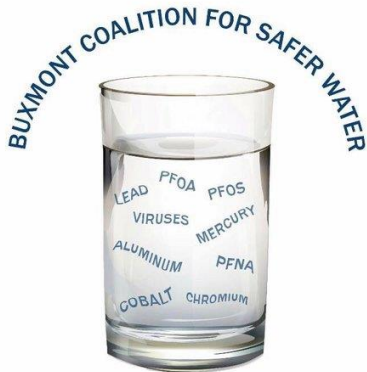
	SBP	DBP	HBP
PFHxS	↑	↑	↑
PFOS	↑	↑	↑
PFOA		↑	
PFNA	↑		
PFDA	↑		
PFUnDA			
MeFOSAA	↑		
PFAS Mixture	↑	↑	↑

↑ indicates positive associations (p<0.05)

Adjusting for age, sex, race and ethnicity, education, household income, BMI, smoking, and alcohol.

Community action and needs

Community groups have taken the lead





The 2025 Goldman Environmental Prize Winners



UNITED STATES

Laurene Allen

Laurene Allen protected thousands of New England families affected by PFAS-contaminated drinking water. Her campaign pressured an industrial giant—responsible for leaking toxic forever chemicals into community drinking water sources—to close in May 2024, marking an end to more than 20 years of rampant air, soil, and water pollution.

Challenges faced by communities

- Blood testing often unavailable and expensive
- Medical professionals unfamiliar with PFAS health concerns
- Some states not testing drinking water or only testing for limited number of compounds
- US EPA and many states have not set drinking water standards
- Fish and other local foods often not tested
- Few opportunities for health studies



"Despite the significant impacts this contamination has on many areas of our life, impacted communities struggle to be seen as critical stakeholders."

*- Andrea Amico, co-founder,
Testing for Pease*

What are communities seeking?

- Water monitoring and treatment
- Drinking water standards and other regulations
- Environmental measurements
- PFAS biomonitoring
- Medical monitoring guidance and education for health professionals
- Health studies



PFOA Project NY
Hoosick Falls, NY, 2016

Clinician resources



- Resource hub developed by Silent Spring Institute and PFAS-REACH researchers, doctors, and community partners
- Cited in the NYTimes and 2022 National Academies report on PFAS and clinical follow-up
- Fact sheets, maps, quizzes, “What’s My Exposure” report-back tool, and more

www.pfas-exchange.org

The PFAS Exchange

is an online resource center about PFAS contaminants in drinking water—helping communities understand their **exposures** and **take action** to protect their health.

Resources for:



Impacted Communities



Clinicians

10:55
pfas-exchange.org

PFAS Exchange

Clinicians

Because PFAS are so ubiquitous in the environment and exposures are so widespread, it's important for clinicians to be informed. Below are resources to help guide you in your practice.



Exposure reduction tips

- Learn about local PFAS drinking water testing and testing options for private wells
- Activated carbon, ion exchange, and reverse osmosis can remove PFAS in water
- Check for local fish consumption advisories
- Avoid stain-resistant products
- Avoid products with “PTFE” or other “fluoro” ingredients
- Choose cast-iron, stainless steel, or enamel cookware or look for “PFAS-free”

How to Reduce Your Exposure to PFAS



PFAS (per- and polyfluoroalkyl substances) are a class of chemicals that companies add to consumer products to make them nonstick, waterproof, and stain-resistant. They are found in carpets and upholstery, waterproof apparel, non-stick cookware, grease-proof food packaging, and even dental floss. They are also used in firefighting foams for putting out fuel fires.

Unfortunately, studies have linked these chemicals with a range of health problems including thyroid disease, cancer, high cholesterol, obesity, and effects on the immune system. Luckily, there are simple steps you can take to reduce your everyday exposure to PFAS and create a healthier environment for you and your community.

In your personal life:

- ✓ Avoid stain-resistant carpets and upholstery, as well as stain-resistant treatments and waterproofing sprays.
- ✓ Avoid products with the ingredient PTFE or other “fluoro” ingredients listed on the label.
- ✓ Choose cookware made of cast iron, stainless steel, glass, or enamel instead of Teflon.
- ✓ Filter your drinking water with an activated carbon or reverse osmosis filtration system.
- ✓ Eat more fresh foods to avoid take-out containers and other food packaging.
- ✓ Avoid microwave popcorn and greasy foods wrapped in paper.
- ✓ Look for nylon or silk dental floss that is uncoated or coated in natural wax.

In your community:

- ✓ Tell retailers and manufacturers you want products made without PFAS.
- ✓ Urge your local water utility to test for PFAS.
- ✓ Ask your state legislators to set up a statewide water and blood testing program.
- ✓ Encourage your state to follow the lead of other states in creating more health protective drinking water limits.
- ✓ Ask your elected officials to support restrictions on PFAS in consumer products and remediation of contaminated sites.
- ✓ Find out about local groups working to protect water quality by visiting:

www.pfas-exchange.org

Clinicians

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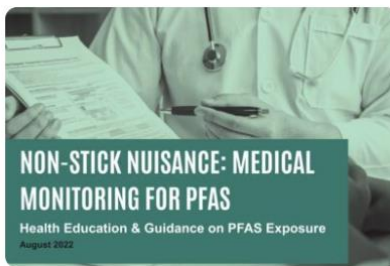
MEDICAL GUIDANCE

**Medical Screening Guidance
- for clinicians**



MEDICAL GUIDANCE

**Medical Screening Guidance
- for people in PFAS-
impacted communities**



MEDICAL GUIDANCE, VIDEO

**Non-stick Nuisance: Medical
Monitoring for PFAS**



FACT SHEET

**How to Reduce Your
Exposure to PFAS**



MEDICAL GUIDANCE

Blood Testing Labs



FACT SHEET

**PFAS and the Immune
System: What Do We Know?**

Blood Testing Labs & What You Need to Know

Find a lab

Purpose

This spreadsheet is intended to provide information to individuals seeking a test to measure PFAS levels in their blood. It is not intended to replace information from a person's doctor or other medical professional.

For general information about ordering blood tests

The PFAS-REACH study has developed a separate guidance document with general information about questions to ask laboratories when seeking blood tests and about what blood tests can and cannot tell you. This [document is available](#) on the [PFAS-REACH website](#).

Click Here

Important note

While the PFAS-REACH team strives to present up-to-date information about chemical testing laboratories, please note that laboratories may have more updated information about the types of PFAS they can measure, the sensitivity of their analyses, and cost. If you notice outdated information or know of other laboratories that offer blood testing, please contact our team at pfas-reach@silentspring.org.



PFAS blood testing: What you need to know

For people in PFAS-impacted communities and occupations

Purpose

This document is intended as a guide for individuals who are seeking PFAS blood testing. Residents of communities with local sources of contamination and people who may have been exposed to high levels of PFAS at their workplace may seek a PFAS blood test to learn more about their exposure. This document provides information about what you can and can't learn from a PFAS blood test, how to find a lab to conduct the testing, questions to ask a lab about their services, and tools to help you with interpretation and action.

What can I learn from a PFAS blood test?

A PFAS blood test measures the levels of certain PFAS chemicals in a person's blood at the time of the test. The results provide an indication of how much PFAS has entered your body over time. You can compare your results to levels found in other groups of people to determine whether your levels are elevated. Results can also provide a baseline so you can monitor changes over time, and they can support actions by agencies to reduce community exposures.

Results can be shared with your doctor for consideration as a risk factor for associated health outcomes and can inform conversations about reducing PFAS exposure and monitoring your health.

What won't a PFAS blood test tell me?

A PFAS blood test can't tell you where the PFAS in your body came from or how long you've been exposed. PFAS can come from many different sources including drinking water, food, and consumer products. Nearly everyone has some measurable amount of PFAS in their blood.

A blood test also doesn't directly indicate whether any health conditions you are experiencing were caused by PFAS exposure or definitively predict whether you are likely to develop certain health problems in the future.

How do I get a PFAS blood test?

Your doctor may be able to order a PFAS blood test. Providers should use ICD-10 diagnosis code Z13.88, and if ordering a test through Quest, they should use Test Code 39307 and CPT code 82542. Let your provider know you prefer a lab that measures both linear and branched isomers and a comprehensive panel that includes many compounds (see explanation on next page).

If your doctor cannot order the test, ask if they can help with a blood draw. Either way, you can contact a lab directly to request the test.

How do I find a lab?

Several labs in North America currently offer PFAS blood testing to individuals: [AXYS Analytical](#), [EmpowerDX](#), and [Eurofins](#). AXYS and Eurofins measure PFAS in blood serum, and EmpowerDX offers a home finger-prick test. [NMS Labs](#) does not offer tests to directly to individuals, but does provide blood testing to other entities, including Quest and LabCorp that do offer testing to individuals through clinicians.

For information about price, specific chemicals tested, and lab requirements, see our online guide (bit.ly/pfas-blood-test).

A note about litigation

If you are considering legal action, consult a lawyer before testing your blood. Discovery of PFAS in blood may start the clock on a statute of limitations that could prevent you from litigating in the future. Note that certain documentation may be required in legal settings, so you may need a blood draw (rather than a finger-prick) by a phlebotomist who can serve as a documented witness.

Blood draw vs. finger-prick tool

- Most labs require a **blood draw** by a phlebotomist so they can test a large amount of your blood. This has been preferred for many years, is well studied, and may have legal benefits.
- EmpowerDX (part of Eurofins) offers a **finger-prick tool** that allows you to collect a sample at home and will test your whole blood. Note that if PFAS levels in your blood are low, this test may be less likely to detect the PFAS.

Limitations you may encounter

- Health insurance may not cover costs.
- The maximum number of PFAS that can be tested is around 40. This is a small number compared to the thousands of PFAS that exist.

Questions to ask when choosing a lab

Selecting a laboratory to conduct PFAS blood testing can be a confusing process. Here are some questions that you may want to keep in mind as you ask for information from blood testing laboratories.

1. **What is the cost? Does it include shipping and blood draw?** PFAS blood testing can be expensive. Depending on the lab and the number of chemicals tested, the test typically costs in the range of \$400-\$600.
2. **Do you conduct testing for individuals or only for multiple samples?** Some labs will send a kit for an individual to provide one blood sample for analysis. Others require a larger group of people.
3. **How do I get a blood sample? Are there clinics you work with? Can you help find one? Can a clinic handle shipping or would I need to do that myself?** Finding a phlebotomy clinic to do the blood draw, process the sample, and send it to a lab can be a challenge. Sometimes the lab or your doctor may be able to help. If the clinic does not handle shipping, you can also ask if there are specific instructions for sending your sample. A blood sample drawn at a clinic by a phlebotomist should typically be shipped overnight on dry ice (which requires special handling), whereas a finger-prick sample can be shipped at room temperature or overnight on regular ice.
4. **How many PFAS chemicals does the lab test for, and which ones?** Some labs only test for a few PFAS chemicals, while others test for over 40. Two of the most common are PFOA and PFOS. Testing for more PFAS at low detection limits will help you understand your exposure to a broader range of PFAS.
5. **What are the lab's detection limits?** Detection limits refer to the lowest levels of PFAS in blood that a lab can identify and measure. Lower detection limits are preferable because they indicate that the test measures lower levels of PFAS. Our [online guide to PFAS lab testing](#) provides detection limits for specific labs in North America. Detection limits are often in the range of 0.1 to 1 parts per billion (ppb), also written as nanograms per milliliter (ng/mL). Note that the levels of PFAS in whole blood are around half the levels in serum (the liquid part of blood), since PFAS tend to be more concentrated in serum. If you have whole blood tested (for instance, with a finger-prick tool), the test will be less sensitive than a test that measures serum, and you will need to be sure that you take this into account when comparing your result to other results.
6. **Does the lab test both linear and branched isomers?** Some PFAS chemicals are present in blood as a mixture of related chemical structures called **isomers**. Most labs will report the total amount of linear and branched isomers, but some labs only report linear isomers. Measuring only linear isomers will underestimate the amount of these PFAS chemicals in your blood. Results for the general population reported by the CDC's NHANES testing program are based on the sum total of both linear and branched isomers, and can't be directly compared to the results of testing that only includes linear isomers.
7. **How long does it take to get my results?** This may take 1-4 weeks or longer, and may vary by lab.
8. **Does your lab work with any insurance companies?** The top PFAS labs currently cannot take insurance. In some cases, insurance companies will cover the cost of PFAS testing but the lab options may be limited. You can talk with your doctor's office or health insurance provider to determine what steps are needed for the cost of the test to be covered. New Hampshire requires insurance providers to cover test costs.

How can I interpret my PFAS blood test results?

- **Compare your results.** Our PFAS-REACH ["What's My Exposure"](#) tool will compare your PFAS blood levels with others in the U.S. and provide other useful information.
- **Talk to your doctor.** Our PFAS-REACH medical screening guidance, ["PFAS Exposure: Information for patients and guidance for clinicians,"](#) has information to help you discuss PFAS blood testing with your doctor.

For more information about labs

Our online guide, ["Information about PFAS blood testing laboratories for individuals,"](#) provides updated information about blood testing labs in North America.

bit.ly/pfas-blood-test



Click Here

Lab	# of PFAS tested	Reporting limit	Testing procedure	Cost	Notes	Sample report
Labs that work directly with individuals						
EmpowerDX At-Home PFAS Blood Test (Eurofins subsidiary)	16 PFAS	Reporting limit: 0.1-0.5 ng/mL Method detection levels (MDLs) range from 0.05 - 0.144 ng/mL	- Order online, delivered to your home in 5 business days - Complete finger prick and mail it to the company's lab via FedEx with a prepaid shipping label - Whole blood test	-\$249 per test	- 90 business days turnaround time	View sample report (Will only include CDC NHANES analytes)
PFAS Exposure Blood Test (Eurofins)	45 PFAS	Reporting limit: 0.1-0.5 ng/mL Method detection levels (MDLs) range from 0.05 - 0.144 ng/mL	- Complete finger prick and mail it to company's lab. Samples are directed to Eurofins Sacramento. - Serum tests are available (see website).	-\$425 per test, including kit and shipping both ways	- Does not have capacity to take large batches of samples	View sample report
Quest Diagnostics PFAS Test Panel (Quest)	9 PFAS	0.1 ng/mL	- Must be 18 years or older - Sample collection can be at-home (with a mobile phlebotomist) or in-person at a Quest facility - Purchases not permitted in Alaska, Arizona, or Hawaii	- \$315 per test - Additional fees may apply, including in-home visits	- 7-10 business days turnaround time	View sample report
Labs that do <u>not</u> work with individuals						
NMS Labs	16 PFAS	0.1 ng/mL	- NMS labs (Pennsylvania) offers PFAS testing through a clinician request and does not currently offer tests to directly to individuals - Serum or plasma test	- PFASure Panel cost \$470 - Does not accept private payments (doctor or lawyer is billed)	- Does not work directly with individuals, only with lawyers or doctor's office - Listed as a PFAS blood testing resource in NASEM PFAS guidance document - 7-14 day turnaround time - LabCorp uses NMS	Not applicable
AXYS Analytical	40 PFAS analytes including legacy PFAS, replacement compounds, and coethers	0.1-1 ng/mL	- Does not coordinate blood draw - AXYS will send a sample collection kit to customer	- \$420-\$570, dependent on sample size and official quote - Price includes test kit and shipping costs - Not covered by insurance	- Minimum batch size is 6 (one price per six tests) - Higher number of samples, more cost effective - 30 business days turnaround time	Not applicable
*Battelle no longer offers PFAS serum tests, as of March 2022.						

[Click Here](#)

Exposure Tool

Have you had your drinking water or blood tested for PFAS? Do you need help interpreting your results?

Use ***What's My Exposure*** to better understand what your results mean. Our online tool will create a personalized report that shows how your levels compare with state and federal health guidelines, provides information on health effects, and shares tips for reducing your exposures.

[Get started!](#)[Click Here](#)

- In Your Home
- In Your Community
- Treat Your Water

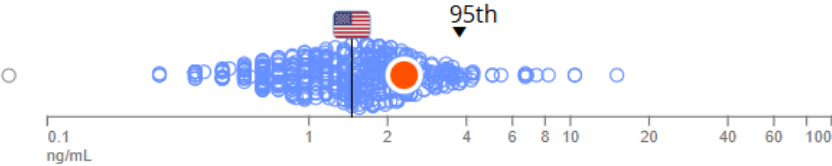
Download Your
Report

Sign Out

PFOA (perfluorooctanoic acid)



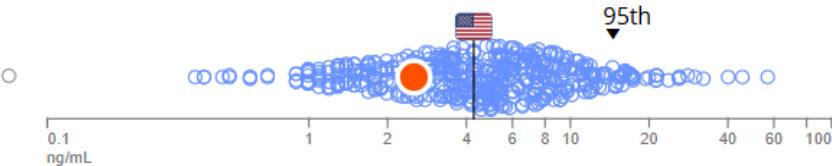
The level of PFOA in your blood is higher than 75% of Americans.



PFOS (perfluorooctane sulfonic acid)



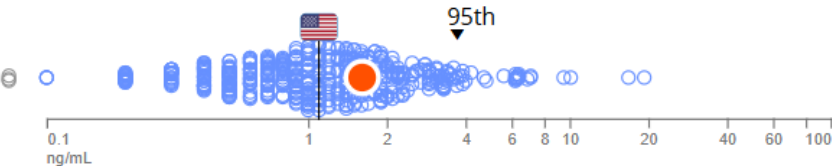
The level of PFOS in your blood is lower than most Americans.



PFHxS (perfluorohexane sulfonic acid)



The level of PFHxS in your blood is similar to a typical American.



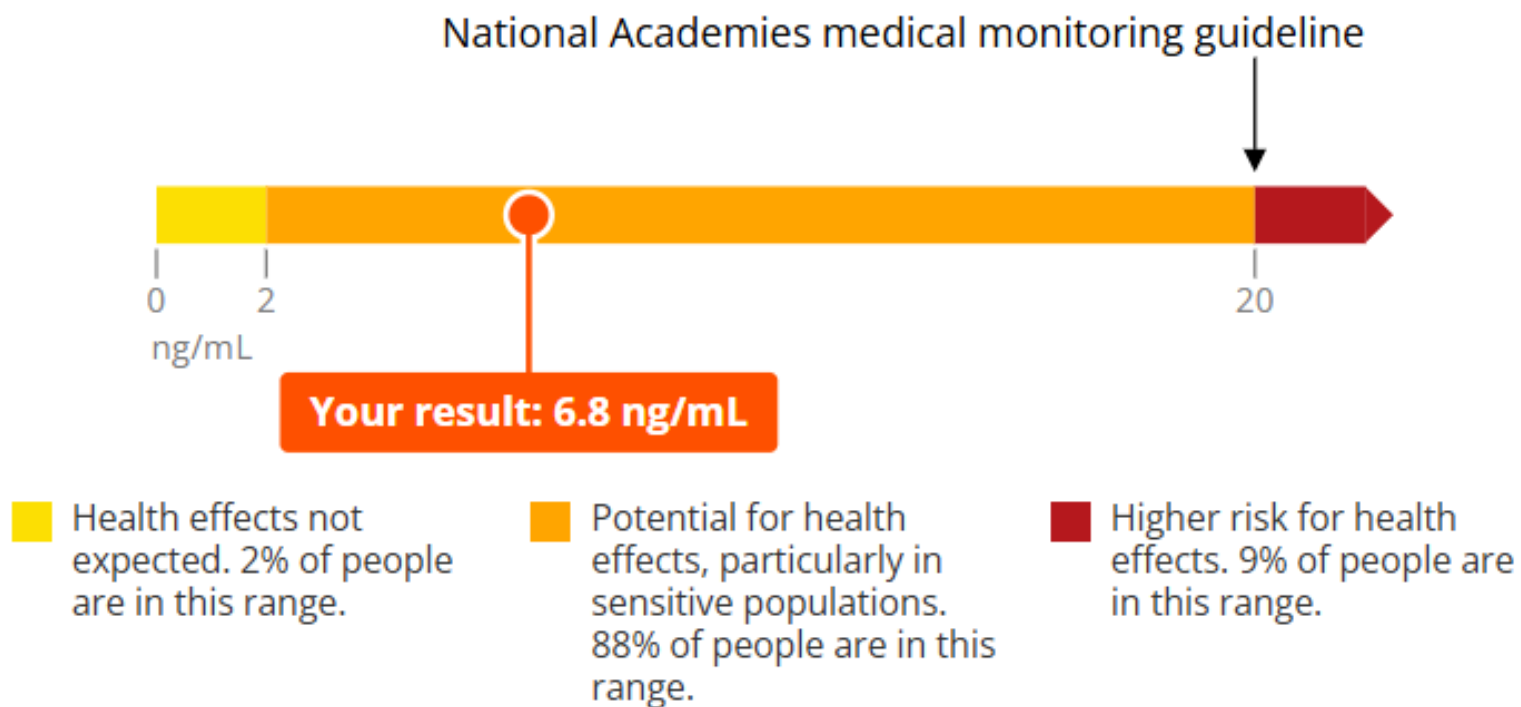
Graph Legend

- your result
- your result (not detected)
- results for other U.S. samples
- results for other U.S. samples where the chemical was [not detected](#)
- 🇺🇸 US median
- ▼ 95th US 95th percentile

7 common PFAS (PFOS, PFOA, PFNA, PFHxS, PFDA, PFUnDA, MeFOSAA)

i At your level (between 2 and 20 ng/mL) the National Academies say there is potential for PFAS-related health effects, especially among pregnant people and children.

i The level of PFOS, PFOA, PFNA, PFHxS, PFDA, PFUnDA, MeFOSAA in your blood is similar to a typical American.



What other guidelines are we showing?

High exposure to certain PFAS chemicals has been linked to harmful health effects. Some of these effects may occur at levels typically found in the general population. Whether PFAS exposure affects a person's health also depends on their age, diet, genes, other environmental exposures, and other factors. The same level of exposure to PFAS might cause disease in one person but not another.

This report compares the sum of seven PFAS chemicals in your blood to recommendations from the [National Academies of Sciences, Engineering, and Medicine](#). To help doctors care for patients exposed to PFAS, an expert panel of medical professionals and scientists provided recommendations for health screenings based on a patient's PFAS blood levels. If you are concerned about your PFAS exposure or have PFAS blood levels above 20 ng/mL, consider bringing this information to your doctor during your next visit.

Below is a summary table of the medical monitoring guidelines.

If your PFAS blood level is...	Then...	Screening recommendation
Less than 2 ng/mL	PFAS-related health effects are unlikely.	None
Between 2 to 20 ng/mL	PFAS-related health effects are possible.	Routine preventative care (e.g., screenings at your annual physical)
Greater than 20 ng/mL	You have increased risk of PFAS-related health effects.	Routine preventative care and additional screening for high cholesterol, thyroid function, kidney and testicular cancer, and ulcerative colitis

Clinicians

Because PFAS are so ubiquitous in the environment and exposures are so widespread, it's important for clinicians to be informed. Below are resources to help guide you in your practice.



MEDICAL GUIDANCE

Medical Screening Guidance – for clinicians

Clinicians

[Download](#)



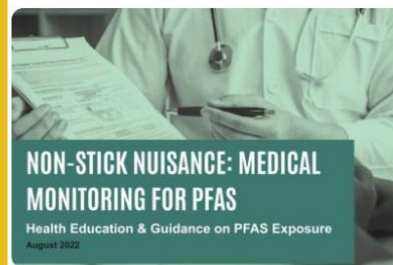
MEDICAL GUIDANCE

Medical Screening Guidance – for clinicians



MEDICAL GUIDANCE

Medical Screening Guidance – for people in PFAS- impacted communities



MEDICAL GUIDANCE, VIDEO

Non-stick Nuisance: Medical Monitoring for PFAS



FACT SHEET

How to Reduce Your Exposure to PFAS



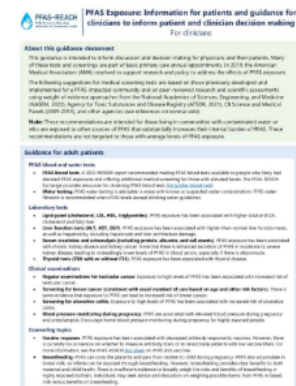
MEDICAL GUIDANCE

Blood Testing Labs



FACT SHEET

PFAS and the Immune System: What Do We Know?



About this guidance document

This guidance is intended to inform discussion and decision making for physicians and their patients. Many of these tests and screenings are part of basic primary care annual appointments. In 2019, the American Medical Association (AMA) resolved to support research and policy to address the effects of PFAS exposure.

The following suggestions for medical screening tests are based on those previously developed and implemented for a PFAS-impacted community and on peer-reviewed research and scientific assessments using weight of evidence approaches from the National Academies of Sciences, Engineering, and Medicine (NASEM, 2022), Agency for Toxic Substances and Disease Registry (ATSDR, 2021), C8 Science and Medical Panels (2005-2013), and other agencies.

Note: These recommendations are intended for those living in communities with contaminated water or who are exposed to other sources of PFAS that substantially increases their internal burden of PFAS. These recommendations are not targeted to those with average levels of PFAS exposure.

Guidance for adult patients

PFAS blood and water tests

- **PFAS blood tests.** A 2022 NASEM report recommended making PFAS blood tests available to people who likely had elevated PFAS exposures and offering additional medical screening for those with elevated levels. The PFAS-REACH Exchange provides resources for obtaining PFAS blood tests (bit.ly/pfas-blood-test).
- **Water testing.** PFAS water testing is advisable in areas with known or suspected water contamination. PFAS water filtration is recommended when PFAS levels exceed drinking water guidelines.

Laboratory tests

- **Lipid panel (cholesterol, LDL, HDL, triglycerides).** PFAS exposure has been associated with higher total and LDL cholesterol and fatty liver.
- **Liver function tests (ALT, AST, GGT).** PFAS exposure has been associated with higher-than-normal liver function tests, as well as hepatotoxicity, including hepatocyte and liver architecture damage.
- **Serum creatinine and urinalysis (including protein, albumin, and cell counts).** PFAS exposure has been associated with chronic kidney disease and kidney cancer. Note that there is enhanced excretion of PFAS in moderate to severe kidney disease, leading to misleadingly lower levels of PFAS in blood serum, especially if there is albuminuria.
- **Thyroid tests (TSH with or without FT4).** PFAS exposure has been associated with thyroid disease.

Clinical examinations

- **Regular examinations for testicular cancer.** Exposure to high levels of PFAS has been associated with increased risk of testicular cancer.
- **Screening for breast cancer** (consistent with usual standard of care based on age and other risk factors). There is some evidence that exposure to PFAS can lead to increased risk of breast cancer.
- **Screening for ulcerative colitis.** Exposure to high levels of PFAS has been associated with increased risk of ulcerative colitis.
- **Blood pressure monitoring during pregnancy.** PFAS are associated with elevated blood pressure during pregnancy and preeclampsia. Encourage home blood pressure monitoring during pregnancy for highly exposed people.

Guidance for pediatric patients

Laboratory tests

- **Lipid panel (cholesterol, LDL, HDL, triglycerides).** PFAS exposure has been associated with higher total and LDL cholesterol and fatty liver.
- **Liver function tests (ALT, AST, GGT).** PFAS exposure has been associated with higher-than-normal liver function tests, as well as other evidence of hepatotoxicity, including hepatocyte and liver architecture damage.
- **Thyroid test (TSH with or without FT4).** PFAS exposure has been associated with thyroid disease.

Clinical examinations

- **Screening for testicular cancer during annual examinations (starting around onset of adolescence).** PFAS exposure has been associated with increased risk of testicular cancer.

Counseling topics

- **Vaccine response.** PFAS exposure has been associated with decreased antibody response to vaccines. There is currently no consensus on whether to measure antibody titers or revaccinate pediatric patients with low vaccine titers.
- **Endocrine disruption.** PFAS have been associated with lower levels of sex hormones in young children.

Acknowledging stress and addressing uncertainty

Uncertainty about long-term health effects can cause stress among patients who have been exposed to PFAS contamination.

Previous studies have shown that providing results of chemical exposure tests, along with contextual information and steps for action, can make people feel empowered (Brody et al., 2016).

ATSDR has developed resources for medical professionals to address concerns of residents in communities impacted by contamination: www.atsdr.cdc.gov/stress/resources/clinicians-tip-sheet.html

► References

MEDICAL GUIDANCE

Medical Screening Guidance – for people in PFAS- impacted communities

Impacted Communities Clinicians

Download

Elimination



Purpose

This guidance document is intended for people living in communities with contaminated water or who have had some other source of substantial exposure to PFAS. This document is not targeted to those a

Water

What is medical screening?

Medical screening is testing for early signs of disease before an individual would normally seek care. Screening for certain conditions or subclinical changes may be advised for those who currently have or previously had elevated exposure to PFAS. Medical screening may identify early indicators of disease and allow you to work with your clinician to determine next steps.

How can I reduce the amount of PFAS in my body?

For people with known elevated PFAS levels in their body, the most important way to reduce the amount of PFAS in the body is to avoid new exposures. Some PFAS chemicals, like PFOS and PFOA, can remain in the body for years. Currently, there are **no medically approved treatments** to speed up removal of PFAS from the body.

- Agents or processes known to remove PFAS from the body, such as cholestyramine, phlebotomy, hemodialysis, or apheresis, are not medically approved treatments for PFAS specifically.
- Chelation and “alternative” medicine programs, such as detoxes and cleanses, are not known to remove PFAS from the body. Many of these can also pose their own health risks.

How can I avoid PFAS exposure?

PFAS exposures are widespread, so it is difficult to avoid PFAS entirely. However, you can take steps to reduce your personal exposure going forward:

- If you know or suspect PFAS to be in your drinking water, you can use a filter to lower the levels. Visit the PFAS Exchange’s [drinking water factsheet](#) to learn more about where to find a lab to test your water for PFAS, and resources to find filters for removing PFOA and PFOS in your drinking water.
- Avoid stain-resistant carpets, treatments, and waterproofing sprays. Green Science Policy Institute’s [PFAS Central](#) maintains a current list of PFAS-free products.
- Avoid take-out containers and other food packaging that may contain PFAS by eating more fresh foods and home-cooked meals.

For more suggestions, visit the PFAS Exchange’s [exposure reduction tips](#) and download Silent Spring Institute’s [Detox Me smartphone app](#).

Reducing PFAS blood levels

- Important to limit new exposures
- No medically approved treatments to speed up PFAS removal from the body
- Clinical trials have evaluated possible approaches.
 - Cholestyramine, a cholesterol-lowering drug, lowered PFAS levels among 45 people in a 3-month Danish trial (Møller et al. 2024)
 - Plasma and blood donation lowered PFAS levels among 285 firefighters in a year-long Australian trial (Gasiorowski et al. 2022)

Clinicians

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VIDEO MEDICAL GUIDANCE

Non-stick Nuisance: Medical Monitoring for PFAS

Clinicians

A one-hour Continuing Medical Education (CME) course prepares clinicians to address PFAS

Available for AMA PRA Category 1 Credit™

This course aims to educate healthcare providers in addressing patient concerns about PFAS exposures. The presentations discuss individual risk factors, screening recommendations, PFAS exposure assessment, prevention and follow-up approaches, blood testing, and additional resources for clinicians. In addition, listen to real-life stories of people affected by PFAS contamination navigating the health risks of PFAS. The presentation promotes competencies for understanding and preventing PFAS environmental exposures and diseases.



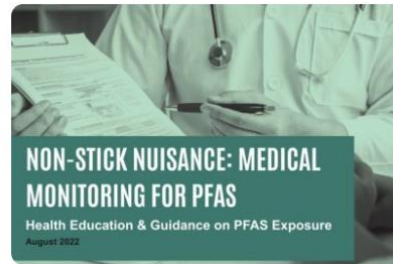
MEDICAL GUIDANCE

Medical Screening Guidance - for clinicians



MEDICAL GUIDANCE

Medical Screening Guidance - for people in PFAS-impacted communities



MEDICAL GUIDANCE, VIDEO

Non-stick Nuisance: Medical Monitoring for PFAS



FACT SHEET

How to Reduce Your Exposure to PFAS



MEDICAL GUIDANCE

Blood Testing Labs



FACT SHEET

PFAS and the Immune System: What Do We Know?



CME course for clinicians

- Updated in 2026
- One-hour course available as stand-alone YouTube video and for CME credit through Michigan State University
- Topics include:
 - PFAS exposures and health effects
 - PFAS blood tests (ordering, interpreting)
 - Medical screening guidance
 - Community perspectives



Scientists/researchers:

- Linda Birnbaum, PhD, DABT, ATS
- Laurel Schaider, PhD
- Phil Brown, PhD
- Courtney Carignan, PhD

Clinicians:

- Alan Ducatman, MD
- Elizabeth Friedman, MD, MPH

Community leaders:

- Andrea Amico
- Nate Barber
- Jaime Honkawa
- Sandy Wynn-Stelt



LISTSERV

Vision: A collaborative, professional forum for medical and public health practitioners to share evidence-based information on PFAS including clinical implementation and interpretation of blood testing, strategies for reducing body burden and exposure, and best practices for medical screening and patient management. We aim to promote informed, ethical, and patient-centered care while supporting sound public health practice.

To Join:

- Send an email with the subject line "subscribe" to PFASinPatientCare@msu.edu
- Please tell us your name, credentials (e.g. MD, DO, PA, RN, LMSW, PhD, MPH), and interest in PFAS
 - Or email Courtney Carignan at MSU directly: carigna4@msu.edu

PFAS and Medical Guidance



Complete a FREE CME to learn about PFAS, a harmful class of contaminants, and help improve medical education

1-hour and virtual (1-credit)

Option to earn a \$100 gift card for an interview or focus group

For all professionals and students in medicine, nursing, and public health

Learn More



TO LEARN MORE

EMAIL:

maruzzo@silentspring.org

OR VISIT:

pfas-exchange.org/clinicians/

REFERENCES

GOVERNMENT DOCUMENTS

Agency for Toxic Substances and Disease Registry (**ATSDR**). 2021. Toxicological Profile for Perfluoroalkyls.

<https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf>

European Food Safety Authority (**EFSA**). 2021. Risk to Human Health Related to the Presence of Perfluoroalkyl Substances in Food. efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223

National Academies of Sciences, Engineering, and Medicine (**NASEM**) 2022. Guidance on PFAS Testing and Health Outcomes. www.nationalacademies.org/our-work/guidance-on-pfas-testing-and-health-outcomes

U.S. Environmental Protection Agency (**EPA**). 2024. Human Health Toxicity Assessment for Perfluorooctanoic Acid (PFOA) and Related Salts. EPA Document No. 815R24006. <https://www.epa.gov/system/files/documents/2024-05/final-human-health-toxicity-assessment-pfoa.pdf>

U.S. Environmental Protection Agency (**EPA**). 2024. Human Health Toxicity Assessment for Perfluorooctane Sulfonic Acid (PFOS) and Related Salts. EPA Document No. 815R24007. <https://www.epa.gov/system/files/documents/2024-05/final-human-health-toxicity-assessment-pfos.pdf>

COMMENTARY

Criswell et al. 2024. Clinical implications of new drinking water regulation for “forever chemicals”. *JAMA*. 332: 785-786. <https://jamanetwork.com/journals/jama/article-abstract/2822469>

HELPFUL LINKS

- PFAS Exchange: www.pfas-exchange.org
- Silent Spring Institute: www.silentspring.org
- Northeastern University SSEHRI: www.pfasproject.com
- STEEP Superfund Research Program: web.uri.edu/steep
- Green Science Policy Institute: www.pfascentral.org
- National PFAS Contamination Coalition: www.pfasproject.net
- NC State University: <https://superfund.ncsu.edu/pfas-hub>

THANK YOU!

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Northeastern University



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