

Human Health Risks of Exposure to PFAS

PFAS Interagency Task Force

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What are PFAS?

PFAS = Per- and polyfluoroalkyl substances

- In widespread use since the 1950s
- Resistant to water, grease, stains
- Have been used in:
 - Firefighting foam
 - Industrial processes
 - Consumer products (e.g., on-stick cookware)



What are PFAS?

PFOS and PFOA most extensively produced and studied PFAS chemicals:

Abbreviation	Chemical name
PFHxS	Perfluorohexanesulfonic acid
PFHpA	Perfluoroheptanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid

How are we exposed to PFAS?

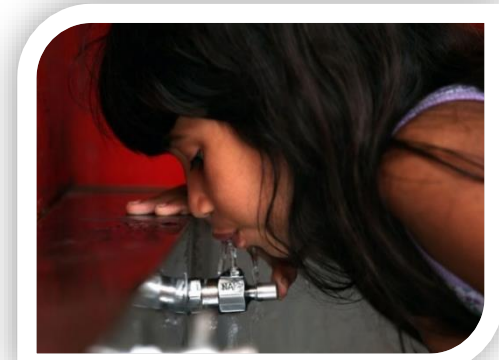
- Nearly all people are exposed via food and consumer products
- Some are exposed from drinking water contaminated with PFAS
 - Local or site-related contamination near industrial facilities or where firefighting foam used (e.g., airports)



Since 1999, the National Health and Nutrition Examination Survey (NHANES) has measured PFAS levels in blood in the U.S. population. Most people in the United States have been exposed to PFAS and have PFAS in their blood.

How is PFAS Regulated?

- MassDEP regulates drinking water under the federal Safe Drinking Water Act.
- Enforceable level of PFAS in drinking water (MCL) established by DEP October, 2020
 - PFOS + PFOA + PFNA + PFHpA + PFHxS + PFDA = 20 ppt
 - ppt = parts per trillion (one part per trillion = one grain of sand in an Olympic-size swimming pool)
- MA Drinking Water Standard is more stringent than Federal EPA Guideline
- DEP also established standards for PFAS clean-up at hazardous waste sites



PFAS and Health

- Effects from exposure depend on:
 - Amount
 - How often and how long
 - Personal factors
- In humans, PFAS *may* be associated with:
 - Increased cholesterol
 - Immune system effects
 - Changes in thyroid and related hormones
 - Decreased fertility
 - Increased risk of high blood pressure or pre-eclampsia in women



PFAS and Health

- Some evidence suggests PFAS can increase cancer risk:
 - Some, but not all studies in humans, show a possible link between PFOA exposure and prostate, kidney, and testicular cancers
 - US EPA considers evidence to be suggestive
 - Scientists continue to research cancer potential
- The risk of cancer depends on many factors – how much and how long someone is exposed plus their health status and genetics



NTP
National Toxicology Program
U.S. Department of Health and Human Services



PFAS and Health

- Current medical/clinical recommendations are focused on managing existing patient needs, and not the PFAS exposure.
 - For asymptomatic individuals - no deviations from established standards of medical care if exposed to PFAS
 - For patients with signs or symptoms of disease – treated with same established standards of care for patients without PFAS exposure
- Federal Agencies are sponsoring a study to consider additional advice for clinicians.
 - Such as when to order lab tests, whom to test, how to test, what to test for, and the risks of testing.

Ways to limit exposure to PFAS

- Avoid cleaning products with “perfluor-” or “polyfluor-” in their ingredient names
- Avoid products with PTFE (used in non-stick coatings)
- Avoid textiles treated with stain-resistant coatings
- Using a damp cloth, frequently clean surfaces young children may contact
- If exposed to contaminated drinking water, switch to PFAS-free bottled water.

It is almost impossible to eliminate all PFAS exposure

Current Studies/Activities to Address PFAS

- Federal efforts involve US EPA, CDC, ATSDR, and FDA:
 - Federally funded PFAS exposure and health outcome studies
 - Development of standardized analytical methods to measure PFAS in various media
 - Development of toxicological criteria to indicate when exposure is unsafe
 - Surveillance of food and food contact materials
- Federally funded health and exposure studies are being conducted in Massachusetts as part of the national strategy



PFAS Exposure Assessments Provide Information to Protect Our Community



CDC/ATSDR staff will meet with community members and answer questions about the exposure assessments.

Households will be randomly selected and invited to participate.

Participants will provide blood and urine samples. A sampling center will be set up in the community.

Environmental samples will be collected from some participant's homes.



CDC/ATSDR staff will host a **community event to discuss results.**

CDC/ATSDR will **review all the results and write a report** describing their findings and recommendations.

Individual **test results will be sent to participants.**

Environmental and blood and urine **samples will be analyzed** at a lab.

PFAS Exposure Assessments Provide Information to Protect Our Community



Hampden County (MA) near Barnes Air National Guard Base
PFAS Exposure Assessment Participation

A total of
459
people



participated in the
exposure assessment:

410 adults
49 children

Those people represented

247
households

459 Hampden County Residents Participated in ATSDR Study

- Results mailed directly to participants' informing them of testing results (May 2020)
- One particular compound (PFH_xS) was ~ 4x higher than typical level
- Two other PFAS compounds were higher than national averages



Multi-site Study – PFAS Cooperative Agreement

- **Goal** - Learn more about the relationship between PFAS exposure in drinking water and health outcomes among differing populations.
- Collect information about the immune response, lipid metabolism, kidney function, thyroid disease, liver disease, glycemic parameters, and diabetes in PFAS exposed individuals.
- Enroll at least 2,100 children and 7,000 adults from communities exposed to PFAS-contaminated drinking water.
- 7 investigator-led teams – including Silent Spring Institute collecting information on health outcomes in Hyannis and Ayer, MA.

Current Studies/Activities to Address PFAS



DPH Bureau of Environmental Health PFAS Activities

- Regulates PFAS in drinking water sold in Massachusetts
- Respond to individual and community concerns on health risks from previous exposure to PFAS contaminated water, including review, analysis and reporting of health outcome data
- Pilot PFAS testing of recreational waterbodies
 - Measure levels in surface water and evaluate risks to swimmers
 - Measure levels in freshwater fish and evaluate fish consumption risks
- Coordinate with MassDEP and DMF on approach to sample shellfish for site-related contamination in Bourne
- Development of PFAS educational materials for training primary care providers