

# Health Effects of Perfluoroalkyl Substances (PFAS)

Stacey Cooper, MS

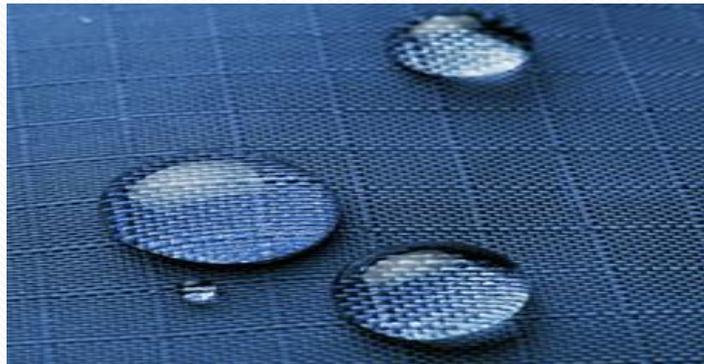
Environmental Public Health Program

Alaska Department of Health and Social Services



# What are PFAS?

- Human-made chemicals used for decades for both residential and industrial purposes.
- Used in fire fighting foams as well as products that are stain, grease, or water resistant (e.g., fast food containers, carpets, upholstery).
- They do not break down in the environment and can travel long distances in air and water.



# How Can I Be Exposed to PFAS?

- Drinking contaminated water
- Ingestion of contaminated food
- Incidental ingestion from hand-to-mouth transfer from surfaces treated with protectants or dust containing PFAS



# PFAS in Drinking Water

EPA lifetime health advisory recommends that the concentration of **PFOA and PFOS** in drinking water, individually or combined, not exceed **70 nanograms per liter (ng/L) or parts per trillion (ppt)**.

EPA health advisories are non-regulatory but provide recommendations.



**EPA**  
United States  
Environmental Protection  
Agency

**FACT SHEET**  
**PFOA & PFOS Drinking Water**  
**Health Advisories**

**Overview**

EPA has established health advisories for PFOA and PFOS based on the agency's assessment of the latest peer-reviewed science to provide drinking water system operators, and state, tribal and local officials who have the primary responsibility for overseeing these systems, with information on the health risks of these chemicals, so they can take the appropriate actions to protect their residents. EPA is committed to supporting states and public water systems as they determine the appropriate steps to reduce exposure to PFOA and PFOS in drinking water. As science on health effects of these chemicals evolves, EPA will continue to evaluate new evidence.

<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

# Health Effects of PFAS

- PFAS are an “emerging” contaminant which means that risk to human health and the environment may not be known.
- Studies have focused mainly on two PFAS: **PFOS** and **PFOA**. PFOS is the major PFAS found in some of the wells near the FAI.



# Health Effects of PFAS

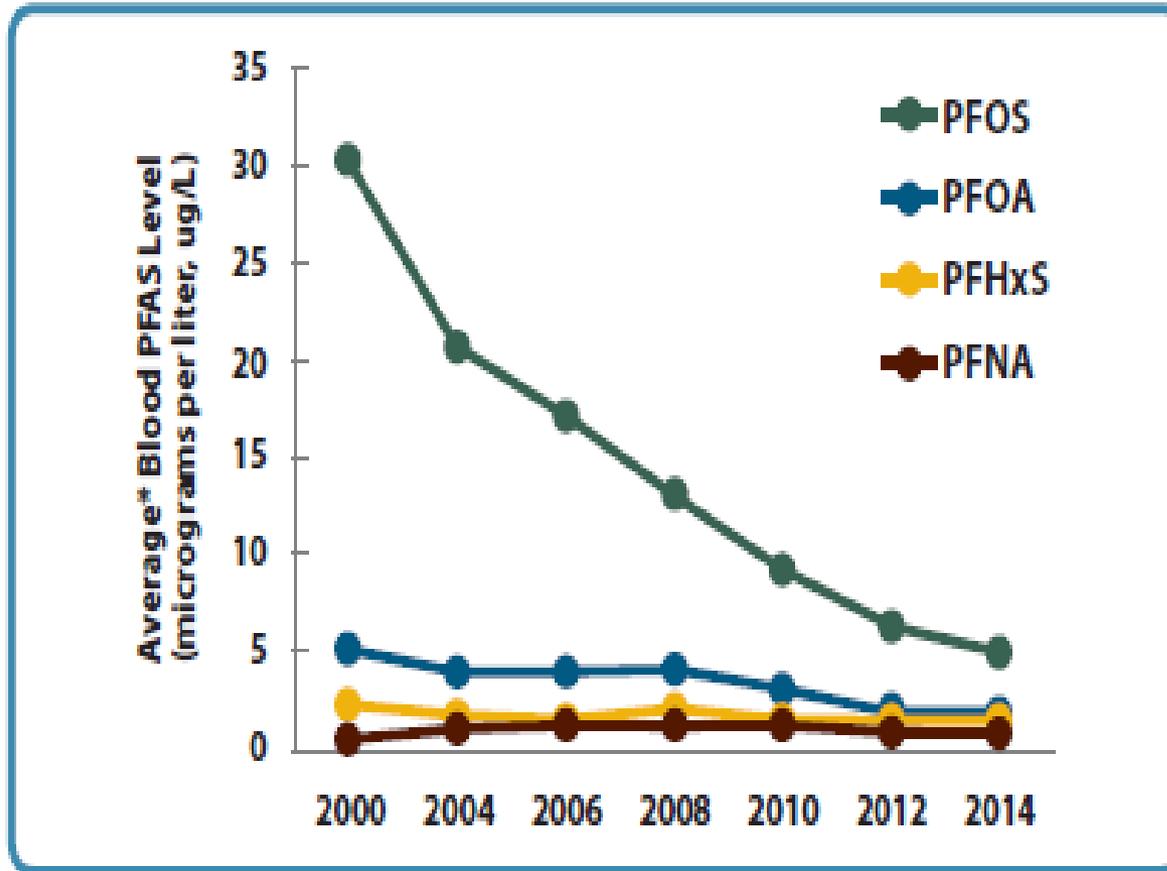
- In a U.S. national study (NHANES) nearly everyone had some level of PFAS in their blood (2,094 participants).
- If you have PFAS in your blood, it does not mean you will suffer adverse health effects
- Body's natural elimination processes are the only way to remove PFAS from the body.

# PFAS Half-life in Humans

<b>Substance</b>	<b>Estimated Half-life</b>
<b>Perfluorooctanoic acid (PFOA)</b>	<b>2-4 years</b>
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>5-6 years</b>
<b>Perfluorohexane sulfonic acid (PFHxS)</b>	<b>8-9 years</b>
<b>Perfluorobutane sulfonic acid (PFBS)</b>	<b>0.1 years</b>

[https://www.atsdr.cdc.gov/pfc/docs/pfas\\_clinician\\_fact\\_sheet\\_508.pdf](https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf)

# Blood Levels of the Most Common PFAS in People of US (2000-2014)

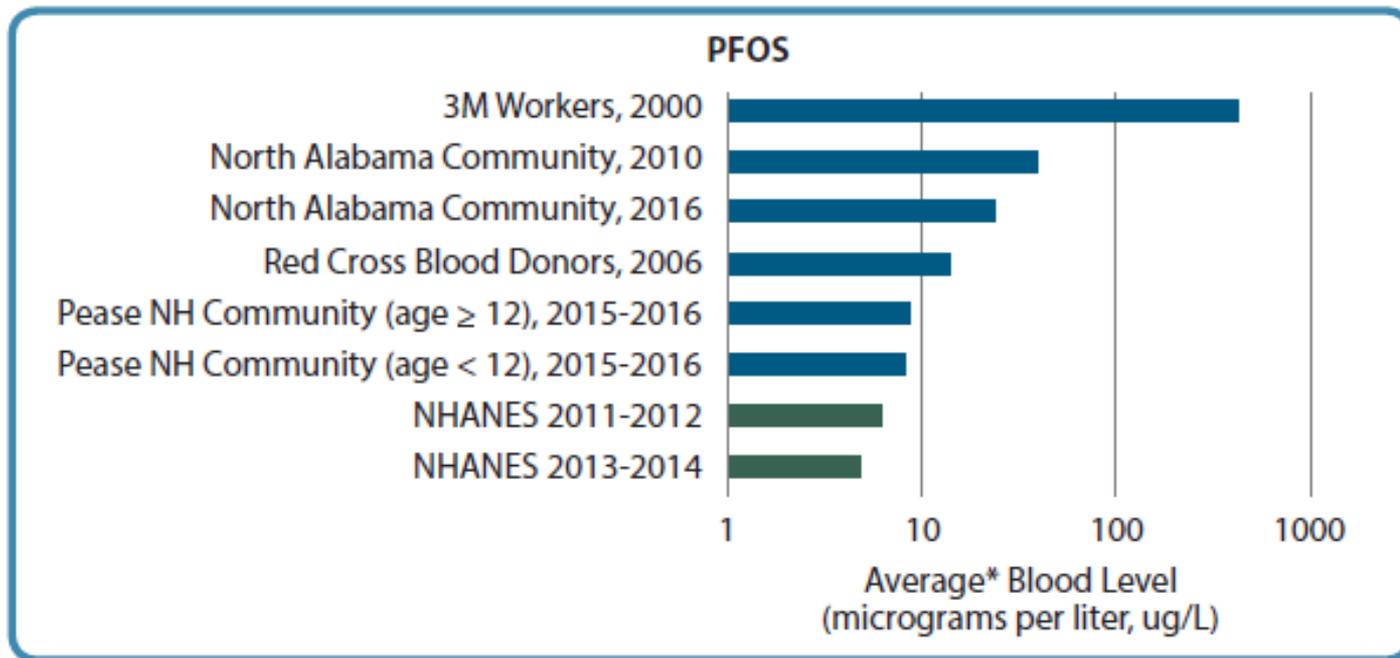


\*Data shown are geometric mean.

Note: As PFOS and PFOA are phased out and replaced, people may be exposed to other PFAS.

Data Source: Centers for Disease Control and Prevention. Fourth Report on Human Exposure to Environmental Chemicals, Updated Tables, (January 2017). Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

# Comparison of PFAS Levels in Blood PFOS

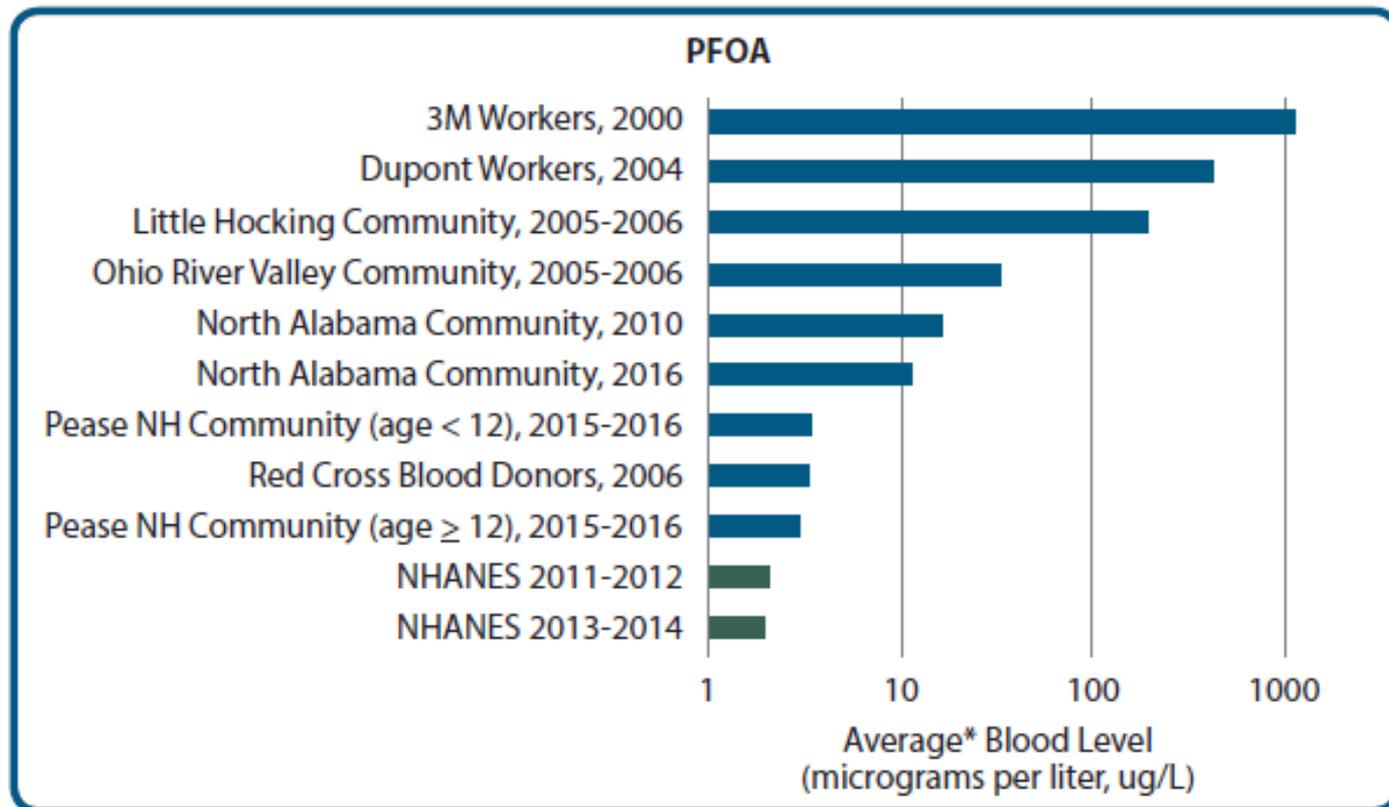


\* Average = geometric mean

# Comparison of PFAS Levels in Blood

## PFOA

### Blood Levels in People Who Were Exposed to PFAS

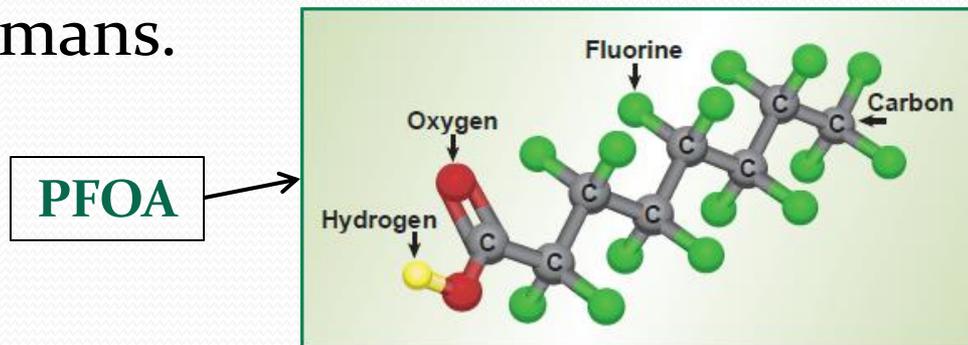


# Health Effects of PFAS

- Some studies suggest that exposure to PFAS above certain levels could be linked to:
  - Developmental effects in fetuses and offspring
    - Lower birth weight
    - Delayed development
  - Liver tissue damage
  - Immune effects (antibody suppression and immunity)
  - Thyroid effects (T<sub>4</sub> and TSH levels)
  - High cholesterol

# PFAS and Cancer Risk

- Some studies have linked exposures to **PFOA** with kidney and testicular cancer, but others have shown no cancer risk.
- World Health Organization's International Agency for Research on Cancer has found that **PFOA** is possibly carcinogenic to humans.
- EPA classified **PFOA** and **PFOS** as possibly carcinogenic to humans.



# Bathing and skin absorption

- Skin does not absorb enough PFAS to make bathing and showering a problem.
- PFAS do not irritate the skin or eyes in the levels found in your well water.
- PFAS do not move easily from water to air, so it is unlikely you will breath them in.



# Recommendations

- Drink water from an alternative source if PFAS in your well water are at or above EPA's Lifetime Health Advisory (LHA) – 70 nanograms per liter of water.
  - This goes for pets and livestock as well
- If your water is above the health advisory, using alternate water to brush your teeth will reduce your exposure to PFAS.
- It's OK to shower and bathe with your water.
- It's OK to clean your house and clothes with well water.

# Recommendations - Gardening

- If your water is below the health advisory level of 70 nanograms/liter PFAS, then it's OK to use in your garden.
- Information we have for water with PFAS levels over the health advisory levels is unclear.
- Some vegetables like lettuce and other leafy vegetables absorb more PFAS than root vegetables like potatoes and carrots.
- Peeling potatoes and carrots will help lower any PFAS contamination in those vegetables.

# Recommendations

- OK to breastfeed.  
Benefits of breastfeeding outweigh the potential risks.
- If PFAS levels in your well are above the health advisory level, we recommend using alternate drinking water if you are a breastfeeding mother.



**KEEP  
CALM  
AND  
CARRY ON  
BREASTFEEDING**

# Questions?

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