PFAS in Colorado

Ruth Powell Hutchins Water Center | September 28, 2022
Overview

- What is PFAS?
- History of PFAS
- Health Effects
- Chemistry
- Regulations
- Upcoming Technologies
- Statewide efforts
What is PFAS?
History

- Created in the 1940s and first began to appear in commercial products in the 1950s
  - Scotchgard (3M)
  - Teflon Pans (DuPont)
PFAS occurs in industrial and commercial processes
Sources and Receivers

Fire Foams

Consumers

Industrial Discharge

Drinking Water

People

Landfills

Environment

Wastewater
Health Effects

PFOA and PFOS can:

- Impact the immune system
- Increase cholesterol
- Decrease infant birth weight
- Cause changes in liver function
- Cause preeclampsia and high blood pressure during pregnancy
- Cause effects on thyroid hormones
- Increase the risk of kidney and testicular cancer (PFOA)
Environmental Impacts

- High Solubility
- Persistent in the Environment
- Bioaccumulation and biomagnify
The Chemistry of PFAS
Over 4,700 PFAS Compounds Exist

Short Chain: Less than 6 carbons
Long Chain: 6 or more carbons
What makes PFAS persistent in the Environment?
## Sampling Considerations

- **Cross contamination**

<table>
<thead>
<tr>
<th><strong>DOS</strong></th>
<th><strong>DON'TS</strong></th>
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</thead>
<tbody>
<tr>
<td>✓ Wear Cotton</td>
<td>× Use fabric softener on clothing</td>
</tr>
<tr>
<td>✓ Wear nitrile gloves/rubber boots</td>
<td>× Wear new waterproof or stain-treated clothing</td>
</tr>
<tr>
<td>✓ Use HDPE sampling materials</td>
<td>× Wear Gore-Tex</td>
</tr>
<tr>
<td>✓ Use silicon or HDPE tubing</td>
<td>× Wear Tyvek</td>
</tr>
<tr>
<td>✓ Use ice (wet ice, not blue)</td>
<td>× Wear cosmetics, moisturizer, hand cream</td>
</tr>
<tr>
<td>✓ Use sharpies</td>
<td>× Use Teflon containing materials such as lids on bottles/jar</td>
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<tr>
<td>✓ Use PFAS free sunscreens and insect repellent</td>
<td>× Use Post-it Notes or Rite in the Rain notebooks</td>
</tr>
<tr>
<td>✓ Wash hands frequently</td>
<td>× Don't handle or consume pre-wrapped food or snacks, carry-out food, fast food, or other food items while on-site during sampling</td>
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Health Advisories and Regulations
Federal PFAS Regulatory Timeline

1950s
Creation of PFAS Compounds

2003
Phasing out of PFOA and PFOS

2009
Provisional Health Advisory for PFOA and PFOS (2009)

2013-2015
UCMR3 for 6 PFAS Compounds

2016
Lifetime Health Advisory for PFAS and PFOA

2021
EPA Releases PFAS Roadmap

June 2022
New Lifetime Health Advisories for 4 PFAS Compounds

Late 2022
New Draft Rule
Federal actions to address PFAS

- EPA to regulate PFOA and PFOS in drinking water
- Nationwide drinking water monitoring: UCMR 5 (2023-2025)
- EPA published guidance on disposal of PFAS materials
- EPA exploring potential future PFOA and PFOS regulations under CERCLA/RCRA
- DoD to phase out PFAS-containing foams by Oct 2024
- FAA to stop requiring use of PFAS-containing foams by Oct 2021
- Phase out of PFAS in consumer products
- PFAS releases reported to EPA’s Toxics Release Inventory
- Research: health/environmental effects, replacement foams, test methods
PFAS Lifetime Health Advisories (June 2022)

What is a lifetime health advisory?

● Concentration at which adverse health impacts are not expected to occur over a lifetime
● Non-enforceable
● Considers all sources of exposure
● PFOA and PFOS considered "interim" because toxicology currently based on vaccine impacts, not carcinogenic impacts

The new health advisories for PFOA and PFOS are based on human studies in populations exposed to these chemicals.

Below detection limit for PFOA and PFOS in drinking water (non-regulatory)
○ Interim HA PFOA=0.004 ppt
○ Interim HA PFOS=0.02 ppt
○ Final HA PFBS=2000 ppt
○ Final HA GenX=10 ppt
Method Detection Limit vs Reporting Level

- The Reporting Level (RL) is the smallest concentration a lab can accurately and precisely quantify.
- Results above the Method Detection Limit (MDL) but below the RL can’t be precisely quantified but indicates the contaminant is present with 99% confidence.
- RL > MDL
  - CDPHE grant program lab RL - 2 ppt
  - CDPHE grant program lab MDL - 0.45 ppt
  - UCMR 5 RL - 4 ppt
- Most results coming directly from drinking water systems will only report data down to the reporting level.
New and Existing Treatment Technologies
Treatment Technologies for the Average Consumer

- Look for manufacturers that have demonstrated the water filter can remove PFAS to non-detectable levels. Examples to consider include:
  - Purefast Pitcher Filter Cartridge
  - Aquasana Claryum Countertop
  - Hydroviv undersink filter
  - Zero water faucet mount
  - Various Samsung and LG refrigerator filters are also certified to remove PFOS/PFOA certified
- Look for bottled water that has been treated with reverse osmosis.

Use alternate or treated water

- Drinking
- Cooking
- Preparing infant formula
- If possible, watering your produce garden

Use tap water

- Showering
- Brushing teeth
- Laundry and cleaning
- Washing produce
Treatment Technologies for Industrial Water Operations

➔ Reverse Osmosis (RO)

➔ Ion Exchange

➔ Granulated Activated Carbon (GAC)
Statewide Efforts
CDPHE PFAS Action Plan - identify contamination, reduce exposure and prevent further contamination
CDPHE Response

- CDPHE will keep providing facts to help inform water systems and the public
  - In home treatment guidance to reduce exposure
  - Pregnancy, infant feeding, and young children
  - PFAS guidance for healthcare professionals
  - [https://cdphe.colorado.gov/pfas-health](https://cdphe.colorado.gov/pfas-health)

- Following EPA’s recommendations in partnership with our water utilities:
  - Assess contamination, inform public if confirmed in tap water, reduce if possible
  - Working with all drinking water systems with confirmed results above the Reporting Level (RL) to notify their customers in partnership with us or through a Tier 2 public notice if necessary

- Utilities often shut off impacted wells or shift supplies until treatment can be installed
  - Widefield aquifer in 2016, Frisco and Commerce City in 2022
  - PFAS water quality issues create water quantity impacts
2020 Sampling Effort

2020 PFAS sampling project results

Colorado faces an emerging public health challenge from a group of chemicals called per-and polyfluoroalkyl substances (PFAS). To help communities learn if residents are at risk, the Colorado Department of Public Health and the Environment (CDPHE) offered free testing to public drinking water systems. Across the state, CDPHE sampled for 18 types of PFAS at:

- **400** Drinking water systems
- **15** Fire station districts
- **71** Surface water sites

CDPHE is working with these water systems and other partners to protect the health of Coloradans. Find out more about the steps CDPHE is taking.

View the results for:

- Drinking water systems
- Fire stations
- Surface water
- Downloadable data
SB20-218 PFAS Cash Fund

- $25 per truckload of fuel from Sep 2020 - Sep 2026 (Capped at $8M)
- Supports PFAS grant program to award grants for:
  - Sampling, assessment, investigation of PFAS in ground or surface water
  - Water system infrastructure to treat for PFAS
  - Emergency assistance to affected communities and water systems
- Supports Takeback Program (launched Sep 2021)
  - Pays fire departments $40 per gallon for unspent PFAS-containing foam to support the purchase of PFAS free foam and providing safe storage
  - We’ll collect and dispose of foam after identifying a safe disposal method
  - May be expanded to include other entities and PFAS materials in the future
PFAS legislation timeline (HB19-1279 and HB20-1119)

**August 2, 2019**
- Cannot use PFAS-containing foam for training
- Aircraft storage structures and certificate holders can test using PFAS-containing foam if follow capture and disposal rules
- Seller must notify purchaser if PFAS in PPE

**June 1, 2021**
- Using/storing PFAS-containing foam requires registration certificate

**August 2, 2021**
- Ban on sale of PFAS-containing foam unless exempt

**January 1, 2023**
- Cannot use PFAS-containing foam for testing
Drinking Water Partnership

Following the 2020 data and the lowered HA:

● 45% of our water utilities proactively tested in 2020, 103 above new HA
● Following EPA’s recommendations in partnership with our water utilities:
  ○ Assess contamination, inform public if confirmed in tap water, reduce
● PFAS Grant Program supports sampling, treatment, emergency assistance
  ○ Helping more than 20 communities
  ○ Supporting water systems with additional testing and private wells
● Encouraging all water systems that have not yet tested to sign up
● Federal funding via Bipartisan Infrastructure Law and Emergency Contaminants in Small or Disadvantaged Communities grant program
● Updated website with resources: cdphe.colorado.gov/pfas
Mapping Tool

- PFAS Takeback Program: so far 12k gallons of PFAS foam taken out of service

- Sampling efforts to test private wells with local public health agencies and EPA

- CRWA collaboration to help water systems with source water protection

- Identify impacts to different sectors (agricultural and recreational) - PFAS fish study
Drinking Water PFAS Assessment, Prevention and Response Toolbox

This toolbox helps public water systems assess and prevent PFAS contamination and guides response to test results when compared to EPA's drinking water lifetime health advisory level of 70 ng/L for PFOA and PFOS.

Proactive tools for assessing and preventing PFAS contamination

- Use CDPHE website to understand basics and health risks of PFAS
- Assess risk to source water
  - Proximity to potential sources of PFAS releases to the environment:
    - Industrial facilities that produce or process PFAS, or use PFAS chemicals or products in manufacturing or other activities
    - Areas where fluorine-containing Class B firefighting foams are used, or released such as airports, military bases and fire stations
    - Waste management facilities, such as landfills
    - Wastewater treatment residuals and areas of biosolids product application, with more significant impacts associated with industrial wastewater discharges
  - Source water vulnerability to contamination
    - If you need source water protection assistance, email cdphe.wqwap@state.co.us
- Implement measures to reduce risk by:
  - Evaluating potential approaches with stakeholders
  - Raising awareness of PFAS contamination
  - Contacting facilities with potential PFAS releases about PFAS use/storage/disposal for better understanding and ways to reduce risks
- Sample treated water and at risk sources for PFAS
  - List of labs approved by EPA to test for PFAS using method 537 from 2015 — please note the number of labs who can test for PFAS

IMPORTANT INFORMATION ABOUT YOUR DRINK WATER

(system name) (PWSID COXXXXXXXXX)

In an effort to be proactive, [water system name] recently conducted voluntary testing for a group of unregulated chemicals scientifically known as per- and polyfluoroalkyl substances or PFAS. These chemicals are commonly found in firefighting foam, manufacturing processes, household products, and soils. Topical exposure may result in negative health effects. Out of an abundance of caution and in keeping with our commitment to keep you informed, we want to let you know our water sample results received on [date] showed a combined level for two types of these chemicals, PFOS and PFOA at [level] parts per trillion which is below EPA's health advisory level of 70 parts per trillion which means health impacts are not expected. All of our PFAS test results are available at:

[www.colorado.gov/pacific/cdphe/PPFA/2020-Sampling-Project] (opens in a new tab)

What are PFAS and the potential health effects from exposure? PFAS are a family of human-made chemicals that have been used for decades in products like food packaging, carpets, non-stick products, other household items, medical supplies, and firefighting foam due to their ability to resist heat, oil, stains, grease, and water. According to EPA, studies indicate exposure to PFAS and PFOS over certain levels may result in adverse health effects. For example, developmental effects or illnesses during pregnancy or to breastfed infants can occur over weeks of exposure (e.g., low birth weight, accelerated puberty, skeletal variations). Years to decades of exposure can lead to liver damage, negative immune and thyroid effects, and other health impacts. We know the most about PFOS and PFOA, but there are other chemicals in the PFAS family such as PPFuA, PFHxS, PFBS, and PFinA. These chemicals may have similar impacts on humans. The health impacts of PFAS is the current focus of much research. As new studies become available, our understanding of the health impacts of these chemicals in humans will continue to grow.

What do these test results mean for my health and do I need to do anything? Toxicity information supporting EPA’s health advisory suggests that drinking water with PFAS levels below
Thank you! Any questions?

Information and resources available at: cdphe.colorado.gov/pfas

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