



# MassDEP PFAS Drinking Water Standards

Town of Wellesley

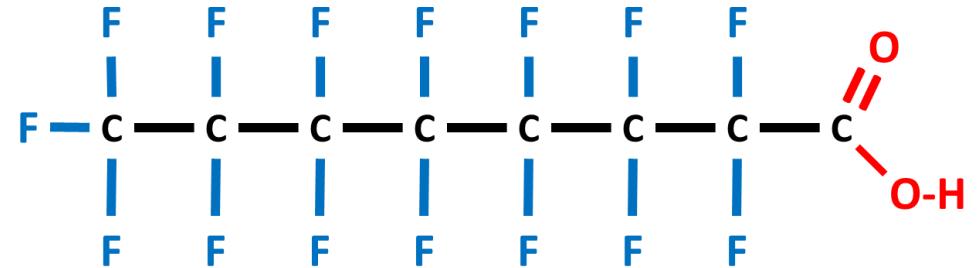
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# What Are PFAS?



## Poly- and perfluoroalkyl Substances

*A family of thousand of compounds with varying structure  
(e.g, carbon chain length)*

- **Extremely stable** – Heat & Stain Resistant, Water repellent
- **“Forever chemicals”** - Very persistent, do not biodegrade
- **Water Soluble**
- **Some are very toxic**
  - Slowly excreted from the body – half lives of years (1-8+ for longer-chain)
  - Developmental risks to fetus/infants
  - Endocrine disruption, effects on immune system
  - Possibly cancers (kidney, teste, pancreas, liver)



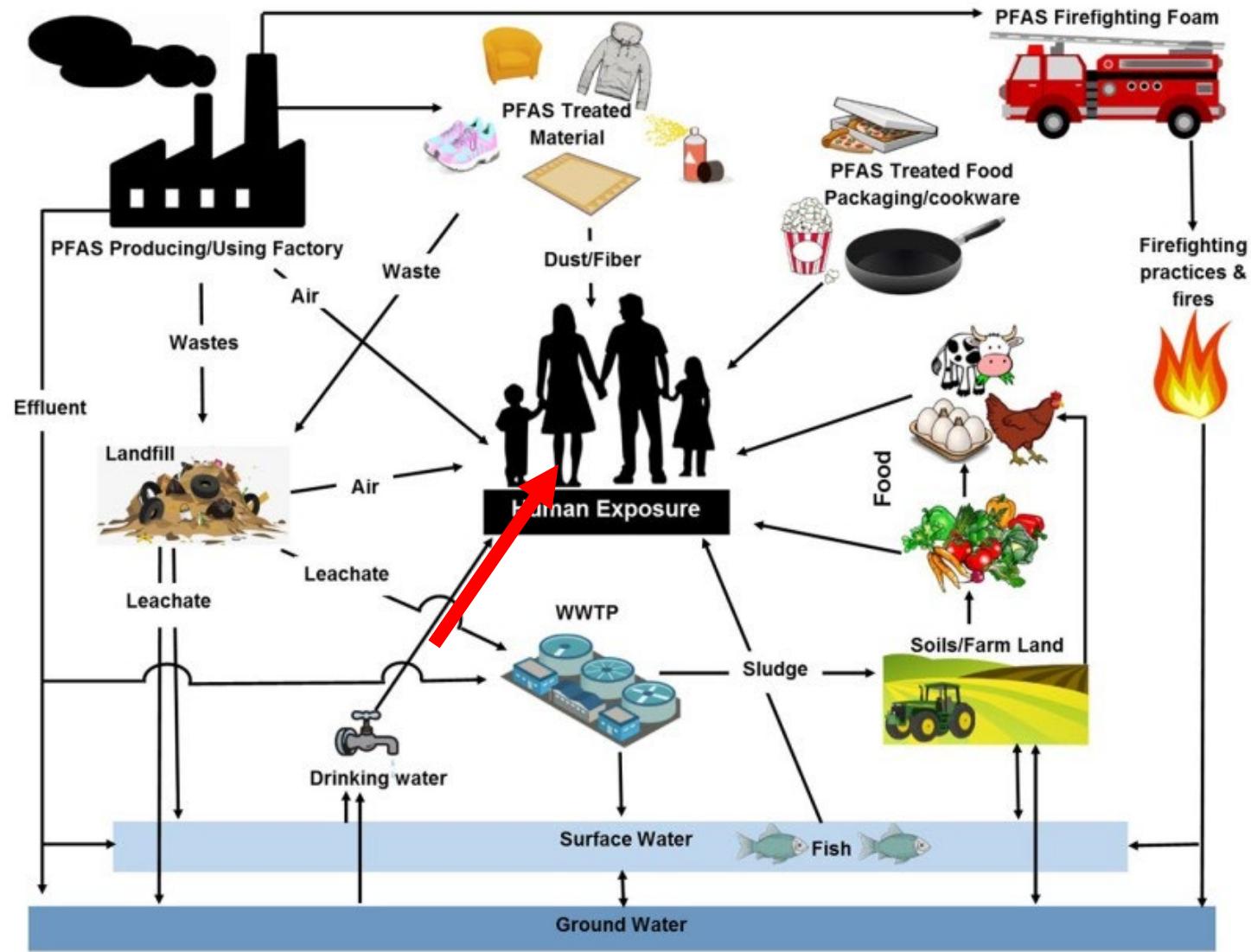
# Common Uses of PFAS Since the 1950s

- Textile treatments: stain resistance/water repellency
- Paper coatings: grease resistant
- “Waxes”: some floor, car, ski
- “Waterproof” down
- Manufacturing
- Aqueous Film-Forming Foam (AFFF)



*Most Americans are exposed to some levels of PFAS through use of consumer products*

# Environment & Human Exposure to PFAS

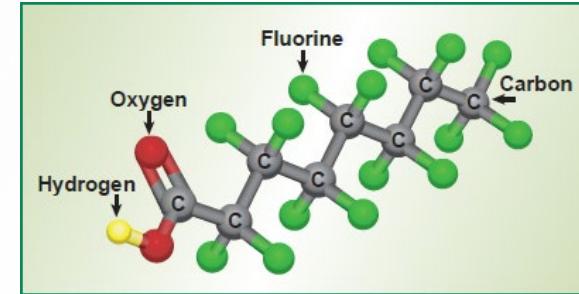


*Human Exposure and sources of PFAS*  
Image: DWP, adapted from Oliaei et al. 2013.



# Why Are PFAS a Concern?

- **TOXICITY AT LOW EXPOSURE LEVELS**
  - DEVELOPMENTAL
  - IMMUNE SYSTEM
  - THYROID
  - LIVER
- **PERSISTENT**
  - DO NOT APPRECIABLY BREAKDOWN IN THE ENVIRONMENT
  - LONG (YEARS) SERUM HALF LIVES
- **WATER SOLUBLE AND WIDESPREAD IMPACTS**



# What Are Exposures of Concern for PFAS?

## Sensitive groups

- *Pregnant women, nursing mothers and infants*
- *Immunocompromised*

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Water uses that pose (relatively) less concern include:

- Water use by someone not considered in a “sensitive group”
- Non-residential water use – *restaurants, workplace*
- Water use for other purposes – *bathing, washing vegetables*

Ways people may reduce potential exposure:

- Consume water below the MCL
- Avoid PFAS products
- Minimize exposure to house dust



# What Is MassDEP Doing About PFAS?

Developed Drinking  
Water and Waste  
Site Cleanup  
Standards

Technical Assistance,  
Education, Outreach,  
Coordination,  
Learning, Training

Firefighting Foam  
Take-Back Program

Working to Identify  
Sources & Releases  
to the Environment

Sampling & Analyses  
for Public Water  
Systems and Private  
Wells



# Subclass of Longer Chain PFAS Regulated by MassDEP



# Carbons		EPA Method 537 Analytes
4	PFBS	Perfluorobutanesulfonic acid
6	PFHxA	Perfluorohexanoic acid
6	PFHxS	Perfluorohexanesulfonic acid
7	PFHpA	Perfluoroheptanoic acid
8	PFOA	Perfluorooctanoic acid
8	PFOS	Perfluorooctanesulfonic acid
9	PFNA	Perfluorononanoic acid
10	PFDA	Perfluorodecanoic acid
11	NMeFOSAA	2-(N-Methylperfluorooctanesulfonamido)acetic acid
11	PFUnA	Perfluoroundecanoic acid
12	NEtFOSAA	2-(N-Ethylperfluorooctanesulfonamido)acetic acid
12	PFDoA	Perfluorododecanoic acid
13	PFTrDA	Perfluorotridecanoic acid
14	PFTA	Perfluorotetradecanoic acid

# PFAS6 Subclass Characteristics

- Share similar chemical structures
- Share similar toxicity profiles
  - Liver
  - Thyroid
  - Development
  - Immune system
- Cause adverse effects at similar doses
- EPA Approved Analytical methods



# Key Elements of MassDEP PFAS Drinking Water Regulations

- Standard of 20 ppt applies to each PFAS individually and sum of all six
  - No federal standard; EPA Advisory = 70 ppt for 2/6
- Health-based and protective of the most sensitive populations
- Requires a technical review every three years
  - ✓ Possible revisions to standards and consideration of additional PFAS



# Applicability of the Drinking Water Standards

## Apply to:

- Community Water Systems (year-round residential customers)
- Non-transient, Non-Community Water Systems
  - Schools/Daycares, Larger Businesses (25+ employees)

## Do not apply to:

- Transient, Non-Community Water Systems
  - Recreational areas, Hotel/Motels, Small Businesses
  - But they must sample



# Drinking Water Values for PFAS by State

	PFOS	PFOA	PFNA	PFHxS	PFHpA	PFDA
<b>U.S. EPA</b>	70	NA	NA	NA	NA	NA
Health Advisory	<b>Sum of two</b>					
<b>MA MCL, GW standard</b>	<b>70 (2018 ORSG) → 20 (MCL; MCP GW standard)</b> <b>Sum of five → Sum of six (add PFDA)</b> <b>MCL October 2020: Sum of six PFAS = 20</b>					
<b>VT MCL</b>	20	<b>Sum of five</b>				NA
<b>CT Action Levels</b>	<b>70 Sum of five</b>					
<b>WI Recommended GW standard</b>	<b>20</b>					
<b>ATSDR</b> Based on draft ATSDR toxicity values and EPA exposure parameters	7	11	10	70	NA	NA
<b>NY MCL</b>	10	10	NA	NA	NA	NA
<b>NJ MCL</b>	13	14	13	NA	NA	NA
<b>CA Notification levels (Response Levels)</b>	6.5 (40)	5.1 (10)	NA	NA	NA	NA
<b>MI MCL</b>	16	8	6	51	NA	<b>PFNA value recommended</b>
<b>MN guidelines</b>	15	35	NA	47	NA	NA
<b>NH MCL</b>	15	12	11	18	NA	NA
<b>Most other states (EPA value by default)</b>	70	NA	NA	NA	NA	NA

Results are in nanograms per liter (ng/L or parts per trillion (ppt)



# A Few Things to Keep in Mind

- Consuming water with PFAS6 above the drinking water standard does not mean that adverse effects will occur.
- The degree of risk depends on the level of the chemicals and the duration of exposure.
- The drinking water standard assumes that individuals drink only contaminated water, which typically overestimates exposure.
- Risks somewhat above the MCL are likely to be low but cannot be ruled out.
- MassDEP staff may be able to assist in answering questions. As individual circumstances and concerns vary, consumers with specific health concerns may wish to consult their doctor or health professional.



# Acknowledgements

Massachusetts Department of Environmental Protection

- Office of Research and Standards

DR. Sandra Baird

Dr. Tsedash Zewdie

- Drinking Water Program staff



# More Information...

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Scientists and regulators are still working to study and better understand the health risks posed by exposures to PFAS, and MassDEP is following developments ...

What are PFAS and why are ... · Development of a PFAS ... · PFAS and Waste Sites

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**Development of a PFAS Drinking Water Standard (MCL)**  
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