

Perfluoroalkyl and Polyfluoroalkyl Substances Scientific and Regulatory Update

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Chris Saranko, PhD, DABT
Geosyntec Consultants
Kennesaw, GA



What are they?

- **Per- and polyfluoroalkyl substances (PFAS)**
 - Incorrectly referred to as “PFCs”
 - Most “famous” compounds are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS)
 - Man-made group of chemicals
 - Unique surface-active properties, non-reactive and stable
- **PFAS uses**

Surface treatments/coatings

- Carpet and upholstery
- Apparel
- Paper and packaging
- Non-stick cookware

Performance chemicals

- Chromium plating (mist suppression)
- Insecticides
- Lubricants
- AFFF



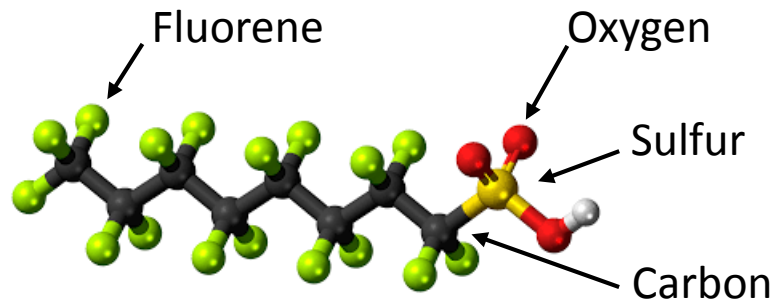
Oil and water repellency = excellent surfactants

AFFF (what the F?)

- Class B hydrocarbon fuel & solvent fires
 - Airports, firefighting training facilities, and many other industrial locations
- Fastest extinguishment time
- ~1-10% PFASs by weight
- 10s -1000s liters released per site since late 1960s-early 1970s
- Hundreds to thousands of potential military and civilian sites

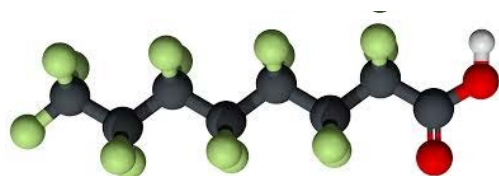


More Than PFOS & PFOA

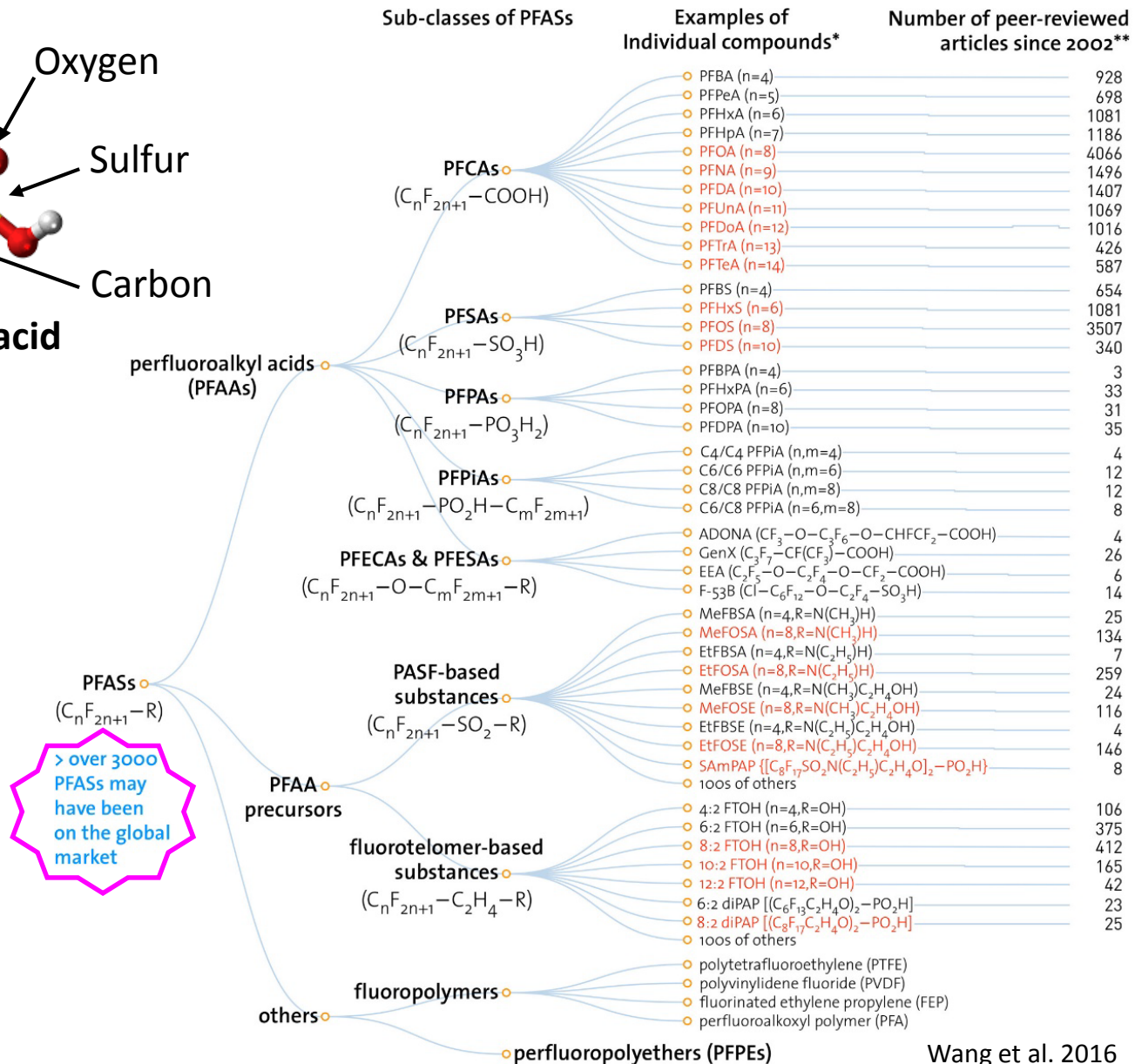


Perfluorooctane sulfonic acid
PFOS

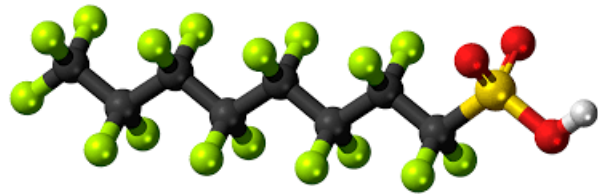
C-F bond is the
shortest and strongest
bond in nature



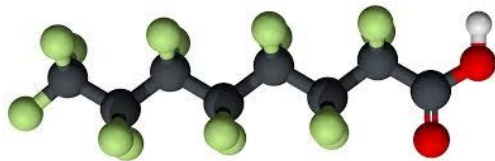
Perfluorooctanoic acid
PFOA



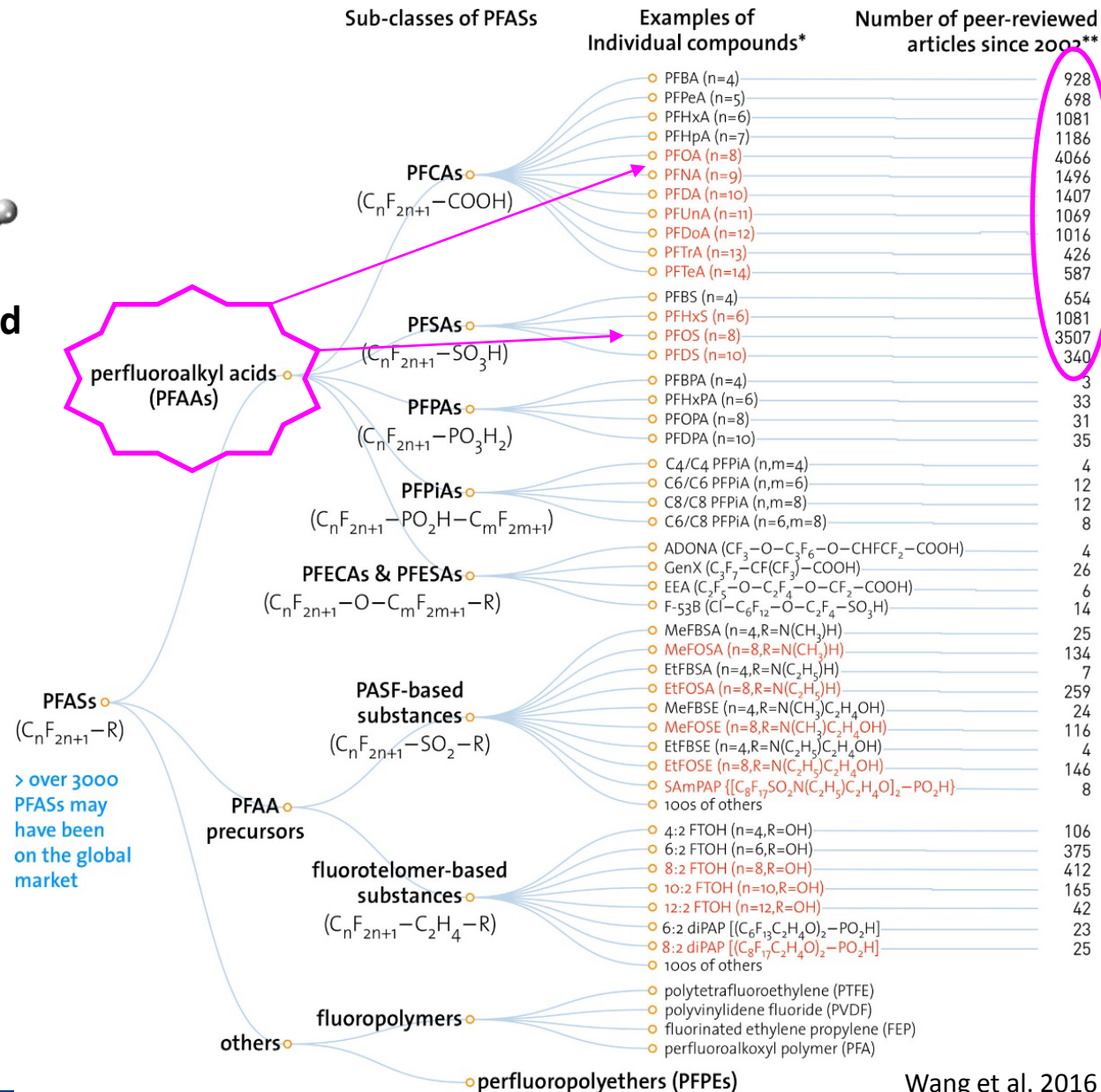
More Than PFOS & PFOA



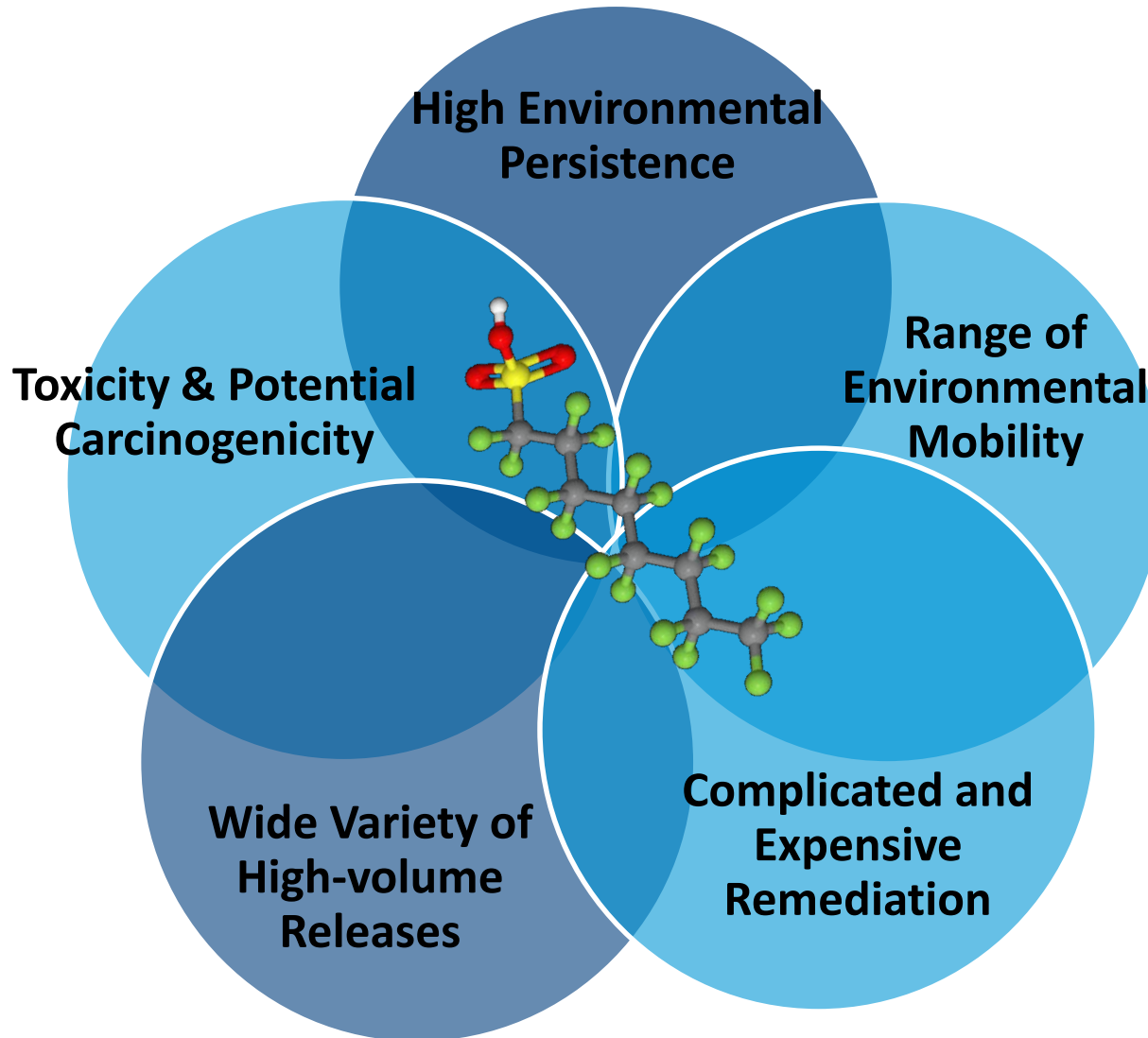
Perfluorooctane sulfonic acid
PFOS



Perfluorooctanoic acid
PFOA



Nexus of Environmental Challenges



Human Health

- Groundwater and surface water as drinking water source
- Bioaccumulation
 - Home grown produce
 - Fish & shellfish
- Incidental soil/dust ingestion (on Site)
- Non-volatile (insignificant VI concerns)



No Federal Standards (yet)

USEPA Numbers: PFOS & PFOA

- Reference Dose (RfD): 2 and 3 ng/kg-day
- Drinking Water HA: 70 ppt
- Direct Contact Soil: 1.26 ppm



ATSDR: PFOS & PFOA

- MRL: 0.2 ng/kg-day (10x lower than EPA's RfD)

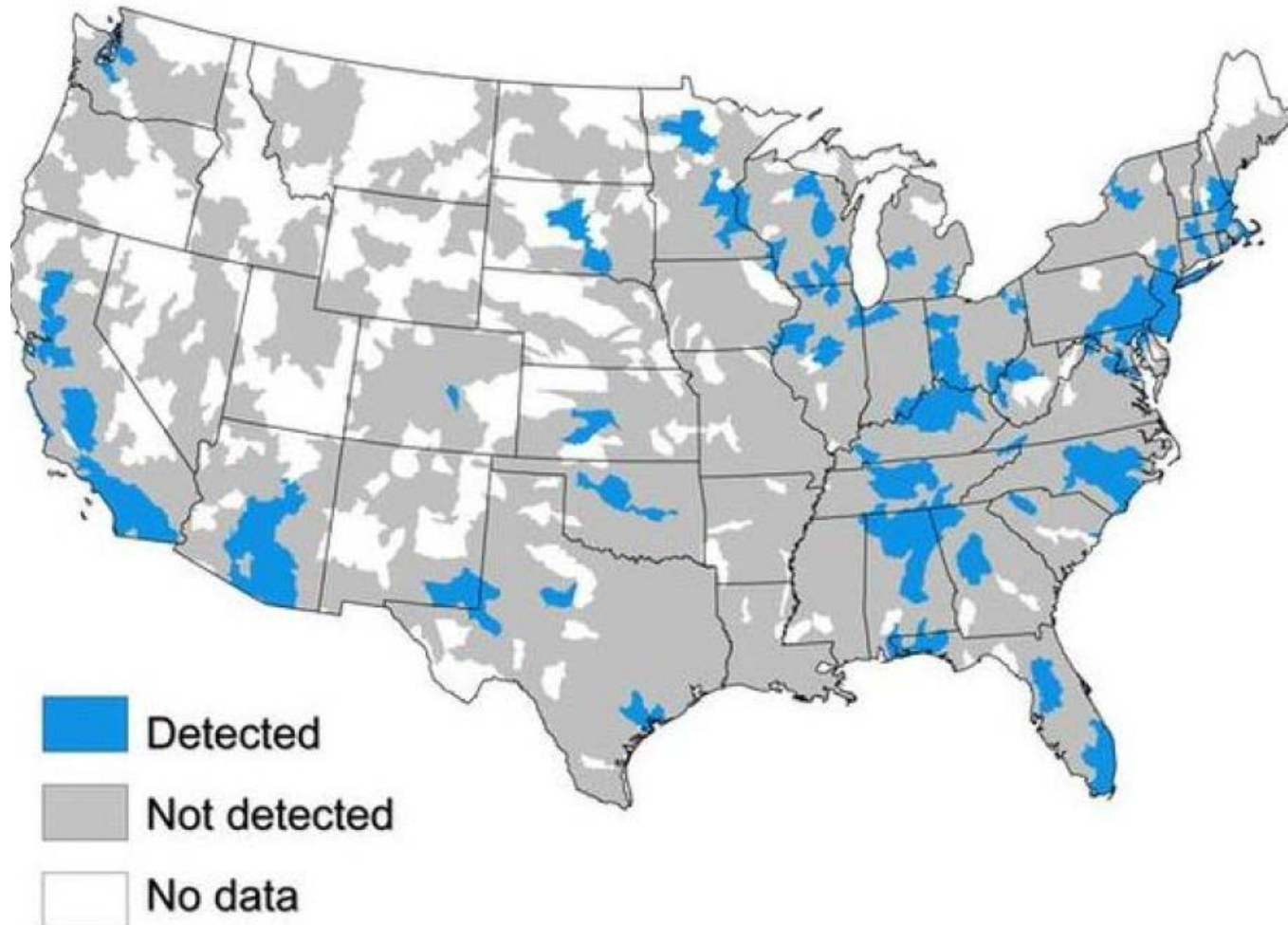
Several states developing their own guidance/standards

State PFAS Groundwater Criteria

State	Drinking Water Action	Compound	Concentration (ppt)
California	Interim Response Levels	Sum of PFOA and PFOS	70
Connecticut	Action Level	Sum of PFOA, PFOS, PFNA, PFHxS, PFHpA	70
Maine	Maximum Exposure Guidelines	Sum of PFOA and PFOS	70
Massachusetts	Office of Research & Standards Guideline	Sum of PFOA, PFOS, PFNA PFHxS, PFHpA	70
Minnesota	Health Based Guidance for Water Surrogate of PFOS HBV	PFOA	35
		PFOS	27
		PFHxS	27
New Hampshire	Groundwater Quality Standards	Sum of PFOA and PFOS	70
New Jersey	Adopted Regulation Regulation in Development	PFNA	13
		PFOA	14
North Carolina	Health Advisory	GenX	140
Vermont	Groundwater Quality Enforcement Standards	Sum of PFOA, PFOS, PFNA, PFHxS, and PFHpA	20

Occurrence in Public Water Systems

- PFOA and PFAS were included in 3rd round of Unregulated Contaminant Monitoring Rule (UCMR) from 2013-2016

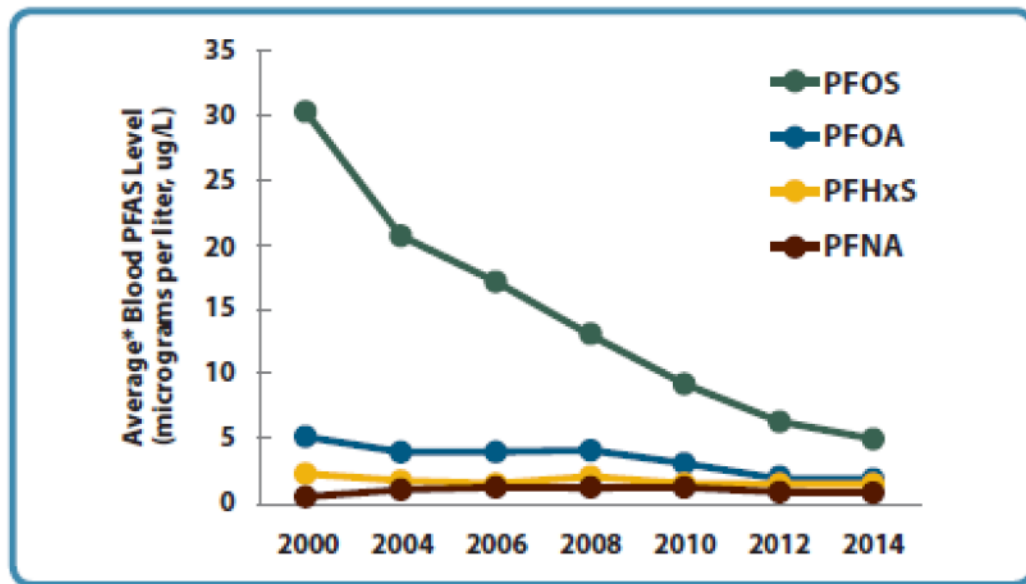


Source: Hu, XC et al. 2016. Environmental Science and Technology Letters, 3(10): 344-350

PFAS Biomonitoring

- National Biomonitoring conducted under CDC's National Health and Nutrition Examination Survey (NHANES)
- Other state- and community-specific biomonitoring studies are also being conducted.

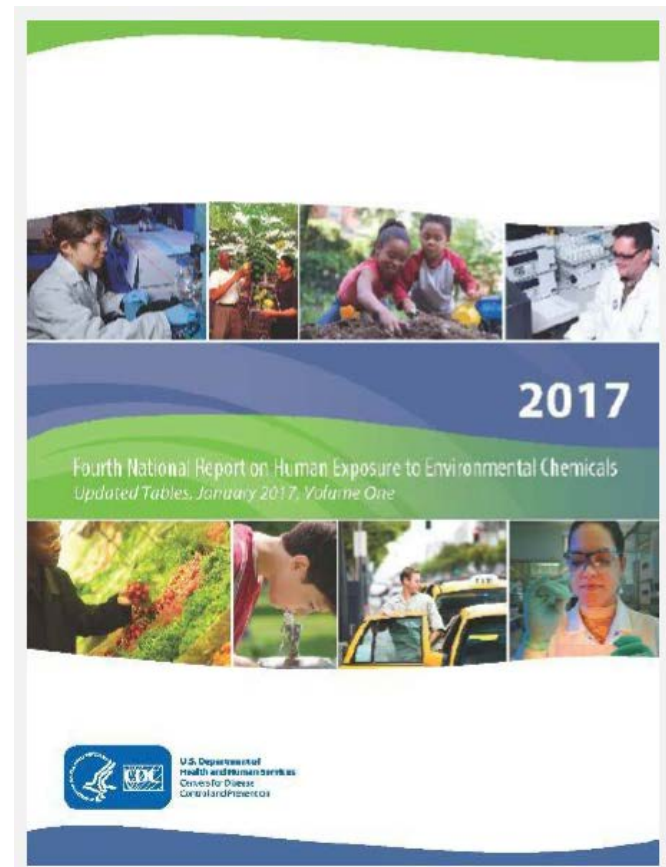
**Blood Levels of the Most Common PFAS
in People of US (2000-2014)**



*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.



PFAS National Leadership Summit and Engagement Washington, DC May 22, 2018

- **Articulated a Four-Step Action Plan**

1. EPA will initiate steps to evaluate the need for a maximum contaminant level (MCL) for PFOA and PFOS. We will convene our federal partners and examine everything we know about PFOA and PFOS in drinking water.
2. EPA is beginning the necessary steps to propose designating PFOA and PFOS as “hazardous substances” through one of the available statutory mechanisms, including potentially CERCLA Section 102.
3. EPA is currently developing groundwater cleanup recommendations for PFOA and PFOS at contaminated sites and will complete this task by fall of this year.
4. EPA is taking action in close collaboration with federal and state partners to develop toxicity values for GenX and PFBS.

(supposed to be released in September 2018)

- Cross-Agency effort led by Office of Water
- Includes members from other HQ and research offices and the regions.
- Near-Term actions to support states, tribes, and communities.
 - Fill data gaps related to toxicity of additional PFAS compounds.
 - Develop analytical methods to expand capacity for analysis of PFAS compounds in drinking water and contaminated media.
 - Provide treatability information for PFAS compounds in contaminated media.
 - Expand tools for proactive risk communication with communities impacted by PFAS compounds.

- PFOA and PFOS being evaluated for regulatory determination under the Safe Drinking Water Act
 - PFOA and PFOS are on the 4th Contaminant Candidate List (CCL4) published in Nov 2016. The Office of Water is assessing PFOA and PFOS against the following determination criteria:
 - May have an adverse effect on the health of persons
 - Is known to occur or there is a substantial likelihood of that it will occur in public drinking water systems with a frequency and at levels of public health concern
 - In the sole judgement of the Administrator, regulating the contaminant presents a meaningful opportunity for risk reductions for persons served by public water systems

- Recently conducted PFAS community engagement sessions in four areas that have been affected by PFAS
 - Exeter, NH – June 25-26, 2018
 - Horsham, PA – July 25, 2018
 - Colorado Springs, CO – August 7-8, 2018
 - Fayetteville, NC – August 13-14, 2018
 - Leavenworth, KS – September 5, 2018
- Intends to develop a “*PFAS Management Plan*” for release later this year

Thank You

Chris Saranko, PhD, DABT
Geosyntec Consultants
(678) 202-9548
csaranko@geosyntec.com

