

# ASTHO *Connects*

A virtual learning series for public health leaders.

## Expanded PFAS Exposure Assessments in Pennsylvania Communities

6/4/2020

# Today's Speaker



## **Sharon Watkins, Ph. D.**

Director, Bureau of  
Epidemiology

State Epidemiologist

Pennsylvania Department  
of Health

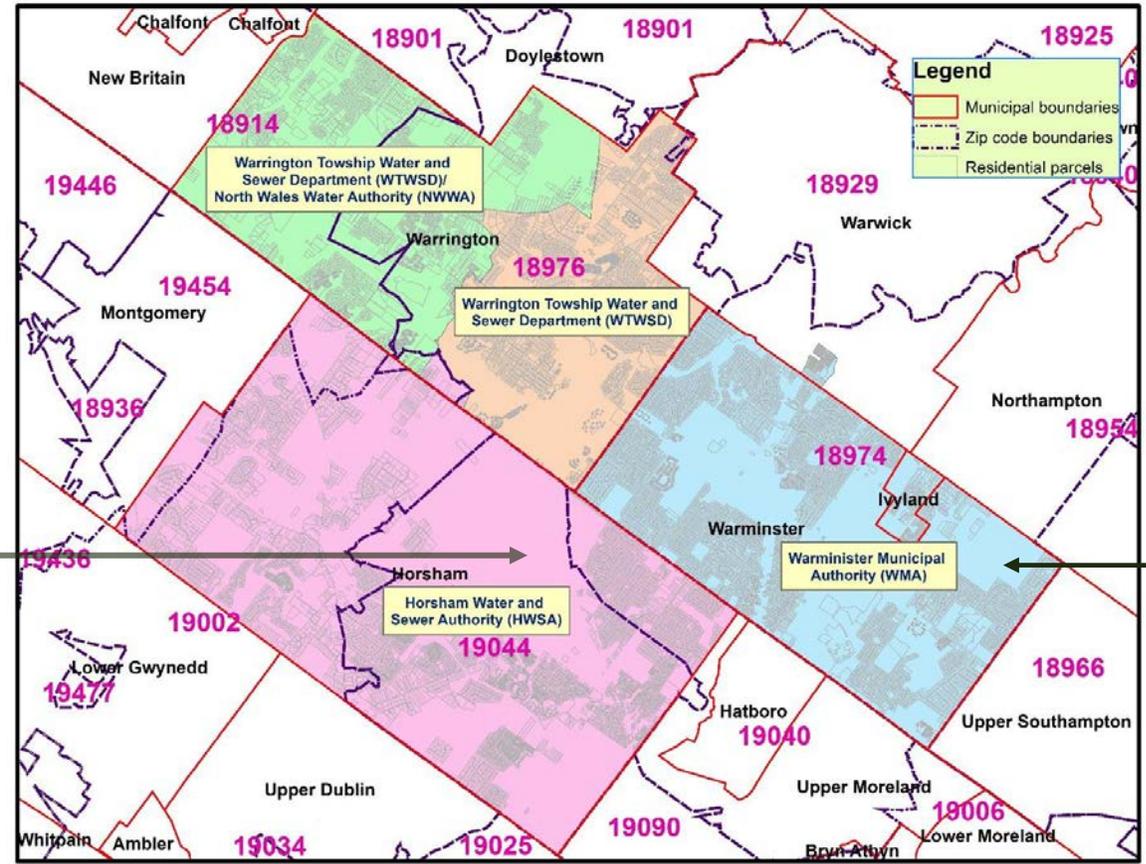
# Per and polyfluoroalkyl substances (PFAS) Exposure Assessment Technical Tools (PEATT) Environmental Assessment Results

Sharon Watkins, Ph.D.  
Director, Bureau of  
Epidemiology  
State Epidemiologist

Date: June 4, 2020

# ▶ PFAS Exposure in Southeastern PA

- Affected area = population of 84,184 (2010 census)
- 32,595 households in water service area



Horsham Air Guard Station & Naval Air Station Joint Reserve Base

Naval Air Warfare Center

# PEATT Pilot Project

- Pennsylvania Department of Health (DOH) received federal funding through the Association of State and Territorial Health Officials (ASTHO) to perform a pilot study to check PFAS levels in blood samples of community residents
- Weekly clinics in Bucks and Montgomery counties from May – September 2018 to draw blood samples from randomly selected community members
- Testing on 235 participants from 119 households
- July-November 2019 DOH tested PFAS levels in urine samples from participants and in dust and tap water within those same households

# PFAS in Blood Samples

- Tested for 11 PFAS compounds
- 4 compounds were commonly detected
  - ▣ Perfluorooctane sulfonic acid (PFOS) (100%)
  - ▣ Perfluorohexane sulfonic acid (PFHxS) (99.0%)
  - ▣ Perfluorooctanoic acid (PFOA) (98.7%)
  - ▣ Perfluorononanoic acid (PFNA) (78.1%)
  - ▣ All four detected in 79% of participants

# Blood Results Overall

- Four most commonly found PFAS

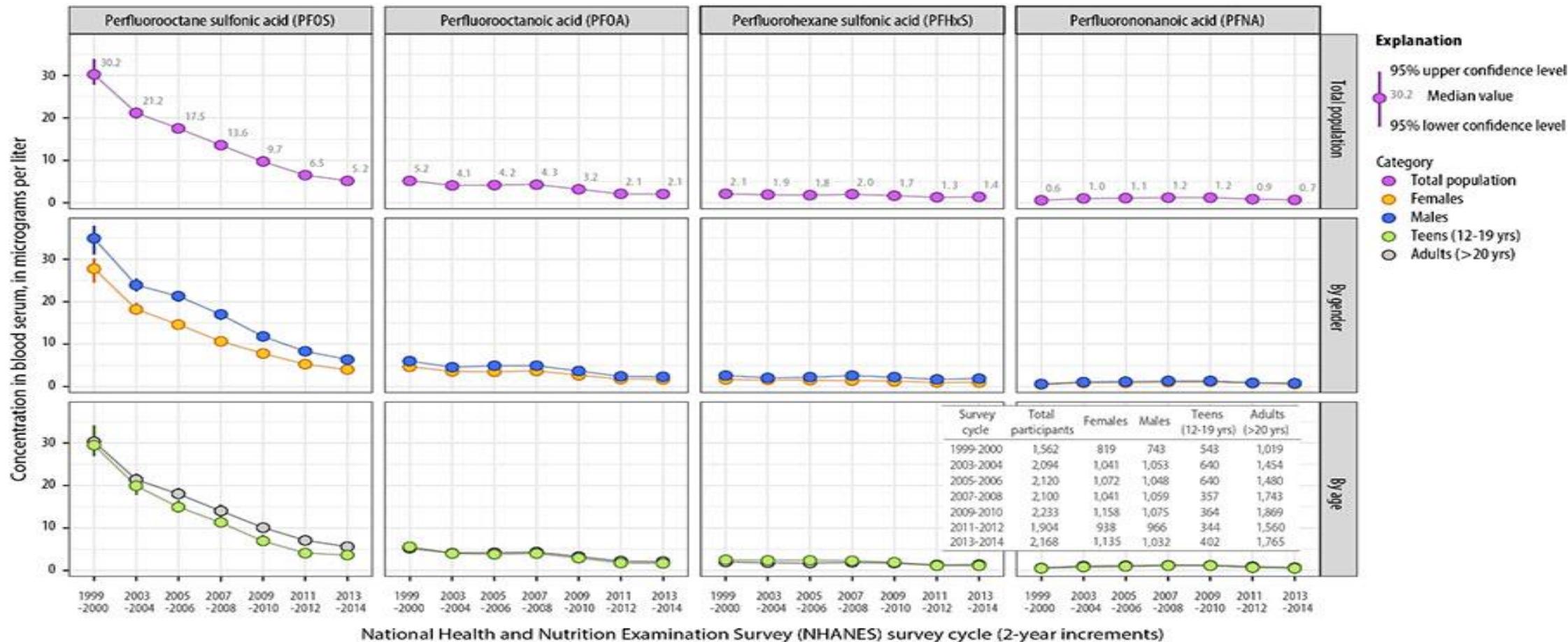
PFAS Compound	Community Results				NHANES Results (2013-2014)	
	Average	95% Confidence Interval	Median	Range	Average	95% Confidence Interval
PFOA	3.13	2.81-3.50	3.06	0.55-24.8	1.94	1.76-2.14
PFOS	10.24	8.86-11.83	9.86	1.02-105.00	4.99	4.50-5.52
PFHxS	6.64	5.51-7.99	6.61	0.54-116.00	1.35	1.20-1.52
PFNA	0.74	0.67-0.80	0.76	0.50-2.56	0.68	0.61-0.74

Results shown in ug/L. Range excludes <LOD

NHANES- National Health and Nutrition Examination Survey

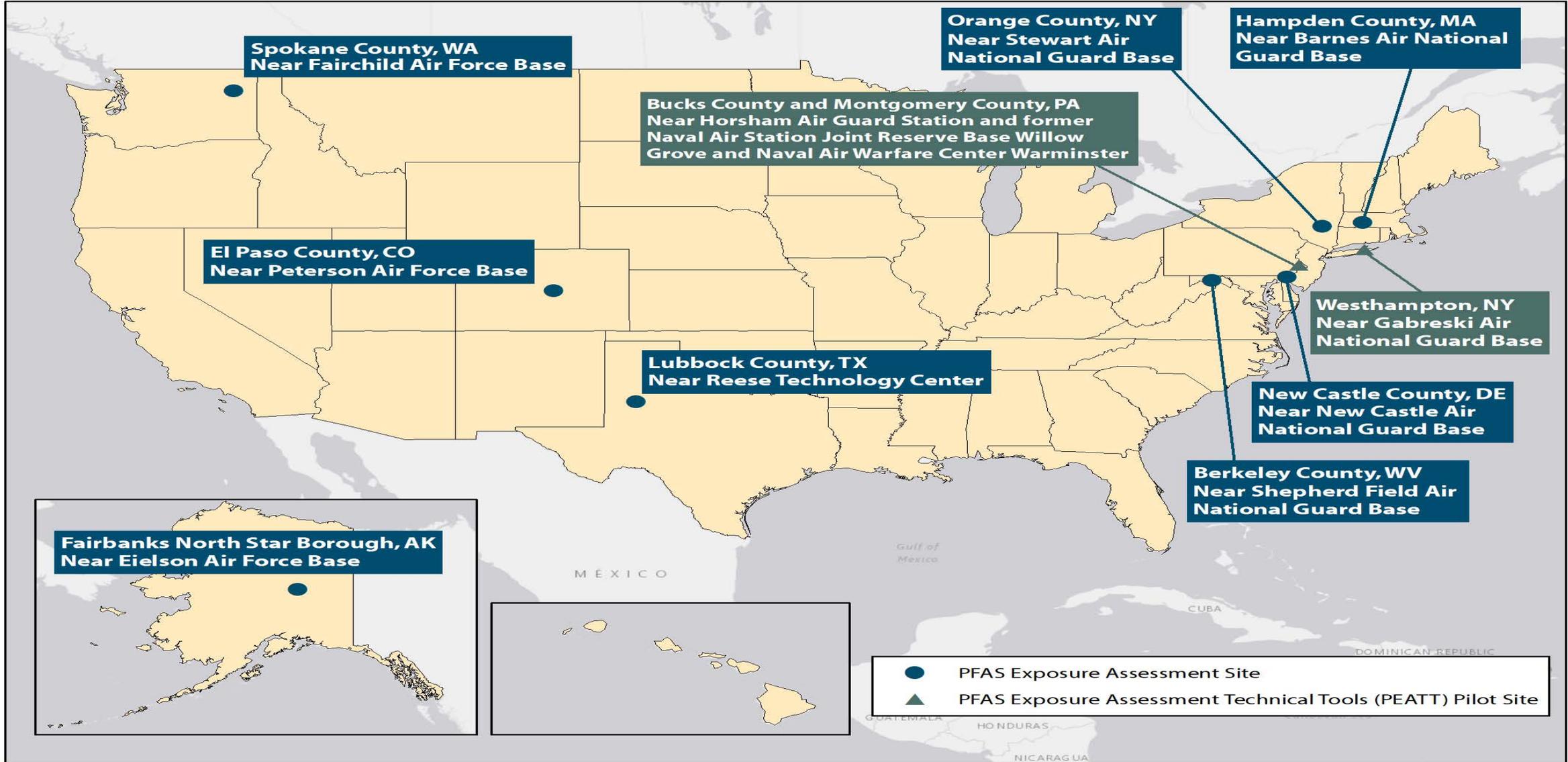
# Serum PFAS Levels in U.S. Population Over Time

Median concentration of selected per- and polyfluoroalkyl substances (PFAS) in blood serum (1999-2014) in the United States



Source: ATSDR, 2018

# Environmental Assessment - National Work



# Urine Results Overall

- Testing on 186 of the 235 participants
- Participants collected first morning samples
  - ▀ Stored in frozen condition
- Tested for 16 PFAS compounds
- Centers for Disease Control and Prevention (CDC) tested 10% of samples
  - ▀ 24 participants
  - ▀ ALL results below the level of detection ( $<0.1$  ng/mL)

# Urine Results Overall

- Similar to other studies
  - ▣ Calafat et al. found less than 0.1% of the U.S. general population has detectable levels of PFAS compounds in urine (2019)
- North Carolina study- (Pritchett et al. 2019)
  - ▣ GenX (precursor to PFOA) detected in Cape Fear River basin at 680 ppt
  - ▣ GenX **NOT** detected in residents' urine samples

# ▶ Tap Water Results Overall

- 14 households had dust and tap water samples analyzed
- Tap water tested for 14 PFAS compounds
  - ▣ post filter results

Compound	Percent Detected	Concentration range (ng/L)	EPA HAL (ppt)
PFOA	71% (10/14)	0.46 - 7.48	70
PFOS	86% (12/14)	0.484 - 7.67	70
PFHxS	43% (6/14)	0.45 - 4.20	70
PFNA	57% (8/14)	0.49 - 1.01	70

All households tested below the EPA HAL

# ▶ Tap Water Results by PFAS Compound

PFAS Compound	Households with measurable levels	Percent Detected	GM and Concentration Range (ng/L)
PFOS	12	85.71%	1.13 (0.46-7.67)
PFOA	10	71.42%	1.55 (0.65-7.48)
PFNA	8	57.14%	0.62 (0.50-1.01)
PFHxS	6	42.85%	0.57 (0.46-4.20)
PFHxA	11	78.57%	0.99 (0.34-3.50)
PFHpA	11	78.57%	0.62 (0.33-2.14)
PFBS	9	64.28%	0.65 (0.32-6.19)

PFHxA - Perfluorohexanoic acid  
 PFHpA - Perfluoroheptanoic acid  
 PFBS - Perfluorobutanesulfonic acid



# ▶ Tap Water Results by Water Source

Source of Water	Number of Households	Percentage of Total Households
Warminster Municipal Authority (WMA)	6	42.86%
Horsham Water and Sewer Authority (HWSA)	4	28.57%
Warrington Township Water and Sewer Department (WTWSD)	2	14.29%
Warrington Township Water and Sewer District/North Wale Water Authority (WTWSD/NWWA)	1	7.14%
Private Well	1	7.14%

# Dust Results Overall

- Household dust analyzed for 33 PFAS compounds
- Wide range of detections
- Composite sample of 1 gram
  - ▣ Master bedroom
  - ▣ Living room
  - ▣ Kitchen
  - ▣ Other locations as needed to yield 1 gram

# Dust Results Overall

- PFOA, PFOS, PFHxS and PFNA detected in all samples (ng/g)
- Wide range

PFAS compound	GM and range	Wisconsin*	Indiana**
PFOA	66.44 (3.94-522.00)	44	9.29
PFOS	35.97 (3.20-1,110.00)	47	14.12
PFHxS	21.08 (1.44-862.00)	16	8.74
PFNA	24.32 (1.24-276.00)	12	3.88

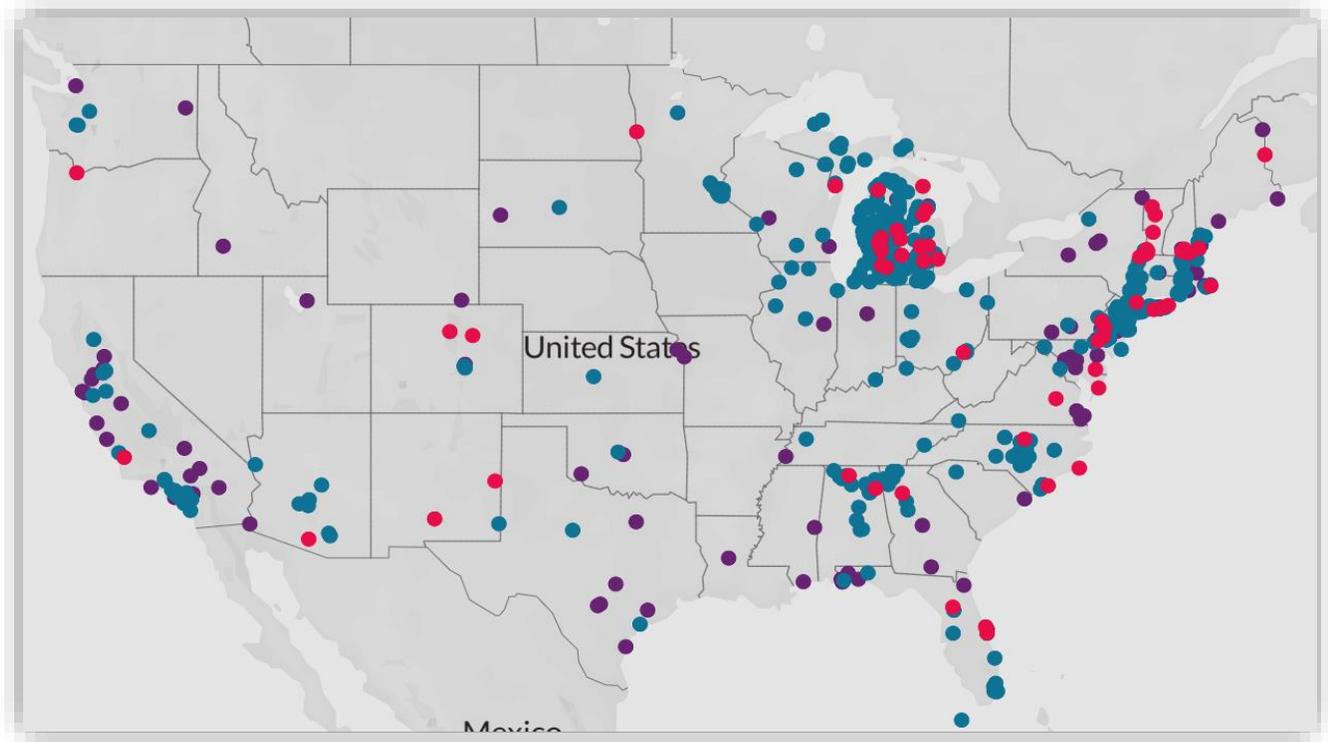
\*Knobeloch et al, 2012 \*\*Karaskova et al. 2016  
GM – Geometric mean

# ▶ PFAS Multi-Site National Study

- CDC conducting a large national health study
- Hoping to obtain better information about health effects of PFAS exposure through drinking water
- Measuring PFAS levels in residents at 7 sites across the nation
- Want minimum of 6,000 adults and 2,000 children

# ▶ PFAS Multi-Site National Study

- Pennsylvania
- New York
- New Jersey
- Michigan
- Massachusetts
- Colorado
- California



Environmental Working Group

[https://www.ewg.org/interactive-maps/2019\\_pfas\\_contamination/](https://www.ewg.org/interactive-maps/2019_pfas_contamination/)

- PFAS Drinking water contamination
- Other known PFAS contamination site
- Military PFAS site

# ▶ PFAS Multi-Site National Study

- Health outcomes of interest

ADULTS
Lipids- high cholesterol, obesity
Coronary Artery Diseases
Renal Function
Glycemic- insulin, diabetes
Thyroid Function
Liver Function
Osteoarthritis, Osteoporosis
Immune Response/Inflammation
Autoimmune – Ulcerative colitis

CHILDREN
Lipids- high cholesterol, obesity
Renal Function
Liver Function
Glycemic- insulin, diabetes
Thyroid Function
Sex Hormones
Immune Response
Neurodevelopment

# ▶ DOH's Partners in Multi-site National Study

RTI International

Temple University

Brown University

Buxmont Coalition for Safe Water

# DOH PFAS Team

Dr. Sharon Watkins

Dr. Anil Nair

Dr. Marshal Ma

Dr. Michael McCaskill

Susan Schrack Wood

Email address for questions  
([Env.health.concern@pa.gov](mailto:Env.health.concern@pa.gov))