



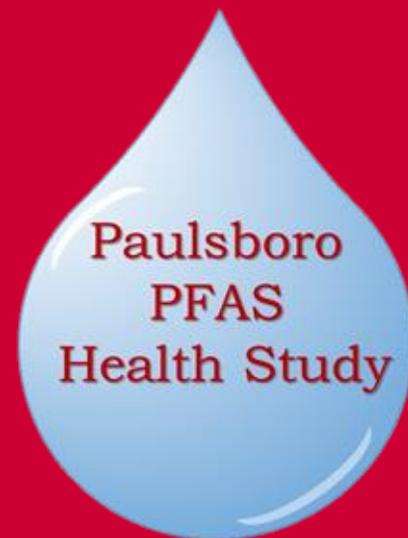
RUTGERS HEALTH  
Environmental and Occupational  
Health Sciences Institute



# Community Meeting

Paulsboro High School

January 15, 2026



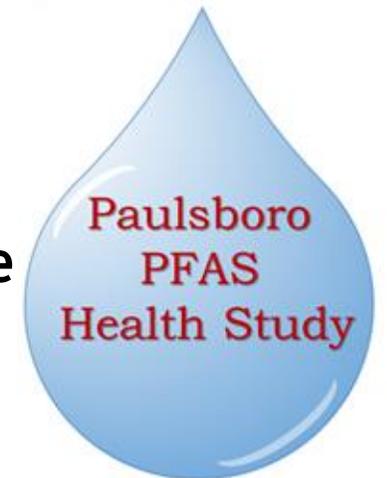
**Welcome**

# Meet the Team

- **Robert Laumbach** – Principal Investigator
- **Shahnaz Alimokhtari** – Project Manager
- **Tonya Kidd** – Research Support Specialist
- **Nancy Victor** – Administrative Assistant
- **Fatima Haynes** – Rutgers PhD Student
- **Alanna O’Neil** – Rutgers PhD Student
- **Fantasia Williams** – Rutgers PhD Student
- **Xiang Li** – Rutgers PhD Student
- **Kerry M. Butch** – Senior Community Outreach Coordinator

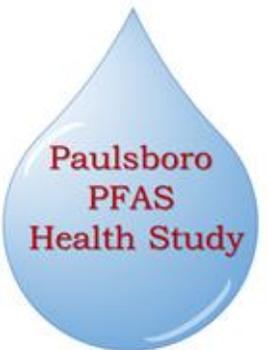
# This Evening's Program

- Review of per- and polyfluoroalkyl substances (PFAS)
- Status report on the Paulsboro PFAS Health Study and the CDC/ATSDR MultiSite Study and the initial studies of health effects across the sites
- Update on ongoing studies: vaccination responses, local fish consumption, community risk perceptions, and the alternative PFAS *chloroperfluoropolyether carboxylic acid (ClPFPECA)*
- What's next for the Study
- Answer your questions about the study and Paulsboro's drinking water



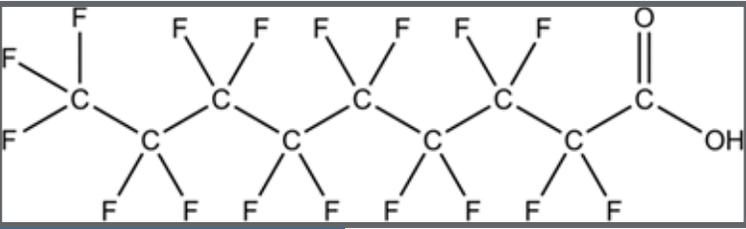
# Rules of Engagement

1. Everyone will be given the opportunity to ask questions.
2. If you prefer, you may write your questions down on an index card and I will ask the question.
3. To move the agenda, we have allotted times for questions.
4. After all of the presentations, we will resume taking questions and comments.
5. We cannot address health questions related to an individual.



# PFAS (per and polyfluoroalkyl substances), a.k.a. “Forever Chemicals”

- Used in many industries and consumer products

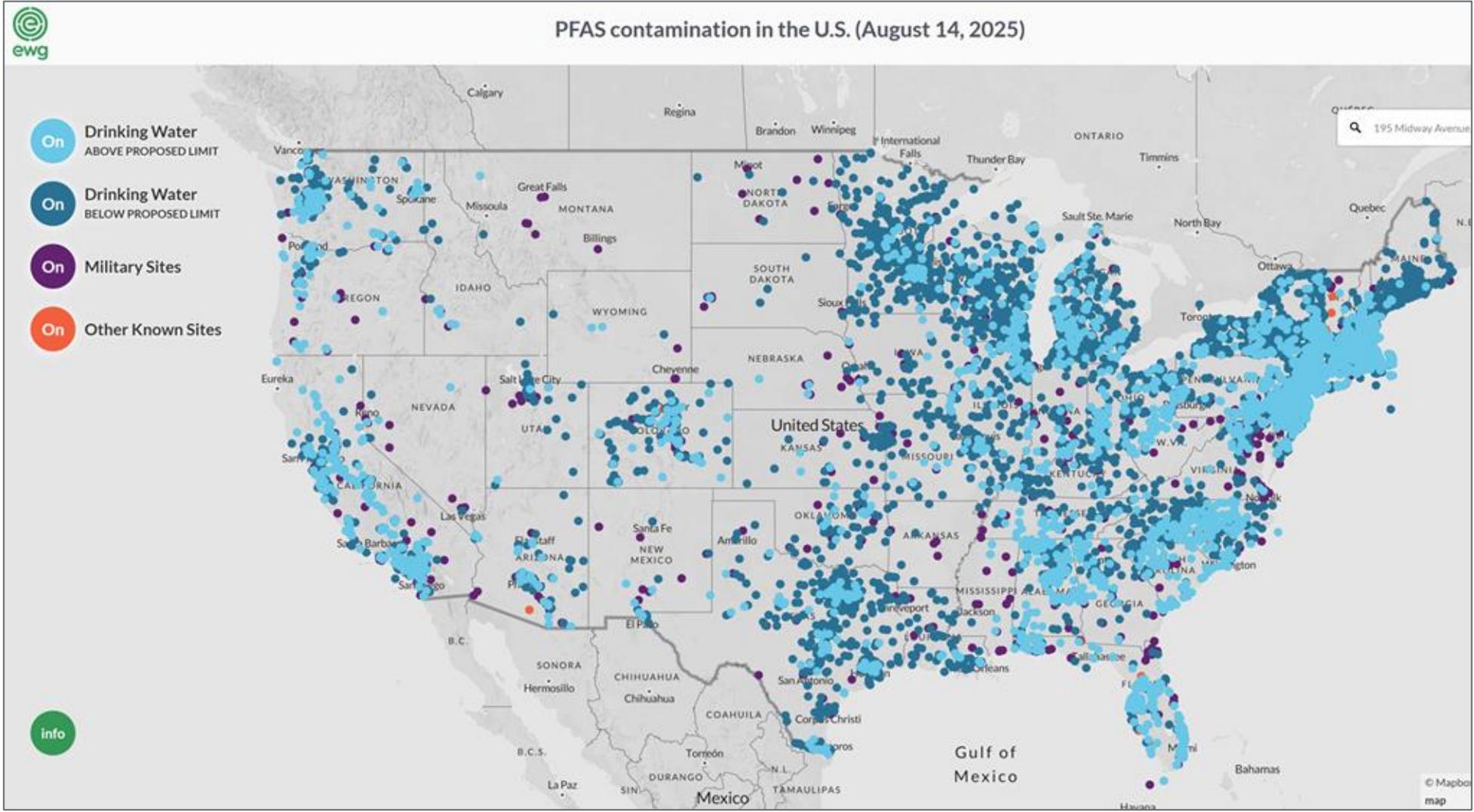


PFNA



- Don’t break down in the environment and build up in our bodies
- Found in water, soil, air, and in plants and animals globally
- “Legacy PFAS” including PFOA, PFOS, PFHxS, and PFNA are in virtually everyone’s blood

# Sites with PFAS Contamination Across the Country



EWG.org

INDUSTRIALS  
**States sue 3M, DuPont over toxic 'forever chemicals' found in drinking water**

**DUPONT FOUND LIABLE IN TEFLON TOXIN TRIAL**

After less than one full day of deliberation, a jury in Columbia County, N.C., found DuPont liable for \$1.6 million in a personal injury claim.

AP WORLD U.S. ELECTION 2024 POLITICS SPORTS ENTERTAINMENT BUSINESS SCIENCE FACT CHECK

Live: DNC Day 2 Mike Lynch George Santos Russia-Ukraine war Israel-Hamas war

POLITICS

**EPA designates 2 forever chemical hazardous substances, eligible for Superfund cleanup**

- KEY POINTS
- Maine recently joined toxic 'forever chemical' resources.
  - An estimated 64 million Americans live in areas contaminated with PFAS.
  - 3M faces a bellwether lawsuit for future lawsuits.

**At least 60% of US population may face 'forever chemicals' in tap water, tests suggest**

Federal tests of one-third of water systems find 70 million Americans exposed to PFAS - suggesting 200 million affected overall



**Prime energy, sports drinks contain PFAS and excessive caffeine, class action suits say**

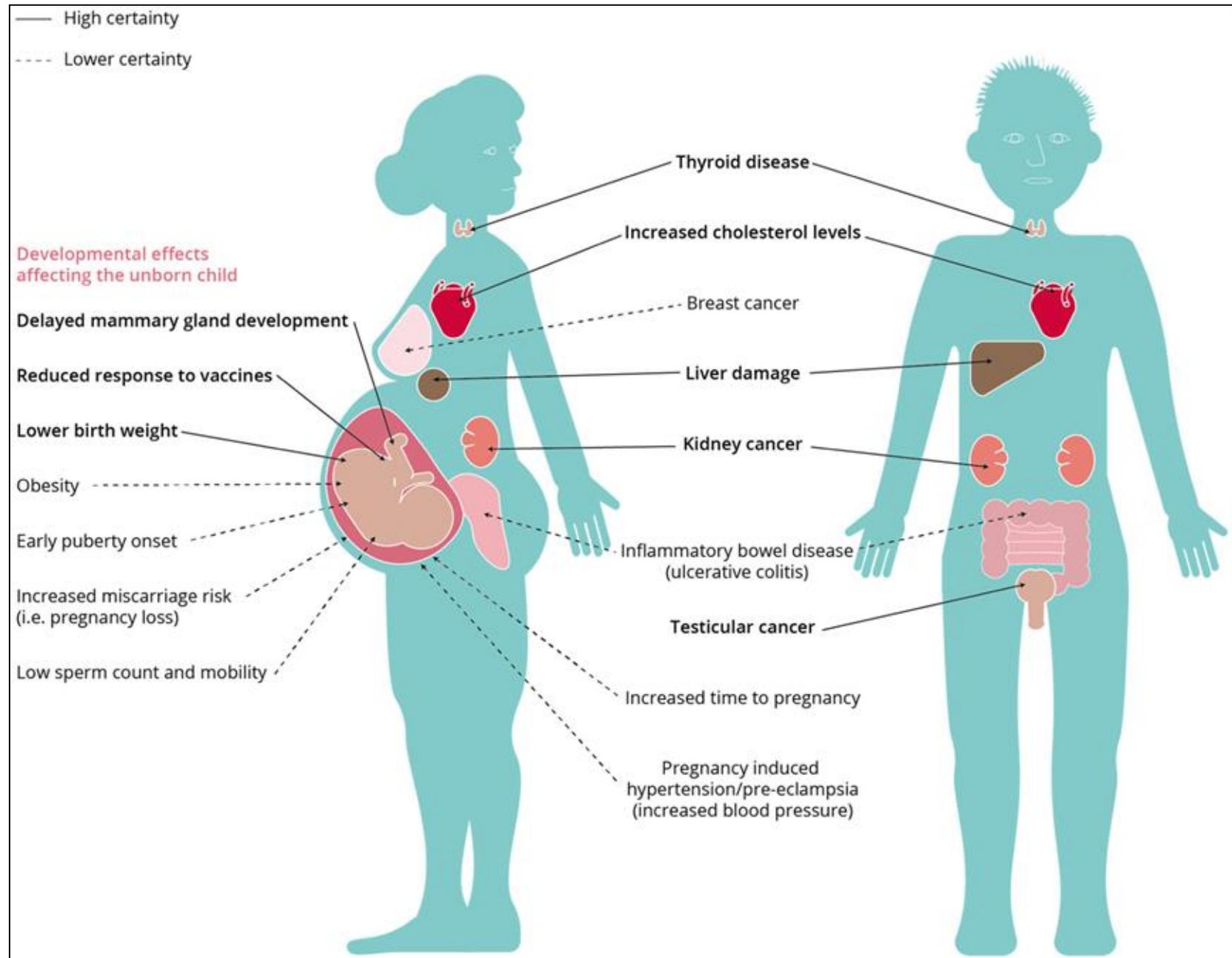
**Jonathan Limehouse**  
USA TODAY

# PFAS in the Environment and in Our Bodies

- **Measured in drinking water in “parts per trillion (ppt)” or “nanograms per liter”**
  - One grain of sand in an Olympic-size swimming pool, or 1 second in 32,000 years
- **How can such a small amount be harmful?**
  - Build up in our bodies – measured in parts per billion in blood
  - “Micrograms per liter” in blood “( $\mu\text{g/L}$ )”
  - Stay in our bodies for many years

# Effects of PFAS on Human Health

Source: European Environment Agency (2019). Original sources for this figure: National Toxicology Program (2016), C8 Science Panel (2012), IARC Working Group on the Evaluation of Carcinogenic Risks to Humans (2017), Barry et al. (2013), Fenton et al. (2009), and White et al. (2011b).



# History of PFNA in Paulsboro's Water

**2009 - PFNA found in Well #7 at 96 ppt.**

**September 2013 - PFNA up to 150 ppt in drinking water**

**January 2014 - NJDEP advisory: infants <1 year should not drink the town water**

**April 2014 - Well #7 shut down**

**June 2016 - Well #7 re-opened with filtration**



# NOT from the Paulsboro Train Derailment in 2012

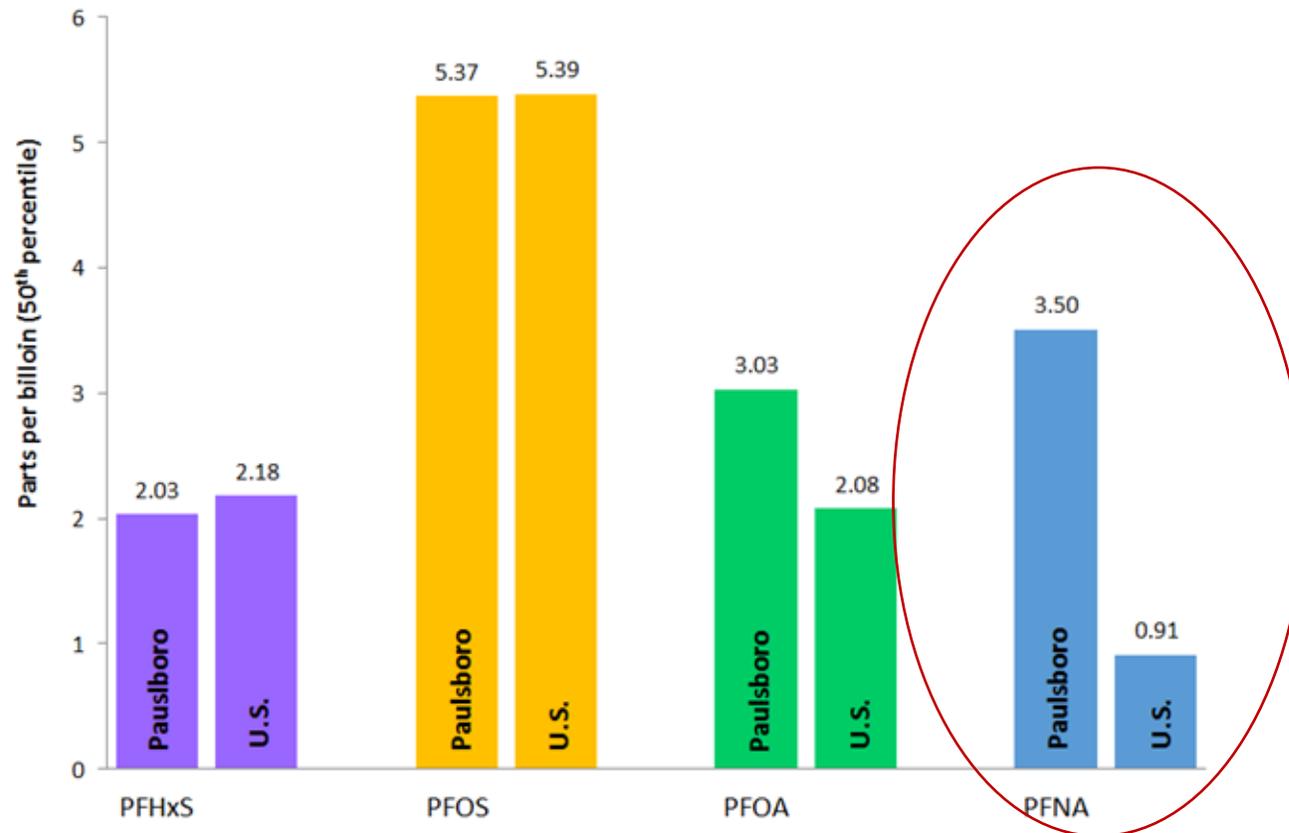


Vinyl chloride released.

No PFAS

# PFAS levels in blood of Paulsboro residents

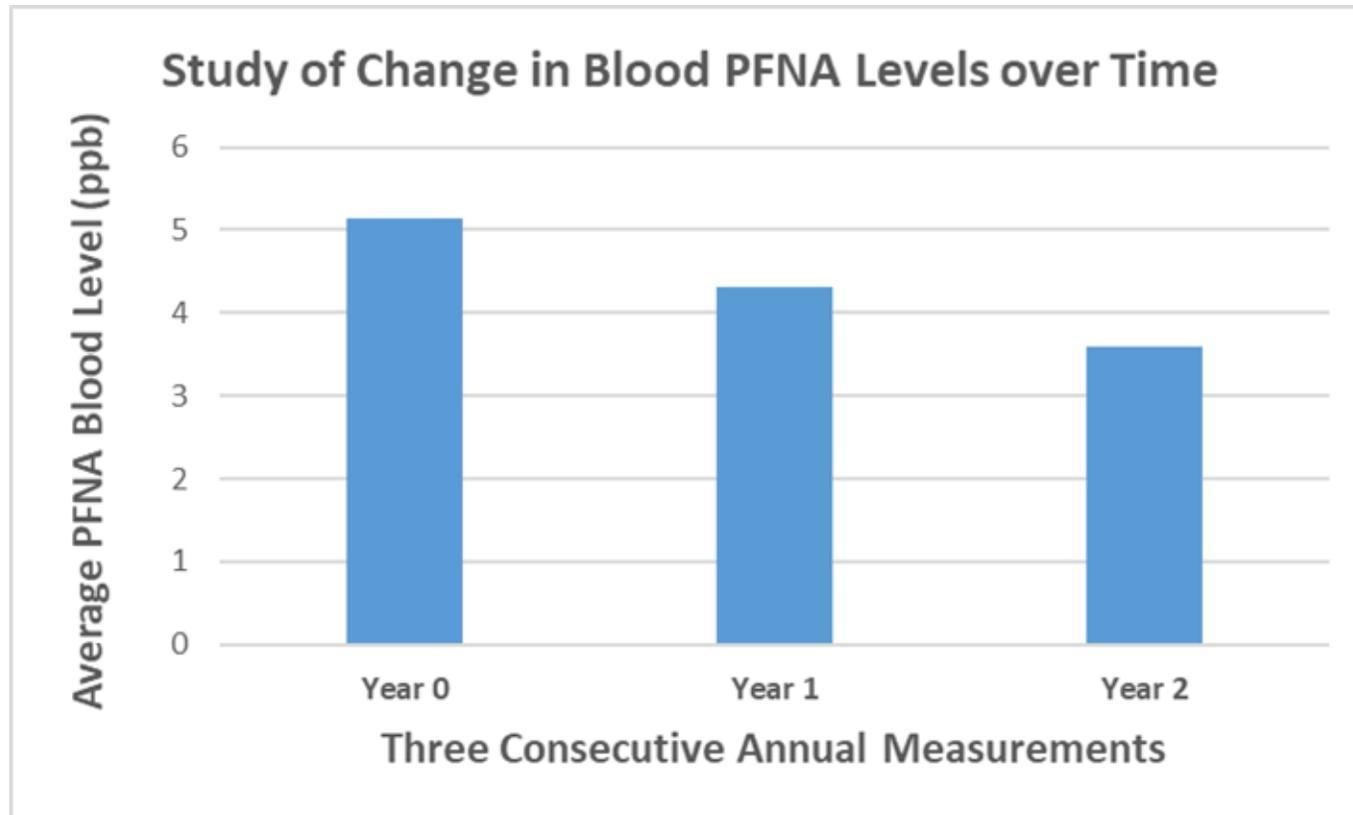
- In 2016, more than 1,300 residents had blood tests as part of a legal settlement
- In a 2018 study, Dr. Graber at Rutgers examined the blood results of 194 volunteers



**About 4X higher  
in Paulsboro  
compared to US**

# Declining Levels of PFNA in Paulsboro Residents' Blood

Rutgers and the NJDOH studied how blood levels have fallen from 2018 to 2020



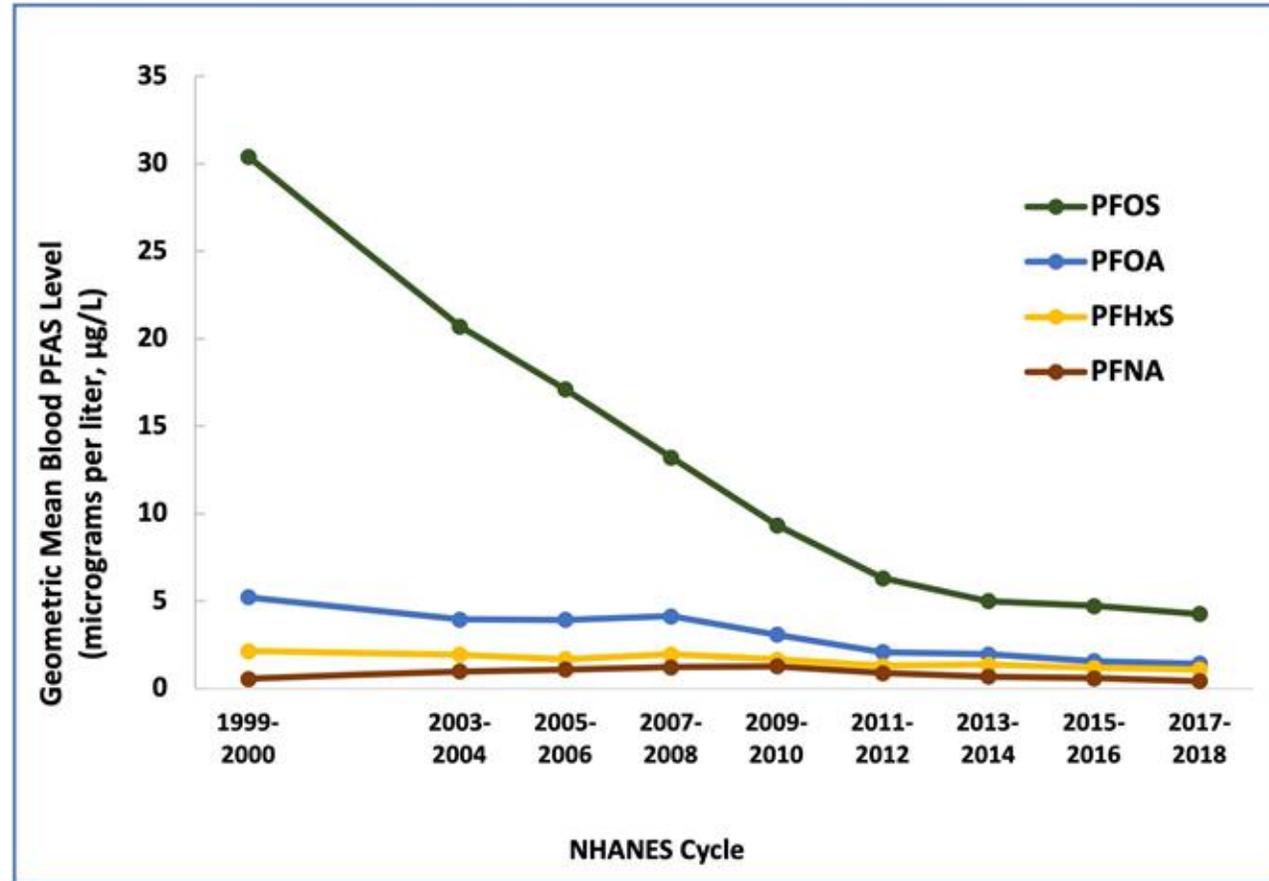
**PFAS Health Study  
PFNA 2021-2023  
(subset)**



**Average 1.2 ppb in same  
participants, 0.77 ppb overall**

Assessing PFNA Body Burden Following Drinking Water Intervention for Communities in New Jersey. C. Yu<sup>1</sup>, C. Weisel<sup>2</sup>, P. Georgopoulos<sup>2</sup>, S. Alimokhtari<sup>2</sup>, Z. Fan<sup>1</sup>; 1-NJDOH, Ewing, NJ, 2-EOHHSI, Piscataway, NJ. International Society of Exposure Science meeting in September 2020.

# Nationally, “long-chain” PFAS blood levels came down following voluntary phase-out of these PFAS, including PFNA in the 2000s



(Current Date)

Dear \_\_\_\_\_,

Thank you for participating in the Paulsboro PFAS Health Study, part of the CDC Multi-site Study that looks at potential human health effects of PFAS exposure through drinking contaminated water. Per- and polyfluorinated substances (PFAS) are a group of chemicals used to make products that resist heat, oil, stains, grease, and water. Some PFAS do not break down in the environment. People are mostly exposed through PFAS-contaminated water or food. Exposure may also occur by using products that contain PFAS in the home or at work.

You may recall that PFNA, a type of PFAS from an industrial source, was found in Paulsboro's drinking water in 2009 and 2013. It is not known how long the drinking water was contaminated with PFNA. There were no standards for PFNA in drinking water at that time. In January of 2014, Paulsboro residents were advised to avoid feeding tap water to infants. In April 2014, the contaminated well #7 was shut down. The well was re-opened with granular activated carbon (GAC) filtration in June of 2016. The water filtration continuously removes PFNA from the tap water. The water is tested for PFAS regularly, and PFNA and other PFAS are below the applicable NJ Safe Drinking Water Standards.

The table on the next page shows the results of the PFAS tests from the blood sample you provided for the Multi-site Study on (test date). We show your result for PFNA and for other PFAS that are commonly found in people's blood compared to the levels that half (50<sup>th</sup> %) and the top 5% of the people in the U.S. in your age group have.

PFAS have been linked to several adverse health effects (see attached fact sheet). However, finding PFAS in a person's blood by itself does not mean that the chemical causes disease. Research like the Multi-site Study will provide more information to see if there are health risks from different PFAS levels in blood. We will continue to share study results, as they become available, with you by mail and through community meetings.

Some PFAS, including those tested in your blood as part of this study, may be measured in blood for years after exposure. Results among Paulsboro residents who had more than one blood test over time indicate that, on average, PFNA levels have decreased by about 80% between approximately 2016 and 2022.

I encourage you to bring your test results to your healthcare provider to include in your medical record. If you or your provider have further questions about these clinical test results, you may contact me at [paulsboro-health-study@eohsi.rutgers.edu](mailto:paulsboro-health-study@eohsi.rutgers.edu) or ATSDR at [pfas@atsdr.gov](mailto:pfas@atsdr.gov).

Sincerely,

Robert J. Laumbach MD, MPH

Where can I find more information?

**Centers for Disease Control and Prevention (CDC) Resources:**

National Health and Nutrition Examination Survey (NHANES)

<https://www.cdc.gov/nchs/nhanes/index.htm>

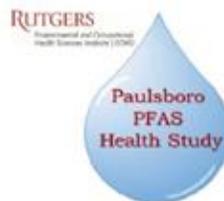
**Agency for Toxic Substances and Disease Registry (ATSDR)**

Toxicological Profiles and ToxFAQs <https://www.atsdr.cdc.gov/ToxProfiles/index.asp> and

<https://www.atsdr.cdc.gov/pfas/index.html>

**U.S. Environmental Protection Agency (EPA)**

Integrated Risk-Information System (IRIS) <https://www.epa.gov/iris>



**Table.** Your PFAS test results compared to people in your age group. Some people will not have results for all chemicals. You may not have a result for one or more PFAS chemicals if your level is lower than the laboratory's ability to measure it in your blood. This is called the limit of detection (<LOD).<sup>3</sup> You may also not have a result if the blood sample did not pass a lab quality control check or there was not enough blood to run the test. If the reason for missing results is known, it will be included with your results.

Participant's Name: _____	Test Name	Your Result (µg/L)	
		50 <sup>th</sup> %	95 <sup>th</sup> %
	<b>Per- and Poly-fluoroalkyl Substances (PFAS)</b>		
	<b>PFOA - perfluorooctanoic acid<sup>‡</sup></b>	1.17	3.87
	• <b>n-PFOA - linear isomer of perfluorooctanoic acid (PFOA)</b> CAS Number 335-67-1	1.40	3.84
	• <b>Sb-PFOA - branched isomer of PFOA</b>	< LOD	0.2
	<b>PFOS - perfluorooctane sulfonic acid<sup>‡</sup></b>	4.7	15.1
	• <b>n-PFOS - linear isomer of perfluorooctane sulfonic acid (PFOS)</b> CAS No. 1763-23-1	3.1	11.0
	• <b>Sm-PFOS - branched isomer of PFOS</b>	1.4	4.6
	<b>PFHxS - perfluorohexane sulfonic acid</b> CAS No. 355-46-4	1.2	3.8
	<b>Me-FOSAA - 2-(N-methyl-perfluorooctane sulfonamido) acetic acid</b> CAS No. 2355-31-9	0.1	0.6
	<b>PFNA - perfluorononanoic acid</b> CAS Number 375-95-1	0.4	1.4
	<b>PFDA - perfluorodecanoic acid</b> CAS Number 335-76-2	0.2	0.6
	<b>PFUnDA - perfluoroundecanoic acid</b> CAS Number 2058-94-8	0.1	0.4

<sup>1</sup> CDC. 2018. 2013-2014 NHANES 50<sup>th</sup> to 95<sup>th</sup> percentiles among children 3-5 and 6-11 old from the Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables, March 2018. [https://www.cdc.gov/exposurereport/pdf/FourthReport\\_UpdatedTables\\_Volume1\\_Mar2018.pdf](https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Volume1_Mar2018.pdf).

<sup>2</sup> CDC. 2021. 2017-2018 NHANES 50<sup>th</sup> to 95<sup>th</sup> percentiles among children 12-19 years old and adults 20+ years old from the Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables, March 2021. [https://www.cdc.gov/exposurereport/pfas\\_early\\_release.html](https://www.cdc.gov/exposurereport/pfas_early_release.html).

<sup>‡</sup> Not measured after Survey Years 2011-2012. Starting in 2013, CDC began measuring linear and branched isomers of both PFOS and PFOA. PFOS and PFDA were calculated by summing the linear and branched isomers for each participant and applying the appropriate sample weight. Because the 2013-2014 values are a calculated sum, there is no limit of detection (LOD) for PFOS and PFOA.

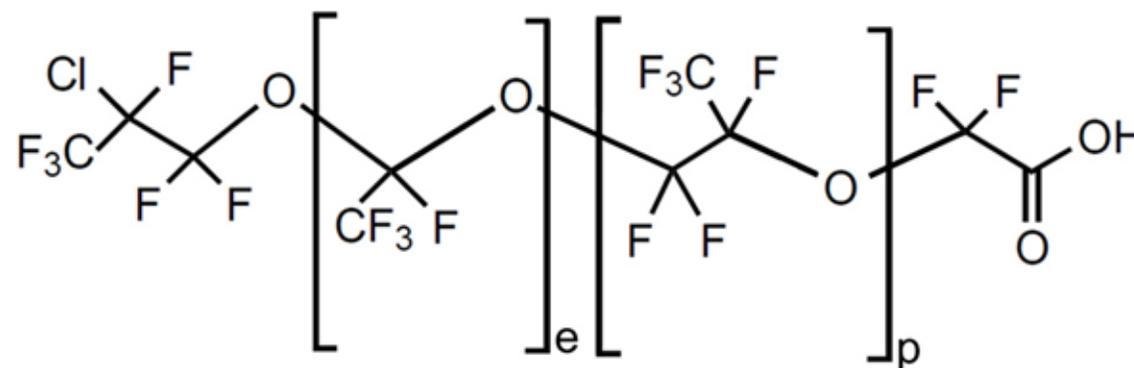
<sup>3</sup> NHANES 2017-8 also included measurements for serum 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid, Adona (ammonium salt of 4,8-dioxo-3H-perfluorononanoic acid, and GenX (ammonium salt of 2,3,3,3-tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (HFO-11A) but their reference ranges were all below LOD) and were not measured in the Multi-site Study.

<0.1 = less than the limit of detection (0.1 µg/L)

# Measurements of an Alternative PFAS in Blood

- *Chloroperfluoropolyether carboxylates* (ClPFPECAs) were discovered in NJ soil by the USEPA and NJDEP in 2017
- Solvay in West Deptford released this compound to air and water from 1996-2021
- >1,000 kg/year from 2002 to 2018
- Persist in the body like legacy PFAS
- May have similar health effects, including increased cholesterol

Chloroperfluoropolyether carboxylates (ClPFPECAs)

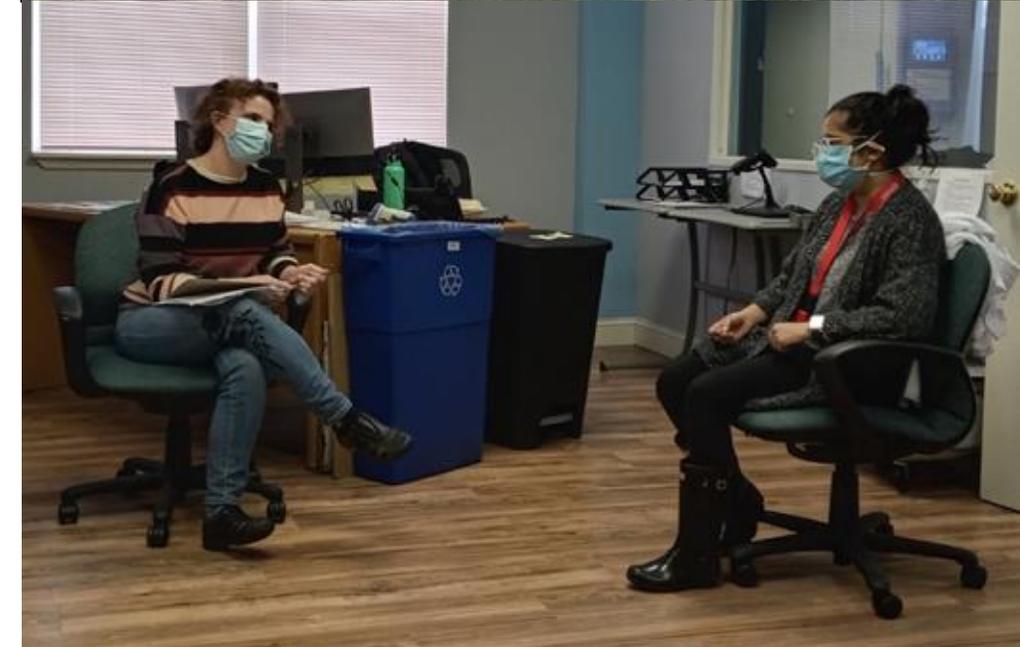


## Blood (plasma) ClPFPECA concentrations (parts per billion, ppb) of 643 Paulsboro PFAS Health Study participants

Specific ClPFPECA compound	% with Detectable Levels	Mean (ppb)	Median/50th percentile	95th percentile
ClPFPECA-0,1	86	0.05	0.056	0.48
ClPFPECA-0,2	92	0.01	0.010	0.14
ClPFPECA-1,1	8.4	-	<LOD	0.013
ClPFPECA-1,2	4.7	-	<LOD	<LOD
ClPFPECA-0,3	3.9	-	<LOD	<LOD
ClPFPECA-0,4	0.4	-	<LOD	<LOD

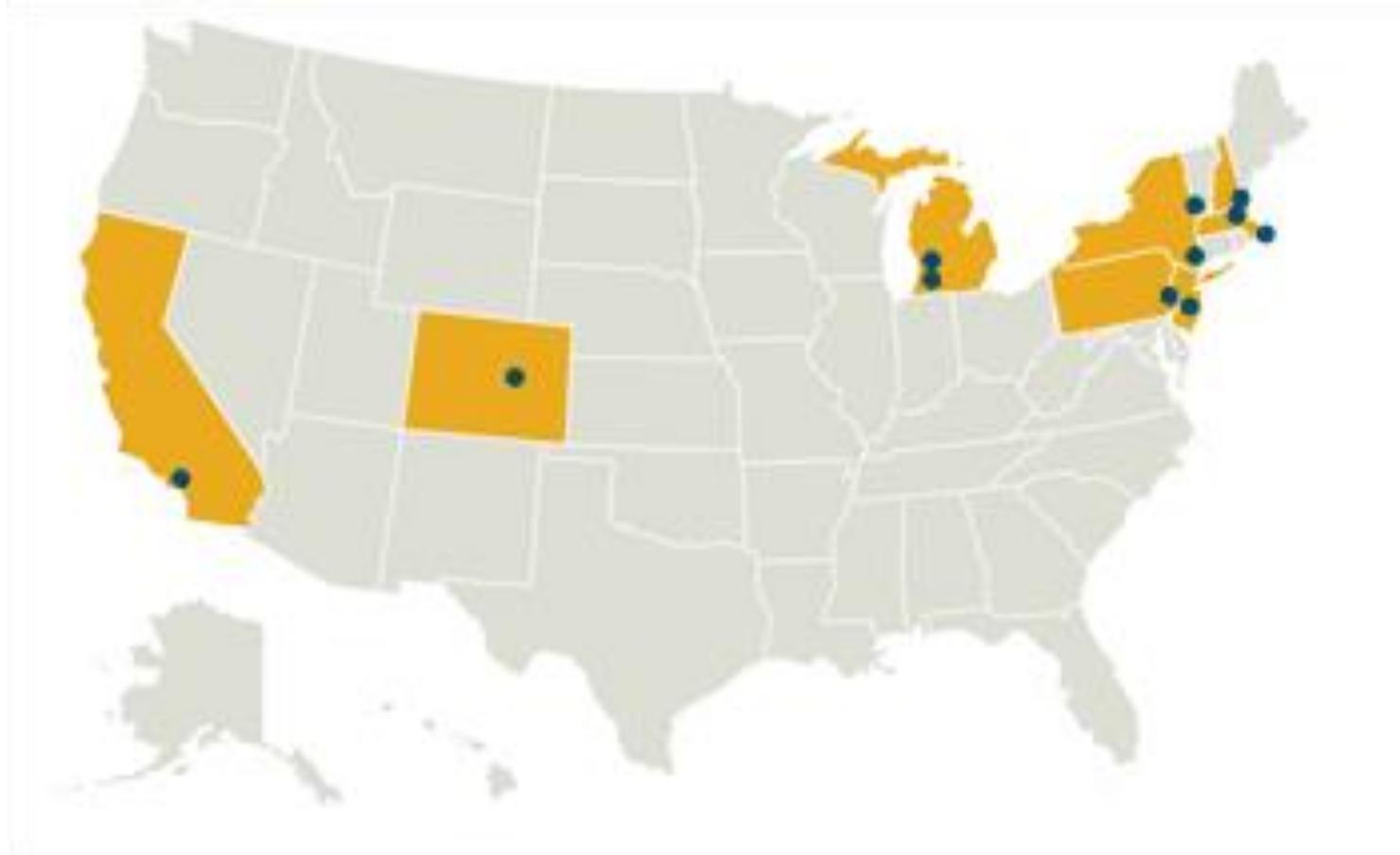
# Paulsboro PFAS Health Study Progress Report

- 776 Adults and 88 Children and Adolescents aged 6 to 17
- Who lived in Paulsboro at any time from 2005 to 2014
- Blood tests for PFAS, interviews and questionnaires
- Body measurements: height, weight, blood pressure
- Blood tests for health indicators: e.g. cholesterol, blood glucose
- Neurobehavioral tests for children and adolescents
- Medical record summaries with participant consent
- Historical reconstruction of past exposure to PFAS
- **Now analyzing for links between PFAS and health outcomes!**

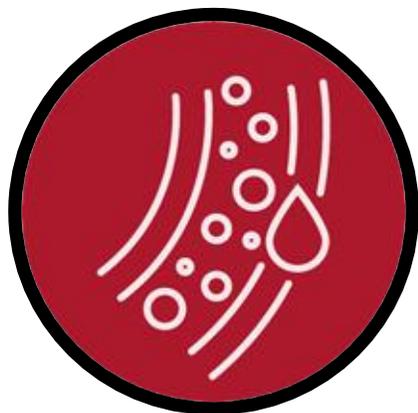


# CDC/ATSDR Multi-Site Study (MSS)

ATSDR and cooperative agreement partners (listed below) recruited almost 6000 adults and 700 children aged 4-17 across eight states and 11 different communities:



# In-Progress MSS and Health Outcome Analyses



**Lipids**



**Thyroid**



**Diabetes**



**Blood Pressure**



**Metabolic Syndrome**



**Heart Disease**



**Obesity**

# MSS “Methods Paper”

Environment International 202 (2025) 109589



Contents lists available at ScienceDirect

Environment International

journal homepage: [www.elsevier.com/locate/envint](http://www.elsevier.com/locate/envint)



Full length article

## Multi-site study of communities with PFAS-contaminated drinking water: Methods, demographics, and PFAS serum concentrations

Marian Pavuk<sup>a,\*</sup>, John L. Adgate<sup>b</sup>, Scott M. Bartell<sup>c</sup>, Erin Bell<sup>d</sup>, Linda M. Brown<sup>e</sup>, Robert J. Laumbach<sup>f</sup>, Laurel A. Schaidt<sup>g</sup>, Thomas J. van t' Erve<sup>h</sup>, Jordan M. Bailey<sup>h</sup>, Julianne Cook Botelho<sup>i</sup>, Antonia M. Calafat<sup>i</sup>, Chris R. Cutler<sup>j</sup>, Steven Forand<sup>d</sup>, Judith M. Graber<sup>f</sup>, Tamarra James-Todd<sup>k</sup>, Zuha Jeddy<sup>j</sup>, Kayoko Kato<sup>i</sup>, Nayara Mowry<sup>j</sup>, Anil S. Nair<sup>e</sup>, Pamela Ohman-Strickland<sup>f</sup>, Patrick Rago<sup>a,l</sup>, Adam M. Schaefer<sup>j</sup>, Anne P. Starling<sup>b,m</sup>, Veronica M. Vieira<sup>c</sup>, Meghan M. Weems<sup>a</sup>, Kristine F. Wiant<sup>e</sup>, Frank J. Bove<sup>a</sup>

### Study publication

M Pavuk et al. 2025. Multi-site study of communities with PFAS-contaminated drinking water: Methods, demographics, and PFAS serum concentrations. *Environment International*.  
doi: <https://doi.org/10.1016/j.envint.2025.109589>



Scan with your phone  
for the research paper

# Other New Chemicals and Health-Related Outcomes

- After all of the major all-site MSS analyses are finished, will do individual site analyses, including the ClPFPECAs, for links to health outcomes.
- Non-targeted chemical analysis
- “Metabolomic” outcomes
  - Measuring thousands of small molecules involved in the body’s metabolism that can be affected by chemical exposures

# “Supplemental” Studies

- **Fatima Haynes:**
  - Vaccine responses
- **Alanna O’Neil:**
  - Perceptions about water quality (Fantasia Williams)
  - Local fish consumption
  - Alternative PFAS: Exposure to chloroperfluoropolyether carboxylic acids (ClPFPECAs) and Health Outcomes

# PFAS Exposure and Immune Response Study

Fatima Haynes , PHD Student, Dept. Environmental Sciences, Rutgers University

## WHAT WE KNOW

**Changes in immune response, including lower antibody levels after vaccination**

- Mostly observed in children
- Limited data on adults
- Similar immune related effects observed in animal studies

## PURPOSE OF THIS STUDY

**To understand how PFAS exposure may influence immune response to vaccination in adults**



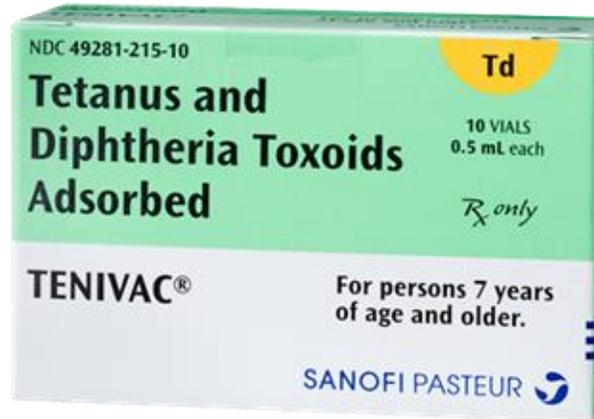
# PFAS Exposure and Immune Response Study

Fatima Haynes , PHD Student, Dept. Environmental Sciences, Rutgers University

## STUDY PROGRESS

### What We Did

- Recruited 20 adults from MSS between Nov-Dec 2024
- Administered routine Tetanus-Diphtheria (Td) booster
- Collected blood and saliva samples before and after vaccination



### Where We Are Now

- All recruitment and study visits complete
- Laboratory testing and data analysis in progress
- Samples are being used to measure:
  - Vaccine specific antibodies
  - Immune markers
  - Other blood-based indicators (metabolites)

# PFAS Exposure, Influence, and Perceptions

Fantasia Williams , PHD Student, Rutgers School of Public Health, Dept. Environmental and Occupational Health

## PURPOSE OF THE STUDY

1. To understand how Paulsboro residents experience and respond to PFAS contamination
2. To improve how risk information is communicated
3. To support informed health and environmental decisions.

# PFAS Exposure, Influence, and Perceptions

Fantasia Williams , PHD Student, Rutgers School of Public Health, Dept. Environmental and Occupational Health

## WHAT WE KNOW

**People judge drinking water safety based on lived experience and trust—not just scientific data.**

- Personal and community experiences strongly shape how people view water safety
- Taste, smell, and color are common signs people use to judge water quality
- Past contamination leads to lasting concern, even after cleanup
- Trust in institutions affects whether safety messages are believed
- Neighbors and social media often influence opinions more than official sources

# PFAS Exposure, Influence, and Perceptions

Fantasia Williams, PHD Student, Rutgers School of Public Health, Dept. Environmental and Occupational Health

## STUDY PROGRESS

### The Process

- Three focus groups were held in 2025, with 6 to 10 Paulsboro adult residents per session.
- Each discussion lasted 1 to 1.5 hours and was audio-recorded and transcribed without personal identification.
- Transcripts are currently being reviewed to learn about residents' shared themes and concerns about water quality in Paulsboro.

### What's Next

- Review focus group discussions to understand residents' main concerns and ideas.
- Conduct a survey so more community members can share their experiences.
- Use what we learn to create clear, helpful ways to share information and support healthy choices.

# Alanna O'Neil

PHD STUDENT, DEPARTMENT OF ENVIRONMENTAL SCIENCES, RUTGERS



**Exposure to PFAS from eating  
locally caught fish**



**Associations between  
Alternative PFAS (ClPFPECA)  
and Cholesterol**

# Why Study PFAS & Fish?

## FISH AS A PFAS EXPOSURE PATHWAY

- Eating fish is good for you – rich in vitamins and nutrients
- But PFAS can bioaccumulate (build-up) in fish
- Studies show that fish and seafood can be major sources of exposure to PFAS
- PFAS levels vary by fish type and location:
  - Freshwater > Ocean fish, Commercial fish
  - Fish near PFAS sources have higher levels
- PFAS have been found in fish from New Jersey and Delaware River
- Fish could be a significant source of PFAS exposure for people who eat a lot of local fish

# Local Fish & PFAS Exposure

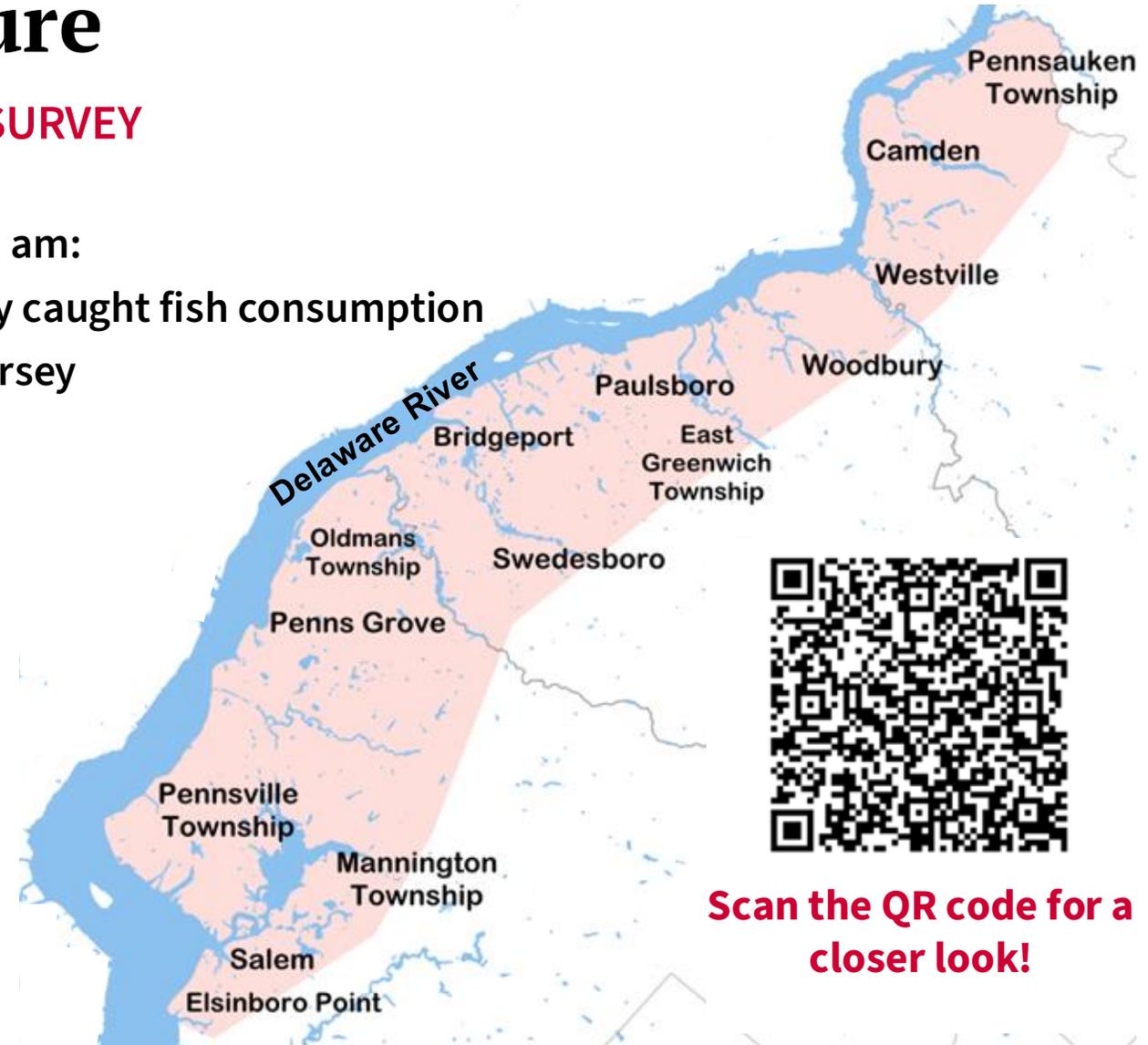
## LITERATURE REVIEW & LOCAL FISH CONSUMER SURVEY

To learn more about PFAS exposure from eating fish, I am:

1. Reviewing past studies about PFAS and locally caught fish consumption
2. Surveying people who eat local fish in New Jersey
  - Learn about who is eating local fish
  - What types of fish people like to eat
  - Estimate PFAS exposure



## Southwestern New Jersey Fish Eaters Interview



# Information about New Jersey Fish

## FISH CONSUMPTION ADVISORIES

- Provide guidance on how often to eat certain fish species
- Based on chemical levels found in fish – mercury, PCBs, PFAS, and dioxins
- Protect people from long-term health risks
- Guidance varies by:
  - Fish species
  - Waterbody
  - Who is eating (adults, kids, pregnant people/women of childbearing age/nursing mothers)
- **These advisories help you enjoy the benefits of fish while minimizing risks**
- For more information and additional guidance on safe fish and shellfish eating habits & preparation
  - **Go to [FishSmartEatSmartNJ.org](https://FishSmartEatSmartNJ.org) OR Scan the QR Code**



# Alternative PFAS in Paulsboro and Cholesterol

## CIPFPECA<sub>s</sub> AND BLOOD LIPID LEVELS

- Some PFAS have been linked to changes in cholesterol and other blood lipids
  - Most studies looked at legacy PFAS
- Previous study looked at CIPFPECA<sub>s</sub> and cholesterol among workers in Italy
  - Their levels were much higher than Paulsboro's levels
- Using data from the Paulsboro PFAS Health Study
- Blood lipid levels including cholesterol (total, LDL, HDL) and triglycerides

# Discussion

# **Mike Reed**

**Consultant and Former Superintendent of Paulsboro Water and Sewer  
Community Advisory Panel Member, Paulsboro PFAS Health Study**

# Hope Grosse

Co-Founder of Buxmont Coalition for Safer Water

267-253-3985

[hope@buxmontwater.org](mailto:hope@buxmontwater.org)

[www.buxmontwater.org](http://www.buxmontwater.org)

# Discussion

**Thank You for Coming!**

.....

**Contact Us**

**(856) 599 - 1205**

**[paulsboro-health-study@eohsi.rutgers.edu](mailto:paulsboro-health-study@eohsi.rutgers.edu)**