

Pease Community Meeting

January 30, 2024

AGENDA

AGENDA ITEMS	PRESENTER
Welcome and Opening Remarks	Chris Reh, PhD <i>Associate Director, ATSDR</i>
Pease PFAS Study Report (15 Minutes) Q&A (15 Minutes)	Marian Pavuk, MD, PhD <i>Epidemiologist, OCHHA, ATSDR</i>
PFAS Information for Clinicians (15 Minutes) Q&A (15 Minutes)	Aaron Bernstein, MD, MPH <i>Director, ATSDR</i>
Next Steps (5 Minutes)	Chris Reh, PhD <i>Associate Director, ATSDR</i>
PFAS-REACH Study (5 Minutes)	Laurel Schaider, PhD <i>Senior Scientist, Silent Spring Institute</i> <i>Principal Investigator, PFAS-REACH</i>
Closing Remarks	Aaron Bernstein, MD, MPH <i>Director, ATSDR</i>

The Pease Study: Design, Methods, and Cohort Description

Marian Pavuk, MD, PhD

Epidemiologist, ATSDR

Office of Associate Director (OAD)

Office of Community Health Hazard Assessment (OCHHA)

Pease Community Meeting

January 30th, 2024





- 1** Background

- 2** Pease Study Overview & Design

- 3** Results

- 4** Summary and Discussion

- 5** Questions?

Thank you, Pease Study Participants!

We would also like to thank:

ATSDR & NCEH

- Frank Bove
- Patrick Rago
- Carol Cusack
- Teresa Wang
- Elizabeth Irvin
- Jamie Mutter (formerly)
- Patrick Breysse (formerly)
- Antonia Calafat, Julianne Botelho (NCEH/DLS)

External Collaborators

- Pease CAP members
- Pease community members

- New Hampshire Division of Public Health Services, Department of Health and Human Services (NH DHHS)
- State University of New York (SUNY) Medical University
- LabCorp
- Abt Associates

What are PFAS?

- Per- and polyfluoroalkyl substances (PFAS) are a large group of manufactured chemicals used in industry and consumer products worldwide since the 1950s.
- Most commonly studied PFAS:
 - Perfluorooctanoic acid (PFOA)
 - Perfluorooctane sulfonate (PFOS)
- Other commonly studied PFAS:
 - Perfluorohexane sulfonic acid (PFHxS)
 - Perfluorononanoic acid (PFNA)

Suspected Health Impacts of PFAS

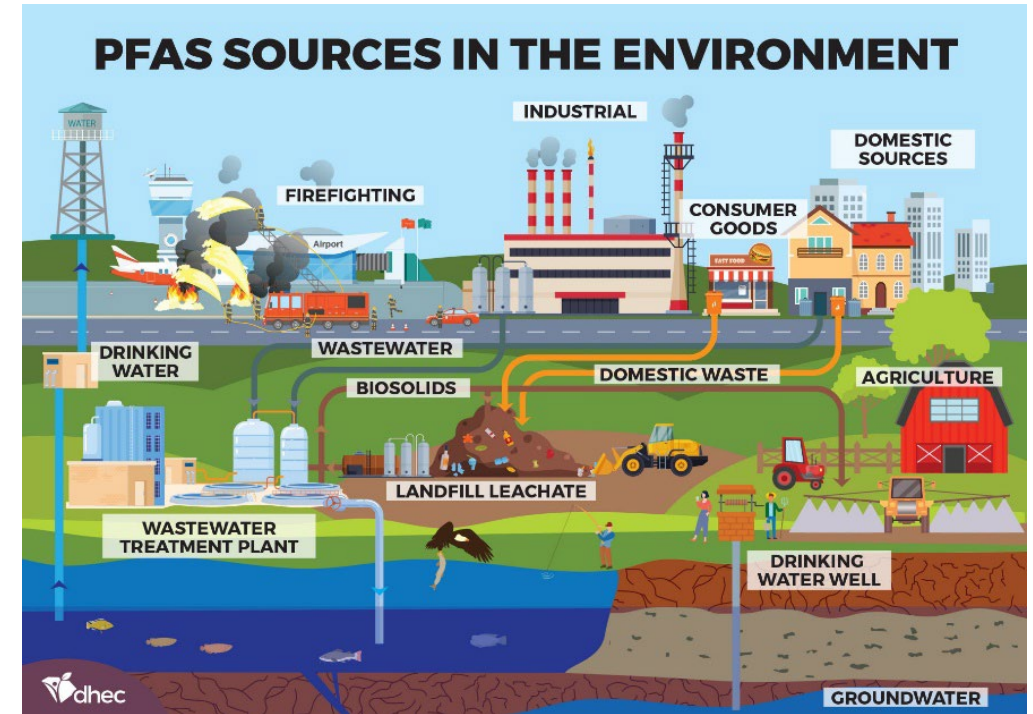
Some studies in humans have shown that exposure to certain PFAS may lead to

- Increases in cholesterol levels (PFOA, PFOS, PFNA, PFDA)
- Small decreases in birth weight (PFOA, PFOS)
- Lower antibody response to some vaccines (PFOA, PFOS, PFHxS, PFDA)
- Kidney and testicular cancer (PFOA)
- Pregnancy-induced hypertension or preeclampsia (PFOA, PFOS)
- Changes in liver enzymes (PFOA, PFOS, PFHxS)



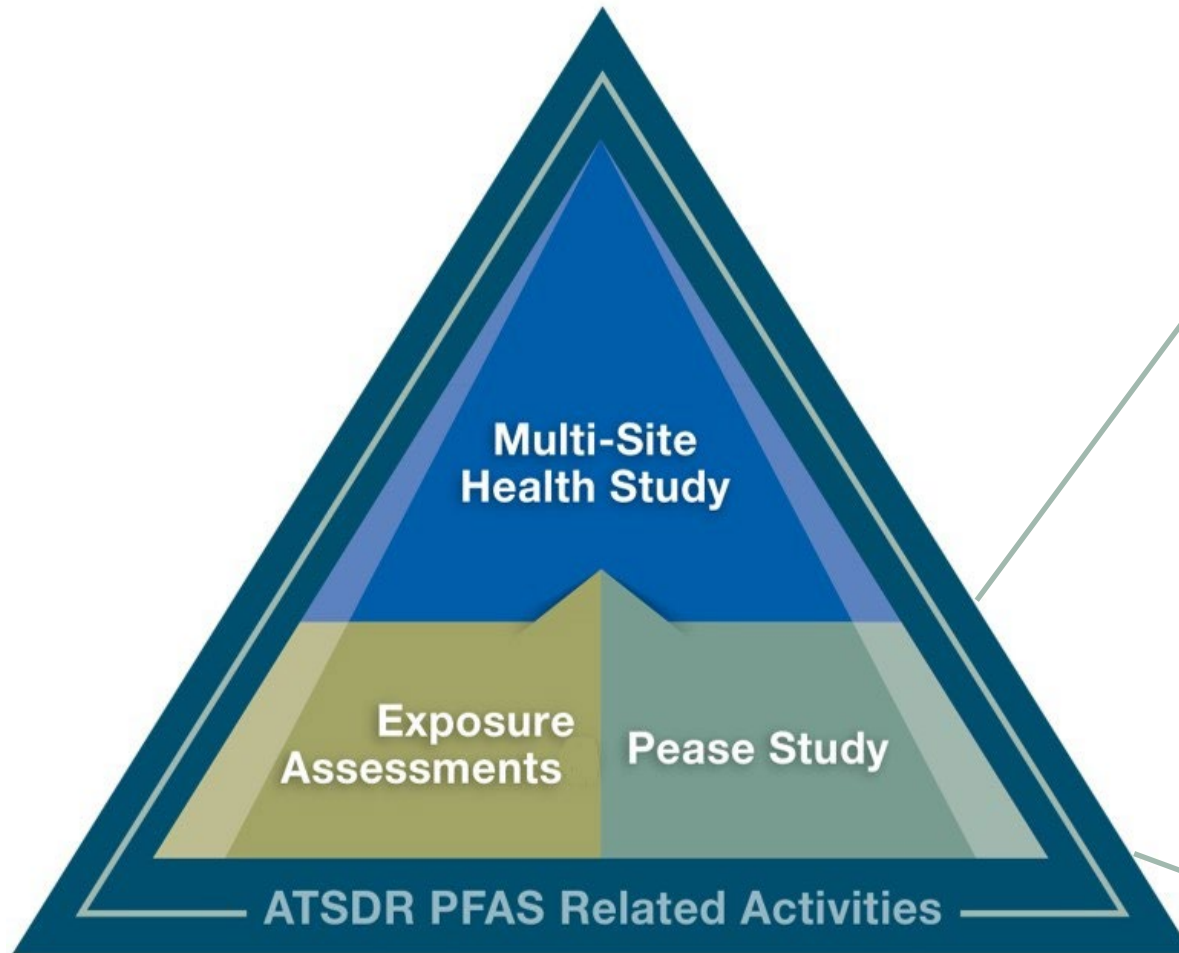
Environmental Impact of PFAS

- PFAS are highly stable and resistant to environmental degradation.
- PFOA and PFOS are no longer produced in the U.S. but are still used and manufactured in other countries.
- PFAS contamination of drinking water is widespread, affecting at least 26 million U.S. residents.*
- Contamination can result from use of industrial processes and use of firefighting foams at military bases and airports.



Source: South Carolina Department of Health and Environmental Control.

ATSDR PFAS-Related Activities: The Pease Study



- Is the first site of the Multi-Site Health Study
- Expands science on relationship between PFAS exposure and health outcomes
- Evaluates study procedures and methods to improve the implementation of the Multi-Site Study

The Pease Study Overview & Design

Pease Air Force Base/Pease International Tradeport

- Pease Air Force Base used aqueous film forming foam (AFFF) to extinguish fires and in drills.
- Class B AFFF typically contains PFOS, PFOA, and PFHxS.
- PFAS molecules migrated through soil and into ground water and or surface water sources of drinking water.
- Pease Air Force Base closed in 1991 and the space was redeveloped into Pease International Tradeport.



Source: Microsoft Stock Images.

New Hampshire Biomonitoring Program

- In 2014, one of three wells providing drinking water to Pease had PFAS measurements 35 times above the EPA advisory levels.
- This well was closed until filters were installed, and PFAS concentrations were below EPA advisory levels.
- A biomonitoring program was implemented by New Hampshire Department of Health and Human Services from 2015–2018.
 - Serum PFOS, PFOA, and PFHxS concentrations were found to be elevated in community members who drank from one of the three wells.*



Source: Getty Images.

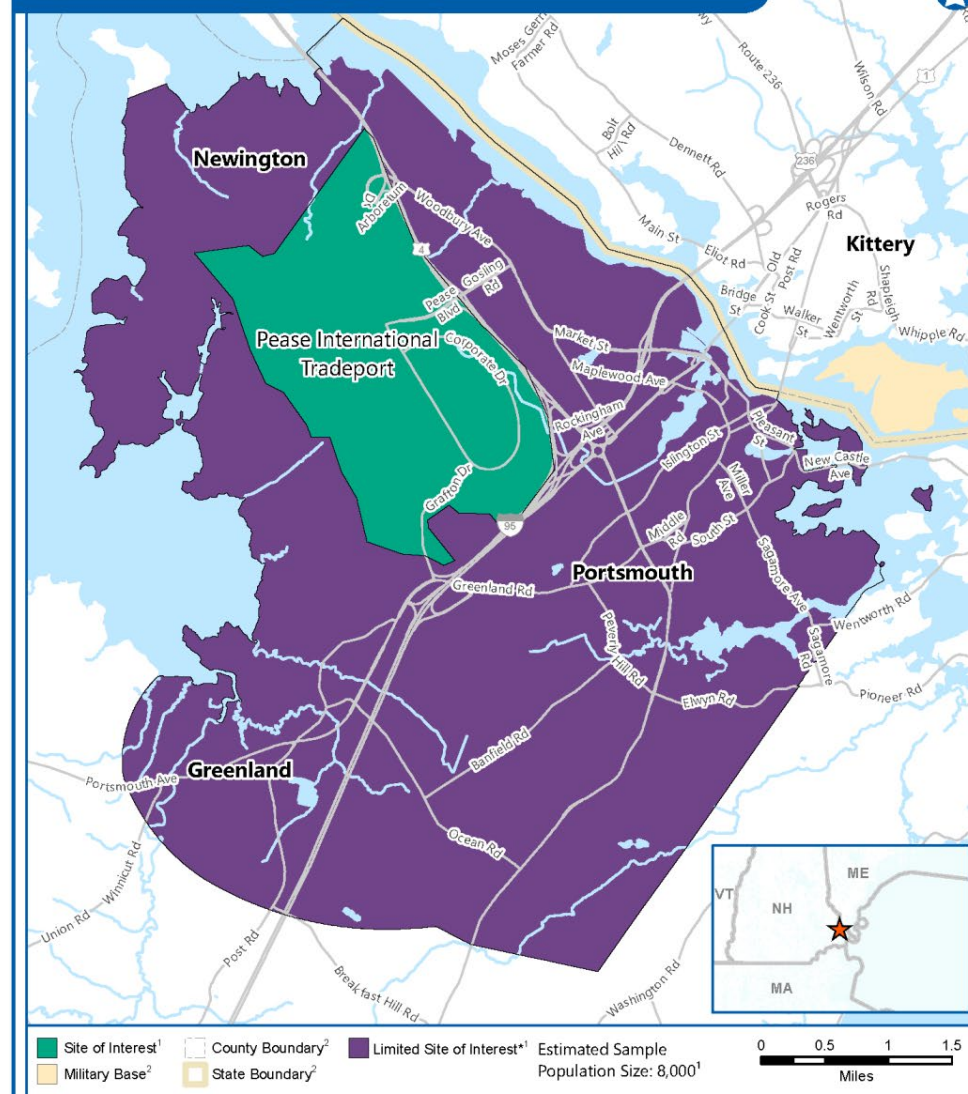
The Pease Study

Objectives:

- **To serve as the first site of the Multi-site Study**
 - Informs and improves the implementation of the Multi-Site Study, which examines human health effects in communities exposed to PFAS contaminated drinking water across the U.S.
- **To better understand non-cancer health effects of PFAS exposure**
 - Expands science on relationship between PFAS exposure and health outcomes

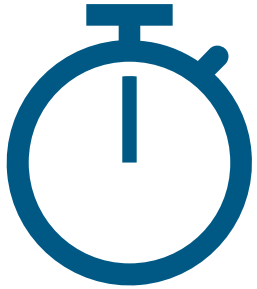
PFAS Multi-site Study Site

Portsmouth, NH
ATSDR Pease Study



¹Study eligibility was limited to those who worked or attended school at the Pease International Tradeport (Site of Interest) at or before May 2014 and those who used a private well with PFAS in Newington, NH.
²Data Sources: Pease Study, TomTom[®] 2022.
Projection: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet.

The Pease Study: Data Collection



Participants were required to:

- Fast for 8 hours prior to appointment
- Set aside 1.5 hours for an office visit
- Spend 1.5 to 2 hours for children’s additional visit and testing

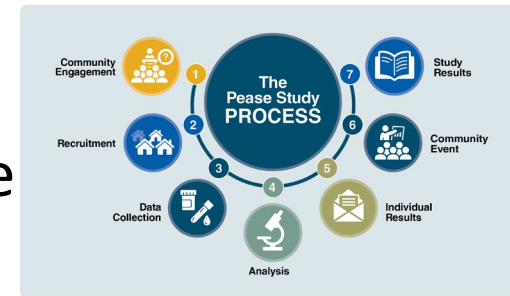


Data collected include:

- Basic health information (height, weight, blood pressure)
- Blood and urine samples
- Structured questionnaire including medical, social, occupational and family history
- List of current medications
- Behavioral information from child participants

The Pease Study Recruitment: October 2019 – December 2021

- Recruitment occurred in three waves
- Total of 1,377 community members were screened
- Total of 1,158 community members were eligible to participate



Focused on individuals who

- Lived in the Newington area or worked at Pease
- Consumed contaminated water
- Were not exposed to PFAS by way of occupation

 **776 adults and 180 children** completed the blood draw and questionnaire

 **128 out of 180 children** also completed the neuro-behavioral assessment

Results

Community Cohort Demographics in Pease Adult (n=776) and Child Participants (n=180)

Demographics	Adults	Children
	n (%)	n (%)
Sex		
Male	366 (47.2)	101 (56.1)
Female	410 (52.8)	79 (43.9)
Age		
18-39 years	(4-5 years) 117 (15.1)	11 (6.1)
40-59 years	(6-11 years) 412 (53.1)	112 (62.2)
≥60+ years	(12-17 years) 247 (31.8)	57 (31.7)
Hispanic or Latino		
Yes	7 (0.9)	1 (0.6)
No	769 (99.1)	179 (99.4)
Race		
White	748 (96.4)	172 (95.6)
Other*	20 (2.6)	8 (4.4)

*Includes American Indian or Alaska Native, Asian, Black or African American, and Multiracial. Each of these groups contained fewer than 10 individuals.
The demographics in blue brackets () correspond to the age ranges among the child population.

Community Cohort Demographics in Pease Adult and Child Participants (continued)

Demographics		Adults	Children
		n (%)	n (%)
Highest Education Level – Adults	Highest Education Level – Children		
High School or Equivalent (GED)	Preschool or Kindergarten	58 (7.5)	20 (11.1)
Some University/College	Grades 1 to 5	119 (15.3)	106 (58.8)
Technical or Trade School	Grades 6 to 11	28 (3.6)	54 (30)
University/College Graduate	--	365 (47)	--
Graduate School or higher	--	206 (26.5)	--
Annual Household Income*			
< \$25,000		17 (2.2)	0 (0)
\$25,000 to \$69,999		126 (16.2)	11 (6.1)
\$70,000 to \$149,999		338 (43.6)	61 (33.9)
More than \$150,000		251 (32.3)	95 (52.8)
Missing		44 (5.7)	13 (7.2)

*Annual household income for the child population is represented by the income for the household as earned by their parents.

Community Cohort Demographics in Pease Adult and Child Participants (continued)

Demographics	Adults	Children
	n (%)	n (%)
Health Insurance for the Last 12 Months		
Yes	775 (99.9)	180 (100)
No	1 (0.1)	0 (0)
Home Tap Water Source		
Pease International Tradeport public water system	1 (0.1)	0 (0)
Other Portsmouth public water system	140 (18)	51 (28.3)
Newington	1 (0.1)	0 (0)
Private well not in Pease International Tradeport area	272 (35.1)	56 (31.1)
Other	362 (46.6)	73 (40.6)

PFAS Serum Concentrations in the Pease Study Adults Compared with NHANES and New Hampshire Biomonitoring Program

PFAS	Pease Participants Who Consumed Contaminated Water (Exposed) (2019-2021)		Pease Participants Who Did Not Consume Contaminated Water (Referent) (2019-2021)		NHANES (2017–2018)			New Hampshire Biomonitoring Program (2015–2017)*	
	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	p-value for Difference (Pease contaminated v. NHANES)	n	Geometric Mean (95% CI)
PFOS (µg/L)	676	5.04 (4.74, 5.35)	100	3.97 (3.47, 4.54)	1700	4.45 (4.10, 4.83)	0.035	1181	8.9 (8.5-9.3)
PFOA (µg/L)	676	1.93 (1.85, 2.03)	100	1.70 (1.52, 1.90)	1700	1.45 (1.35, 1.56)	<0.001	1181	3.0 (2.9-3.2)
PFNA (µg/L)	676	0.48 (0.45, 0.50)	100	0.51 (0.46, 0.57)	1700	0.41 (0.37, 0.47)	<0.001	1181	0.7 (0.7-0.7)
PFHxS (µg/L)	676	3.21 (2.97, 3.48)	100	1.79 (1.50, 2.15)	1700	1.11 (1.02, 1.21)	<0.001	1181	4.3 (4.1-4.6)

*Includes results from 1181 adult participants (≥20 years of age) as published in Daly et al. 2018

PFAS Serum Concentrations in the Pease Study Adults Compared with NHANES and New Hampshire Biomonitoring Program (continued)

PFAS	Pease Exposed (2019-2021)		Pease Referent (2019-2021)		NHANES (2017–2018)			New Hampshire Biomonitoring Program (2015–2017)*	
	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	p-value for Difference (Pease contaminated v. NHANES)	n	Geometric Mean (95% CI)
PFDA (µg/L)	676	0.19 (0.18, 0.20)	100	0.19 (0.17, 0.21)	1700	0.20 (0.18, 0.21)	0.027	-	-
PFUnDA (µg/L)	676	0.15 (0.15, 0.16)	100	0.16 (0.14, 0.18)	1700	0.13 (0.12, 0.14)	<0.001	-	-
MeFOSAA (µg/L)	676	0.10 (0.10, 0.11)	100	0.13 (0.11, 0.14)	1700	0.13 (0.12, 0.14)	<0.001	-	-

*FDA, PFUnDA and MeFOSAA were not presented in Daly et al. 2018; over 60% of results were below the Limit of Detection in New Hampshire Biomonitoring Program

Perfluorodecanoic acid (PFDA); Perfluoroundecanoic acid (PFUnDA); 2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)

PFAS Serum Concentrations in the Pease Study Children Compared with NHANES

PFAS	Pease Exposed (2019-2021)		Pease Referent (2019-2021)		NHANES (2017–2018)		
	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	p-value for Difference (Pease Contaminated v. NHANES)
PFOS (µg/L)	172	3.06 (2.78, 3.38)	8	2.00 (1.61, 2.05)	229	2.53 (2.18, 2.93)	<0.001
PFOA (µg/L)	172	1.47 (1.38, 1.57)	8	1.38 (1.02, 1.85)	229	1.13 (1.04, 1.22)	<0.001
PFNA (µg/L)	172	0.31 (0.28, 0.34)	8	0.20 (0.10, 0.39)	229	0.37 (0.30, 0.46)	0.539
PFHxS (µg/L)	172	1.82 (1.61, 2.05)	8	1.10 (0.69, 1.76)	229	0.80 (0.70, 0.90)	<0.001

Note: Overall PFAS levels among children combined were not presented in Daly et al. 2018; thus, NH Biomonitoring Results are not included in this table.

Frequency and Percent of Self-Reported Health Outcomes in the Pease Study Adults

Health Outcomes	Self-Reported	Health Care Provider Reported
	n (%)	n (%)
Allergies	373 (48.1)	165 (44.2)
High Cholesterol	258 (33.2)	211 (81.4)
High Blood Pressure	216 (27.8)	163 (75.5)
Asthma	113 (14.6)	66 (58.4)
Atopic Dermatitis	109 (14.0)	25 (22.9)
Osteoarthritis	88 (11.3)	37 (42.0)
Thyroid Disease	76 (9.8)	57 (75.0)
Diabetes	60 (7.7)	52 (86.7)
Osteoporosis	58 (7.5)	41 (70.7)

*N/A; not applicable. Verification was not sought for chronic bronchitis or emphysema

Frequency and Percent of Self-Reported Health Outcomes in the Pease Study Adults (continued)

Health Outcomes	Self-Reported	Health Care Provider Reported
	n (%)	n (%)
Infertility	40 (5.2)	2 (5.0)
Endometriosis	33 (4.3)	7 (21.2)
Heart Disease	32 (4.1)	20 (62.5)
Kidney Disease	19 (2.4)	9 (47.4)
Chronic Bronchitis	19 (2.4)	N/A*
Liver Disease	15 (1.9)	7 (46.7)
Rheumatoid Arthritis	15 (1.9)	3 (20.0)
Ulcerative Colitis	13 (1.7)	5 (46.2)

Frequency and Percent of Self-Reported Health Outcomes in the Pease Study Children

Health Outcomes	Self-Reported	Health Care Provider Reported
	n (%)	n (%)
Allergies	64 (35.6)	35 (54.7)
Atopic Dermatitis	30 (16.7)	6 (20.0)
Other learning or behavioral problems	30 (16.7)	6 (20.0)
Attention deficit hyperactivity disorder (ADHD) or attention deficit disorder (ADD)	27 (15.0)	23 (85.2)
Asthma	21 (11.7)	14 (66.7)
Chronic stuffy/runny nose (rhinitis/sinusitis)	8 (4.4)	2 (25.0)
Autism	4 (2.2)	3 (75.0)
High Cholesterol	2 (1.1)	0 (0)

Summary and Discussion

The Pease Study

Summary: Self-Reported Health Conditions

- Among adults, the most reported health conditions were
 - Allergies (n=373, 48.1%),
 - High cholesterol (n=258, 33.2%), and High blood pressure (n=216, 27.8%),
 - Followed by Atopic dermatitis (n=109, 14%), Osteoarthritis (n=88, 11.3%), Thyroid disease (n=76, 9.8%) and Diabetes (n=60, 7.7%).
- Among children, the most reported health conditions were
 - Allergies (n=64, 35.6%),
 - Atopic dermatitis (n=30, 16.7%)
 - Attention deficit hyperactivity disorder (ADHD) or attention deficit disorder (ADD) (n=27, 15.0%), and
 - Learning and behavioral problems besides ADD/ADHD and autism (n=30, 16.7%)

Summary: Serum PFAS Levels

- **The Pease Study versus 2015—2017 NH Biomonitoring Program results**
 - Pease Study exposed participants had lower concentrations of all PFAS analytes.
 - When comparing the subset of Pease Study participants who also participated in the NH Biomonitoring Program, these patterns remained.
- **The Pease Study versus NHANES 2017—2018 results**
 - Adults and children in this study had significantly higher levels of PFOS, PFOA, PFNA, and PFHxS and significantly lower levels of Me-FOSAA compared to NHANES.
 - PFUnDA levels were significantly higher among Pease Study adults; this association was not observed in Pease children.

The Pease Study Strengths

- Few other studies have evaluated PFAS drinking water exposures.
 - The contamination evaluated in the Pease Study was from a specific source, i.e., the use of AFFF at the Pease Air Force Base.
- The relatively large size of the adult cohort provides additional information on PFAS serum concentrations and information on health outcomes
 - Smaller children cohort also expands the PFAS exposure profile, adding participants' characteristics and health outcomes/biomarkers not collected in the NH Biomonitoring Program.
- Two points in time for serum PFAS levels available from the NH Biomonitoring Program
 - Samples closer in time to when the Haven well was in operation 2015-2018 (n=293).

The Pease Study Limitations

- It cannot be determined if the PFAS level in a person's blood is definitively linked to a past or current health problem or will be associated with the development of future health problems.
- Given the length of time that has passed, there may be errors in the self-reporting of water consumption and time spent on base.
- This would have no impact on the key comparisons in this paper, i.e., comparisons between the PFAS serum levels of those who did or did not drink the Pease water and NHANES.

Next Steps and Future Directions

- **Pease statistical analyses** to examine the associations between specific health effects and serum PFAS concentrations **are underway**
 - Results will be presented at future community meeting(s) (2024-2025).
- **Pease Study data will be combined with MSS data** to increase the sample size for health outcomes and biomarkers analyses with PFAS exposure
 - Health outcomes with small sample size will not be analyzed specifically for Pease and will be included in the aggregate MSS data analyses
- **Enrollment in MSS and analyses of PFAS completed at the end of 2023**
 - Clinical analyses and verification of medical records and school information continues
 - Work on data management and aggregated dataset ongoing (timeline: preliminary dataset June 2024; complete all-sites dataset Aug 2024).

Next Steps and Future Directions

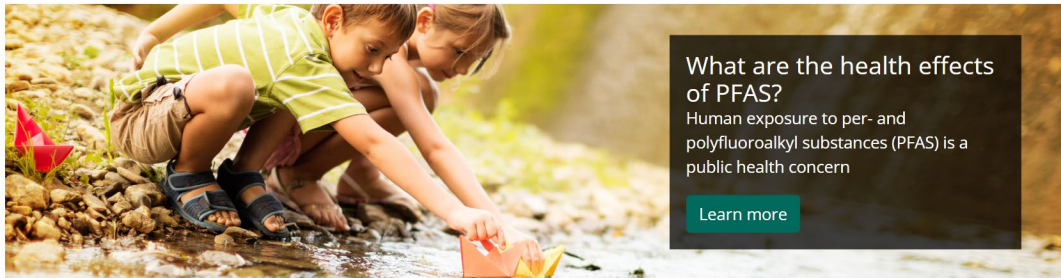
- For a subset of individuals who participated in both the NH Biomonitoring Program and the Pease Study, analyses will be conducted to understand how their individual levels have changed over an approximate 4-year period
 - Decreases in the national biomonitoring data (NHANES) have been observed over the last decade.
 - We expected the serum concentration in Pease Study participants to also decrease.
- ATSDR will work with the cooperative partners on MSS on statistical analyses and publication of results investigating the associations between specific health effects and serum PFAS concentrations

Additional Resources

Per- and Polyfluoroalkyl Substances (PFAS) and Your Health

PFAS and Your Health

[Español \(Spanish\)](#) | [Print](#)



What are the health effects?

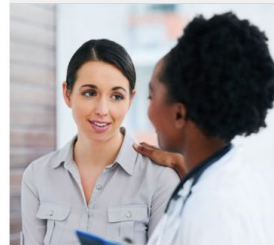


What is ATSDR doing?



Resources

PFAS Clinician Fact Sheet



An overview of the science and guidance for clinicians.

[Learn More](#)

PFAS FAQs



PFAS are a large group of man-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

[Learn More](#)

Info for Clinicians and Environmental Health Professionals



Free resources for clinicians and environmental health professionals, including health assessors.

[Learn More](#)

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

Questions

- 1-800-CDC-INFO (232-4636)
- ATSDR Website: www.atsdr.cdc.gov/pfas/Pease-Study.html
- PeaseStudy@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this presentation have not been formally disseminated by [the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry] and should not be construed to represent any agency determination or policy.



Supplemental Slides

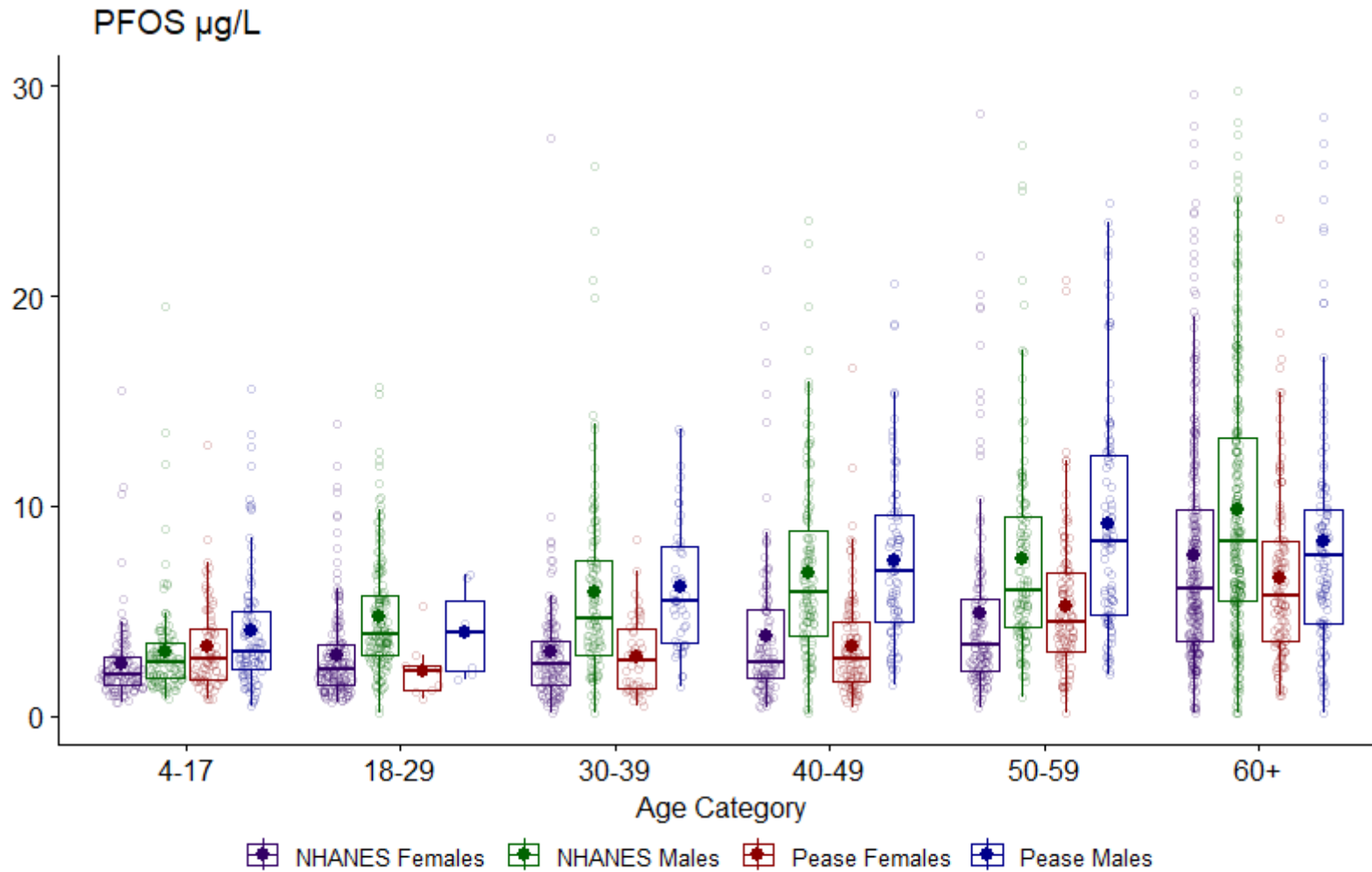
Combined Pease and MSS Final Recruitment Numbers

Site	Launch	Adult Participants		Child Participants		
		Questionnaire Only	All Study Activities	Questionnaire Only	Questionnaire and Body Measurements /Blood Draw Only	All Study Activities (includes NBT)
California	12/2021	586	518	71	51	28
Colorado	11/2021	979	925	190	141	122
Massachusetts	10/2021	695	689	99	90	48
Michigan	08/2021	445	423	42	27	19
New Jersey	07/2021	829	777	103	88	68
New York	12/2021	508	468	55	44	20
Pennsylvania	10/2021	1455	1252	125	89	53
Pease	10/2019	811	776	201	180	129
TOTAL		6,308	5,828	886	710	487

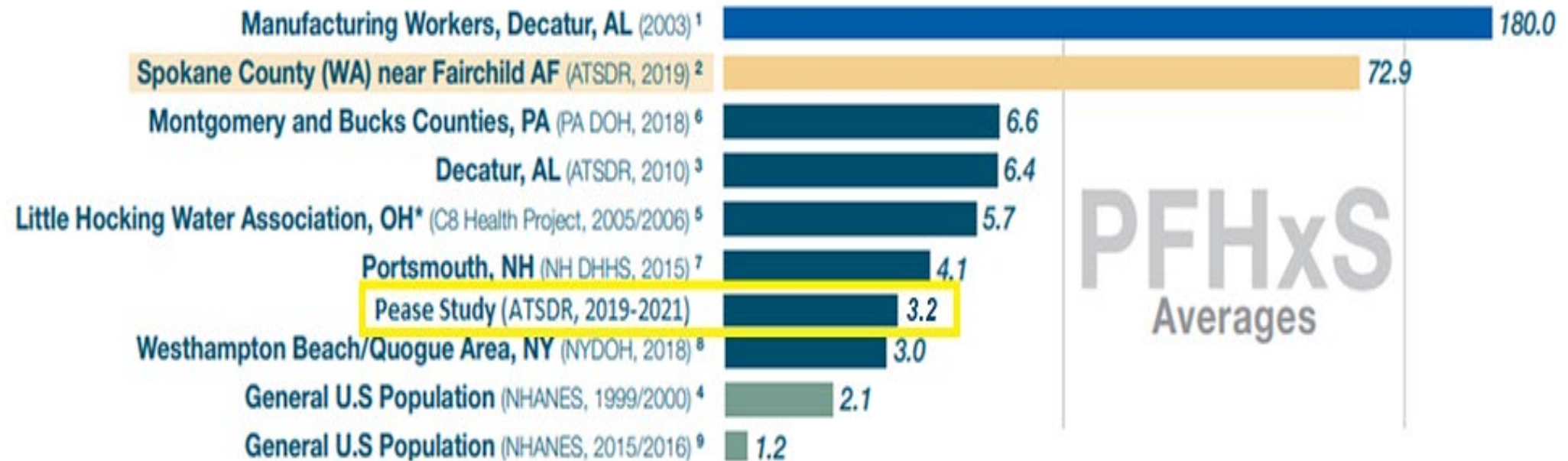
Total Completed Questionnaires: 7,194

Total Completed Participants: 6,315

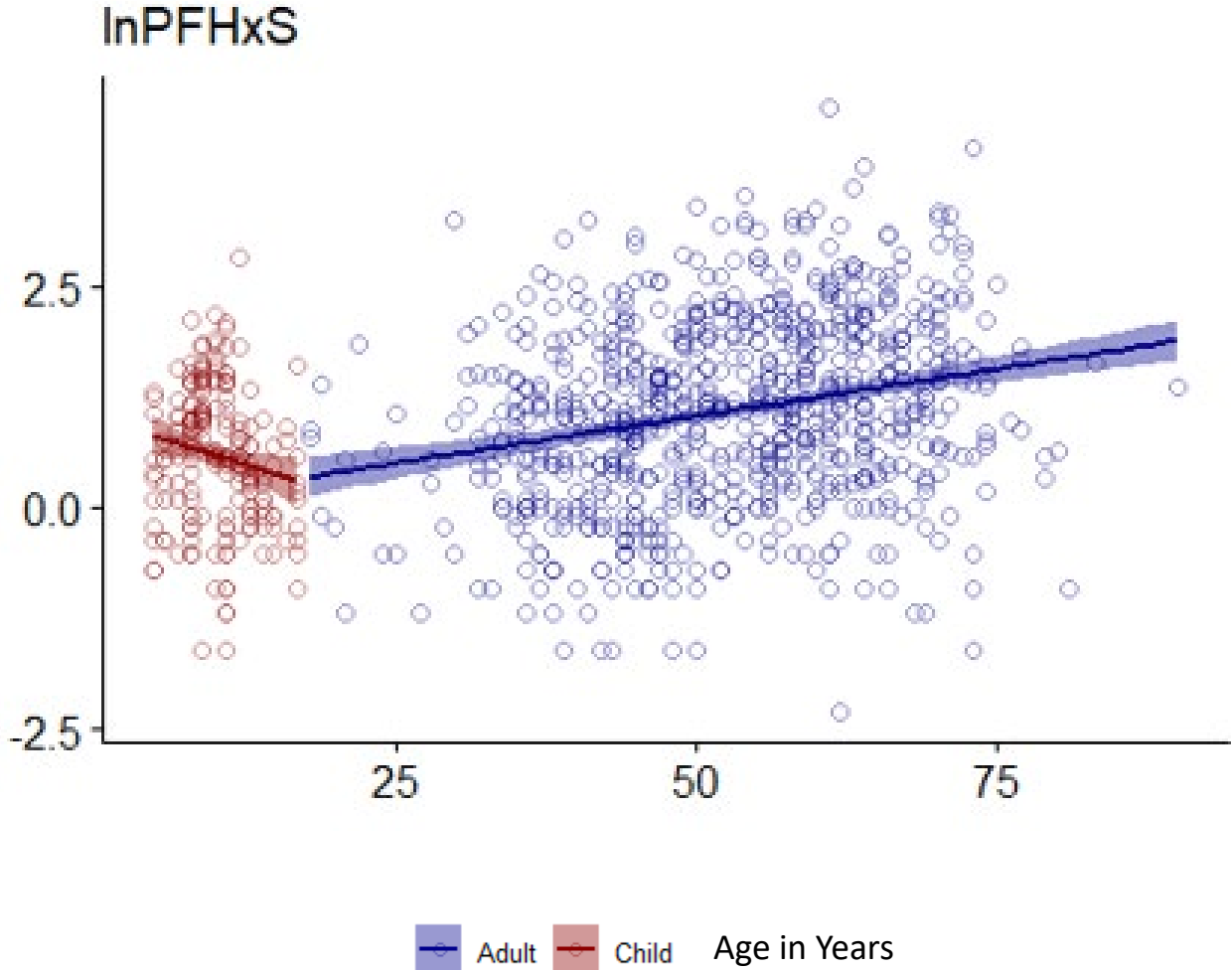
PFAS Concentrations in the Pease Study Compared with NHANES (Age and Sex Categories)



PFHxS Serum Concentrations in the Pease Study Adults Compared with NHANES and New Hampshire Biomonitoring Program



Linear Regression Plots of PFAS Serum Concentrations by Age



PFAS Serum Concentrations in Pease Study Compared with New Hampshire Biomonitoring Program, by Adults and Children

PFAS	Group	Pease Participants		New Hampshire Biomonitoring Program (2015–2017)*		% Difference
		n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	
PFOS (µg/L)	Adults	776	4.88 (4.62, 5.16)	244	10.51 (9.58, 11.53)	73.2
	Children	180	3.01 (2.73, 3.30)	49	10.26 (8.72, 12.06)	109.3
PFOA (µg/L)	Adults	776	1.9 (1.82, 1.99)	244	3.53 (3.25, 3.82)	60.0
	Children	180	1.47 (1.37, 1.56)	49	4.16 (3.74, 4.62)	95.6
PFNA (µg/L)	Adults	776	0.48 (0.46, 0.50)	244	0.79 (0.73, 0.85)	48.8
	Children	180	0.3 (0.27, 0.33)	49	1.21 (0.97, 1.50)	120.5
PFHxS (µg/L)	Adults	776	2.98 (2.77, 3.21)	244	5.66 (5.02, 6.39)	62.0
	Children	180	1.78 (1.58, 2.00)	49	6.93 (5.76, 8.34)	118.3

PFAS Serum Concentrations in NHANES 2013–2014 and 2017–2018

PFAS	Group	NHANES (2013–2014)		NHANES (2017–2018)		% Difference
		n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	
PFOS (µg/L)	Adults	1698	5.34 (5.11, 5.58)	1700	4.65 (4.45, 4.86)	13.8
	Children	256	3.09 (2.87, 3.32)	229	2.36 (2.18, 2.54)	26.8
PFOA (µg/L)	Adults	1698	1.88 (1.81, 1.94)	1700	1.39 (1.35, 1.44)	30.0
	Children	256	1.54 (1.46, 1.62)	229	1.07 (1.01, 1.13)	36.0
PFNA (µg/L)	Adults	1698	0.7 (0.68, 0.72)	1700	0.42 (0.41, 0.44)	50.0
	Children	256	0.57 (0.53, 0.62)	229	0.32 (0.29, 0.36)	56.2
PFHxS (µg/L)	Adults	1698	1.33 (0.68, 0.72)	1700	1.09 (1.04, 1.13)	19.8
	Children	256	1.15 (1.04, 1.27)	229	0.75 (0.68, 0.82)	42.1

Proportion of Pease Participants across NASEM Exposure Categories

	<2 (µg/L)	2–20 (µg/L)	>20 (µg/L)
Pease Adults	6 (0.8%)	600 (77.3%)	170 (21.9%)
Pease Children	2 (1.1%)	169 (93.9%)	9 (5.0%)

PFAS Serum Concentrations in the Pease Study Children Compared with NHANES (continued)

PFAS	Pease Exposed (2019-2021)		Pease Referent (2019-2021)		NHANES (2017–2018)		
	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	n	Geometric Mean (95% CI)	p-value for Difference (Pease Contaminated v. NHANES)
PFDA (µg/L)	172	0.14 (0.13, 0.15)	8	0.12 (0.08, 0.19)	229	0.15 (0.13, 0.17)	0.988
PFUnDA (µg/L)	172	0.09 (0.08, 0.10)	8	0.11 (0.07, 0.17)	229	0.10 (0.09, 0.10)	0.156
MeFOSAA (µg/L)	172	0.11 (0.10, 0.12)	8	0.09 (0.06, 0.12)	229	0.14 (0.13, 0.15)	0.091

Note: Overall PFAS levels among children combined were not presented in Daly et al. 2018; thus, NH Biomonitoring Results are not included in this table.

Frequency and Percent of Self-Reported Health Outcomes in the Pease Study Adults (continued)

Health Outcomes	Self-Reported	Health Care Provider Reported
	n (%)	n (%)
Fibromyalgia	12 (1.5)	1 (8.3)
Celiac Disease	8 (1.0)	3 (37.5)
Multiple Sclerosis	7 (0.9)	4 (57.1)
Emphysema	6 (0.8)	N/A*
Crohn's Disease	4 (0.5)	3 (75.0)
Scleroderma	3 (0.4)	0 (0)
Lupus	2 (0.3)	0 (0)
Parkinson's Disease	0 (0)	N/A*

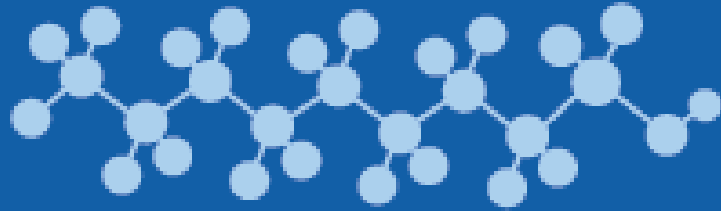
*N/A, not applicable

Frequency and Percent of Self-Reported Health Outcomes in the Pease Study Children (continued)

Health Outcomes	Self-Reported	Health Care Provider Reported
	n (%)	n (%)
Obesity	2 (1.1)	1 (5.0)
Celiac Disease	1 (0.6)	1 (100.0)
Crohn's Disease	1 (0.6)	0 (0)
Delayed puberty	1 (0.6)	0 (0)
Diabetes	0 (0)	0 (0)
Thyroid Disease	0 (0)	0 (0)
Lupus	0 (0)	N/A*
Scleroderma	0 (0)	N/A*

*N/a, not applicable

PFAS



Information for Clinicians

Aaron Bernstein, MD, MPH

Director

National Center for Environmental Health & Agency for Toxic
Substances and Disease Registry



Introduction and Purpose

- CDC/ATSDR's *PFAS: Information for Clinicians*:
 - Provides clinicians information for engaging patients to help them understand their exposures, how they may reduce exposure, and navigate decisions around PFAS blood testing and clinical testing.
 - Updates previous ATSDR materials with what is currently known about health effects associated with per- and polyfluoroalkyl substances (PFAS).
 - Responds to community requests for greater provider awareness of PFAS concerns and actions that can be taken to address PFAS exposures.

Key Components

Health Effects Information



Increases in cholesterol levels



Decreases in birth weight



Lower antibody response to vaccines



Pregnancy-induced hypertension and preeclampsia



Kidney and testicular cancer



Changes in liver enzymes

Example Exposure Reduction Strategies



PFAS Blood Testing

- In deciding whether to order PFAS blood testing, clinicians can consider
 - an individual's exposure history,
 - results of PFAS testing from the patient's water supply, food sources, or other exposure routes, and
 - whether results can inform exposure reduction and health promotion.
- Includes information on the benefits and limitations of PFAS blood testing to support shared decision-making between patients and providers based on the patient's unique circumstances.

Clinical Management Based on PFAS Blood Levels

- Patients and clinicians can discuss the potential risks and benefits of using PFAS blood testing results to guide clinical management.
- Considerations include:
 - factors unique to the patient, including the patient's risk for disease
 - whether health screening beyond the usual standards of care is appropriate
 - the potential for unnecessary further testing and treatment related to false positives from additional screening tests

Questions

Please feel free to reach out at PFAS@cdc.gov

For more information, contact ATSDR

1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348 www.atsdr.cdc.gov

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The findings and conclusions in this presentation have not been formally disseminated by the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.

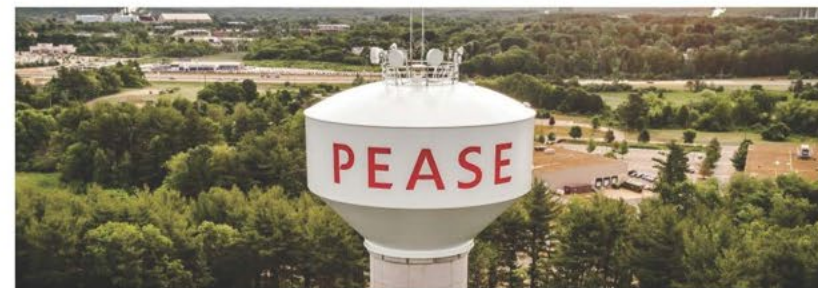
Next Steps

- Ongoing community and provider engagement on PFAS information for clinicians
- Work to standardize PFAS testing
- Continue to engage with the community as the Pease Study data analyses continue



PFAS-REACH

PFAS Research, Education,
and Action for Community Health



PFAS-REACH Children's Health Study

Laurel Schaidler, PhD

Senior Scientist, Silent Spring Institute

January 30, 2024

PFAS-REACH Children's Health Study



- **Goal:** Understand how exposures to PFAS in early life can affect vaccine response and immune system function in children.
- **Eligibility:** Children (ages 4-8 and 11-15) who attended daycare at Pease or whose mothers worked at Pease before 2014.
- **Participation:** Includes providing a blood and urine sample, completing questionnaires, and responding to text message surveys.
- **You'll receive:** PFAS and antibody blood test results and up to \$125 in gift cards.

Call or text:

617-221-6428

Email:

PFAS-REACH@
silentspring.org

Visit:

bit.ly/pfas-reach

Scan for
link to
website



Closing Remarks

Aaron Bernstein, MD, MPH

THANK YOU!

For Information about	Please Contact or Visit
Replacement Pease Study Individual Results	PeaseStudy@cdc.gov
For PFAS Information for Clinicians	pfas@cdc.gov
PFAS-REACH Study	pfas-reach@silentspring.org
PFAS and Health Effects	PFAS@cdc.gov
ATSDR's Pease Study	www.atsdr.cdc.gov/pfas/activities/pease
ATSDR's PFAS Multi-site Study (MSS)	atsdr.cdc.gov/pfas/activities/studies/multi-site