



PA PFAS Health Study Update



From the PA PFAS Multi-site Health Study Team

WELCOME

Hello to all PA PFAS Multi-site Health Study participants. We want to thank you for taking part in this important Health Study and share additional PFAS results for the 1,251 adults and 89 children who completed the questionnaire and have PFAS blood values. For these results, we use the geometric mean because it reduces the impact of a few extreme values on the overall average. Tables 1 and 2 compare our PA PFAS results to other groups. The Pease Study is a similar group of New Hampshire

residents whose drinking water was also contaminated with PFAS from firefighting foam. The National Health and Nutrition Examination Survey (NHANES) provides average PFAS levels for the general U.S. population. Table 3 provides PFAS results for adult PA health study participants. For all three tables, total PFAS was calculated as the simple additive sum of PFOA and PFOS (linear and branched isomers), PFHxS, PFNA, PFDA, PFUnDA, and MeFOSSA.

STUDY RESULTS

Table 1 presents PFAS results for adults and children. For adults, PA serum PFAS concentrations were considered significantly higher than Pease and NHANES for PFOA, PFOS, and PFHxs (**bolded** values) and significantly higher than NHANES for

PFNA (**highlighted** values). For children, PA serum PFAS concentrations were considered significantly higher than NHANES for PFOA and PFHxS (**highlighted** values). All PFAS concentrations were higher in adults than children.

Table 1. Per- and Polyfluoroalkyl Substance Serum Concentrations in Adult and Child PA MSS Health Study Participants in 2021–2023 Compared with Pease Study Participants in 2019–2021 and NHANES 2017–2018

PFAS	Age Group	PA MSS Study		Pease Study (Exposed) ¹		NHANES 2017-18 ¹	
		Number of Participants	Geometric Mean	Number of Participants	Geometric Mean	Number of Participants	Geometric Mean
PFOA	Adult	1,251	2.30	676	1.93	1,700	1.45
	Child	89	1.53	172	1.47	229	1.13
PFOS	Adult	1,251	5.87	676	5.04	1,700	4.45
	Child	89	2.47	172	3.06	229	2.53
PFHxS	Adult	1,251	4.22	676	3.21	1,700	1.11
	Child	89	1.63	172	1.82	229	0.80
PFNA	Adult	1,251	0.53	676	0.48	1,700	0.41
	Child	89	0.32	172	0.31	229	0.37
Total PFAS	Adult	1,251	14.33	NA	NA	NA	NA
	Child	89	6.63	NA	NA	NA	NA

¹From Pease Study Report, Design, Methods and Cohort Description, January 12, 2024. DHHS, ATSDR Pease Study Report. DHHS, ATSDR [Pease Study Report](#).

Table 2 presents PFAS results for adult males and females. For males, PA serum PFAS concentrations were considered significantly higher than NHANES for PFOA, PFOS, PFHxs, and PFNA (**highlighted** values). For females, PA serum PFAS concentrations were considered significantly higher than Pease and

NHANES for PFOA, PFOS, and PFHxS (**bolded** values) and significantly higher than NHANES for PFNA (**highlighted** values). For all individual PFAS and total PFAS serum levels were higher in males than females. All PFAS concentrations were higher in males than females.

Table 2. Per- and Polyfluoroalkyl Substance Serum Concentrations in Adult PA MSS Health Study Participants in 2021–2023 Compared with Pease Study Participants in 2019–2021 and NHANES 2017–2018 by Sex

PFAS	Sex	PA MSS Study		Pease Study (Exposed) ¹		NHANES 2017–18 ¹	
		Number of Participants	Geometric Mean	Number of Participants	Geometric Mean	Number of Participants	Geometric Mean
PFOA	Male	519	2.54	316	2.28	837	1.65
	Female	732	2.15	360	1.68	863	1.28
PFOS	Male	519	7.73	316	6.93	837	5.72
	Female	732	4.83	360	3.81	863	3.53
PFHxS	Male	519	5.49	316	4.75	837	1.55
	Female	732	3.50	360	2.28	863	0.81
PFNA	Male	519	0.58	316	0.54	837	0.45
	Female	732	0.50	360	0.43	863	0.39
Total PFAS	Male	519	17.77	NA	NA	NA	NA
	Female	732	12.30	NA	NA	NA	NA

¹From Pease Study Report, Design, Methods and Cohort Description, January 12, 2024. DHHS, ATSDR Pease Study Report. DHHS, ATSDR [Pease Study Report](#).

Table 3 presents adult PA PFAS results for selected demographic variables. All PFAS concentrations increase with age. PFAS concentrations were higher for participants whose current residence was in a Township

(Horsham, Ivyland, Warminster, Warrington) closest to a military base. Except for PFOA, PFAS levels were highest for participants who reported the public water system as their primary water source.

Table 3. Per- and Polyfluoroalkyl Substance Serum Concentrations in Adult PA MSS Health Study Participants in 2021–2023 by Selected Demographic Variables

Variable	Number of Participants	PFOA	PFOS	PFHxS	Total PFAS
		Geometric Mean	Geometric Mean	Geometric Mean	Geometric Mean
Age Group					
18–51	312	1.72	3.81	2.61	9.58
52–61	307	2.26	5.52	3.89	13.47
62–68	319	2.49	6.57	4.86	16.01
>69	313	2.88	8.54	6.39	20.34
Current Resident Township					
Abington	64	2.39	4.72	3.30	11.96
Hatboro	24	2.71	5.96	4.56	14.94
Horsham	352	2.54	7.21	5.94	17.88
Ivyland	11	3.32	11.96	11.66	29.21
Northampton	66	2.19	4.28	2.21	10.34
Upper Dublin	115	1.92	4.00	2.41	9.96
Upper Moreland	37	2.13	5.10	3.63	12.40
Upper Southampton	44	2.05	4.51	2.34	10.36
Warminster	255	2.30	6.33	4.88	15.45
Warrington	153	2.16	6.33	4.45	14.76
Warwick	42	2.50	5.60	3.67	13.56
Previous Resident	88	2.12	5.01	3.43	12.28
Current Resident: Township Closest to Military Base					
Yes	771	2.39	6.78	5.31	16.52
No	392	2.17	4.58	2.82	11.22
Previous Resident	88	2.12	5.01	3.43	12.28
Current Resident: Primary Water Source					
Public Water System	1,038	2.31	6.08	4.48	14.82
Private Well	114	2.43	4.85	2.94	12.10
Other/Don't Know	11	1.97	5.66	3.04	12.46
Previous Resident	88	2.12	5.01	3.43	12.28

Watch for additional information in future newsletters.