



## **INFORMATION SHEET**

**June 2019**

### **Westhampton Beach and Quogue Area PFAS Blood Testing: Group-Level Results**

The New York State Department of Health (NYSDOH) conducted a PFAS blood testing program for a sample of the population served by the public water supply in the Westhampton Beach and Quogue area of Suffolk County. PFAS stands for perfluoroalkyl and polyfluoroalkyl substances, which are also known as perfluorinated chemicals or PFCs. This blood testing was conducted for a systematic sample of people in order to provide information about PFAS levels in blood in the population served by public water in this area. This information sheet summarizes the blood testing program's group-level results.

#### **Background:**

Testing for PFAS and some other unregulated chemicals in public water supply systems nationwide was conducted in 2013 and 2014 as part of a United States Environmental Protection Agency (USEPA) program called "the unregulated contaminant monitoring rule". The results, reported in 2015 and 2016, showed that some public water supply wells in the Westhampton Beach and Quogue area were contaminated with PFAS chemicals. PFOS and PFHxS were the primary contaminants detected.<sup>1</sup> Impacted public wells were treated or taken out of service.

Environmental investigations conducted at the Gabreski Air National Guard Base in Westhampton Beach showed PFAS contamination of groundwater, and sampling of some nearby private wells also showed PFAS contamination. NYSDOH offered blood testing in 2017 to people in the Westhampton Beach area whose private wells had been tested. Approximately 50 people participated. Because the number of people tested was relatively small, no group-level results were provided. Participants' PFAS levels in blood varied according to the PFAS levels in their private wells.

Studies of some types of PFAS have shown that when these chemicals are present in drinking water, levels in blood are expected to be higher than levels in the general U.S. population. Once the exposure to PFAS is prevented, PFAS levels decline in blood by about half over a specific time period, called a half-life. The exact number of years depends on the type of PFAS. For PFOS, the half-life is five to six years. For PFHxS, the half-life is eight to nine years.

#### **Blood Testing Program Approach:**

NYSDOH and the Agency for Toxic Substance and Disease Registry (ATSDR) developed the methods and documents used for this blood testing program. A random sample of the population served by the potentially affected public water supply system was selected and offered blood testing. Water sample data are not available for individual households, and the water delivered to households is generally a mix of water from multiple wells, with some supply wells used rarely or only seasonally.

Participants filled out questionnaires and provided information about their residential histories, work histories, and other potential PFAS exposures such as consumption of locally caught fish. Blood samples were analyzed by the Wadsworth Center, NYSDOH’s public health lab. All participants received a lab report from the Wadsworth Center showing their results for 11 different PFAS (PFBuS, PFDeA, PFDoA, PFHpA, PFHxS, PFNA, PFOA, PFOS, PFOSA, Me-PFOSA-AcOH, and PFUA) along with information about PFAS levels in the general U.S. population.

<b>Full chemical names and acronyms of PFAS measured in people’s blood.</b>	
<b>PFAS</b>	<b>Acronym</b>
Perfluorobutane sulfonic acid	PFBuS
Perfluorodecanoic acid	PFDeA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanoic acid	PFHpA
Perfluorohexane sulfonic acid	PFHxS
Perfluorononanoic acid	PFNA
Perfluorooctanoic acid	PFOA
Perfluorooctane sulfonic acid	PFOS
Perfluorooctane sulfonamide	PFOSA
2-(N-Methyl-perfluorooctane sulfonamido) acetic acid	Me-PFOSA-AcOH
Perfluoroundecanoic acid	PFUA

The group-level results presented here allow participants to compare their own levels with those of other participants while keeping individual results confidential. People residing in the Westhampton Beach/Quogue area who did not have a blood test can estimate what their PFAS level might have been by using the information in these tables.

Information about PFAS levels in blood only provides exposure information and cannot be used to determine whether a person’s current illness is due to PFAS or if a future illness is likely to result from PFAS. Future studies of PFAS exposure and health outcomes may provide more definitive information on health risks associated with PFAS exposures. Knowledge about an individual or a community’s level of exposure may be helpful for applying this information in the future.

### **Blood Testing Results:**

Results of PFAS blood testing are provided for the group of 161 people residing in households served by public water who were recruited for the blood testing program from April through October 2018.

- Table 1 provides brief information about blood levels for all 11 chemicals tested.
- Table 2 shows more detailed blood level information for the subset of chemicals found at some level in most participants (PFOS, PFOA, PFHxS and PFNA). The other seven chemicals tested were not present in most participants’ blood.
- Table 3 shows PFOS and PFHxS levels for specific age groups for participants and for the general U.S. population.

Estimates of the middle levels of PFAS in blood for the participants as a group are presented by age and gender. The middle level for the group is shown as a geometric mean. The geometric mean is used to prevent the highest and lowest values from distorting the average when the rest of the data are close together. 95<sup>th</sup> percentile levels are also provided. Ninety-five out of every 100 people had levels lower than the 95<sup>th</sup> percentile level. All results are reported in units of micrograms per liter (mcg/L), which equals one part per billion.

Table 1: PFAS blood levels in Westhampton Beach/Quogue area residents (N=161) and the general U.S. Population age 12 and up.							
PFAS	Westhampton Beach/Quogue 2018			U.S. population 2015-2016		U.S. population 1999-2000	
	% of samples with PFAS detected	Geometric mean (mcg/L)	95 <sup>th</sup> percentile (mcg/L)	Geometric mean (mcg/L)	95 <sup>th</sup> percentile (mcg/L)	Geometric mean (mcg/L)	95 <sup>th</sup> percentile (mcg/L)
PFBuS	-	*	**	*	**	*	**
PFDeA	9%	*	0.58	0.154	0.70	*	0.60
PFDoA	-	*	**	*	**	*	**
PFHpA	-	*	**	*	0.20	*	0.70
PFHxS	100%	3.03	12.26	1.18	4.90	2.13	8.70
PFNA	70%	0.64	1.42	0.577	1.90	0.55	1.80
PFOA	99%	1.54	3.48	1.56	4.17	5.21	11.9
PFOS	100%	6.56	18.37	4.72	18.3	30.4	75.7
PFOSA	-	*	**	*	**	0.35	1.40
Me-PFOA-AcOH	8%	*	0.63	*	0.60	0.84	2.79
PFUA	9%	*	0.59	*	0.40	*	0.40

**mcg/L = micrograms per liter:** A microgram per liter equals one part per billion.

**Geometric mean:** Geometric means are a way of calculating the middle level. They are used in science to prevent the highest and lowest values from distorting the average when the rest of the data are close together. In most published studies of blood concentrations, the geometric mean is used.

**95<sup>th</sup> percentile:** 95 out of every 100 people in the U.S. had results below this level.

\* Geometric mean was not calculated because not enough people had results that were detectable.

\*\* 95<sup>th</sup> percentile was below the limit of detection. Below LOD means no level was detected or it was detected at a level so low it could not be quantified.

**Source:** The general U.S. population data are from the National Report on Human Exposure to Environmental Chemicals, Updated Tables, January 2019. Available at: <https://www.cdc.gov/exposurereport/>. Note: The most recent results are from 2015-2016, except PFOSA, with data from 2011-2012 and PFHpA and PFBuS with data from 2013-2014.

**Table 1** shows the geometric mean and 95<sup>th</sup> percentile PFAS levels for the Westhampton Beach/Quogue participants and for the U.S. population. For comparison, Table 1 also shows PFAS levels for the general U.S. population for two different time periods. Blood levels for PFOS in the general U.S. population have declined substantially, from approximately 30 micrograms per liter in 1999-2000 to approximately 5 micrograms per liter in 2015-2016. This decline is due to PFOS being phased out of use in the U.S. beginning in 2000.

- Four of the PFAS were detected in most people's blood (**PFHxS, PFNA, PFOA and PFOS**). These are the four PFAS most commonly found in biomonitoring studies.
- The geometric means for two of these four types of PFAS (**PFHxS and PFOS**) were slightly above the geometric means for the U.S population. These are the types of PFAS associated with fire-fighting foams and contaminated groundwater in the area near Gabreski Air National Guard Base.

- Two of these four PFAS (**PFNA and PFOA**) were found at levels close to the geometric means of the U.S. population.
- Three of the 11 PFAS tested (PFDEA, Me-PFOA-AcOH, and PFUA) were detected in less than 10 percent of participants' blood. Because they were detected in so few people's blood, a geometric mean could not be calculated.
- Four of the 11 PFAS tested (PFBuS, PFDoA, PFHpA and PFOSA) were not detected in any of the Westhampton Beach/Quogue participants' blood.

**Table 2** shows the geometric mean PFOS, PFOA, PFHxS and PFNA levels for the Westhampton Beach/Quogue participants as a group by gender, age, and length of residence categories. The

<b>Table 2: PFOS, PFOA, PFHxS and PFNA blood levels in Westhampton Beach/Quogue area residents by gender, age and length of residence.</b>					
	Number of participants	PFOS (mcg/L)	PFOA (mcg/L)	PFHxS (mcg/L)	PFNA (mcg/L)
		Geometric Mean	Geometric Mean	Geometric Mean	Geometric Mean
All participants	161	6.56	1.54	3.03	0.64
Participants by gender					
Males	68	7.33	1.62	3.56	0.65
Females	93	6.05	1.47	2.69	0.63
Participants by age group					
19 and under	18	2.92	0.97	1.29	0.39
20-39	29	4.60	1.22	2.07	0.49
40-59	49	6.29	1.42	2.82	0.63
60 and older	65	9.95	2.05	4.80	0.83
Participants by length of residence					
Less than 10 years	30	4.31	1.26	1.59	0.54
10 to 19 years	62	6.09	1.42	2.81	0.58
20 to 29 years	36	7.53	1.74	3.51	0.72
30 or more years	33	9.55	1.85	5.38	0.78

geometric means are higher in males than females, and higher in people who are older. This pattern is consistent with PFAS results in other communities. Table 2 also shows that levels increase with increasing length of residence. For PFOS and PFHxS, which were found at levels slightly higher than in the U.S. population, the increases associated with length of residence were more pronounced than for PFOA and PFNA, which were found at levels similar to levels in the general U.S. population.

The Westhampton Beach/Quogue blood testing participants were older on average than the general U.S. population, and it is possible this contributed to PFOS and PFHxS blood levels being higher among participants as a group. To address this possibility, PFOS and PFHxS levels for participants and the general U.S. population were examined for specific age groups. **Table 3** shows that Westhampton participants' PFOS and PFHxS levels are higher than general population levels for most age groups. This suggests age differences are not playing a role in the overall findings. Additional analyses were conducted using information provided by participants in questionnaires about their exposure histories. The analyses showed that participants who reported eating more locally caught fish tended

to have higher PFOS and PFHxS levels.<sup>2</sup> More information about these analyses will be provided in a full report currently being drafted.

**Table 3. PFOS and PFHxS blood levels in Westhampton Beach/Quogue area residents and the general U.S. population by age group.**

Age group	Number of participants	PFOS 50 <sup>th</sup> percentile level* (mcg/L)		PFHxS 50 <sup>th</sup> percentile level* (mcg/L)	
		Westhampton Beach/Quogue	General U.S. population 2015-2016	Westhampton Beach/Quogue	General U.S. population 2015-2016
12-19 years	18	2.82	2.9	1.27	0.9
20-39 years	29	4.37	3.6	2.00	1.1
40-59 years	49	6.61	5.3	2.89	1.2
60 years and older	65	10.60	7.9	4.26	1.7

- 50<sup>th</sup> percentile levels are shown here instead of geometric means as in Tables 1 and 2 because geometric mean levels for these specific age groups are not currently available. Geometric mean and 50<sup>th</sup> percentile levels are very similar.
- **Source:** The general U.S. population data are from the National Health and Nutrition Examination Survey 2015-2016 Laboratory Data. The age group percentiles were provided by ATSDR to NYSDOH as a technical assist.

### Summary and Conclusion:

In summary, of the 11 PFAS tested, four were not found in any of the participants’ blood, five were detected at levels similar to the U.S. population, and two (PFOS and PFHxS) were found at levels slightly higher than levels in the general U.S. population. An important limitation of this evaluation is that the general U.S. population levels used for comparison may not accurately reflect general population levels for the northeast region. If PFAS levels in blood in the general population of the northeast region of the U.S. are slightly higher than in the U.S. as a whole, comparison of the participants’ levels to regional levels may not have shown any elevations.

The findings of elevations for PFOS and PFHxS among participants suggest there could have been exposures from the public drinking water supply in the Westhampton Beach and Quogue area in the past. The differences between levels in the study group and the general U.S. population are relatively small however, and other sources of exposure may be contributing to PFOS and PFHxS levels among study participants. Study analyses conducted to date suggest differences between participants’ levels and general U.S. population levels are **not** indicative of unusually high-level exposures for the participants as a group. A full report for the project is forthcoming and will be shared with participants and the community when complete.

<sup>1</sup>Suffolk County Water Authority 2017 Annual Water Quality Report (for calendar year 2016).

[http://s1091480.instanturl.net/dwqr2017/water-quality-report-2017-scwa\\_v1.html](http://s1091480.instanturl.net/dwqr2017/water-quality-report-2017-scwa_v1.html)

<sup>2</sup>For advice about healthy choices for eating fish caught in local waters:

[https://www.health.ny.gov/environmental/outdoors/fish/health\\_advisories/](https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/)

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**For more information, questions, or comments, please contact:**

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