NEW YORK STATE OF OPPORTUNITY. Department of Health

INFORMATION SHEET March 2017

Newburgh Area PFC Biomonitoring Group-Level Results

The Department of Health (DOH) offered blood testing for perfluorinated chemicals (PFCs) to people from the Newburgh area beginning in November 2016. This information sheet shows group results for individuals who participated in testing through January 29, 2017 so people can see how their levels compare with those of other participants, while keeping individual results confidential.

As studies have shown, when PFCs are present in drinking water, levels in blood are expected to be higher than levels in the general U.S. population. The blood testing result provides important information about exposure to PFCs and allows for comparisons to people living elsewhere.

The blood testing results only provide information about the level of these PFCs in participants' blood. Because scientists and public health experts are still learning about PFCs and human health, the blood testing result does not indicate if a person's current illness is due to PFCs, or if a person will experience illness in the future due to PFCs.

The U.S. EPA has not established health advisory levels for any PFCs beyond perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). All PFCs are effectively removed from drinking water by granular activated carbon filtration systems like the one being built for the City of Newburgh public water system, which has been drawing from a clean, alternate water source since May 2016.

All blood testing participants will receive a lab report from Wadsworth Center, New York's public health lab, showing their results for six different PFCs. This information sheet shows combined results for the 740 participants who took part in testing through January 29, 2017 and provides comparisons to the general U.S. population, other communities with PFOS and PFOA in the drinking water, and individuals who worked with these chemicals. All results are reported in units of micrograms per liter, which equals one part per billion, about one drop of liquid in an Olympic-size swimming pool.

The tables show two types of "middle" levels. They show the geometric mean and the 50th percentile. 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. The 50th percentile is the middle result among all the individual results: half of the people had levels higher and half had levels lower than the 50th percentile.

Table 1 shows combined results for Newburgh area participants, including people using the City of Newburgh public water, people using private wells, people who work in the area or attend school, and former residents. PFOS and PFOA levels in blood are also shown for separate groups according to their drinking water history (**Table 1**). For people currently served by City of

Newburgh public water, PFOS and PFOA levels in blood are shown by gender and age group as well (**Table 2**).

TABLE 1 **PFOS and PFOA blood test results by drinking water history** **Participants tested November 1 – January 29, 2017**					
	Number of participants	PFOS level in μg/L		PFOA level in μg/L	
		Geometric mean	50th percentile	Geometric mean	50th percentile
Total	740	13.3	13.3	2.6	2.5
By drinking water history					
Currently on City of Newburgh water	495	19.3	20.2	3.3	3.3
Formerly on City of Newburgh water	61	9.7	10.0	1.6	1.8
Never on City of Newburgh water	184	5.5	5.4	1.5	1.6

TABLE 2 **PFOS and PFOA blood test results by gender and age group:** **For residents currently served by City of Newburgh public water** **Participants tested November 1 – January 29, 2017**					
	Number of participants	PFOS level in μg/L		PFOA level in μg/L	
		Geometric mean	50th percentile	Geometric mean	50th percentile
Total	495	19.3	20.2	3.3	3.3
By gender					
Females	273	18.0	18.5	3.2	3.1
Males	222	20.9	22.2	3.5	3.5
By age group					
0-17	71	8.7	8.7	2.1	2.0
18-39	92	12.4	12.9	2.3	2.4
40-59	139	19.5	19.8	3.3	3.2
60 and older	193	31.7	34.8	4.6	4.9

- **Table 1** shows that Newburgh participants have higher blood serum levels of PFOS than PFOA. This is consistent with information about PFC levels detected previously in Newburgh drinking water from Washington Lake before the source was changed to Brown's Pond, and then to the Catskill Aqueduct. Additional information about the PFCs measured in drinking water sources are on the NYS DOH website, http://www.health.ny.gov/environmental/investigations/newburgh/faq.htm.

- **Table 1** also shows that the middle PFOS and PFOA levels in blood in participants who formerly lived in homes served by Newburgh drinking water or who never lived in homes served by Newburgh water are lower than PFOS and PFOA levels in people living in homes served by Newburgh drinking water. The participants who were never served by Newburgh water participated in the project because they go to school or work in the City of Newburgh, or had concerns about PFCs in their private well.

- **Table 2** shows that the middle levels of PFOS and PFOA in blood are higher in males than females, and higher in people who are older. This is consistent with findings in other populations. Levels increase with age because levels in blood increase over time if the exposure continues. Once the exposure to PFCs is prevented, as it was for City of Newburgh residents beginning in May 2016, PFOS levels decline in blood naturally by about half every 5-7 years. This is known as a half-life. For PFOA, the half-life is 2-4 years.

COMPARISONS WITH PFC LEVELS FROM OTHER STUDIES

Table 3 provides comparisons with other populations that experienced PFOS and PFOA contamination in their drinking water. General U.S. population levels are included both for 1999-2000 and for 2013-2014 to show how levels have been declining in the general population due to these chemicals being phased out of use beginning in 2000.

- Comparing PFOS and PFOA blood levels for Newburgh participants (**Table 1**) and other populations (**Table 3**) shows that the middle PFOA level for participants currently on Newburgh City water is higher than the middle level but lower than the 95th percentile level for the general U.S. population in the most recent data, for 2013-2014. The middle level for PFOS for City of Newburgh participants is higher than both the middle and 95th percentile level in the general U.S. population for 2013 2014.

- Comparing PFOS and PFOA blood levels for Newburgh area participants (**Table 1**) to other populations (**Table 3**) shows that participants who did not live in homes served by City of Newburgh water had PFOS and PFOA blood levels very similar to those of the general U.S. population.

- **Table 3** also shows the PFOS and PFOA levels for the general U.S. population for 1999-2000 as well as the most recently published levels for 2013-2014. Blood levels of PFOS and PFOA declined over these years because these chemicals began to be phased out of use starting in 2000. The decline for the general U.S. population is particularly strong for PFOS, with blood levels declining from 30.2 to 5.2 micrograms per liter.

- The middle blood levels for PFOS among Newburgh area participants (**Tables 1 and 2**) are generally lower than the middle levels shown for other communities in **Table 3** where there was contamination of drinking water with PFCs, with the primary contaminant being PFOS. People served by drinking water in Minnesota's East Metro area appear to have blood PFOS levels that are higher than PFOS levels measured in Newburgh participants. Additional information about the East Metro studies in Minnesota can be found at the following link: http://www.health.state.mn.us/divs/eh/hazardous/sites/washington/3Mcottagegrove.html

Additional information is available on the DOH website, www.health.ny.gov/newburgh. Copies of some materials are available in Spanish and Creole on the DOH website.

For Newburgh area information about the water supply:
http://www.health.ny.gov/environmental/investigations/newburgh/docs/faq.pdf

For information about PFOS and blood testing:
http://www.health.ny.gov/environmental/investigations/newburgh/docs/pfos_bloodtesting_brochure.pdf

For information about PFCs:
https://www.atsdr.cdc.gov/pfc/docs/pfas_fact_sheet.pdf

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Table 3 PFOS and PFOA levels in blood from other studies: other communities with PFCs in drinking water, people who work with PFCs, and the general U.S. population				
OTHER RESULTS FOR COMPARISON	**PFOS Results in µg/L**		**PFOA Results in µg/L**	
Other communities with PFCs in drinking water:	**Geometric mean**		**Geometric mean**	
Morgan-East Lawrence people on private wells, near Decatur, AL 2010	75		29	
Morgan-East Lawrence people on public water, near Decatur, AL 2010	40		18	
East Metro area people on public water, near Minneapolis, MN 2008	36		15	
People who worked with PFCs:	**Geometric mean**		**Geometric mean**	
3M workers, Cottage Grove, MN 2000	1,760		5,200	
3M workers, Decatur, AL 2000	910		1,130	
General U.S. population:	**Middle level (50th percentile)**	**High level (95th percentile)**	**Middle level (50th percentile)**	**High level (95th percentile)**
U.S. population in 1999-2000**: Age 12 and up	30.20	75.70	5.20	11.90
U.S. population in 2013-2014: Age 12 and up	5.20	18.5	2.07	5.57
Males only	6.40	22.1	2.37	5.67
Females only	4.00	15.1	1.67	5.07
Young people age 12-19	3.60	9.30	1.67	3.47
Non-Hispanic blacks	5.30	24.5	1.67	4.60
Non-Hispanic whites	5.70	18.0	2.27	5.77
Hispanics	3.70	10.8	1.47	3.47

µg/L = micrograms per liter: A microgram per liter equals one part per billion, about one drop of liquid in an Olympic-size swimming pool.
Middle level (50th percentile): Half the people had a result below and half had a result above this level.
High level (95th percentile): 95 out of every 100 people had results below this level.
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, the geometric mean is used.
N.A.: Level not available for this group.
** PFC levels for the general U.S. population for 1999-2000 and the most recently published levels for 2013-2014 are provided. Blood levels of PFOS and PFOA declined over these years because some PFCs began to be phased out of use starting in 2000. The decline for the general U.S. population is particularly strong for PFOS, with blood levels declining from 30.2 to 5.2 micrograms per liter from 1999 to 2014.

Table 3 references:

1 General U.S. population: National Health and Nutrition Examination Survey (NHANES), Fourth National Report on Human Exposure to Environmental Chemicals, U.S. Centers for Disease Control and Prevention (CDC), Updated Tables, January 2017, Volume One.

2 ATSDR (Agency for Toxic Substances and Disease Registry) (2013) Health Consultation. Exposure Investigation Report. Perfluorochemical Serum Sampling in the vicinity of Decatur, Alabama Morgan, Lawrence, and Limestone Counties. U.S. DEPT OF HEALTH AND HUMAN SERVICES. Atlanta GA.

3 Minnesota Department of Health (2009) East Metro Perfluorochemical Biomonitoring Pilot Project. July 2009 Technical Report. Minnesota Department of Health. Minneapolis.

4 Occupational groups: Olsen GW (2015) "PFAS biomonitoring in higher exposed populations," in DeWitt JC (ed.) Toxicological effects of perfluoroalkyl and polyfluoroalkyl substances. Humana.

The following links provide additional information:

The C8 Health Project: Design, Methods, and Participants, December 2009, Frisbee, SJ et al. www.ncbi.nlm.nih.gov/pubmed/20049206

Frequently Asked Questions: Perfluorochemicals (PFCs) Detected in the Pease Tradesport Water System, February 2016, New Hampshire Department of Health and Human Services. www.dhhs.nh.gov/dphs/documents/pease-water-faqs.pdf

Blood PFC Testing and Health Information Summary: Morgan, Lawrence and Limestone Counties, Alabama, Agency for Toxic Substances and Disease Registry. www.atsdr.cdc.gov/HAC/pha/decatur/Blood%20PFC%20Testing%20and%20Health%20Information.pdf

Community exposure to perfluorooctanoate: relationships between serum concentrations and exposure sources, August 2006, Emmet, EA et al. www.ncbi.nlm.nih.gov/pubmed/16902368

TOXFAQs for Perfluoroalkyls. http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1116&tid=237

Exposure to Environmental Toxins (and breastfeeding). https://www.cdc.gov/breastfeeding/disease/environmental_toxins.htm

The Surgeon General's Call to Action to Support Breastfeeding http://www.surgeongeneral.gov/library/calls/breastfeeding/

FOR MORE INFORMATION:

NYS DOH, Center for Environmental Health, Bureau of Environmental and Occupational Epidemiology, Corning Tower, Albany NY 12237; 518-402-7950 or BEOE@health.ny.gov