

Appendix G1: Results Letter for Biological Sampling

PFAS Exposure Assessment Example Result Letter, Biological Sampling

[Insert Date]

[Name

Address

City, State, Zip code]

Dear [Insert Name],

Thank you for being a part of the [Insert State Health Department] PFAS exposure assessment. We tested your blood and urine for per- and polyfluoroalkyl substances (PFAS). We are grateful for the time and effort you gave to this project. This letter is to give you your test results along with what they mean. You may share these results with your doctor if you would like – it's your choice. Research to better understand the health effects associated with PFAS exposure is ongoing, but scientists are not currently certain of how PFAS levels in the blood can affect a person's health. More research is needed to clarify the risks posed by PFAS exposure.

The Results of Your Blood Test

Table 1 provides a list of all the specific PFAS that we measured in your blood. The table also lists the acronyms for the PFAS.

Table 2 shows the concentration of specific PFAS we found in your blood. The table also shows range of PFAS levels for people in the United States, namely, the geometric mean and 95th percentile values, when available.

Table 3 shows your results compared to results from other members in your community who also participated in this assessment. Your result is in units of micrograms per liter ($\mu\text{g/L}$). One $\mu\text{g/L}$ equals one part per billion, equivalent to about one drop of ink in a large tanker ship.

The Results of Your Urine Test (Include only if urine sampling was conducted)

Table 4 provides a list of all the specific PFAS that we measured in your urine. The table also lists the acronyms for the PFAS.

Table 5 shows the concentration of specific PFAS we found in your urine. The table also shows range of PFAS levels for people in the United States, namely, the geometric mean and 95th percentile values, when available.

Table 6 shows your results compared to results from other members in your community who also participated in this assessment. Your result is in units of micrograms per liter ($\mu\text{g/L}$). One $\mu\text{g/L}$ equals one part per billion, equivalent to about one drop of ink in a large tanker ship.

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A Little Help Interpreting the Results

Tables 2–5 provide a lot of information. To fully understand all this information, you need to know about a survey called NHANES (the National Health and Nutrition Examination Survey).

Every year, the CDC examines about 5,000 people from across the country. As part of the survey, CDC takes blood and urine samples and tests them for chemicals like PFAS (among other things) in a subset of the overall group. The NHANES blood and urine tests for PFAS chemicals come from a representative sample of members of the U.S. population (age 12 and older).

Having a representative sample of the U.S. population means NHANES helps CDC estimate, for example, the levels of PFAS in the U.S. population. That is how we can compare the results of your blood and urine tests to reference values for people in the United States.

Now, let's talk about interpreting your results, presented in Tables 2–5. The diagrams below should help you understand the data we are giving you.

	Your Level in µg/L	Geometric Mean in µg/L	95 th percentile in µg/L
PFBuS	[insert level]	*	< 0.1**

This column lists all the different chemicals (PFAS) that we measured in your blood.

This column shows the concentration that we found in your blood.

This column shows the geometric mean of results from the 2013–2014 NHANES survey (Table 2) or your community.

This column shows the 95th percentile of results from the 2013–2014 NHANES survey (Table 2) or your community (Table 3).

A couple of important notes:

- If your PFAS result is in **bold**, then it exceeds the reference value (95th percentile). This means that your result is higher than what is measured in most people in the United States.
- If your result is not bold, then it does not exceed the reference value (95th percentile) and does not higher than what is measured in most people in the United States.

PFAS	Acronym
Perfluorobutanesulfonic acid	PFBuS
Perfluorodecanoic acid	PFDeA

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Perfluorododecanoic acid	PFDoA
Perfluoroheptanoic acid	PFHpA
Perfluorohexane sulfonate	PFHxS
Perfluorononanoic acid	PFNA
Perfluorooctanoic acid	PFOA
Perfluorooctane sulfonate	PFOS
Perfluorooctane sulfonamide	PFOSA
2-(N-Ethyl-perfluorooctane sulfonamido) acetate	Et-PFOSA-AcOH
2-(N-Methyl-perfluorooctane sulfonamido) acetate	Me-PFOSA-AcOH
Perfluoroundecanoic acid	PFUA

Table 1: List of measured PFAS measured in blood and corresponding acronyms

Table 2: Your PFAS blood levels compared to what has been measured in the general U.S. Population

PFAS	Your Level in µg/L	U.S. population Geometric Mean in µg/L ^a	U.S. Population 95 th percentile in µg/L ^a
PFBuS	[insert level]	*	< 0.1**
PFDeA		0.185	0.700
PFDoA		*	0.200
PFHpA		*	0.200
PFHxS		1.35	5.60
PFNA		0.675	2.00
PFOA		1.94	5.57
PFOS		4.99	18.5

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PFOSA		*	<0.1**
Et-PFOSA-AcOH		*	0.110
Me-PFOSA-AcOH		*	0.600
PFUA		*	0.500

Note: Above results from NHANES 2013-2014, except PFOSA and Et-PFOSA-AcOH which are from 2011-2012.

ND - Not detected.* Geometric mean was not calculated because not enough people had results that were detectable. **95th percentile was below the limit of detection, 0.1 µg/L.

^aSource: CDC. The National Report on Human Exposure to Environmental Chemicals, Updated Tables, February 2017. Available at: <https://www.cdc.gov/exposurereport/>

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Table 3: Your PFAS blood levels compared to other people who participated in this assessment from [insert community name]

PFAS	Your Level (µg/L)	Geometric Mean in µg/L (# participants)	95 th percentile in your community in µg/L
PFBuS	[insert level]	[insert mean]	[insert value]
PFDeA			
PFDoA			
PFHpA			
PFHxS			
PFNA			
PFOA			
PFOS			
PFOSA			
Et-PFOSA-AcOH			
Me-PFOSA-AcOH			
PFUA			
ND- Not detected.			

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(Only include Tables 4-6 if urine sampling was conducted.)

Table 4: List of measured PFAS measured in urine and corresponding acronyms

PFAS	Acronym
Sodium Perfluoro-1-Propanesulfonate	PFPrS
Potassium Perfluoro 1-Butanesulfonate	PFBS
Sodium Perfluoro-1-Heptanesulfonate	PFHpS
Perfluorohexane Sulfonic Acid	PFHxS
Sodium Perfluoro-1-Octanesulfonate	n-PFOS
Mixture Of Sodium Perfluoro-5-Methylheptane Sulfonate Isomers	Sm-PFOS
Perfluorobutanoate	PFBA
Perfluoropentanoate	PFPeA
Perfluorohexanoate	PFHxA
Perfluoroheptanoate	PFHpA
Ammonium Perfluorooctanoate	n-PFOA
Mixture Of Perfluoro-5-Methylheptanoic Acid Isomers	Sb-PFOA
Perfluorononanoic Acid	PFNA
Perfluorodecanoic Acid	PFDA
Perfluoroundecanoic Acid	PFUnDA
Ammonium Salt Of 2,3,3,3,-Tetrafluoro-2-(1,1,2,2,3,3,3-Heptafluoropropoxy)-Propanoate	HFPO-DA (GenX)
Dodecafluoro-3H-4,8-Dioxanoate	DONA
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonate	9Cl-PF3ONS

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Table 5: Your PFAS urine levels compared to what has been measured in the general U.S. Population

PFAS	Your Level in µg/L	U.S. population Geometric Mean in µg/L ^a	U.S. Population 95 th percentile in µg/L ^a
PFPrS	[insert level]		
PFBS			
PFHpS			
PFHxS			
n-PFOS			
Sm-PFOS			
PFBA			
PFPeA			
PFHxA			
PFHpA			
n-PFOA			
Sb-PFOA			
PFNA			
PFDA			
PFUnDA			
HFPO-DA (GenX)			
DONA			
9Cl-PF3ONS			
<p>Note: Above results from NHANES 2013–2014, except PFOSA and Et-PFOSA-AcOH which are from 2011–2012. ND – Not detected.* Geometric mean was not calculated because not enough people had results that were detectable. **95th percentile was below the limit of detection, 0.1 µg/L.</p>			

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Table 6: Your PFAS urine levels and the range of PFAS urine levels found in other people in your community who were tested.

PFAS	Your Level (µg/L)	Range of levels in study participants (µg/L)
PFPrS		
PFBS		
PFHpS		
PFHxS		
n-PFOS		
Sm-PFOS		
PFBA		
PFPeA		
PFHxA		
PFHpA		
n-PFOA		
Sb-PFOA		
PFNA		
PFDA		
PFUnDA		
HFPO-DA (GenX)		
DONA		
9Cl-PF3ONS		
ND - Not detected		

What Do These Results Mean to Your Health?

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These results tell you how much PFAS is currently present in your body from all sources combined, such as water, food, and other environmental sources. You can compare your results with others from your community and also people across the United States.

Scientists are not sure about the health effects of human exposure to PFAS. Some studies in humans have shown that certain PFAS may affect the developing fetus and child, including possible changes in growth, learning, and behavior. In addition, PFAS may decrease fertility and interfere with the body's natural hormones, increase cholesterol, affect the immune system, and possibly increase cancer risk.

While scientific research on PFAS is growing, for now these test results cannot tell you:

- If a current health problem is related to the PFAS levels found in your body.
- If the PFAS levels in your body will make you sick now or later in life.
- How and where you were exposed.
- When or how often you were exposed.
- How long the exposure lasted.
- How much of the chemical you were exposed to.

Your results, when combined with others, may help us better understand any potential health risks from PFAS exposure in the future.

What about Your Exposure? [Include only one category below]

[Use for results below reference values compared to NHANES or community]

- Your sample showed that your PFAS levels are within the values of what has been reported for people living in US or in the [insert community name] community.
- Please see the included handouts for more information about PFAS and how to reduce your exposure.

[Use for results above reference values compared to NHANES or community]

- While your results were above the 95% percentile found in the people living in the United States or in the [insert community name], it is important to remember that scientists do not know what these levels mean in terms of affecting your health, if at all.
- Please see the included handouts for more information about PFAS and how to reduce your exposure.

Next Steps

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Please call [*phone number*] to discuss any questions you may have. Your personal test results will be kept private and confidential. Your results may be combined with other participants in your community and used in a summary report; however, no one will be able to identify you.

More Information

- If you or your doctor have any medically related questions about these results or wish to further discuss these results, please contact [*name*] by phone [*number*] or email [*email*].
- **For additional information about PFAS from [DOH], please visit [*web address*].**
- For additional information about PFAS from the CDC and the Agency for Toxic Substances and Disease Registry, please visit: <http://www.atsdr.cdc.gov/pfas/index.html>.
- For additional information about PFAS from the U.S. Environmental Protection Agency, please visit: <https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas>.

Thank you again for being part of the PFAS assessment.