NC STATE UNIVERSITY
Center for Human Health and the Environment

GenX Exposure Study
North Carolina State University
Campus Box 7633
Raleigh, NC 27695
Phone: 855-854-2641
https://genxstudy.ncsu.edu/

[Date]

[Street Address]
[City, State, Zip code]

Dear [Participant],

Thank you for participating in the GenX Exposure Study. This study aims to understand human exposure to per- and polyfluoroalkyl substances (PFAS) including GenX in people living in the Cape Fear River Basin, NC, and to learn if this PFAS exposure is associated with health effects. You are part of an important health study which will help understand the long-term health consequences of PFAS exposure.

What are PFAS and where did PFAS in the Cape Fear River Basin, NC, come from?

- PFAS are human-made chemicals that have unique properties that make them resistant to heat, water, and grease. Because of these properties, they have been used to make a large variety of products including non-stick cookware, fast-food packaging, rain gear, stain- and water-resistant carpeting and upholstery, paint, and fire-fighting foams. PFAS last for a long time in the environment and can accumulate in plants, animals, and people.
- Sources of PFAS contamination in the Cape Fear River Basin include textile and furniture manufacturing, use of sludge from wastewater treatment plants as fertilizer, and use of fire-fighting foams at airports.
- Additionally, discharges into water and air emissions from the Fayetteville Works facility near Fayetteville, NC, have contaminated the Fayetteville area and lower Cape Fear River Basin with PFAS.

What did we do?

- From November 2020 to November 2021, we enrolled volunteers from three regions of the Cape Fear River Basin in NC into the GenX Exposure Study. People from the lower Cape Fear River Basin and Pittsboro were served by public utility water, while people from the Fayetteville area were served by private wells.

- In November 2020, we collected blood samples from 282 people who lived in the lower Cape Fear River Basin (specifically, New Hanover and Brunswick Counties).
- In June and July 2021, we collected blood samples 300 people in the Fayetteville area (Bladen, Cumberland, and Robeson Counties),
- In September and October 2021, we collected blood samples from another 232 people in the lower Cape Fear River Basin, and
- In November 2021, we collected blood samples from 206 people in Pittsboro (Chatham County).

- We tested participants' blood samples for 44 PFAS. The list of all PFAS we tested for is on our website (https://genxstudy.ncsu.edu/). The blood samples were analyzed at NC State University.
- This letter describes the results from all blood samples collected in 2020 and 2021. **In addition, your individual PFAS blood results are on Pages 5-11.**

What did we find in blood samples collected in 2020 and 2021?

- We detected 4 PFAS (PFOS, PFOA, PFHxS, and PFNA) in almost everyone who participated no matter where they lived in the Cape Fear River Basin. These 4 PFAS are also commonly detected in people living in the United States. The concentrations for people in our study were higher than the United States national averages.
- We detected 2 PFAS (Nafion byproduct 2 and PFO5DoA) in most people in the lower Cape Fear River Basin in 2020 and 2021, and some people in the Fayetteville area in 2021. Nafion byproduct 2 and PFO5DoA concentrations decreased in the lower Cape Fear River Basin between 2020 and 2021.
- We rarely detected Nafion byproduct 2 and PFO5DoA in people in Pittsboro.
- We did not detect GenX in blood samples. GenX does not last in blood for a long time so even though people in the Lower Cape Fear River Basin and some people in the Fayetteville area were exposed to GenX, it was not present in blood when samples were collected in 2020 and 2021.

Is there any medical guidance for people exposed to PFAS?

- Yes, in July 2022, the National Academies of Science, Engineering, and Medicine (NASEM) released a report based on an unbiased review of the human data for PFAS exposure and health. This report provides recommendations for medical follow-up for people exposed to PFAS. The summary of the NASEM report is available online (bit.ly/PFAS-guidance).

- The NASEM panel recommended that exposed people get their blood tested for PFAS to inform medical decisions. They recommended certain health-based actions depending on the summed concentration of 7 PFAS (PFOS, PFOA, PFHxS, PFNA, PFDA, PFUnDA, and MeFOSAA) in blood. We tested for these PFAS in the blood samples and these PFAS were detectable in most study participants in 2020-2021.
- About 30% of people in our study had summed PFAS concentrations above 20 ng/mL. This level was associated with the highest risk for adverse health effects based on the NASEM 2022 guidance.
- The current guidance from NASEM are recommendations. At this time, there is no money set aside to help people pay for PFAS blood testing or health testing. However, many of these recommendations are things that are included in regular check ups with your health care providers.

What's on the following pages of this letter?

- **Page 5-6** shows your individual concentrations and the sum concentration of the 7 PFAS in your blood sample in a small table next to the recommended medical action based on the current NASEM guidance.
- **Pages 7-10** show stripcharts for several PFAS. A stripchart is a picture showing your blood result and the blood results for all people in your community. You will also see the median concentration (half of the participants are above this value, half of the participants are below) of the results for each PFAS.
- **Page 11** is a table of all your PFAS results and the method reporting limits for our PFAS blood testing.

What's next?

- Please join us for a webinar to learn more about these results. We will also have a question-and-answer period. The webinar is scheduled for October 18th, 2022, 6-8pm, and here's the link to join (https://ncsu.zoom.us/s/92719272112 | +1(312)626-6799 |ID: 92719272112).
- We plan to come to your communities in person to share these results with the public and answer any questions. Below are the details for currently scheduled community meetings. We hope you will attend at least one of these meetings and bring others who are not study participants but would like to know what we are learning.

Oct 19th, 2022, 6-8pm, Chatham County Agriculture & Conference Center
1192 US Hwy 64 West Business, Pittsboro, NC, 27312

Nov 2nd, 2022, 6-8pm, Grays Creek Community Center
3024 School Rd, Hope Mills, NC, 28348

Nov 10th, 2022, 6-8pm, Cedar Creek Baptist Church
4170 Tabor Church Rd, Fayetteville, NC, 28312

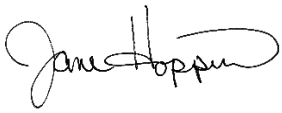
We're in the process of finding a location for a meeting in the New Hanover and Brunswick County area. We will announce details on our website and through social media.

- Please check our study website (https://genxstudy.ncsu.edu/) or the NC State Superfund website (superfund.ncsu.edu) for more information about the webinar and in-person meetings.
- If you have questions about these results, the GenX Exposure Study, or the NASEM recommendations, please contact our study office by phone (855-854-2641) or email (genx-exposure-study@ncsu.edu).

In the next few weeks, you will receive a post card and a survey questionnaire from independent researchers at NC State University. These researchers will be evaluating our community engagement efforts in the GenX Exposure Study.

Once again, we thank you for your participation in the GenX Exposure Study.

Sincerely,



Jane Hoppin, ScD
GenX Exposure Study, Principal Investigator

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Clinical Guidance for PFAS Exposed People

In July 2022, the National Academies of Science, Engineering, and Medicine (NASEM) published recommendations for medical monitoring based on the total (sum) concentration of 7 specific PFAS in blood.

The table below shows the levels of 7 PFAS we measured in your sample from [year], and the sum ofthese 7 PFAS in the blood. On the right, current NASEM recommendations based on the sum PFAS are shaded with a **bold box** around them.

PFAS	Your blood result (ng/mL)
PFOS	2.0
PFOA	2.0
PFHxS	3.0
PFNA	0.3
PFDA	0.1
MeFOSAA	0.1
PFUnDA	0.0
Your sum	**7.5**

2022 Guidance on PFAS from the National Academies of Sciences, Engineering, and Medicine

Sum PFAS More Than 20 ng/mL

Associated with higher risk of adverse effects. You should...
- Reduce PFAS exposure (see other side of page)
- Speak with your medical provider and ask them to check cholesterol levels, hypertensive disorders of pregnancy, breast cancer, thyroid function, kidney and testicular cancer, and ulcerative colitis, as per NASEM guidance.

Sum PFAS Between 2 and 20 ng/mL

Associated with potential for adverse effects in sensitive populations. You should...
- Reduce PFAS exposure (see other side of page)
- Speak with your medical provider and ask them to check cholesterol levels, hypertensive disorders of pregnancy, and breast cancer, as per NASEM guidance.

Sum PFAS Less Than 2 ng/mL

Health effects not expected at this time. You should...
- Maintain usual medical care.

What can you do with this information? You can discuss these PFAS blood results and the NASEM recommendations with your clinician to decide whether you would benefit from specific medical tests.

If your clinician has questions about PFAS, they can refer to the NASEM report (bit.ly/PFAS-guidance) or to a memo from the North Carolina Department of Health and Human Services (https://bit.ly/DHHSMemo). If you would like us to email you a copy of the NASEM report, please contact our study office. These recommendations do not mean that insurance will pay for any additional PFAS or clinical testing at this time.

If you are underinsured or noninsured and are seeking primary care services, please contact one of the following resources.
For Lower Cape Fear River Basin Region, NC, contact Cape Fear Health New (Phone: 910-399-2751; Website: http://www.capefearhealthnet.org/getting-care/). Note that Novant outpatient clinics have assistance places for low-income and uninsured people.

For Fayetteville area, NC, contact Stedman-Wade Health Services, Inc., 7118 Main St., Wade, NC, 28395 (Phone: 910-483-6694).

For Pittsboro, NC, contact Siler City Community Health Center, 224 S. Tenth Ave., Siler City, NC, 27344 (Phone: 919-663-1744) OR Moncure Community Health Center, 7228 Moncure-Pittsboro Road, Moncure, NC, 27559 (Phone: 919-542-4991).

What about other PFAS, besides these 7? The 2022 NASEM recommendations are based on the sum of 7 PFAS in blood. These 7 PFAS have been monitored by the Centers for Disease Control and Prevention in Americans for the past 20 years. Health screening recommendations for people exposed to PFAS may change as scientists learn more about the health effects of PFAS.

How can you reduce your PFAS exposure? The PFAS in your blood tells you about the PFAS that you are currently exposed to and what you were exposed to in the past. Many people in the Cape Fear River Basin have been exposed to PFAS through contaminated drinking water. Recently, municipal water suppliers have worked to remove PFAS from drinking water. The Sweeney Water Treatment plant in New Hanover County, the Brunswick County's Northwest Water Treatment Plant, and the Town of Pittsboro have installed treatment technologies to remove PFAS from drinking water sources.

If you use well water, you may want to have your water tested for PFAS and, if PFAS are detected, install filtration at your sink to reduce PFAS exposure. Private well owners in the Fayetteville area may be eligible for water testing and remediation (https://bit.ly/DEQGenX).

To learn what more you can do to reduce PFAS exposure, please visit this website (https://bit.ly/ATSDRPFAS). You can also contact our community partners: Cape Fear River Watch for Lower Cape Fear River Basin (https://capefearriverwatch.org/; phone: 910-762-5606), Sustainable Sandhills for Fayetteville area (https://sustainablesandhills.org/; phone: 910-484-9098), and Haw River Assembly for Pittsboro (https://hawriver.org; phone: (919) 542-5790).

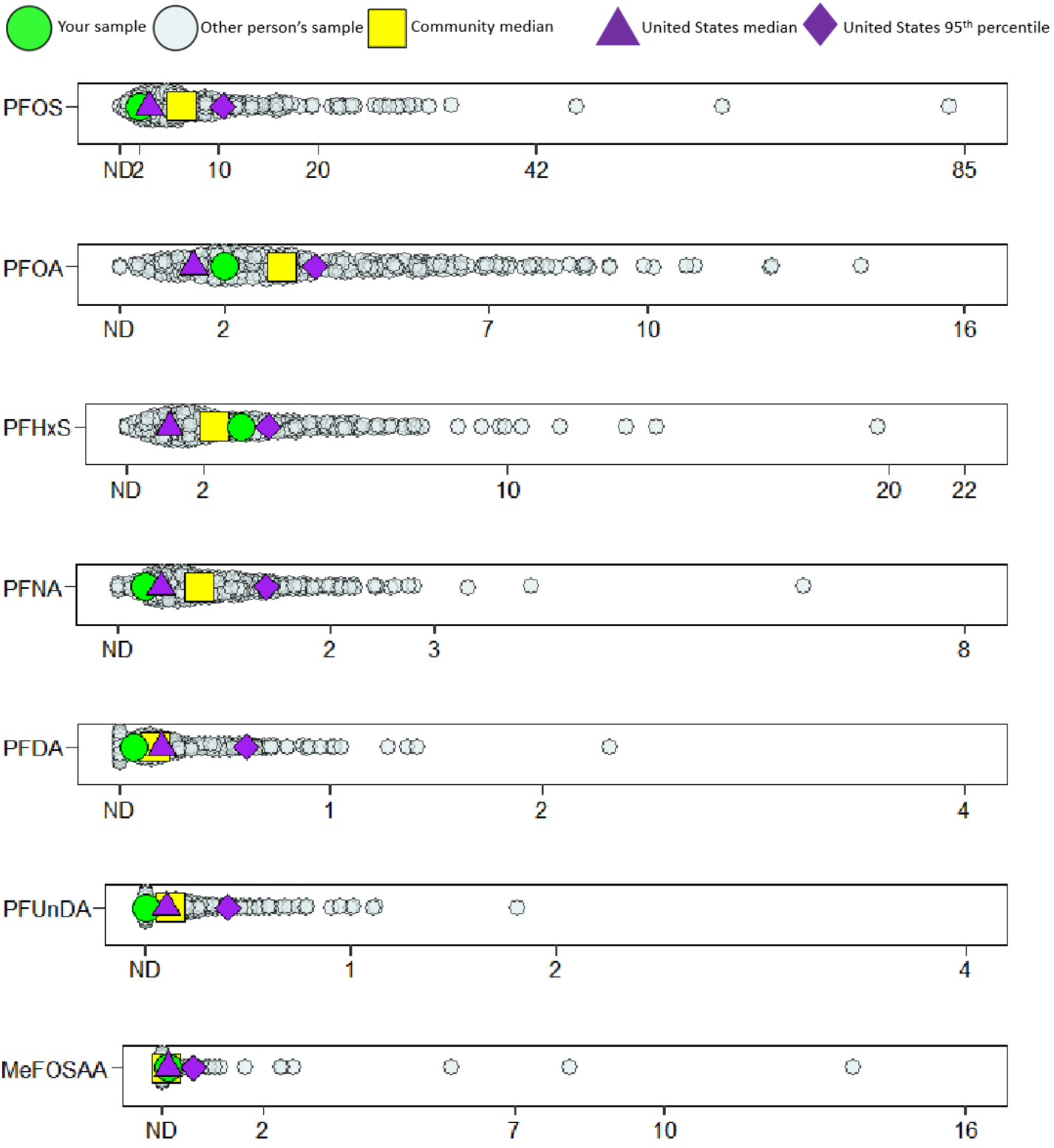
What if you have more questions about the GenX Exposure Study?
Please contact our study office by phone (855-854-2641) or email (genx-exposurestudy@ncsu.edu) and visit our study website (genxstudy.ncsu.edu).

We thank you for your participation in the GenX Exposure Study.

Sincerely,

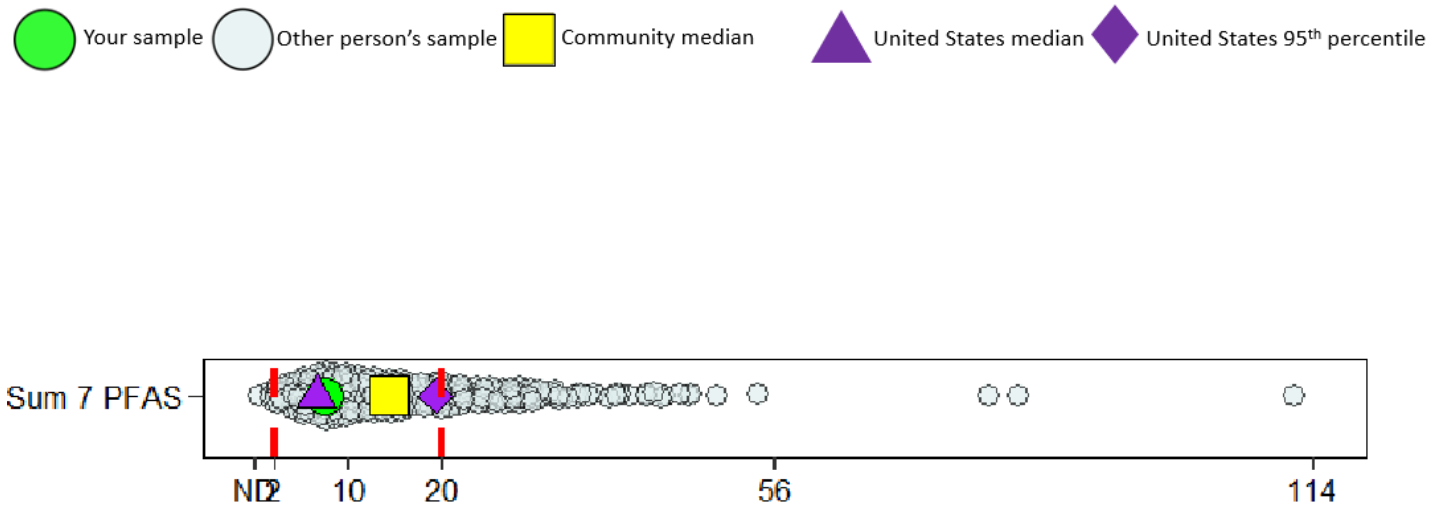
Jane Hoppin, ScD
GenX Exposure Study, Principal Investigator

Below are your blood results for the sample you provided in [year]. Each stripchart shows results for all [total] people who lived in Lower Cape Fear River Basin Region, North Carolina, and provided a blood sample in [year]. For PFAS measured by the Centers for Disease Control and Prevention (CDC) in 2017-2018, we show the median and 95th percentile for United States residents. These values show you how your sample compares with the average United States resident (the purple median) and someone who has a blood level higher than 95% of US residents (the 95th percentile). **All concentrations are nanograms PFAS per mililiter of blood (ng/mL). "ND" means not detected.**



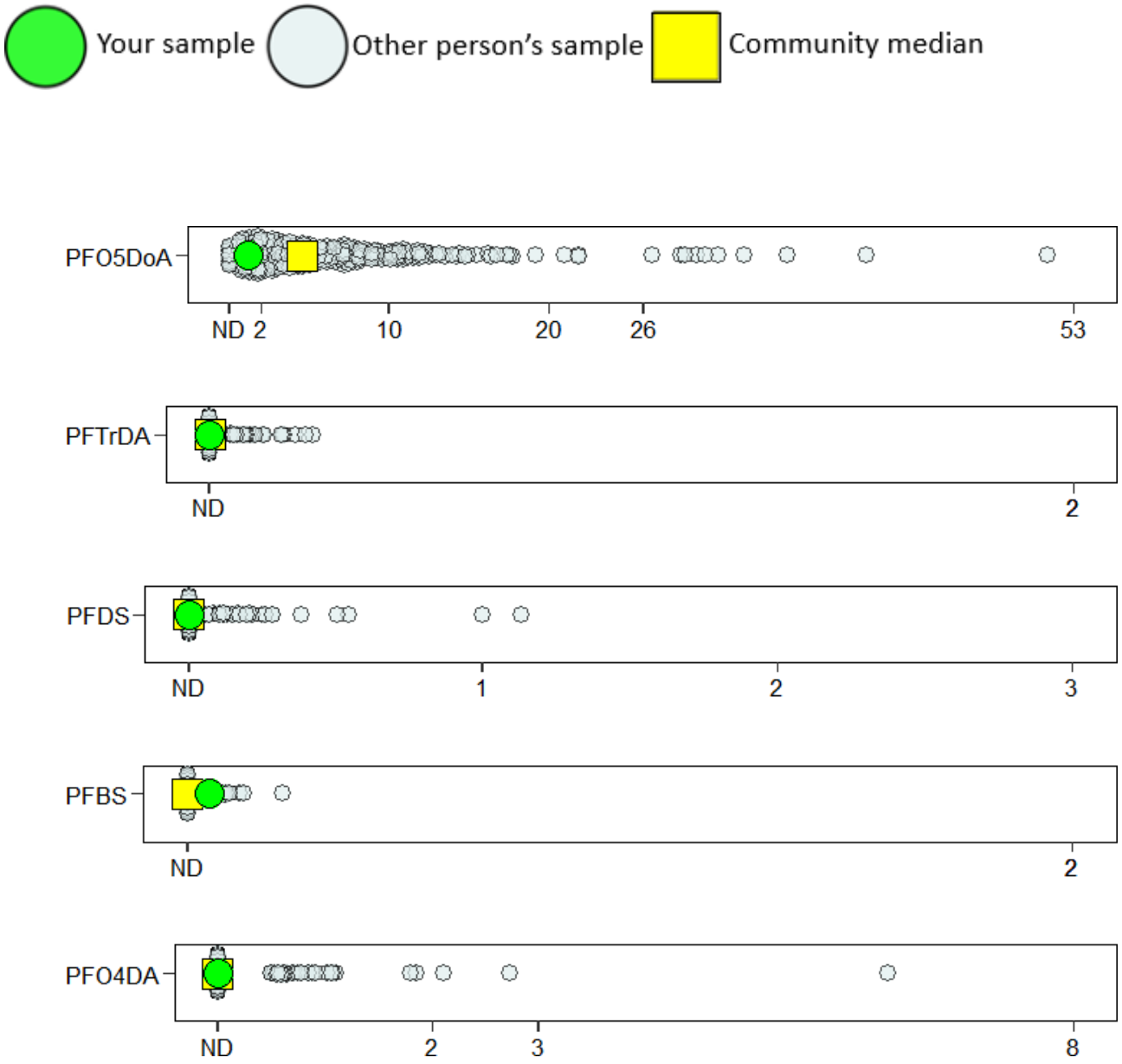
The National Academies of Sciences, Engineering, and Medicine recently published guidelines for PFAS blood levels based on the summed blood concentration of 7 PFAS (PFOS + PFOA + PFHxS + PFNA + PFDA + PFUnDA + MeFOSAA). **The stripchart below shows your blood's sum for these 7 PFAS in your sample from [year] and the sums for samples from all [total] people in Lower Cape Fear River Basin Region, NorthCarolina, in [year].** You can also see how your sample compares with the average United States resident (the purple median) and someone who has a blood level higher than 95% of US residents (the 95th percentile). **Theconcentrations are nanograms summed PFAS per milliliters of blood (ng/mL). "ND" means not detected.**

According to the National Academies report, sum PFAS between 2 and 20 ng/mL is associated with potential for adverse health effects in sensitive populations, and sum PFAS greater than 20 ng/mL is associated with higher risk of adverse health effects. We marked 2 ng/mL and 20 ng/mL with red, dotted lines on the stripchart below. See page 5 for more information about your sum and the National Academies' recommendations.



The stripcharts below are for other PFAS frequently detected in Lower Cape Fear River Basin Region, North Carolina, in [year]. The United States median and 95th percentile are not shown on these stripcharts because CDC did not test for these PFAS in blood samples collected 2017-2018. **All concentrations are nanogramsPFAS per milliliter of blood (ng/mL). "ND" means not detected.**

The stripcharts below are for other PFAS frequently detected in Lower Cape Fear River Basin Region, North Carolina, in [year]. The United States median and 95th percentile are not shown on these stripcharts because CDC did not test for these PFAS in blood samples collected 2017-2018. **All concentrations are nanogramsPFAS per milliliter of blood (ng/mL). "ND" means not detected.**



Below are PFAS results for the blood sample you provided in [year]. If the result is "< MRL" that means that that PFAS was not detected in your blood above the Method Reporting Limit (MRL). The MRL, shown to the right of your result, is the lowest concentration we could test for in the blood samples.

PFAS	Your blood result (ng/mL)	MRL (ng/mL)
PFOS	2	0.50
PFOA	2	0.10
PFHxS	3	0.05
PFNA	0.3	0.05
PFDA	0.1	0.05
PFUnDA	< MRL	0.05
MeFOSAA	0.1	0.05
PFHpS	0.1	0.05
PFPeS	0.1	0.05
Nafion byproduct 2	0.1	0.05
PFO5DoA	1.1	0.50
PFHpA	< MRL	0.05
PFDoA	< MRL	0.05
PFDS	< MRL	0.10
PFTrDA	< MRL	0.05
PFBS	0.1	0.05
7:3 FTCA	< MRL	0.50
4:2 FTS	< MRL	0.05
NEtFOSAA	< MRL	0.05
F53B Major (9Cl-PF3ONS)	< MRL	0.05
PFHxA	< MRL	0.05
PFO4DA	< MRL	0.50
PFTeDA	< MRL	0.05
8:2 FTS	< MRL	0.10
PFBA	< MRL	1.00

For more information on these PFAS and the full list of PFAS we tested for in blood, go to our study website (https://genxstudy.ncsu.edu).