

## PFOA Biomonitoring (Blood Sampling) Program

The New York State Department of Health is collecting blood samples as part of a PFOA (perfluorooctanoic acid) biomonitoring program. Biomonitoring assesses people's exposure to chemicals, in this case, by measuring PFOA in blood. Biomonitoring can tell us about exposure to PFOA from drinking water and other sources. It can also provide information on how levels of PFOA in one community compare to people living elsewhere.

### Questions and Answers about the Biomonitoring Program

**1. Should people in this program expect to find PFOA in their blood?**

Yes. Studies show that human exposure to perfluorooctanoic acid (PFOA) is widespread and that nearly all people in the United States have PFOA in their blood. People can be exposed to PFOA through air, water, or soil contaminated from industrial sources, and from PFOA-containing consumer products. When PFOA is present in drinking water, we expect blood levels of PFOA to be higher than the U.S. average.

**2. How high will PFOA levels be in blood?**

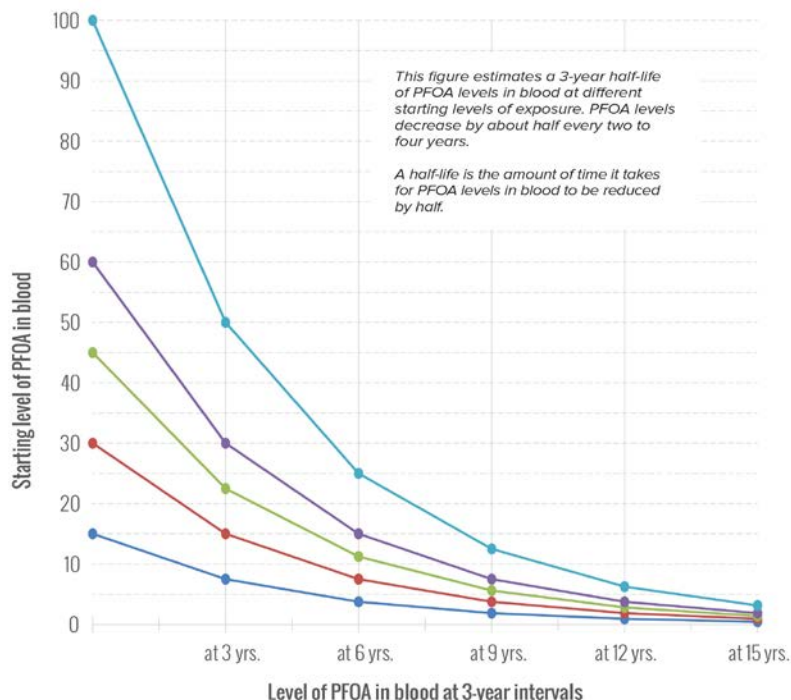
When PFOA is present in drinking water, PFOA levels in blood are expected to be higher than levels in drinking water.

**3. Will PFOA blood levels ever go down?**

Yes. Studies in other communities show that levels of PFOA in blood declined after filtration systems were installed on their public and private drinking water sources. However, PFOA can be measured in blood for years after exposure. PFOA levels decline in blood naturally by about half every 2-4 years, assuming there is no additional exposure. This is known as a half-life. Health care providers and the resources listed in #17 can provide additional information and answer further questions.

#### How Long it Might Take for PFOA Blood Levels to Decline

Assumes a 3-year half-life (Micrograms per Liter)



Bartell SM, Calafat AM, Lyu C, et al. 2010. Rate of decline in serum PFOA concentrations after granular activated carbon filtration at two public water systems in Ohio and West Virginia. Environ Health Perspect. 118(2):222-8

4. **Can PFOA blood levels predict the likelihood of having health problems?**

The measured PFOA levels only tell us about exposure to PFOA. The blood testing results provide important information about exposure to PFOA and allows for comparisons to people living elsewhere. Individual results only provide exposure information and are not cannot be used to determine of whether a person's current illness is due to PFOA or if a future illness is likely to result from PFOA.

The blood testing results provide important information about exposure to PFOA and allow for comparisons to people living elsewhere.

Future studies of PFOA exposure by scientists, public health experts, and government agencies may provide more definitive information on health effects. Knowledge of an individual's exposure may be helpful in applying this information in the future.

5. **What do the studies show about health effects, cancer, and PFOA exposure?**

Some human health studies have found associations between PFOA exposure and health effects. Others have not. The studies that found associations were not able to determine with certainty if the health effects were caused by PFOA or some other factors. These studies did not show that PFOA caused diseases.

When it comes to cancer, there is no conclusive evidence that PFOA causes cancer in humans. The International Agency for Research on Cancer (IARC) classifies PFOA as "possibly carcinogenic" in people based on limited evidence in humans and animals. Some studies have also shown associations between PFOA exposure and kidney and testicular cancer. However, others have not.

An association does not mean that one thing caused the other. For example, people with blue eyes tend to be taller than people with other eye colors. This is an association. However, eye color does not cause people to be taller and height does not cause people to have blue eyes. Northern European ancestry is known to be associated with blue eyes, and Northern European ancestry is associated with being relatively tall. But genetics alone do not cause increased height. Other factors, such as nutrition, are important as well.

According to the federal Centers for Disease Control and Prevention ([CDC](#)), more research is needed to determine the health effects of exposure to PFOA: "Most human studies have looked for a relationship between levels of perfluoroalkyls in the blood and a health effect. It is difficult to interpret the results of these studies because they are not consistent; some studies have found associations, but others looking at the same health effect have not found these associations." The National Institutes of Health ([NIH](#)) also states that "data on the human health effects of PFOA are sparse."

The New York State Health Department is conducting an investigation to see if there are unusual elevations of cancer among Village of Hoosick Falls residents. This review is being conducted in response to PFOA exposures that occurred in the past from the public drinking water supply. The investigation is looking at total cancers and specific types of cancer diagnosed from 1995 through 2013 (latest available data), using data from the New York State Department of Health Cancer Registry, which receives reports on all cases of cancer occurring in New York State. This Health Outcomes Review will be available online at [www.health.ny.gov/hoosick](http://www.health.ny.gov/hoosick).

6. **Do some people tend to have more PFOA in their blood than others?**

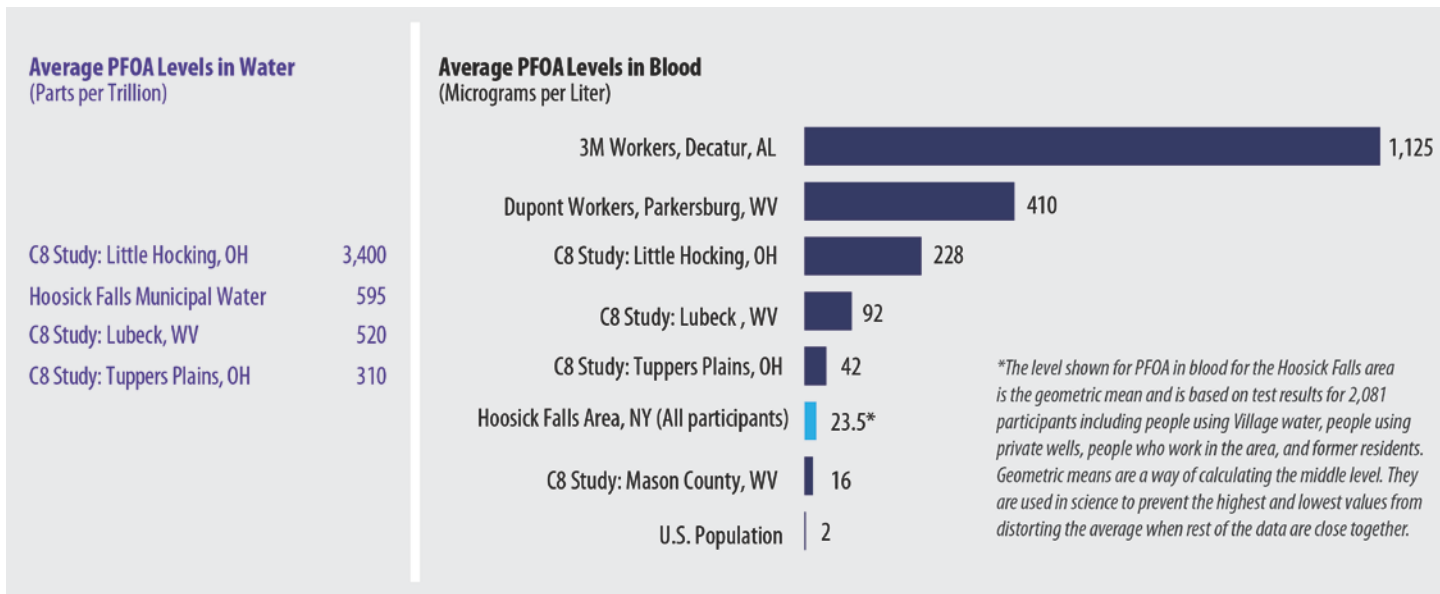
Yes. Older people tend to have higher levels because the chemical builds up in the body over time. Men tend to have higher levels than women. Children may have higher levels than their parents. PFOA is thought to build up or concentrate more in the youngest children from exposures occurring before birth and from breastfeeding or formula feeding if tap water containing PFOA is used. According to [CDC](#), "breastfeeding is still recommended despite the presence of chemical toxins" [such as PFOA] because "for the vast majority of women the benefits of breastfeeding appear to far outweigh the risks." Other possible reasons for the higher levels in the youngest children are that small children may consume more water for their body size and may excrete PFOA more slowly than adults.

7. **How will people be able to compare their levels to others?**

We are providing information to participants so that they will be able to compare their PFOA results to national data from the CDC and also to results for PFOA biomonitoring projects conducted in other communities in the U.S.

8. **Were there other biomonitoring studies of PFOA exposure?**

Yes. The chart below show some information on biomonitoring results for people in other parts of the country.



*This chart compares average PFOA levels in participants' blood results from worker studies, the "C8" studies and CDC's National Report on Human Exposure to Environmental Chemicals. The purple text shows the PFOA levels in drinking water in the communities where water was sampled. People who had the highest levels in their drinking water also had the highest levels in their blood*

In addition, both a study of some of the C8 communities and the Minnesota Pilot Study tracked blood levels in people who were exposed to drinking water contaminated with PFOA and other perfluorinated chemicals (PFCs). They found that PFOA and other PFCs in blood were higher than in the U.S. general population, but continued to decrease after filtration systems were installed on public water supplies and private wells.

9. **What do we know about levels of PFOA in blood in the U.S. population?**

The CDC produces the National Report on Human Exposure to Environmental Chemicals. This report summarizes information from a nationwide biomonitoring program (part of the National Health and Nutrition Examination Survey [NHANES]), and provides an understanding of the U.S. general population's exposure to environmental chemicals. In the latest [report](#), the median level of PFOA in the U.S. general population is 2.08 micrograms per liter (mcg/L) of blood. The median level is the middle level. It means half the people had a lower level and half the people have a higher level. It is also known as the 50<sup>th</sup> percentile. The geometric mean for the U.S. general population is also 2.08 mcg/L. The median levels and geometric means are merely measures; they do not represent a health limit or a safety limit. Individual results only provide exposure information and are not indicative of whether a person's current illness is due to PFOA or if a future illness is likely to result from PFOA.

10. **How are people exposed to PFOA?**

People can be exposed to PFOA through air, water, or soil from industrial sources and from PFOA-containing consumer products. In the Hoosick Falls and Town of Hoosick area, drinking water contaminated with PFOA is the exposure of concern that prompted the blood sampling program.

11. **How does PFOA leave the body?**

PFOA leaves the body via the kidneys in urine. PFOA blood levels largely reflect total exposure over many years. However, PFOA levels decline in blood naturally by about half every 2-4 years, assuming there is no additional

exposure. This is known as a half-life. The best intervention to reduce PFOA levels is to stop the exposure. International, U.S., and state public health agencies do not recommend any medical treatment to speed up the process of removing PFOA from the body.

**12. Who has participated in the biomonitoring program?**

- a. People who are participating in biomonitoring are residents and non-residents of the Village of Hoosick Falls or Town of Hoosick including:
  - i. People who get their drinking water from the Village of Hoosick Falls municipal water system.
  - ii. People who get their drinking water from private wells in the Village of Hoosick Falls or Town of Hoosick.
  - iii. People who work in the Village of Hoosick Falls or Town of Hoosick and have spent significant time in the community.
  - iv. People who lived or worked in the area in the past, but moved away.
- b. People who are residents of Petersburg have also participated.

Blood sample collection takes place at the HAYC3 Armory in Hoosick Falls and at Veteran's Memorial Community Center in Petersburg. [Click here for more information on upcoming testing dates](#)

**13. What is the process of conducting PFOA blood testing and sending results to biomonitoring participants?**

Analyzing PFOA in blood is a complex process that requires sophisticated equipment and specialized staff. It is very different from routine blood work. One of the few laboratories in the country capable of performing this analysis is the New York State Department of Health's Wadsworth Center. Still, before Wadsworth Laboratory could begin analyzing the samples, special preparations had to be made because some laboratory equipment contains Teflon, which has PFOA properties. Laboratory equipment had to be fitted for replacement parts that were PFOA-free and the technicians had to confirm that no background PFOA remained to interfere with analysis. For more detailed information about the blood sampling process, [click here](#).

After this process, all results were analyzed, reviewed, and confirmed. In addition to the process outlined above, the questionnaire responses collected when blood samples were taken, including names, addresses, ages, names of health care providers, and exposure history information had to be entered into a database to prepare to release results back to participants and to their health care providers if requested. Once the laboratory analyses were completed, the PFOA test results were matched to the questionnaire information using each participant's unique ID number. The database with questionnaire information about age, gender, exposure histories, and test results was used to create group level summary information about test results. The group level summary information provides context for people to interpret their individual results. During the course of preparing the mailing of results letters, all personal information was checked to ensure that the correct result letter, correct PFOA level, and correct laboratory report were provided to each participant.

**14. Does the geometric mean artificially lower the middle level of results?**

No. The geometric mean is a way of protecting the data in the middle in order to find the true middle value. It reduces the effect of the results at the far ends of the scale (high and low) on the middle numbers, which is where most results fall. Geometric means are regularly used to report scientific results, including national studies conducted by the federal government. One such study is the [National Health and Nutrition Examination Survey \(NHANES\)](#), which is the source we used for the PFOA level in the general U.S. population. We also provided information on the 50th percentile which 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.

**15. Why did you use geometric mean for Hoosick Falls, and the average for other communities?**

We provided the geometric mean for Hoosick Falls because it is the standard way of reporting the mean in the majority of scientific studies. In published reports and journal articles on the C8 studies of communities in Ohio and West Virginia, geometric means were reported for total participants but not for specific communities. The C8 studies only reported the average levels for specific communities. We also provided the median for Hoosick Falls area participants. The data on PFOA blood levels provided by the federal government for the general U.S.

population, which we also provided in the results letters, include the geometric mean and the median, and does not include averages.

**16. Should mothers exposed to PFOA breastfeed their children?**

The [U.S. Surgeon General](#) recommends that babies be fed **only** breast milk for the first six months of their lives, and continue on breast milk for at least the next six months. Human breast milk has the right amount of fat, sugar, water, and protein that a baby needs and is much easier for a baby to digest than infant formula. Breast milk helps protect a baby from infections such as colds. Breastfeeding also reduces the risk of allergies; obesity; and illnesses such as ear infections, diarrhea and respiratory infections. It also helps strengthen the bond between a mother and her baby.

According to the [CDC](#), “breastfeeding is still recommended despite the presence of chemical toxins” [such as PFOA] because “for the vast majority of women the benefits of breastfeeding appear to far outweigh the risks.” If you have more questions about breastfeeding you should speak with your healthcare provider.

**17. How can people find out more?**

For more information, including related studies, go to [Drinking Water Response](#), call the New York State Health Department at 518-402-7950, or email [beoe@health.ny.gov](mailto:beoe@health.ny.gov). In addition, physicians with environmental exposure expertise from the [Mount Sinai Hospital of New York](#) are available by telephone at 1-866-265-6201 to help answer questions PFOA blood test results.

**Links to References**

- [The C8 Health Project: Design, Methods, and Participants](#), December 2009, Frisbee, SJ et al. [www.ncbi.nlm.nih.gov/pubmed/20049206](http://www.ncbi.nlm.nih.gov/pubmed/20049206)
- [A methodology for estimating human exposure to perfluorooctanoic acid \(PFOA\): a retrospective exposure assessment of a community \(1951-2003\)](#), January 2007, Paustenbach DJ et al. [www.ncbi.nlm.nih.gov/pubmed/17162497](http://www.ncbi.nlm.nih.gov/pubmed/17162497)
- [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](http://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/decaturn/Blood%20PFC%20Testing%20and%20Health%20Information.pdf](http://www.atsdr.cdc.gov/HAC/pha/decaturn/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](http://www.ncbi.nlm.nih.gov/pubmed/16902368)
- [Private drinking water wells as a source of exposure to perfluorooctanoic acid \(PFOA\) in communities surrounding a fluoropolymer production facility](#), January 2011, Hoffman, K. et al. [www.ncbi.nlm.nih.gov/pubmed/20920951](http://www.ncbi.nlm.nih.gov/pubmed/20920951)
- **TOXFAQs for Perfluoroalkyls**  
<http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=1116&tid=237>  
**Epidemiologic Evidence on the Health Effects of Perfluorooctanoic Acid (PFOA)**  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920088/>
- **Exposure to Environmental Toxins (and breastfeeding)**  
[https://www.cdc.gov/breastfeeding/disease/environmental\\_toxins.htm](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/>