



East Metro PFC Biomonitoring Follow-up Project: December 2011 Report to the Community

What is the East Metro PFC Biomonitoring Follow-up Project?

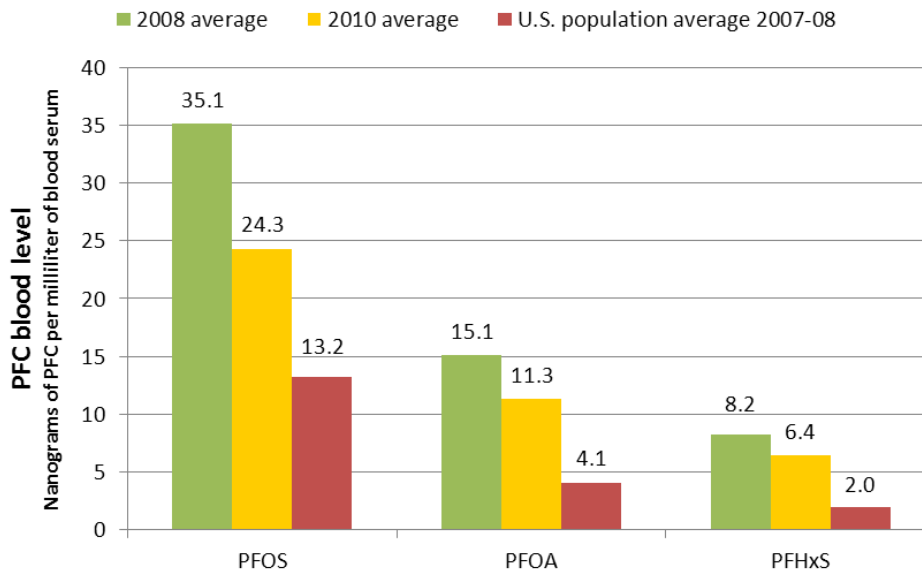
This project measured perfluorochemicals (PFCs) in blood of residents of the East Metro who participated in the Minnesota Department of Health’s (MDH) 2008 East Metro PFC Biomonitoring Pilot Project. The follow-up project’s purpose is to find out whether efforts to reduce drinking water exposure to PFCs have been successful in reducing PFC blood levels in the population.

Participants from 2008 who had agreed to future contact were asked to participate again in 2010; 164 people (88% of those contacted) agreed. Participants filled out a survey about sources of exposure to PFCs, and gave blood samples at a local clinic between November 2010 and February 2011.

MDH’s Public Health Laboratory analyzed blood samples for the same 7 PFCs measured in 2008: perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), perfluorohexane sulfonate (PFHxS), perfluorobutanoic acid (PFBA), perfluorobutane sulfonate (PFBS), perfluorohexanoic acid (PFHxA), and perfluoropentanoic acid (PFPeA).

What are the findings? How have levels changed since 2008?

Three PFCs – PFOS, PFOA, and PFHxS – were found in the blood of all participants. Levels of these PFCs have declined since 2008 in most participants: on average, individual levels of PFOS went down by 26%, PFOA by 21%, and PFHxS by 13%*. The graph below shows the average levels** of the 164 participants in both the 2008 and 2010 MDH projects, along with the U.S. population average** for comparison.



* These percent decreases are based on changes in individual levels and not the overall project average.

** The averages shown are geometric means, often used for comparing biomonitoring results. U.S. population levels are from the National Health and Nutrition Examination Survey, which measured blood from a representative group of people age 12+.

Both the project average and levels in people with the highest blood levels went down from 2008 to 2010, though 2010 levels were still somewhat higher than the most recent information available for the average U.S. population.

As in 2008, levels were a little higher in men than in women and increased with age and length of time people lived in their homes. There were no significant differences in blood levels between the two East Metro communities in the project (Oakdale and Cottage Grove/Lake Elmo). Both communities saw similar declines in PFC levels from 2008 to 2010.

The other 4 PFCs were less frequently detected: PFBA in 34 people (21%), PFBS in 7 people (5%), and PFPeA in 1 person. PFHxA was not detected in any samples. This was similar to 2008, though PFBA was detected in a greater percentage of participants (25%) in 2008.

Did all participants' PFC levels decrease?

While PFC levels in most participants went down, levels in some people did not. There are different reasons why measured levels may not decrease or could even increase.

- Some variability is normal in lab measurements, especially when very small amounts of PFCs are being measured. A small change in levels may not reflect a “real” increase or decrease.
- People have other exposures to PFCs such as diet or consumer products.
- Eating local fish from affected lakes or the Mississippi River may expose people to PFCs.
- Due to biological differences, some people may clear PFCs from their body more slowly than others.

Participants who had lower PFC levels to begin with in 2008 were more likely to have levels that stayed the same or went up in 2010. These people probably did not have significant drinking water exposure to PFCs, so PFC reductions in their drinking water would have had less effect on their 2010 levels.

How do these results compare with other studies?

Two other studies (in the Ohio River Valley and Germany) were similar to this project – they measured the change in PFOA blood levels over time in communities where significant drinking water exposure was stopped. Our project found declines in PFOA blood levels in the same range as these studies.

Studies in workers and the Ohio River Valley have measured how quickly PFCs are cleared from the body once major exposures end. This project's results for PFOS, PFOA, and PFHxS are comparable to these studies.

Blood levels of certain PFCs are also declining in the general U.S. population. This is especially true for PFOS, which is no longer commonly used in products. It is less clear whether and how quickly PFOA and PFHxS levels are going down. While discharges of PFOA have been reduced, chemicals that break down into PFOA are still used in products. PFHxS is cleared from the body more slowly than the other PFCs.

What do we know now about how people are exposed to PFCs?

In communities such as the East Metro, where groundwater is contaminated by PFCs, drinking water is thought to be an important source of exposure. Filtration of drinking water decreases this exposure. Oakdale water is filtered by the city, and PFC levels in water are within MDH exposure limits. Homes with private wells that had the most elevated PFC water levels were given filters or alternate drinking water sources. The reductions in PFC blood levels seen in this project indicate that these strategies worked.

How exposure to PFCs occurs is not fully understood. In people with lower or “background” exposures to PFCs, most researchers think that diet is the major source of exposure. Food can contain PFCs if it was grown with water, soil, or feed containing PFCs, or if it touched packaging made of chemicals that break

down into PFCs. Recent studies have found that house dust may be an important source of exposure, especially for toddlers. Exposure from consumer products that contain PFCs or chemicals that break down into PFCs – such as clothing, carpeting, textiles, and plastics – is poorly understood. More research is needed to understand how people are currently being exposed to PFCs.

What do we know now about the health effects of PFCs?

We still do not fully understand the human health effects of PFC exposure. Studies in animals have found changes in liver and thyroid function, increased tumors in certain organs, and reproductive problems. Most of these studies were at higher exposure levels than those found in humans, and comparing research findings in animals to human health effects can be difficult. Human studies have been done for a number of years in workers exposed to high levels of PFCs. These studies have not found consistent effects on health. Most of the studies did not involve women and none involved children.

More recently, studies have begun in the general population, including women and children. The C8 Study is the largest of these. It is studying a number of health outcomes in people exposed to high levels of PFOA in the Ohio River Valley. Full findings are expected in 2012. MDH will continue to monitor the growing body of science about PFCs and will provide a review of the health research findings to the community.

What do these results mean?

This project found substantial decreases in blood levels of PFOS, PFOA, and PFHxS between 2008 and 2010 in East Metro residents. Because these declines are similar to other studies where exposure to PFCs was removed, the results tell us that efforts made to reduce drinking water exposure to PFCs in the East Metro were successful. We would not expect levels to have dropped to general U.S. population levels in the two-year time period because these compounds stay in the body for a long time. We expect that, over time, East Metro residents' blood levels will continue to go down to this "background" level.

What will happen next?

It is important to know more about ongoing sources of exposure to PFCs. Our next step in the project is to study the surveys that participants completed, which we hope will also help explain why some participants' PFC levels did not decrease. MDH will also continue to review studies about possible human health effects of PFCs and communicate this information to the community.

Where can I learn more?

- MDH 2008 East Metro PFC Biomonitoring Pilot Project: <http://www.health.state.mn.us/tracking/biomonitoring/projects/eastmetropfc.html>
- MDH Division of Environmental Health overview of PFCs in Minnesota: <http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/index.html>
- Ohio River Valley C8 Science Panel web site: <http://www.c8sciencepanel.org>



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For more information, contact the Environmental Public Health Tracking and Biomonitoring Program at MDH.

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