

East Metro PFC3 Biomonitoring Project

DECEMBER 2015 REPORT TO THE COMMUNITY

Project Summary

Since 2008, MDH has tracked blood levels of perfluorochemicals (PFCs) in people who live in the East Metro as directed by the Minnesota Legislature. Some East Metro drinking water sources were found to be polluted with PFCs in the early 2000s. A public health intervention, including installing filtration systems for polluted public and private wells, reduced PFCs in drinking water to below health-based limits.

The East Metro PFC3 Biomonitoring Project is MDH's third PFC biomonitoring project. The project shows that PFC blood levels are going down in long-term residents who were exposed to PFCs in drinking water before the intervention in 2006. Additionally, PFC levels in newer residents who moved to Oakdale after the intervention are similar to levels seen elsewhere in the U.S. The project confirms that efforts to keep PFCs in drinking water below health-based limits are protecting East Metro residents.

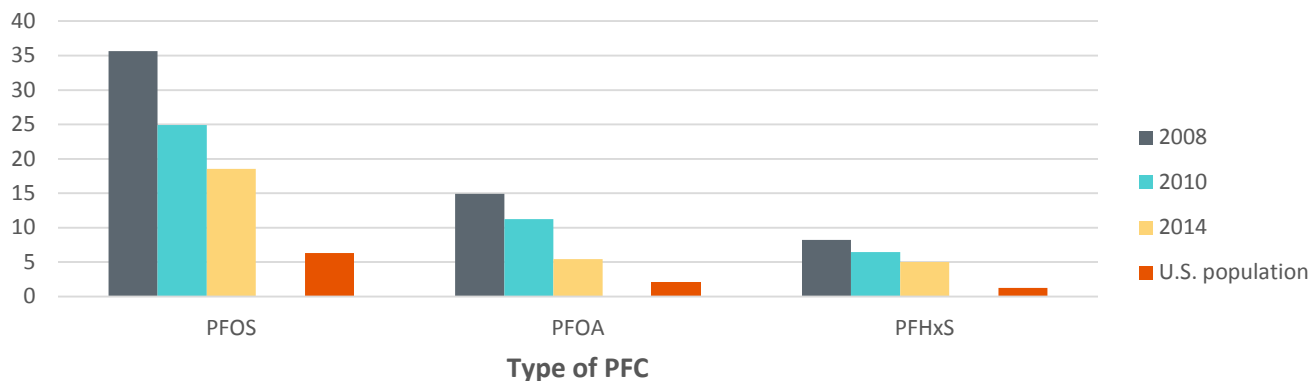
The PFC3 project tested PFCs in people

We measured blood levels of 8 perfluorochemicals (PFCs) in two groups of East Metro residents:

- **149 long-term residents** of Oakdale, Lake Elmo, and Cottage Grove who were exposed to PFCs in drinking water before the intervention and participated in past studies, and
- **156 new Oakdale residents** who moved to the area after the intervention.

PFC levels continue to go down in long-term residents

Blood PFC levels in long-term East Metro residents



The averages are geometric means in microgram of PFC per liter of blood. U.S. population levels are from the 2011-12 National Health and Nutrition Examination Survey, which measures chemicals in a group of people 12 and older that represents the U.S. population.

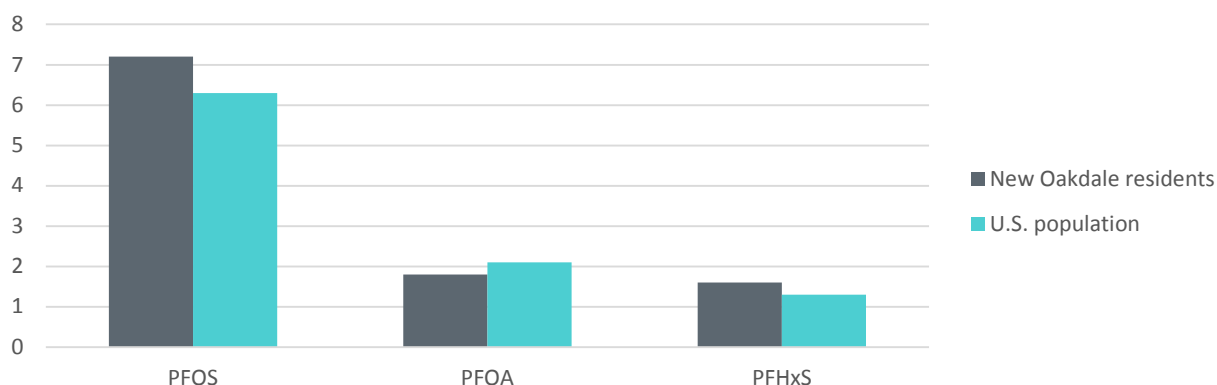
PFC levels continue to go down in long-term residents (continued)

Three PFCs – PFOS, PFOA, and PFHxS – were found in the blood of almost all long-term residents we tested. Levels of these PFCs decreased between 2008 and 2014 in most people. On average, individual levels of PFOS went down by 45%, PFOA by 59%, and PFHxS by 34% over 6 years. The chart on the previous page shows average PFC blood levels for each year we tested. PFC blood levels in long-term residents are still higher than levels seen in the U.S. population, but they are getting closer.

A small group of people had levels of one or more PFCs that stayed the same or increased over time. Reasons for this likely include variability inherent in lab measurements (especially when PFC levels are low), ongoing contact with PFCs through products and foods, and differences in the time it takes people’s bodies to clear PFCs.

PFC levels in new Oakdale residents are similar to the U.S. population

2014 blood PFC levels in new Oakdale residents



The averages are geometric means in microgram of PFC per liter of blood. U.S. population levels are from the 2011-12 National Health and Nutrition Examination Survey, which measures chemicals in a group of people 12 and older that represents the U.S. population.

PFC levels in the new Oakdale residents we tested were about the same as levels seen in the U.S. population. Statistical tests did not find significant differences between the two groups. One limitation here is that the most recent information for the U.S. population is from 2011-2012, and we know that PFC levels are going down in the U.S. population. We saw no relationship between the number of years new residents reported living in Oakdale after the 2006 intervention and their PFC levels.

Though PFCs are filtered out of Oakdale water, **very low levels** of some PFCs still end up in the treated water. The results in this group tell us that it is unlikely that the low levels in Oakdale water are the source of PFOS, PFOA, and PFHxS in new residents’ blood. Instead, low blood levels may be due to ongoing contact with PFCs through products and foods.

Levels of other PFCs in blood are very low



Blood levels of PFBA were low. It was detected in a higher proportion of long-term residents in 2014 (34%) than in 2010 (20%), and in 45% of new Oakdale residents. A small amount of PFBA is found in treated Oakdale drinking water. The city's filtration system is effective at removing most PFCs, but PFBA breaks through the filter a short time after it's replaced every year. It's possible that PFBA was detected more in 2014 because blood samples were collected after the PFBA breakthrough occurred. PFBA does not build up in the body like PFOS, PFOA, and PFHxS – it's cleared in a matter of days. It is also found in dust and household products.

The project measured another PFC called PFNA for the first time. PFNA is **not** a known pollutant of East Metro water, but it is used in food packaging and furniture treatment. Levels of PFNA in both long-term residents and new Oakdale residents were significantly lower than levels seen in the U.S. population.

The remaining PFCs – PFBS, PFHxA, and PFPeA – were not detected in most people.

PFC levels are related to sex, age, and drinking polluted water

Sex and age were related to PFC levels in long-term residents and new Oakdale residents. Older people tend to have higher PFC levels because these chemicals can build up in the body over time. Men tend to have higher PFC levels in part because women can clear PFCs through menstruation, childbirth, and breastfeeding.

In long-term residents, PFC levels were also related to the number of years drinking unfiltered water in the East Metro before the intervention. This makes sense because drinking water was the major source of exposure before the intervention.

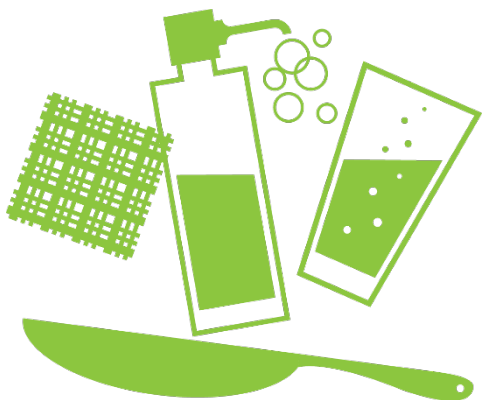
There are some links between PFC levels and race/ethnicity and income

We looked at PFC levels by race/ethnicity, homeowner status, and household income to check if some groups are exposed to PFCs more than others.

- In new Oakdale residents, PFHxS levels were slightly higher in non-Hispanic white people compared to all other people. We did not see any other differences by race/ethnicity, but we were unable to look at specific racial/ethnic groups because of small numbers.
- There was no clear pattern between PFC levels and income.
- We did not see differences in PFC levels between people who rent and people who own their homes.



PFC levels can be partly explained by blood donation history and product use



We found that PFC levels were related to blood donation history. In long-term residents, people who reported donating blood in the last 2 years had lower levels of PFOS, PFOA, and PFHxS.

We asked participants questions about using products that may contain PFCs. We found that having new carpet installed at work was related to higher levels of PFOA among new Oakdale residents. We did not find links to other products like non-stick cookware, waterproofing sprays, and new furniture.

We asked about consumption of foods that may contain PFCs, like foods that come in grease-resistant packaging, but did not find eating specific food items was related to PFC levels.

More information on PFCs in East Metro drinking water

PFCs are chemicals used to make products that resist stains, grease, water, and heat. Some public and private drinking water wells in the East Metro were found to be polluted with PFCs in 2004. A public health intervention reduced PFCs in drinking water to below health-based limits.



Image: City of Oakdale water treatment plant

A large granular activated carbon (GAC) system was constructed in 2006 to filter PFCs out of Oakdale city water. Lake Elmo and Cottage Grove residents with PFCs in their private well water were provided filtration systems for their homes or connected to Lake Elmo city water. MDH continues to test public and private well water to be sure that water levels stay below health-based limits.

You can learn more information about our past East Metro PFC biomonitoring projects at our website <http://tinyurl.com/PFC3project> or by calling us at 651-201-5900. For more information on PFCs in Minnesota water and PFCs and health, visit <http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs>.

Minnesota Department of Health
Environmental Health Tracking and
Biomonitoring
PO Box 64882, St. Paul, MN 55164 -
0882
651-201-5900
health.tracking@state.mn.us



DATE: 12/29/2015

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651-201-5900