

Communicating the Risks of PFAS: Minnesota Department of Health

Background and Health Department Activities

The Minnesota Department of Health (MDH) is a freestanding public health agency and has a decentralized relationship with local health departments in the state. MDH was one of the first states to begin investigating the issue of environmental per- and polyfluoroalkyl substance (PFAS) contamination, amassing significant experience and knowledge on the subject. MDH and the Minnesota Pollution Control Agency (MPCA) first became aware of possible environmental PFAS contamination in 2002, stemming from industrial facilities and waste sites. These agencies then discovered PFAS-contaminated drinking water supplies in the eastern Twin Cities in 2004.¹ Initially, MDH was interested in the two most widely known PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). However, after subsequent investigations into the extent of environmental contamination, MDH began studying five additional PFAS chemicals: perfluorobutane sulfonate (PFBS), perfluorohexane sulfonate (PFHxS), perfluorobutanoic acid (PFBA), perfluoropentanoic acid (PFPeA), and perfluorohexanoic acid (PFHxA). MDH initially worked with the state public health laboratory to analyze these chemicals in the contaminated water supply. After further investigation, PFAS were found in private wells and other community water systems in the area. In response to the contamination, MDH and its partners conducted further sampling of private wells in affected areas, issued drinking water advisories to private well owners, and worked with affected community public water suppliers to institute controls designed to lower PFAS concentrations in residents' drinking water.

In addition to mitigating exposures to PFAS in drinking water, MDH has worked on several biomonitoring investigations in the affected communities to better understand exposure risks and to compare the results with nationally representative data. Minnesota's legislature approved funding for the initial investigation in 2007, and the work was repeated in 2010 and 2014 to better understand how well contamination mitigation has worked over the past few years. MDH conducted biomonitoring for the same seven PFAS chemicals listed above. The initial investigation showed that affected communities in Minnesota had PFAS levels in their bodies far above the national averages, as reported by the National Health and Nutrition Examination Survey. The three chemicals most consistently found were PFOA, PFOS, and PFHxS. Repeat studies found decreased PFAS levels in residents' blood, an indication that MDH and their partners' mitigation work was having a positive effect on the levels of PFAS exposure in affected communities.² MDH spent a great deal of time on communicating with the participants of these studies, letting them know that drinking water was indeed the main route of exposure, and that blood levels for the three main PFAS chemicals of concern (PFOS, PFOA, and PFHxS) had declined over time.³ However, these biomonitoring studies only gave information on exposure, and were not designed to evaluate health effects. MDH has found nothing unusual in cancer incidence or adverse birth outcome rates in the PFAS-affected communities. However, specific conclusions about health effects on an individual level are difficult to draw from these investigations.

In addition to the exposure mitigation work and biomonitoring investigations, MDH also worked to develop its own groundwater guidance values for PFOA and PFOS, beginning in 2002. In 2011, MDH established similar groundwater guidance values for PFBS and PFBA and released updated values in 2009 and 2017 for PFOA and PFOS. MDH fielded questions from the public on a daily basis both when the department released these groundwater guidance values and also during the biomonitoring

investigations. Additionally, MDH answered many of the public's questions related to the U.S. Environmental Protection Agency's (EPA) 2016 Drinking Water Health Advisories for PFOA and PFOS.

Development of Health Advisories

As stated above, MDH developed groundwater guidance values for PFOS and PFOA beginning in 2002 and for PFBS and PFBA in 2011. The department updated the PFOS and PFOA values in 2009 and 2017. For PFHxS, MDH uses a groundwater guidance value equal to PFOS. MDH's current groundwater guidance values for PFOA and PFOS are more conservative than EPA's 2016 Drinking Water Health Advisories for PFOA and PFOS. However, similar to EPA's 2016 Drinking Water Health Advisories, MDH's groundwater guidance values "apply to short periods of time as well as over a lifetime of exposure."^{4,5} These groundwater guidance values are considered by MDH to be "health-based values," which are defined as "the concentration of a chemical (or a mixture of chemicals) that is likely to pose little or no risk to human health."⁶ They are considered technical guidance and not legally enforceable.⁷

MDH consulted with a variety of partners in developing these groundwater guidance values. For risk communication assistance, MDH worked primarily with its in-state partners at the MPCA. MDH also used scientific methodology resources from CDC, the Agency for Toxic Substances and Disease Registry (ATSDR), and other state health and environmental agencies in Connecticut, New Jersey, and Washington state. Additionally, MDH used EPA's technical documents, released with EPA's 2016 Drinking Water Health Advisories for PFOA and PFOS, to assist with the 2017 update to the groundwater guidance values.

Rollout and Dissemination of Advisory and Relevant Resources

When MDH released its groundwater guidance value updates in 2017, the department issued a press release and hosted a teleconference, inviting media to call in and ask questions about the updated groundwater guidance values. MDH also held meetings with the affected communities in order to present the updated groundwater guidance values and answer questions. The health department answered questions from the community both in group settings and on a one-on-one basis. These meetings were useful in that they allowed MDH to simultaneously answer questions posed by the community and gather information on issues that most concerned the community. Furthermore, MDH posted multiple factsheets and updates to its website regarding the new groundwater guidance values and sent informational emails to its large email distribution lists, which contain several thousand public email addresses. There is a dedicated [webpage](#) for MDH's information on PFAS, including individual information sheets for each groundwater guidance value. Most questions that come into MDH are first directed to the webpage and associated resources, which are currently only available in English.

When developing these risk communication and informational resources for the press and public, MDH worked hard to keep the language at an 8th grade reading level so that individuals of all educational backgrounds could read and understand the information presented. MDH developed separate risk communication resources to assist health professionals in communicating with their patients about PFAS health risks. MDH also connected with representatives from the firefighting community to warn them about the risks of PFAS groundwater contamination due to their use of PFAS-containing firefighting foam. Furthermore, MDH collaborated with wastewater treatment plants and assisted them in developing risk communication plans. Finally, MDH developed advisories for fish consumption based on PFOS found in fish tissues.⁸

Key Messages for the Public

- Testing is available for households on private wells that would like their drinking water tested for PFAS. If test results show elevated levels, options are available from the MPCA for treating the water and reducing exposures.
- Currently, PFAS levels found in the drinking water supply in impacted Minnesota communities have been within the margin of safety for the current groundwater guidance values, and outright negative health effects from these exposures are not expected with what is currently known about PFAS exposures and health effects.
- Affected water supplies are safe to use to water produce in home gardens.

Gaps and Challenges

Similar to other agencies working on PFAS exposure concerns around the United States, MDH finds it is often difficult to communicate with the public about specific health outcomes related to their exposures due to the emerging nature of these contaminants and the inconsistent research findings on human health effects. Environmental contaminants, such as lead, have well-characterized health risks gleaned from decades of research. On the other hand, direct health effects from PFAS exposures alone are still being studied. Furthermore, more information is needed about how these chemicals move through and partition themselves in the environment and human body. These data will further enhance risk communication materials. Finally, communicating about health risks from different chemicals that have different advisory values can be challenging. Additional risk communication guidance for different PFAS chemicals, not just PFOA and PFOS, would be helpful.

Minnesota PFAS Quick Facts	
Advisory Values Utilized ⁹	PFBS – 2 parts per billion (ppb); PFHxS – 0.027 ppb; PFOS – 0.027 ppb; PFBA – 7 ppb; PFOA – 0.035 ppb
Collaborators	U.S. EPA, CDC, ATSDR, MPCA, and health and environmental agencies in Washington state, Connecticut, and New Jersey
Languages for Materials	English
GIS Mapping	Yes
Website	http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/index.html

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¹ Minnesota Pollution Control Agency. "PFCs." Available at

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² Minnesota Department of Health. "East Metro PFC Biomonitoring Follow-up Project. May 2013 Report to the Community Survey Analysis: How are Participants Exposed to PFCs." Available at

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³ Ibid

⁴ Minnesota Department of Health. "PFCs and Health." Available at

<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcshealth.pdf>. Accessed 5-1-2018.

⁵ U.S. Environmental Protection Agency. "Fact Sheet PFOA and PFOS Drinking Water Health Advisories." Available at [https://www.epa.gov/sites/production/files/2016-](https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf)

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⁶ Minnesota Department of Health. "Health-based Values and Risk Assessment Advice for Water." Available at

<http://www.health.state.mn.us/divs/eh/risk/guidance/hbvraawater.html>. Accessed 5-1-2018.

⁷ Ibid.

⁸ Minnesota Department of Health. "Contaminants and Minnesota Fish." Available at

<http://www.health.state.mn.us/divs/eh/fish/faq.html#whatcontam>. Accessed 5-1-2018.

⁹ Minnesota Department of Health. "PFCs and Health." Available at

<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcshealth.pdf>. Accessed 5-1-2018.