

Perfluoroalkyl Substances (PFAS) Summary

About PFAS

PFAS are a family of manmade chemicals that have been widely used for decades. PFAS are extremely stable and do not breakdown in the environment. They have been found in the groundwater and surface water in Minnesota.

Common uses of PFAS include 1) nonstick cookware, stain-resistant carpets and fabrics, 2) coatings on some food packaging (especially microwave popcorn bags and fast food wrappers), 3) components of fire-fighting foam, 4) many industrial applications, 5) consumer products – for example, products that are stain and/or water resistant, cosmetics, and some cleaning products.

Health Effects

Some PFAS can build up and stay in the human body for many years. They can also slowly decline if the exposure stops. There are many different PFAS and each may have varying roles for different effects.

Scientists are actively studying PFAS exposures and human health impacts. Numerous studies have shown that higher levels of exposure to PFAS are associated with a wide range of human health effects. These include higher cholesterol, changes to liver function, reduced immune response, thyroid disease, and, in the case of PFOA, kidney and testicular cancer.

Animal studies have shown effects including changes in development, liver and thyroid function, immune response, increased kidney weight, and cellular changes. Increased tumors were also observed in certain organs in animals exposed to very high doses of PFOA.

While we believe the immediate health risks for most people exposed to PFAS are low, the latest information indicates that fetuses and infants are more vulnerable. Long term exposure to PFOA, PFOS, and PFHxS leads to a buildup of these chemicals in women of child-bearing age that increases exposure to the fetus and breastfed babies. Breastfeeding provides many health benefits for mothers and babies. MDH recommends that women currently breastfeeding, and pregnant women who plan to breastfeed, continue to do so. MDH recommends that women who plan to get pregnant follow the recommendations in [Reducing Exposures to PFAS \(PDF\)](https://www.health.state.mn.us/communities/environment/hazardous/docs/pfas/pfasreducingexp.pdf)

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How people are exposed to PFAS

PFAS are present in people and animals all over the world. They are found in some food products and the environment (air, water, soil, etc.). Eliminating all exposure to PFAS is unlikely.

People are exposed to PFAS primarily through drinking beverages or eating food made with contaminated water and exposure to PFAS in dust or consumer products.



Exposures that are expected to be minor include 1) exposure through skin contact because absorption through skin is low and 2) exposure through breathing in fine water droplets is expected to be infrequent, short, and involve small amount.

MDH Health based Guidance

MDH has developed health-based guidance values to represent levels for several PFAS in drinking water. The guidance values are levels that MDH considers safe for all people to consume, including sensitive populations. The guidance values apply to short time periods and to a lifetime of exposure.

Table of Health-based Values for PFAS

PFAS Detected in Minnesota	Drinking Water Guidance Value (ppb)
perfluorobutane sulfonate (PFBS) PFBS and Drinking Water (PDF)	2
Toxicological Summary for: perfluorohexane sulfonate (PFHxS) (PDF)	0.047
perfluorooctane sulfonate (PFOS) PFOS and Groundwater (PDF)	0.015
perfluorobutanoic acid (PFBA) PFBA and Drinking Water (PDF)	7
Toxicological Summary for: perfluorohexanoic acid (PFHxA) (PDF)	0.2
perfluorooctanoic acid (PFOA) PFOA and Drinking Water (PDF)	0.035

When more than one chemical is present, a Health Risk Index (HI) calculation is used to evaluate the combined health risk. Any HI > 1 is considered an exceedance of allowable health risk levels. Cancer risks are added together for a cancer HI. Non-cancer risks grouped by the same health endpoints (such as liver, kidney, nervous system, etc.) are added together. For example, a liver effect HI.

For information about MDH health-based guidance, see [Perfluoroalkyl Substances \(PFAS\) \(www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html\)](http://www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html)

For more information

MDH: [Perfluoroalkyl Substances \(PFAS\) \(www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html\)](http://www.health.state.mn.us/communities/environment/hazardous/topics/pfcs.html)

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