DEPARTMENT OF HEALTH

Fluoride in Drinking Water

Fluoride is natural to our environment. You can find it in soil and rock, as well as in fresh water and ocean water. Small amounts can dissolve from different kinds of rocks into groundwater that may be used for drinking water.

Community water fluoridation is a common practice where fluoride is added to drinking water as an efficient and equitable way to prevent one of the most common childhood diseases – dental decay. Fluoridation adjusts the natural levels of fluoride to help prevent tooth decay. An overwhelming amount of scientific evidence indicates that fluoridation of community water supplies is safe.

The U.S. Centers for Disease Control (CDC), the American Medical Association (AMA), the World Health Organization (WHO), the American Dental Association (ADA), and more than 125 other national and international organizations recognize the public health benefits of water fluoridation for preventing dental decay.

Health effects

The U.S. Public Health Service recommends the fluoride level in community drinking water set to 0.7 parts per million (ppm), which is the same as 0.7 milligrams per liter (mg/L).* At this concentration, fluoride protects teeth from cavities while avoiding adverse health effects that occur at higher concentrations.

Once ingested, half of the fluoride leaves your body in urine within 24 hours. The other half collects in your bones and teeth.

Drinking water with higher concentrations of fluoride over time is associated with increased risk of dental and skeletal fluorosis. Children under 8 years of age are susceptible to dental fluorosis with a few almost invisible white spots forming after exposure over 1 mg/L with larger white spots and some brown spots forming at higher concentrations. Taking in too much fluoride during enamel development can lead to a dental condition known as dental fluorosis. Severe dental fluorosis is not common when drinking water fluoride concentrations are below 2 mg/L.

Skeletal fluorosis occurs after long and high exposures to fluoride. It is rare in the United States and occurs after exposure to over thirty times higher than the optimal level used in fluoridation.

Other health effects from fluoride exposure are less certain. Some epidemiology studies conducted outside of the United States found a correlation between lower IQ and fluoride exposure at levels two times higher than the optimal dose. Other epidemiological studies did not find this correlation between IQ and fluoride exposure. There are no studies that have found adverse effects at the recommended community water level of 0.7 mg/L fluoride.

*One milligram per liter (mg/L) is the same as 1 part per million (ppm).

How to protect yourself and your family

Minnesota state law requires that municipal drinking water systems add fluoride to reach an average value of 0.7 mg/L or a range of 0.5-0.9 mg/L to promote oral health. All community water systems test their water regularly to ensure that fluoride

levels remain in this range, which is recommended by the US Centers for Disease Control (CDC).

If you are concerned about over-exposure to fluoride, do not swallow toothpaste and oral rinses. If you are concerned about fluoride and drink bottled water, read the label to ensure that fluoride is not added. Since some tea and seafoods have higher amounts of fluoride, you can also limit your intake from these sources. Some people who live near coal-fired power plants, aluminum smelters, hazardous waste sites, and phosphorus fertilizer plants will have higher fluoride exposure from inhalation.

If you own a private well

Fluoride occurs commonly in groundwater used for drinking, but the U.S. Geologic Survey reports that it typically occurs at concentrations less than the drinking-water standard for human health. Since fluoride concentrations in groundwater are generally low in Minnesota, the Minnesota Department of Health (MDH) **does not recommend** that every well be tested for fluoride. However, if you live in an area with naturally elevated fluoride (see Fluoride in Minnesota water below), you might want to consider testing your well water for fluoride. You can find certified laboratories that test for fluoride through the Environmental Laboratory Accreditation Program. You can also contact your county to see if they have any programs to make testing your water easier.

Fluoride concentrations from most drinking water wells sampled were below the optimal concentration to prevent tooth decay, so let your dentist know if you primarily consume well water. Your dentist may recommend high fluoride toothpaste or fluoride dental treatments.

If your well water has fluoride above 2 mg/L, you may consider treating your well water. See the Home Water Treatment webpage. A private water treatment company can help you select the best option for your household.

If you are on a public water system

The EPA sets the Maximum Contaminant Level (MCL) at 4.0 mg/L for public water systems serving places where people live, work, go to school, and receive childcare. If levels exceed the standard, MDH assists community water systems to take action to reduce fluoride levels. Community water systems that exceed 2 mg/L but do not exceed 4.0 mg/L must provide public notice to customers.

You can find the level of fluoride in a community water system (serving your home) by reading their water quality report (also known as a Consumer Confidence Report [CCR]). You can call your public water system to get a paper copy of your CCR or find it online at Find Your Local CCR.

Background information

Fluoride in the environment can result from human activity such as industrial activities and fertilizer use. For most people, food (fruits/vegetables), beverages (tea), and drinking water represent some of the largest potential sources of fluoride consumption.

Fluoride in Minnesota water

Fluoride can be found in groundwater throughout Minnesota but is more common in some areas than others. Higher levels of naturally occurring fluoride are more common in the western and southwestern parts of Minnesota.

Most Minnesota groundwater has some level of naturally occurring fluoride (below 1.0 mg/L). As water moves through the ground it can dissolve a small amount of fluoride from rocks and minerals. Higher levels of natural fluoride are usually found in older groundwater from deep Quaternary and Cretaceous aquifers. Only about 0.4% of Minnesota community public water systems have naturally elevated fluoride levels between 2-4 mg/L.

What MDH is doing

MDH regulates public water systems by:

- Approving public water systems' treatment plans.
- Enforcing the Safe Drinking Water Act.
- Testing public water supplies.

MDH regulates private and public wells through:

- Establishing and enforcing Laws and Rules for proper Construction of Wells and Borings and Sealing of Wells and Borings.
- Providing guidance for private well owners on Water Quality/Well Testing/Well Disinfection.

MDH's Oral Health Program provides information and resources on helping prevent tooth decay and promoting evidence-based dental preventive services, such as community water fluoridation.

On average, every dollar spent on fluoridation by a community saves $20 in avoided dental treatment costs. Additionally, communities with fluoridated water experience 25% fewer cavities, which results in less dental pain, fewer fillings and teeth pulled, and fewer missed days of work and school About Community Water Fluoridation (CDC).

What other groups are doing

The EPA, the CDC, and MDH regularly review research on fluoride in drinking water and have not found any significant adverse health effects due to fluoride at the levels added to drinking water (0.7 mg/L), but they do find a substantial benefit to oral health.

Oral Health - MN Dept. of Health (https://www.health.state.mn.us/people/oralhealth/index.html)

Improve Your Oral Health – Minnesota Oral Health Coalition Improve Your Oral Health – Minnesota Oral Health Coalition (https://minnesotaoralhealthcoalition.org/)

Agency for Toxic Substances and Disease Registry (ATSDR): Fluoride (https://www.atsdr.cdc.gov/interaction-profiles/about/cyanide-fluoride-nitrate-and-uranium.html)

World Health Organization: Fluoride (https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/chemical-hazards-in-drinking-water/fluoride)

Resources

Environmental Laboratory Accreditation Program (https://eldo.web.health.state.mn.us/public/accreditedlabs/labsearch.seam)

Home Water Treatment (https://www.health.state.mn.us/communities/environment/water/factsheet/hometreatment.html)

Find Your Local CCR (https://mnccr.web.health.state.mn.us/index.faces)

Safe Drinking Water Act (https://www.epa.gov/dwstandardsregulations/background-drinking-water-standards-safe-drinking-water-act-sdwa)

Laws and Rules (https://www.health.state.mn.us/communities/environment/water/wells/rules/index.html)

Construction of Wells and Borings (https://www.health.state.mn.us/communities/environment/water/wells/construction/index.html)

Sealing of Wells and Borings (https://www.health.state.mn.us/communities/environment/water/wells/sealing/index.html)

Water Quality/Well Testing/Well Disinfection (https://www.health.state.mn.us/communities/environment/water/wells/waterquality/index.html)

About Community Water Fluoridation (CDC) (https://www.cdc.gov/fluoridation/about/index.html)

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To obtain this information in a different format, call: 651-201-4700.