

## Manganese in Drinking Water

Manganese occurs naturally in rocks and soil across Minnesota and is often found in Minnesota ground and surface water. Your body needs some manganese to stay healthy, but too much can be harmful.

### Health Effects

Children and adults who drink water with high levels of manganese for a long time may have problems with memory, attention, and motor skills. Infants (babies under one year old) may develop learning and behavior problems if they drink water with too much manganese in it.

### How to Protect Yourself & Your Family

The Minnesota Department of Health (MDH) developed guidance values to keep your household drinking water safe. Because these are guidance values, public water systems are not required to meet these values and some do not.

- If you have an infant who drinks tap water or drinks formula made with tap water, a safe level of manganese in your water is 100 micrograms of manganese per liter of water ( $\mu\text{g/L}$ )\* or less.
- If you have an infant who never drinks tap water or formula made with tap water, a safe level of manganese in your water is 300  $\mu\text{g/L}$  or less.
- If everyone in your household is more than one year old, a safe level of manganese in your water is 300  $\mu\text{g/L}$  or less.

Drinking water with a level of manganese above the MDH guidance level can be harmful for your health, but taking a bath or a shower in it is not. Manganese in your water can stain your laundry, cause scaling on your plumbing, and make your water look, smell, or taste bad. Manganese can also create a brownish-black or black stain on your toilet, shower, bathtub, or sink.

The only way to know the level of manganese in your drinking water is to contact your public water system or have your tap water tested. All water testing should be done through an accredited laboratory. Contact an accredited laboratory to get sample containers and

instructions, or ask your county environmental or public health services if they provide water testing services (see *Search for Accredited Laboratories*).

If you have a household water treatment unit, the unit may reduce the level of manganese in your drinking water (see *Home Water Treatment Units: Point-of-Use Devices* for more information). MDH and Dakota County conducted a study in 2016 and found that water softeners can be an effective way to reduce the level of manganese in drinking water (see *The Wells and Increased Infant Sensitivity and Exposure (WIISE) Study*).

\*One microgram per liter ( $\mu\text{g/L}$ ) is the same as 1 part per billion.

### If you have a private well

Some Minnesota groundwater naturally has levels of manganese higher than the MDH guidance values. You may want to test your drinking water for manganese, especially if infants drink your tap water. You are responsible for keeping your well water safe and testing it as needed.

### If you are on a public water system

Public water systems may test their water for manganese, but they are not required to. You can contact your public water system to find out if they test the water for manganese. If your public water system does not test for manganese, you can arrange and pay for an accredited laboratory to test your water. Remember that certain types of home water treatment units may make the level of manganese lower in your tap water than what your water system detected.

## Background Information

Manganese occurs naturally in rocks and soil and can be found in water, food, and air. Your body needs some manganese to stay healthy. The recommended daily intake for manganese depends on a person's age and sex. The recommended manganese intake for children over eight years old and adults varies from 1,900 to 2,600 µg per day. Infants should consume 600 µg or less of manganese per day.

The level at which manganese benefits one person could overlap with the level at which it is harmful to another person. Adults and children get enough manganese through their diet. Infants get enough manganese from breast-milk, food, or formula. Food often has a higher manganese level than water; however, there are many types of food that can actually block manganese from getting into the body. Water does not have the same characteristics as food, so your body can more easily absorb manganese in water.

## Manganese in Minnesota's Water

Manganese occurs naturally in groundwater across Minnesota. Based on an MDH study, groundwater in southeastern Minnesota tends to have low levels of manganese (below 50 µg/L). Southwestern Minnesota tends to have higher levels—some over 1,000 µg/L. There are no clear patterns in the other parts of the state.

Although public water systems are not required to test for manganese, some Minnesota community public water systems test for manganese either before or after treating water. Based on test results and treatment practices, MDH estimates about 90 percent of Minnesotans using community public drinking water systems receive water with levels of manganese below 100 µg/L. About 3 percent of Minnesotans on community public water systems receive water with levels above 300 µg/L. It is important to remember certain types of household water treatment units may reduce manganese to safe levels.

## What MDH is Doing

MDH has health-based guidance for manganese in water (see *Human Health-Based Water Guidance Table*). MDH gathered data to find patterns of where manganese occurs in Minnesota's groundwater (see *Initial Assessment of Manganese in Minnesota Groundwater*). MDH also participated in an effort by the Minnesota Ground Water Association to create a report about manganese called *Manganese in Minnesota's Groundwaters*.

## What Other Groups are Doing

Researchers at the University of Minnesota received funding to investigate *Risks to Infants from Manganese in Drinking Water*.

## Resources

Home Water Treatment  
([www.health.state.mn.us/communities/environment/water/factsheet/hometreatment](http://www.health.state.mn.us/communities/environment/water/factsheet/hometreatment)).

Human Health-Based Water Guidance Table  
([www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html](http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html)).

Initial Assessment of Manganese in Minnesota Groundwater (PDF)  
([www.health.state.mn.us/communities/environment/water/docs/swp/mnreport.pdf](http://www.health.state.mn.us/communities/environment/water/docs/swp/mnreport.pdf)).

Manganese in Minnesota's Groundwaters (PDF)  
([www.mgwa.org/documents/whitepapers/01\\_manganese/Manganese\\_in\\_Minnesotas\\_Groundwaters.pdf](http://www.mgwa.org/documents/whitepapers/01_manganese/Manganese_in_Minnesotas_Groundwaters.pdf)).

Risks to Infants from Manganese in Drinking Water  
(consortium.umn.edu/risks-infants-manganese-drinking-water).

Search for Accredited Laboratories  
([www.health.state.mn.us/labsearch](http://www.health.state.mn.us/labsearch)).

The Wells and Increased Infant Sensitivity and Exposure (WIISE) Study (PDF)  
([www.health.state.mn.us/communities/environment/risk/docs/studies/wiisereport.pdf](http://www.health.state.mn.us/communities/environment/risk/docs/studies/wiisereport.pdf)).

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