

Fluoride

in Manitoba Water Supplies

What is fluoride?

Fluoride is a naturally occurring trace element found in low concentrations in nature. It is present in most geologic environments but particularly in igneous and sandstone rocks. Fluorides may be introduced into the environment by a variety of sources such as the manufacture of aluminum, steel, enamel, glass, bricks, tiles, pottery, cement, phosphate fertilizers and metal casting, welding and brazing.

Exposure to fluoride

Most Canadians are exposed to fluoride on a daily basis. It is found in almost all food and in many drinking water sources. Small amounts of fluoride are often added to drinking water systems to prevent tooth decay. Fluoride can also be found in dental products such as tooth paste and mouth rinse. Fluoride in groundwater and well water may occur when soil and rocks containing fluoride break down and dissolve.

Drinking water standard for fluoride

Health Canada has established a maximum acceptable concentration (MAC) of 1.5 milligrams per litre (mg/L) for fluoride in drinking water. This is the same value used in Manitoba as a standard for all public (municipal) drinking water supplies.

The optimal level for fluoride in drinking water to prevent dental caries is 0.7 mg /L.

Health effects of fluoride

The health effects of fluoride depend on the duration and level of exposure. In low doses, fluoride is beneficial and can prevent the development of dental cavities. In children under the age of eight, ingestion of elevated amounts of fluoride can result in dental fluorosis. This condition

causes white areas or brown stains on the teeth. This affects the appearance of the teeth but not their function. Over the age of eight, enamel formation is complete and dental fluorosis will not occur.

Depending on the consumption of fluoride through other sources, levels of fluoride in drinking water between 0.7 and 1.5 mg/L are unlikely to produce any significant dental fluorosis in children. The level of 1.5 mg/L has been set to protect children age 1 to 4 years of age from developing moderate effects of fluorosis where some dental discolouring may occur.

In adults, high levels of fluorides consumed for a very long period of time may lead to skeletal fluorosis. Skeletal fluorosis is a progressive disease, in which bones increase in density and become more brittle. In mild cases, the symptoms may include pain and stiff joints. In more severe cases, the symptoms may include difficulty in moving, deformed bones and a greater risk of bone fractures.

Ingestion of very high doses of fluoride may result in acute poisoning effects such as nausea, vomiting, abdominal pain, diarrhea, fatigue, drowsiness, coma, convulsions, and cardiac arrest.

Current science does not show a link between fluoride and cancer. This is based on scientific reviews conducted by a number of international agencies and by Health Canada which are in agreement that the weight of evidence from all currently available studies does not support a link between exposure to fluoride in drinking water and cancer.

How fluoride gets into well water

Fluoride found in well water in Manitoba occurs naturally. It is the result of groundwater coming into contact with rocks and minerals containing fluoride. The concentration of fluoride in a well water sample depends on a number of factors, such as the amount of fluoride present in the rock through which the groundwater has passed and whether the water chemistry is favorable for fluoride to remain dissolved.

Fluoride in Manitoba water supplies

Public (municipal) water systems that use well water are tested regularly by the water system owner or the Office of Drinking Water as required under *The Drinking Water Safety Act*.

Some municipalities add fluoride to the water supply to protect dental health. For information on your drinking water system, contact your water supplier or the drinking water officer in your region. Large, public water suppliers must make annual reports available to the public, and post a copy of that report on the Internet.

What to do if there is fluoride in your water supply

If the fluoride level in the water is above the drinking water standard, private home owners should consider how they are using this water and may wish to discuss health risks with their doctor or dentist particularly if there are young children in the home.

For young children, toothpaste may also be a significant source of fluoride, especially if they swallow it. Health Canada recommends children under three have their teeth brushed by an adult without using any toothpaste. Children age 3 to 6 years should be supervised when brushing and use only a small amount of toothpaste.

Private home owners may also wish to consider options to increase the safety of water used for drinking or food preparation (such as for beverages, baby formula, soup and coffee). These options include:

- Installing a cistern and arranging for the delivery of safe drinking water by a water hauler.
- Using commercially bottled water from a supplier who is a member of the Canadian Bottled Water Association or International Bottled Water Association.
- Treating the water.

Treating the water

Common treatment systems like water softeners, carbon filters and sediment filters cannot adequately remove fluoride from drinking water. Boiling will only concentrate the fluoride, it will not remove it.

Water treatment methods that can remove fluoride from drinking water include reverse osmosis, distillation, anion exchange units and adsorption with activated alumina or other special filter media. A treatment device may be installed at the kitchen faucet (point-of-use) or where the water enters the home (point-of-entry).

The treatment device should be certified to meet the NSF International (NSF)/American National Standards Institute (ANSI) standard for removal of fluoride.

Accredited certification organizations include:

- NSF International (NSF)
- Canadian Standards Association (CSA)
- Underwriters Laboratories Incorporated (UL)
- Quality Auditing Institute
- International Association of Plumbing and Mechanical Officials (IAPMO)
- Water Quality Association (WQA)

Certified devices are tested to ensure the safety of materials used in the devices and to ensure they perform as claimed.

Quotes should be obtained from reputable water treatment equipment suppliers. The supplier should provide information on how much fluoride will be removed, maintenance requirements and costs.

Once installed, manufacturer's instructions on the use and maintenance of treatment devices and disposal of filter media should be followed. The water supply and treated drinking water should be tested annually for fluoride to confirm that the treatment system is working properly.

For more information

For more information on fluoride, refer to Health Canada's website at www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/fluoride-fluoreure/index-eng.php; www.hc-sc.gc.ca/ewh-semt/consult/_2009/fluoride-fluoreure/index-eng.php; and www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/fluor-eng.php.

For more information on water treatment, contact Manitoba Water Stewardship's Office of Drinking Water at 204-945-5762, or refer to the website at www.gov.mb.ca/waterstewardship/odw/reg-contacts/index.html for a local office near you.

For information on certification of water treatment devices visit www.nsf.org.

For health related questions on fluoride, call Health Links at 204-788-8200 or toll free at 1-888-315-9257 or your local public health office.