

# Arsenic

## in Manitoba Water Supplies

### What is arsenic?

Arsenic is a naturally occurring trace element found in low concentrations in the Earth's crust. It is present in certain types of soil and rocks. It is present in small amounts in all living matter. Arsenic compounds are also used for a wide variety of commercial and industrial purposes.

### Exposure to arsenic

Since arsenic is a natural part of our environment, everyone is exposed to small amounts. Sources of arsenic exposure include:

- foods containing trace amounts of arsenic
- smoke from burning wood, coal and tobacco products
- dust from some industrial processes
- drinking water that contains arsenic
- arsenic-treated wood
- soil ingestion

Most of the arsenic found in Manitoba well water occurs naturally. It is the result of the water coming into contact with soil or rock that contains arsenic. Occasionally, arsenic in well water may be a result of commercial or industrial operations, or the use or disposal of arsenic-containing products such as pesticides.

### Drinking water standard for arsenic

Health Canada has established a maximum acceptable concentration (MAC) for arsenic in drinking water of 0.01 milligrams per litre (mg/L). Manitoba has adopted this guideline value as a provincial standard for all public (municipal) drinking water supplies within the province. At this guideline level, it is estimated that 3 to 39 people in 100,000 may develop a cancer related to arsenic exposure in drinking water in their lifetime. It should be noted that exposure to arsenic in drinking water, even at levels lower than the guideline may result in a very low risk of developing cancer over a lifetime.

### Health effects of arsenic

Despite its reputation as a poison, arsenic's effect on human health depends on factors such as the level and length of exposure.

Exposure to arsenic, including drinking well water with elevated levels of arsenic over a lifetime can increase the risk for some cancers such as the bladder, liver, kidney, lung and skin cancer.

Long-term exposure to high levels of arsenic over many years or decades may also cause thickening and discoloration of the skin, nausea and diarrhea, decreased production of blood cells, abnormal heart rhythm, blood vessel damage or numbness of the hands and feet. These health effects are not normally associated with the levels of naturally occurring arsenic commonly found in Manitoba's well waters.

### How arsenic gets into well water

Most of the arsenic found in Manitoba well water occurs naturally. It is a result of groundwater coming into contact with rocks or soils containing arsenic. The concentration of arsenic in well water depends on a number of factors, such as the amount of arsenic present in the soil through which the groundwater has passed and whether the water chemistry is favourable for arsenic to remain dissolved.

Less commonly, arsenic in groundwater may be caused by waste from commercial or industrial operations, or through the use or disposal of arsenic-containing products such as pesticides.

### Arsenic 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*.

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 arsenic in your water supply

If the arsenic 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, who can consult their regional medical officer of health for more information.

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 arsenic from drinking water. Boiling will only concentrate the arsenic, it will not remove it.

Water treatment methods that can remove arsenic from drinking water include reverse osmosis, distillation, anion exchange units and adsorption with activated alumina or other special filter media such as iron or titanium oxide. 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 arsenic.

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 arsenic 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 arsenic to confirm that the treatment system is working properly.

## For more information

For more information on arsenic, refer to Manitoba Health's website at [www.gov.mb.ca/health/publichealth/environmentalhealth/arsenic.html](http://www.gov.mb.ca/health/publichealth/environmentalhealth/arsenic.html) or to Health Canada's website at [www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index_e.html).

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.manitoba.ca/waterstewardship/odw/reg-contacts/index.html](http://www.manitoba.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](http://www.nsf.org).

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

For information on agricultural uses of water containing arsenic, refer to the Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses – Arsenic Fact Sheet <http://ceqg-rcqe.ccme.ca/>.