

# ARSENIC IN WELL WATER

## Guidance

### Introduction

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) recommends that homeowners have their well water tested for arsenic. Arsenic is a chemical element that naturally occurs in the earth's mineral deposits and dissolves in groundwater. Michigan has naturally higher arsenic levels in groundwater. Arsenic in drinking water may have harmful health effects depending on how much you consume and how sensitive you are to it. Since arsenic cannot be seen or tasted in water, a laboratory analysis specifically designed for detecting arsenic is the only way to determine the arsenic level in drinking water wells.

### How do I have my well water tested for arsenic?

To test for arsenic, call the EGLE's Drinking Water Laboratory at 517-335-8184, or any commercial laboratory certified to test for arsenic. Your local health department can provide you with a list of certified laboratories or make arrangements for your water to be tested by the EGLE Laboratory.

Contact the laboratory to obtain water sample collection bottles and instructions for sample collection. You can find the address and telephone number for your local health department in the government section of your local phone book or at [www.malph.org](http://www.malph.org).

### Arsenic Exposure

A few areas in Michigan have naturally higher arsenic levels in groundwater. Exposure to inorganic arsenic typically occurs through groundwater used for drinking and cooking.

Although, exposure is possible in the following ways:

- A large source of total arsenic comes from the food we eat. However, most of the arsenic in food is in an organic (carbon containing) form which is much less harmful than the inorganic arsenic found primarily in groundwater. Some foods also contain inorganic arsenic but the main exposure to inorganic arsenic is normally from consuming water.
- Arsenic may be inhaled by breathing in dust from industrial processes or smoke from burning arsenic-treated wood. Tobacco smoke also contains small amounts of arsenic.
- Work-related exposures to arsenic may occur in certain occupations.
- Arsenic is not readily absorbed by the skin; contact with water (showering, laundering, washing dishes, etc.) is not a risk.

### Health Risk Factors

If you have been exposed to arsenic, several factors will determine your health risk.

These factors are:

- Dose – The amount of arsenic in your body
- Duration – How long and how often your body has been exposed to arsenic
- Type of arsenic – Whether your body has been exposed to inorganic or organic arsenic
- General health, age, lifestyle, and diet – Some people may be affected by lower levels of arsenic while others remain unaffected at the same levels. Young children, the elderly, people with long-term illnesses, and unborn babies are at greater risk, as they can be more sensitive to exposure.

### Human Health Effects of Arsenic Exposure

The way arsenic affects our bodies is not fully understood. Long-term exposure to low levels of inorganic arsenic in drinking water is known to cause human health problems including: cancer, thickening and discoloration of the skin, problems with blood vessels, high blood pressure, heart disease, nerve effects including numbness and/or pain, and interference with some important cell functions.

Short-term exposure to very high levels of arsenic may cause stomach pain, nausea, vomiting, diarrhea, headaches, weakness, and even death; but, groundwater in Michigan has not been shown to have this high a level of arsenic. There is some evidence that suggests that long-term exposure to low levels ( $\geq 0.005$  milligrams/liter (mg/L)) of arsenic from drinking water may result in lower IQ scores in children.

If you have concerns about health problems that may be related to arsenic in your well water, discuss them with your doctor. A urine test will indicate if you have been exposed to arsenic at levels of concern.

### Interpreting Water Sample Results

The U.S. Environmental Protection Agency (U.S. EPA) set an arsenic maximum contaminant level (MCL) for public water supplies at 0.010 mg/L. This is equivalent to 0.010 parts per million (ppm), 10 micrograms/liter ( $\mu\text{g/L}$ ), or 10 parts per billion (ppb). The EPA also sets the MCL Goal (MCLG) for drinking water. The MCLG is set at a level that uses the best available science to prevent potential health problems. The EPA has set the MCLG for arsenic at zero.

For private water supplies (i.e. individual residential wells) the arsenic drinking water health advisory recommendation is also 0.010 mg/L. ***If the arsenic in your water exceeds 0.010 mg/L, EGLE recommends that you do not use your well water for drinking or cooking.***

### What to do if you have Arsenic in your Drinking Water

Contact your local health department to discuss solutions that have worked in your area. There are several options available to reduce exposure to arsenic in drinking water, including:

- Connecting the home to a public (municipal) water supply (if available). Public water supplies are required to meet the arsenic MCL.
- Replacing a well or modifying a well to draw water from an aquifer with lower levels of arsenic may be possible. Contact your local health department **before** replacing or modifying your water well to discuss whether this is a viable option.
- Using bottled water for drinking and cooking. Commercially prepared bottled water for sale meets the arsenic MCL.
- Treating drinking water with point-of-use reverse osmosis (RO) or arsenic adsorption media cartridge filters is the most effective and practical treatment method for residential use. Point-of-entry treatment which treats all water entering the home is also an option. Before installing a water treatment system, owners should carefully research the treatment system's effectiveness for arsenic reduction and its operational and maintenance requirements. Generally, arsenic adsorption media point-of-entry treatment is used with water low in iron, while oxidation/filtration (greensand iron removal) is used with water high in iron. Water softeners and activated carbon filters do not reduce arsenic levels effectively. A treatment unit certified by NSF International for arsenic reduction and installed to their specifications is recommended. Information is available at [www.nsf.org](http://www.nsf.org).

### Additional Resources

[U.S.EPA Chemical Contaminant Rules: Arsenic](#)  
[Center for Disease Control and Prevention - Arsenic and Drinking Water from Private Wells](#)  
[Agency for Toxic Substances and Disease Registry – Toxic Substances Portal Arsenic](#)  
[World Health Organization Arsenic Fact Sheet](#)  
[Statewide Arsenic Map](#)

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