

Arsenic in Well Water: Understanding Your Test Results

What is arsenic?

Arsenic is a natural element found in soil and bedrock throughout Wisconsin. Under certain conditions, arsenic can be released into groundwater and enter water wells. In fact, arsenic has been detected in groundwater in every county of Wisconsin. In certain areas of the state, there are serious problems with very high levels of naturally-occurring arsenic in well water. Researchers are studying where arsenic is found and the conditions that cause its release into groundwater. High levels of arsenic can cause serious health effects.

How can arsenic affect my health?

Your health risks are determined by the following factors:

- the amount of arsenic in your water,
- the amount of water you drink each day,
- the number of years you drink the water, and
- your individual sensitivity to arsenic.

Long-term exposure to arsenic in drinking water is known to increase risks of skin, bladder, lung, liver, colon, and kidney cancer. Other health effects may include blood vessel damage, high blood pressure, nerve damage, anemia, stomach upsets, diabetes, and skin changes.

Very high exposure to arsenic can cause noticeable changes to skin and nails. Arsenic exposure can cause a certain pattern of skin changes that resemble warts, called "hyperkeratosis." Fingernails may show ridges and yellowing. Dark or light spots may also appear. Consult your physician if you have any health problems that you think may be caused by arsenic exposure.

Are there special concerns about children's health?

Yes. Prenatal and early childhood exposures to arsenic can increase the risk of lung cancer and respiratory disease in later life. Arsenic exposure has also been associated with lower IQ scores in school-aged children and can affect learning. The current standard is intended to protect the developing fetus and young children from these effects.

Where is the arsenic level on my well water test results from the lab?

Lab slips vary from lab to lab but the basic information is the same. The amount of arsenic in your sample is reported under the heading RESULTS. This level is reported in UNITS of either $\mu\text{g/L}$ (micrograms per liter), ppb (parts per billion), or mg/L (milligrams per liter). The units of $\mu\text{g/L}$ and ppb represent the same concentration, and are used interchangeably. 1,000 $\mu\text{g/L}$ is equal to 1 mg/L. Thus, 10 $\mu\text{g/L}$ = 10 ppb = **0.010 mg/L**. The 'less than' symbol (<) means the amount of arsenic in your water sample is lower than what the lab can detect. Contact the lab directly if you have questions about your lab slip. You can find a laboratory in the yellow pages of your phone book under "Laboratories – Testing." Ask to make sure the lab is certified by the Wisconsin Department of Natural Resources (DNR) to test for arsenic. DNR also maintains a list of certified labs online at: <http://dnr.wi.gov/org/es/science/lc/labs/lablists.htm>.

What level of arsenic is safe?

The federal drinking water standard for arsenic is set at 10 ppb. For private residential wells, there is no state or federal requirement that you stop using your water, regardless of the arsenic level. However, if your arsenic level is more than 10 ppb, the Wisconsin Department of Health Services (DHS) recommends that you stop using your water for drinking or food preparation. Continuing to use your water is a personal decision that you must make yourself, based on the health risks and other factors such as cost and convenience. The following table provides a general guide for the average person.

Arsenic level below 10 parts per billion (ppb)*	This water is safe to drink and use for food preparation.
Arsenic level 10 parts per billion (ppb) or greater*	Do not drink your water or use it to prepare foods that require a lot of water (e.g. infant formula, soups, Jell-O, rice, coffee, tea) if the arsenic level is above 10 ppb. Washing foods and dishes in the water is safe, and is not a significant source of exposure.

**Because levels can change over time, annual testing is recommended.*

What about bathing/showering or other uses?

If your arsenic level is less than 300 ppb, uses other than drinking, such as showering, bathing, and flushing toilets, are safe. Arsenic is not easily absorbed through intact skin. Arsenic does not evaporate into the air.

What is Wisconsin doing about the arsenic in drinking water?

Because high arsenic levels occur naturally in some parts of Wisconsin, State and local agencies are investigating the health effects and possible solutions to the problem. Under certain conditions, arsenic can be released into groundwater and enter local wells. Drawdown of water tables is causing arsenic levels to rise in some local wells. Drawdown occurs when the groundwater level is lowered as large amounts of water are pumped from the ground by wells.

The Department of Natural Resources (DNR) is working with researchers and well drillers to identify drilling methods that will reduce the chance of having arsenic-contaminated water. The Department of Commerce is working with water treatment companies to identify the best treatment option for water systems.

How can I reduce my exposure to arsenic?

The following table lists things you can do to reduce your exposure to arsenic. Each of these methods has advantages and disadvantages. All the choices that follow are intended to provide your family with a safe water supply.

Use Bottled Water for drinking and food preparation.	
<p>Advantages</p> <ul style="list-style-type: none"> • No or low upfront equipment costs • Low ongoing cost (about \$200-\$300/year) 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Inconvenient
Install a Point of Use (POU) treatment system to remove arsenic from your drinking water: These filters are used to treat water coming from the kitchen faucet. Reverse Osmosis (R/O) and Distillation	
<p>Advantages</p> <ul style="list-style-type: none"> • More convenient than bottled water. • Relatively inexpensive <ul style="list-style-type: none"> ➤ Average cost for reverse osmosis system is \$500-\$1200 + pretreatment devices ➤ Average cost for distillation system is \$800-\$2000 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Only the kitchen tap water is treated • Regular maintenance and testing is needed • May not remove enough arsenic if well test is above 300 ppb • Reverse osmosis units tend to use a lot of water.
Install a Point of Entry (POE) treatment system in your home. These systems treat all water coming into the house.	
<p>Advantages</p> <ul style="list-style-type: none"> • Safe drinking water is available at every tap • Aids POU efficiency 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Moderately expensive. Average cost is \$1500-\$7000 • Requires regular maintenance and testing (\$500/year)
Drill a deeper well and install casing past the arsenic producing zone. Make sure the well driller obtains and follows the special well construction recommendations provided by the DNR at http://dnr.wi.gov/org/water/dwg/arsenic/recommend.htm .	
<p>Advantages</p> <ul style="list-style-type: none"> • Usually provides a permanent solution • 90% of new wells have tested low in arsenic 	<p>Disadvantages</p> <ul style="list-style-type: none"> • There is no guarantee that a new well will be arsenic-free. Some new wells initially produce water low in arsenic, but the arsenic level can increase over time. • Expensive: Cost can be more than \$10,000
Connect to a public water supply or community well	
<p>Advantages</p> <ul style="list-style-type: none"> • Provides a permanent safe water supply. • Cost is shared by many families 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Public water may not be nearby. • Annexation may be required. • Shared wells require continued cooperation between neighbors.

Who makes water treatment devices approved for arsenic reduction?

The Wisconsin Department of Commerce maintains a list of Approved Water Treatment Devices for Arsenic Reduction. To download a copy of this list, go to:

<http://dnr.wi.gov/org/water/dwg/arsenic/AsTreatment.pdf>

NOTE: All consumers are encouraged to obtain a copy of the state of Wisconsin approval letter for the specific water treatment device model they are interested in. Copies of approval letters are normally available free from charge from the manufacturer. The Department of Commerce can also provide a copy, however there is a \$20.00 fee.

For more information

For more information on arsenic, visit the Wisconsin Department of Natural Resources website at <http://dnr.wi.gov/org/water/dwg/arsenic/> or see the contact information below.

DNR contacts

Contact a local drinking water expert in your regional DNR Office:

RHINELANDER

DNR Northern Region Headquarters
715-365-8900

GREEN BAY

Northeast Region Headquarters
920-662-5100

EAU CLAIRE

West Central Region Headquarters
715-839-3700

FITCHBURG

South Central Region Headquarters
608-275-3266

MILWAUKEE

Southeast Region Headquarters
414-263-8500

Local Health Departments

Look up your local health department using this link:

<http://dhs.wisconsin.gov/localhealth>

Wisconsin Division of Public Health

1 W Wilson St, Rm 150
Madison, WI 53701

<http://dhs.wisconsin.gov/eh>

Contacts:

Mark Werner, Toxicologist

Phone: 608-266-7480

Email: mark.werner@wi.us or

Lynda Knobeloch, Sr. Toxicologist

Phone: 608-266-0923

Email: lynda.knobeloch@wi.us

For more information about treatment options

Wisconsin Department of Commerce

201 W. Washington Avenue

P.O. Box 7162

Madison, WI 53707

Contact: Glen Schlueter

Phone: 608-267-1401

Email: Glen.Schlueter@wisconsin.gov



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OR