

Arsenic and drinking water

What is arsenic and where does it come from?

Arsenic is a naturally occurring element found in the earth's crust. As water flows through certain rock formations, the arsenic can dissolve and be carried into underground aquifers, streams or rivers that may be drinking water sources.

How can arsenic affect my health?

Arsenic is a health hazard. Drinking water with high levels of arsenic can cause health effects such as:

- Thickening and discoloration of the skin
- Stomach pain, nausea, vomiting and diarrhea
- Heart, lung, liver, immune, nervous or reproductive system disorders and diabetes
- Cancer of the bladder, lungs, skin, kidney, liver and prostate

Children are more susceptible to high levels of arsenic in drinking water because they drink more water per body weight than adults and because they are passing through important developmental stages, especially brain development.

When does arsenic in drinking water become a health concern?

Arsenic is measured in parts per billion (ppb). The federal government has established the safe drinking water standard (also called maximum contaminant level) for arsenic as 10 ppb*.

If your water has arsenic levels above 35 ppb (0.035 ppm), **young children, especially infants, should stop drinking it immediately**, because this level has been associated with health effects in children after very short-term exposures (2 weeks or less).

**Arsenic can also be measured in parts per million (ppm) or mg/L. For example, 10 ppb is the same as 0.010 ppm or 0.010 mg/L. See the conversion table below to help interpret your results.*

Units of measurement	Arsenic	
ppb	Parts per billion	ppb= ppm / 1000
ppm	Parts per million	ppm = ppb x 1000
mg/L	Milligram per liter	equal to ppm

What can I use my water for if it is contaminated with arsenic?

While arsenic in water above the drinking water standard may not present an immediate health hazard, you should consider obtaining your water for drinking, beverage-making or food preparation from a known safe source for use on a temporary basis. Other uses of water pose much less hazard but are not entirely safe if arsenic levels are significantly above the drinking water limit.

Can I wash my food with arsenic-contaminated water?

If arsenic levels in your water are above 35 ppb (0.035 ppm), **young children, especially infants are at immediate risk**. You should use a known safe source to prepare and cook your food.

Can I irrigate or water my garden with arsenic-contaminated water?

If your water has more than 100 ppb (0.100 ppm) of arsenic, you should not use it for irrigation. The amount of arsenic in the soil may build up over a period of years to levels that are poisonous for some plants. An increase in soil arsenic may also pose a direct hazard to humans by accumulating in food crops.

What about bathing and showering?

Arsenic does not easily enter the body through the skin. Bathing, swimming and showering with water that has levels as high as 500 ppb (0.500 ppm) is safe if you **avoid swallowing the water**. Supervise small children when they are bathing and brushing teeth to ensure they do not swallow the water.

What about washing dishes, utensils and food preparation areas?

Only a very small amount of water clings to smooth surfaces, such as dishes. Water with up to 500 ppb (0.500 ppm) of arsenic may be safely used to wash and sanitize dishes, tables and eating utensils.

What about general cleaning and laundry?

Very little water remains on washed surfaces and in laundered fabrics. Water with up to 500 ppb (0.500 ppm) of arsenic may be safely used for general cleaning and washing of clothing, bedding and linens.

What about my pets?

Consider giving pets the same water you would drink. If you have concerns about how arsenic in water could affect livestock or other animals, contact the Oregon State University Agricultural Extension Service at extension.oregonstate.edu/extension-ask-an-expert.

Learning about arsenic levels in your drinking water

For people on public water systems:

Public drinking water providers must monitor for arsenic. If arsenic levels remain above the drinking water standard of 10 ppb (0.01 ppm), treatment to remove arsenic or developing a new source of drinking water may be required. Public water system monitoring results are available on the Oregon Drinking Water Services [Data Online](#) website. If your water comes from a community water system (you pay a water bill), your drinking water provider must provide a [Consumer Confidence Report](#) to its customers every year. This report contains the most recent arsenic test results if detected. Contact your drinking water provider to request a copy of the most recent consumer confidence report.

For private well owners:

If your drinking water comes from your own well, you will have to find an accredited laboratory that does water testing for private property owners. These labs can provide information and instructions for getting your well water tested. For a list of accredited laboratories for drinking water in Oregon refer to the following [link](#).

Information on private domestic wells is available on the OHA Domestic Well Safety Program's website at: www.healthoregon.org/wells.

Removing arsenic from drinking water

Do not boil the water!

Boiling contaminated water does not remove arsenic and can increase arsenic levels.

For public drinking water system operators:

Arsenic can be reduced or removed entirely from drinking water, but treatment processes require careful maintenance and monitoring. Current treatments include activated alumina, electro dialysis, reverse osmosis and ion exchange resins. If treatment is not possible for your system, you should consider developing a different water source or connecting to another safe water source in the area. Treatment has limitations and disadvantages. Not all kinds of treatment are effective, and no single treatment method can remove all contaminants from water. Before selecting treatment equipment, contact [Oregon Drinking Water Services](#) for regulatory requirements for public water systems.

Private well treatment options:

Several treatment methods can remove arsenic from drinking water. The one most commonly used is called reverse osmosis. Options include central treatment (at the well or entry to the home) or a point-of-use device (kitchen sink filter). A point-of-use device will not protect against exposure from other taps not treated with a device.

Be sure that any treatment system used is certified by a recognized, third-party testing organization that meets strict testing procedures established by the [American National Standards Institute \(ANSI\)](#) and the [National Sanitation Foundation \(NSF\) International](#). Proof of certification should be available from the distributor or manufacturer. Alternatively, NSF certification for various treatment units may be verified through NSF or the [Water Quality Association](#).

Treatment equipment must be carefully maintained to work properly and may not be effective if arsenic levels are very high. It is recommended that treated water be tested at least once a year. Untreated water should be tested at least every three years.

For more information:

- Private well owners with health-related questions about arsenic in their water may call 971-673-0440, or email general.toxicology@state.or.us.

- For questions about treatment options for your domestic well, contact the drinking water specialist at your local or county health department. Here is a list of [local and county health departments in Oregon](#) with their contact information.
- [U.S. Environmental Protection Agency](#) – Arsenic in drinking water
- [Agency for Toxic Substances & Disease Registry](#) – Arsenic

Guidance for use of water contaminated with arsenic

Arsenic level	Water use	Recommendations
Below 10 ppb (below 0.010 ppm)	USE for drinking, cooking and all other domestic uses	Test water once every three years
Between 10 and 35 ppb (between 0.010 and 0.035 ppm)	RECOMMEND NOT USING for drinking, mixing into beverages, cooking or washing fruits and vegetables RECOMMEND NOT USING for pets to drink USE for all other domestic uses, including bathing, washing dishes, doing laundry or irrigating gardens	Use water from a known safe source (e.g., bottled water) or have an approved water filtration system for drinking, cooking and washing fruits and vegetables. Give pets same water you would drink.
Between 36 and 99 ppb (between 0.036 and 0.099 ppm) Children are at immediate risk drinking water with arsenic above 35 ppb (0.035 ppm)	DO NOT USE for drinking, mixing beverages, cooking or washing fruits and vegetables DO NOT USE for pets to drink USE for all other domestic uses, including bathing, washing dishes, doing laundry or irrigating gardens	Supervise children to help them avoid swallowing water while bathing, brushing teeth, etc. If you have a treatment system, test treated water at least once a year. Test untreated water (pre-treatment unit) at least every three years
Between 100 and 499 ppb (between 0.100 and 0.499 ppm)	Same restrictions as between 36 and 99 ppb DO NOT USE for irrigating gardens – arsenic may build up in soil overtime and be taken up into vegetables USE for all other domestic uses	
500 ppb and higher (0.500 ppm and higher)	DO NOT USE for any domestic uses	Contact your local health department or Oregon Drinking Water Services at 971-673-0405



This document can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request this publication in another format or language, contact Drinking Water Services (DWS) at 971-673-0405 or 711 for TTY.

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