

# Benzene and drinking water

## What is benzene and where does it come from?

Benzene is a volatile, clear, sweet smelling liquid used as a gasoline additive and in production of consumer products such as paints dyes, insecticides and cosmetics.<sup>1</sup> Benzene use as a solvent has decreased in recent years.<sup>2</sup> Benzene is highly flammable and is also produced naturally from volcanoes and forest fires.<sup>3</sup> Benzene can get into drinking water from industrial discharge, gas storage tank leaching and landfills.

## How can benzene affect my health?

Benzene is a health hazard. Consuming water with high levels of benzene over a long time can cause health effects such as:

- Central nervous system dysfunction<sup>4</sup>
- Extensive hemorrhaging
- Pancytopenia (decrease in amount of blood cells); white blood cells are especially sensitive<sup>2</sup>
- Increase risk of cancer<sup>3</sup>

## When does benzene in drinking water become a health concern?

Benzene is measured in parts per billion (ppb). The federal government has established the safe drinking water standard (also called maximum contaminant level) for benzene as 5 ppb.

## What can I still use my water for if it is contaminated with benzene?

Water for drinking, beverage-making or food preparation can be obtained from a known safe source and used on a temporary basis. Other uses of water pose much less hazard, but are not entirely safe if benzene levels are significantly above the drinking water limit.

## Can I wash my food with benzene-contaminated water?

If benzene levels in your water are above 5 ppb, you should use bottled water or water from a safe source to wash, prepare and cook your food.

## Can I irrigate or water my garden with benzene-contaminated water?

Benzene cannot be taken up by plants,<sup>5</sup> however, benzene can be broken down in soil under certain conditions.<sup>2</sup> To avoid accumulation and migration<sup>1</sup> of benzene in soil, water above 5 ppb should not be used for irrigating or watering.

## What about bathing and showering?

Skin exposed to benzene may become red or irritated.<sup>4</sup> Bathing, swimming and showering with benzene is not recommended. Since benzene easily releases from water into the air, bathing and showering with benzene-contaminated water may increase exposure through breathing.<sup>3</sup>

## What about washing dishes, utensils and food preparation areas?

Only a very small amount of water clings to smooth surfaces, such as dishes. However, using hot water to wash dishes or utensils may increase exposure to benzene through breathing.<sup>3</sup> A safe alternate source of water is recommended 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. However, using hot water to wash laundry and other surfaces may increase exposure to benzene through breathing.<sup>3</sup> A safe alternate source of water is recommended for general cleaning and washing of clothing, bedding and linens if water contains more than 5 ppb benzene.

## What about my pets?

Animals should not drink water with benzene levels above 5 ppb.

# Learning about benzene levels in your drinking water

## For people on public water systems:

Public drinking water providers must monitor for benzene and ensure levels remain below the drinking water standard of 5 ppb. 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 benzene 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](#).

# Removing benzene from drinking water

## Don't boil the water!

There is no evidence that boiling removes benzene and boiling water containing benzene may increase inhalation exposure.<sup>3</sup>

## For operators of public drinking water systems:

Benzene can be reduced below 5 ppb in drinking water using granular activated carbon filtration or packed tower aeration. Work with a professional engineer to determine the best treatment for your system. Not all kinds of treatment are effective, and no single treatment method can remove all contaminants from water. Alternatives to treatment include developing a different water source or connecting to another safe water source in the area. Benzene contamination can be prevented by not using source water that contains industrial discharge or has been near gas storage tanks

and runoff from landfills. Treatment has limitations and disadvantages. Before deciding on treatment equipment, contact Oregon [Drinking Water Services](#) for regulatory requirements for public water systems.

### Private well treatment options:

Treatment options are available to remove benzene from well water. The most commonly used is granular activated carbon filtration. Options include central treatment (at the well or entry to home) or a point-of-use device (kitchen sink filter). A point-of-use device will not protect against breathing risk from showering or bathing from taps not treated with a device.

Check to be sure 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 through your 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 might not be effective if benzene 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 and concerns about benzene in their water can call 971-673-0440 or email [general.toxicology@state.or.us](mailto: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](#) – Basic information about benzene in drinking water

### References

1. ODHS (ed Environmental Toxicology Section). 1992.
2. WHO. 2003.
3. USEPA. 2013. Basic Information about Benzene in Drinking Water. <http://water.epa.gov/drink/contaminants/basicinformation/benzene.cfm>
4. ATSDR. 2014. Toxic Substances Portal-Benzene. [www.atsdr.cdc.gov/toxfaqs/tf.asp?id=38&tid=14](http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=38&tid=14)
5. Ferro, A. et al. 1997. Fate of benzene in soils planted with alfalfa: uptake, volatilization, and degradation.



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.