

TCE in Drinking Water at Groundwater Contamination Sites

Trichloroethylene (TCE) spilled on the ground can move through soil and into groundwater where it may pollute private and public drinking water wells. This sheet has information about TCE in drinking water and health, and how to minimize exposure.

TCE is...

- a nonflammable, colorless liquid commonly used in industry to degrease metal parts and was also used as a dry-cleaning agent.
- odorless at levels that may cause health impacts.
- a chemical that may also be found in household products such as wood finishes, adhesives, paint removers, lubricants, and cleaners.
- a common environmental contaminant that dissolves in water and readily evaporates from soil and water into the air.

What are the health concerns of TCE in drinking water?

In 2013, Minnesota Department of Health (MDH) conducted a toxicological review of TCE in drinking water. MDH has concluded that the main health concerns from exposure to TCE at the lowest exposures are immune system effects such as immunosuppression or autoimmune disease including increased hypersensitivity; an increased chance of cancer from long-term exposure; and heart defects in the developing fetus if the pregnant mother is exposed in the first trimester. Other health effects related to TCE are observed only at higher exposures.

How can I be exposed to TCE?

TCE easily moves from water to air. Besides ingesting TCE in drinking water, breathing can be a significant source of contact with TCE, especially during showering/bathing or other household activities such as cooking or running the dishwasher. In addition, a small amount of TCE can be absorbed through the skin.

What amount of TCE in drinking water is safe?

In 2013, MDH developed a Health Based Value (HBV) of **0.4 micrograms per liter ($\mu\text{g}/\text{L}$ or parts per billion)**. This level of TCE in drinking water is safe for all people exposed to TCE in drinking water at any time during their life, including pregnant women and their fetuses, infants, children, and other sensitive people, including those with already impaired immunity.

At 2 $\mu\text{g}/\text{L}$: This level of TCE in drinking water protects all people who are exposed for an entire lifetime, from cancer. The increased risk for cancer is estimated to be 1 additional cancer case in 100,000 people, which is considered a negligible cancer risk. This level is also safe for healthy adults who are only exposed to TCE after age 18, and protects pregnant women and their developing fetus from heart defects.

These values protect people exposed to TCE in drinking water used in any way (ingesting water, showering, cooking, etc.).



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At a Glance...

*A TCE concentration of **0.4 micrograms per liter ($\mu\text{g}/\text{L}$)** in drinking water is safe for all people, including pregnant women and their fetuses, infants, children, and those with impaired immunity.*

Infants and children may be at greater risk from TCE exposure than adults because they drink more water relative to their body weight than adults.



Ways to lower your contact with TCE...

- Install a carbon water filter
- Ventilate indoor air while bathing/showering, cooking, and while running the dishwasher or washing machine

I've been drinking water that contains over 2 µg/L of TCE. Will I have a health problem?

The amount of TCE that is considered a risk to health depends on many variables, such as the amount of water a person drinks, their size, their age, and whether they have other health conditions, such as an immune condition. There may be some increased risk for health effects for the most highly exposed and sensitive individuals. However, almost all people are unlikely to experience health impacts from exposure to TCE at levels up to five times the Health-based Value of 0.4 µg/L. The health-based values incorporate adjustment factors to account for uncertainties in our understanding of the health risks posed by a chemical. This helps to ensure that our values protect people.

How can I reduce my exposure to TCE in drinking water?

Ventilating indoor air while bathing/showering, cooking, and while running the dishwasher or washing machine is an effective way to reduce the amounts of TCE in indoor air.

A granular activated carbon (GAC) filter is the best way to remove TCE from drinking water. The type of filter that works best for you should be based on: how much water you use, available space and plumbing access, and whether or not you are protecting against vapor exposure.

There are two types of filters:

1. Point-of-use filters that treat water for one sink or appliance dispenser, like a refrigerator. This type of filter also includes water filtration pitchers.
2. Whole-house filter (point-of-entry filters) that treat all of the water that enters the home, not just water from one sink or appliance. The filter system usually consists of two canisters of carbon in series. This type of system does cost more and can be more difficult to install.

There are two added benefits of a whole-house filter:

- It stops people from having contact with TCE while bathing and,
- It stops TCE from being breathed in when it evaporates from the water during other uses (such as showering, washing dishes, flushing toilets).

When choosing a filter, select a device that has been certified by NSF International (NSF), Underwriters Laboratory (UL), or the Water Quality Association (WQA) to remove TCE from drinking water. The activated carbon in the filter should meet ANSF/ANSI Standards 61 and 53 (which ensure that the carbon removes VOCs and will not leach arsenic).

Properly sized whole-house filters have been demonstrated to remove TCE to less than 0.1 µg/L. Depending on how much TCE is in your water, it is possible that point-of-use filters may not remove TCE from the water down to the HBV of 0.4 µg/L for the full life of the filter; you may need to change the filter more often than the manufacturer recommends. MDH is testing a few devices to learn more about their effectiveness.

For more information about selecting a filter:

www.health.state.mn.us/divs/eh/hazardous/topics/gac.html

Contact with questions or for more information:

MDH – Site Assessment and Consultation

Phone: 651-201-4897 or toll-free 1-800-657-3908

Email: health.hazard@state.mn.us or visit: www.health.state.mn.us/divs/eh/hazardous/index.html



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