How to Detect and Reduce Lead in Drinking Water

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The problem of lead-contaminated water has been making news for some time. As a result, families in all types of communities are taking steps to understand the risks, determine whether their drinking water is contaminated, and evaluate options for reducing lead and other toxic metals and chemicals in their drinking water.

Lead poisoning caused by tainted water is harmful and can cause irreversible brain damage.* Fortunately, it's also preventable. This white paper provides an overview of the dangers lead-contaminated water poses and outlines what you can do to test your household drinking water and, if necessary, reduce the lead in your family's drinking water.

Understanding the risks

Lead is a poison that poses serious problems for both children and adults. Those most at risk are babies and young children, pregnant women, and nursing mothers.

In children, lead exposure can cause:

- Damage to the central and peripheral nervous system
- Learning disabilities
- Shorter stature
- Impaired hearing
- Impaired formation and function of blood cells*

In adults, including pregnant and nursing mothers, lead exposure can cause:

- Cardiovascular complications, including increased blood pressure and incidence of hypertension
- Decreased kidney function
- Complications during pregnancy by crossing the placental barrier, exposing the fetus to lead and possibly resulting in serious health effects to the mother and her developing fetus
- Reproductive problems in men and women*

Sources of lead in drinking water

To protect against the hazards of lead exposure through drinking water, it's important to understand how drinking water can become lead-contaminated.

Corroded service pipes, brass or chrome-plated faucets, and fixtures with lead solder are common sources of the problem. Lead can get into the water from those sources and is more likely to leach into hot water.*

As the result of legislation and building code changes, homes built in the U.S. before 1986 are more likely to have lead pipes, fixtures, fittings, or solder. In place of lead, more modern plumbing components are made of cast iron, copper, PVC (polyvinyl chloride, a plastic polymer), or stainless steel.

Municipal and private water utilities that have not replaced older lead-containing supply lines rely on corrosion inhibitors to lower the amount of lead absorbed in water.

Aggressive water, such as water with a pH value below 6.5 pH units, can accelerate corrosion of plumbing components, thereby contributing to elevated levels of lead as well as other metals.

Regulation of water utilities

Under the Lead and Copper Rule, a U.S. federal regulation, water utilities must control the corrosiveness of water and test water samples from sites served by the system. The US EPA Safe Drinking Water Act establishes a maximum of 15 parts per billion as the maximum contamination level (mcl) for lead in drinking water. Results of 15 parts per billion in more than 10% of samples require utilities to take additional action, including optimizing corrosion control, providing consumer education, and replacing lead supply lines.

Testing has identified problems across the country. A Natural Resources Defense Council report using 2015 data identified 5,363 active community water systems with 8,093 violations of the Lead and Copper Rule. Those systems with reported violations served 18,164,558 people in the U.S.‡

How to tell if you have lead in your drinking water

Before you can take steps to protect your family from lead-contaminated water, you need to know what, if any, levels of lead your water contains.

- Community water systems are required to publish annual Consumer Confidence Reports. If you can't find yours online, contact your water utility to request a copy.
- Identify the supply pipe entering your home. A dull gray pipe that does not attract a magnet and shines like aluminum when scratched with a coin is likely lead. A pipe that attracts magnets is likely iron. A copper/brown shine indicates copper pipe. See this publication from the North Dakota Department of Health for help in identifying different types of pipes. § If your plumbing was installed prior to 1986, there is a greater chance of lead in the pipe, soldered joints, and fixtures.
- To be certain, have your water tested. A state-certified laboratory can provide the most accurate results. Find one here.

If your water comes from a private well or a private water utility, your local health department may be able to provide testing.

- Local retailers and some health authorities offer water sample kits. Use a sample kit to have water from your kitchen and bathroom faucets tested, following proper sampling instructions.
- Contact a water quality professional to have water from your kitchen and bathroom faucets tested.

Effectively reduce lead levels in your drinking water

There are several options for addressing lead in drinking water.

- The lowest-cost option reduces lead at the point of use with a certified lead reduction filter installed on the cold water line to your kitchen and bathroom faucets.
- Reverse osmosis systems also reduce lead. They use a storage tank to buffer typical fixture flow rates and can be sized for small point of use or higher volume point of entry installations.
- Replacing older plumbing and fixtures throughout a building also reduces the risk of lead contamination. Note that this solution is only 100% effective in locations that have lead-free municipal supply lines.
- Correcting aggressive water conditions such as water with a pH value below 6.5 pH units lowers the risk of lead leaching into the water. This can be done with specialized media. Contact your plumber for assistance.

Watts offers point of use and whole home water treatment options to reduce lead and a range of other contaminants. Contact your local plumbing and water treatment professional if you need assistance with water quality analysis, equipment selection, or installation.

References

*Basic Information about Lead in Drinking Water. Retrieved from https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water

†Lead Poisoning. Retrieved from https://www.mayoclinic.org/diseases-conditions/lead-poisoning/symptoms-causes/syc-20354717

‡What's in Your Water: Flint and Beyond. Retrieved from https://www.nrdc.org/sites/default/files/whats-in-your-water-flint-beyond-report.pdf

§ Identifying Lead Service Lines and Plumbing. Retrieved from https://deq.nd.gov/publications/mf/IdentifyingLeadServiceLinesAndPlumbing.pdf

Additional information

Centers for Disease Control and Prevention
(CDC) Lead in Drinking Water Overview

CDC – Information on Testing Private Wells

Environmental Protection Agency (EPA)

EPA – Contact Information for Certification Programs and Certified Laboratories for Drinking Water

EPA Safe Drinking Water Hotline: 800-426-4791

Health Canada Report from the Federal-Territorial-Provincial Committee on Drinking Water

National Lead Information Center: 800-424-LEAD www.epa.gov/lead

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