COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences

Lead in Drinking Water

Lead's Threat

Lead is a naturally-occurring element found in the earth's crust. Historically, lead has had many commercial and industrial applications that increased its presence in our homes, schools, and communities, including in paint, piping, gasoline, cosmetics, soldering materials, and other materials (EPA 2022). Recently, the public health crisis centered around Flint, Michigan drew the nation's eye to the concern of lead in drinking water sources, a result of corrosion in aging plumbing pipes and fixtures.

Lead is considered hazardous to human health, and exposure can impair mental and physical development and lead to disease and even death. According to the Center for Disease Control and Prevention, lead exposure, commonly through inhalation or ingestion, is a concern, particularly in children. Pediatric exposure can result in brain and central nervous system damage, in addition to intellectual, vision, hearing, speech, and behavioral issues (CDC 2022). Once exposed, small amounts of lead can be stored in teeth and bones, impacting the individual for many years and having later implications on fetal exposure in pregnant women.

Today, lead use is restricted in many household products and materials, helping reduce lead exposure and protect community health. This regulation extends to lead monitoring, management, and restriction in drinking water resources.

Sources of Lead in Drinking Water

All plumbing fixtures, solder, fittings, and drinking water service line pipes may contain lead. This is more common in plumbing, solder, and piping material in buildings and service lines installed or built prior to 1986. If these pipes and plumbing fixtures corrode because of exposure to more acidic water, or water with a low pH, lead can leach into drinking water. The age of pipes, water temperature, scaling, length of time between flushing, and other factors can play a role in how much leaching may occur (EPA 2022). To mitigate this threat, many municipal utilities use food-grade corrosion-inhibitors. The health crisis in Flint, Michigan occurred because corrosion-inhibitors were not used, resulting in lead leaching in plumbing and pipes in the Flint community (Masten et al. 2016).

If not appropriately mitigated, pipe and plumbing corrosion can be a threat in private drinking well water as well. Groundwater, particularly in some areas of the midlands of South Carolina, may be characterized by more acidic water conditions, which could result in corrosion and lead concerns in private well-supplied homes or facilities if untreated (Bryant et al. 2019). Treatment for lead can include reverse osmosis, distillation, and carbon filtration (CDC 2022).

Water Quality Standards for Lead in Drinking Water

The South Carolina Department of Health and Environmental Control (SC DHEC) requires routine testing by all drinking water utilities to comply with federal and state monitoring and prevention of lead in municipal drinking water. Federal regulation sets a maximum contaminant level goal of no lead in municipally-supplied drinking water. Additional trigger and action levels for lead exists at 10 and 15 parts per billion, respectively; if 10% of sampled water samples exceed this level, then a drinking water utility must take certain protection actions (EPA 2022). The state of South Carolina also has additional requirements if the action level is exceeded.

There is no regulation on lead in private well water. It is recommended that private well owners follow the maximum contaminant level goal of no lead in their tap water.

How to Manage Lead in Drinking Water in Your School

All schools and daycares can help protect the health of their students by managing the potential for lead in drinking water.

Schools and daycares on municipal water systems can review their provider's regular water quality reports to understand lead monitoring and concentration levels collected during routine sampling. You may also be able to request lead testing specific to your school's point of use.

Schools or daycares on private wells can have their water tested through the SC DHEC's Well Water Testing program (https://scdhec.gov/well-water-quality-testing-services) or through a private, certified commercial laboratory (https://scdhec.gov/permits-regulations/environmental-laboratory-certification/commercial-environmental-laboratory).

School administration should work with appropriate staff to perform an audit of the school to determine the type of plumbing fixtures that are in place, including the service line to the building. Replace fixtures, including water fountains, and pipes as you are able.

Schools and daycare should perform regular flushing of all faucets weekly. This should include all sinks and water fountains used for drinking and any food preparation.

For more information on lead prevention in school drinking water, please review:
Testing for Lead in School Drinking Water
Establishing Routine Lead Prevention Practices for School Drinking Water
Remediation Options for Lead in School Drinking Water
Lead in Drinking Water: Frequently Asked Questions

References:

Bryant C. Jurgens, David L. Parkhurst, and Kenneth Belitz. 2019. Assessing the Lead Solubility Potential of Untreated Groundwater of the United States. Environmental Science & Technology 53 (6), 3095-3103. DOI: 10.1021/acs.est.8b04475

Centers for Disease Control and Prevention (CDC). 2022. URL: https://www.cdc.gov/nceh/lead/prevention/sources/water.htm

Environmental Protection Agency (EPA). 2022. URL: https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water

Masten, Susan J., Simon H. Davies, and Shawn P. McElmurry. 2016. Flint Water Crisis: What Happened and Why? Journal of American Water Works Association 108(12):22-34. DOI: 10.5942/jawwa.2016.108.0195