

GREAT LAKES WATER INFRASTRUCTURE PROJECT ISSUE BRIEF: LEAD IN DRINKING WATER



SUMMARY

Between 15 and 22 million people nationwide have lead-contaminated drinking water. There is no safe level of lead in the bloodstream. The most effective way to eliminate exposure to lead in the drinking water is to replace public and private water service lines simultaneously.

ISSUE

Lead is commonly found in water service lines and fixtures of U.S. homes built before 1978.¹ There is no identified safe level of lead in blood.² Lead exposure causes severe, life-long health effects, including developmental delays; behavioral problems; and an increased risk of kidney disease, reproductive disorders, and strokes.³ According to a report by the Water Research Foundation and the American Water Works Association, approximately 15 - 22 million people receive lead-contaminated drinking water nationwide.^{4,5}

Common solutions to lead water pipes include: 1) adding chemicals to reduce pipe corrosion; 2) high-velocity pipe flushing; and 3) partial replacement of water service lines (i.e., only replacing the municipally-owned service line). However, each solution has potential adverse results. Chemical treatment can result in more lead leaching into the system,⁴ and decreases water quality. Flushing is a temporary solution which requires public education and creates water waste. And the disturbance of publicly-owned pipes during limited line replacement can release lead-containing particulates in privately-owned lead pipes, causing increased lead levels, according to the CDC.⁶

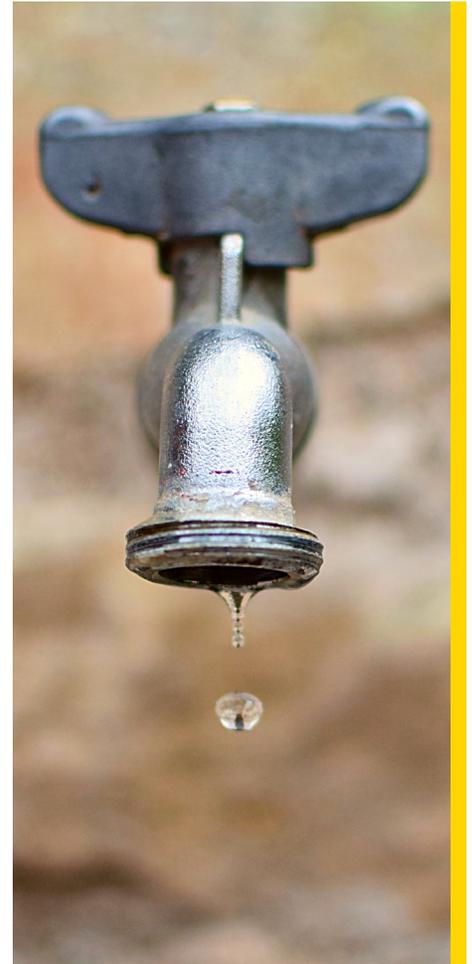


Photo: Chris Pantazis, Flickr/Creative Commons



Photo: Pictoreps, Flickr/Creative Commons

POLICY CONTEXT

The 1986 *Safe Drinking Water Act Lead Ban* requires the use of lead-free plumbing in the installation or repair of any public water system, residential buildings or facilities providing drinking water.⁷ The 1991 *Lead and Copper Rule* requires public water suppliers to monitor for lead in drinking water, and to provide treatment for corrosive water if lead or copper are found at unacceptable levels.⁸ The *Lead and Copper Rule* is due to be updated; however, the outcome is uncertain.

Advocates have criticized drinking water monitoring programs as insufficiently rigorous. For example, the tester may flush the tap before sampling, which reduces the maximum level of lead detected, in favor of a more average sample result.⁹



Photo: versageek, Flickr/Creative Commons

BEST PRACTICES

The most effective infrastructure strategy for eliminating lead exposure is to replace public and private water service lines simultaneously. Lansing (MI) and Madison (WI) have implemented city-wide full water service line replacement programs, both taking approximately 10 years to complete the initiative. Lansing spent approximately \$42 million and Madison, \$19.4 million.¹⁰ Infrastructure interventions should be coupled with broader community solutions that address place-based lead exposure and other health inequities. For example, Black and Latino households are more likely to live in substandard housing, which is linked to a variety of poor health outcomes.^{11, 12, 13}

Other short-term strategies include public education campaigns to help residents reduce their risk of exposure, through actions such as using lead-removing water filters, cleaning faucet aerators, and using cold water for drinking and cooking. In addition, there are several linings and coatings that have been researched and demonstrated for addressing lead service lines, but replacement remains the recommended best practice.¹⁴

Policy strategies include providing transparent public access to lead sampling protocols and testing results, and the creation of lead service line inventories.¹⁵ Several states have passed laws requiring public drinking water utilities to inventory and/or disclose known lead service lines; California also requires the utility to develop a plan for replacement (see [CA SB 1398](#); [OH HB 512](#); [IL Sec 17.11](#); [MI](#) and [IN](#)).

1. USEPA. (n.d.). Lead. Retrieved from <https://www.epa.gov/lead>
2. Council on Environmental Health. (2016). Prevention of Childhood Lead Toxicity. *Pediatrics*. 38(1):e20161493. DOI:10.1542/peds.2016-1493
3. Wisconsin Department of Health Services. (2014). Report on Childhood Lead Poisoning in Wisconsin. Division of Public Health, Bureau of Environmental and Occupational Health. Retrieved from <https://www.dhs.wisconsin.gov/publications/p01202.pdf>
4. Brown, R., McTigue, N. & Cornwell D. (2015). Controlling Lead in Drinking Water. Water Research Foundation & American Water Works Association. Web Report #4409. Retrieved from <http://www.waterrf.org/PublicReportLibrary/4409.pdf>
5. Cornwell, D. A., Brown, R. A., Via, S. H. (2016). National Survey of Lead Service Line Occurrence. American Water Works Association. 108(4). DOI: <http://dx.doi.org/10.5942/jawwa.2016.108.0086>
6. Frumkin, H. (2010). Lead-based Water Lines. Centers for Disease Control, National Center for Environmental Health/Agency for Toxic Substances and Disease Registry. Retrieved from <https://www.cdc.gov/nceh/lead/waterlines.htm>
7. USEPA. (2005). Lead in Drinking Water: What You Should Know to Protect Children in Your School or Child Care Facility. Office of Water. Retrieved from https://www.epa.gov/sites/production/files/2015-09/documents/toolkit_leadschools_3ts_training_factsheet.pdf
8. USEPA. (2017). Lead and Copper Rule. Office of Water. Retrieved from <https://www.epa.gov/dwreginfo/lead-and-copper-rule>
9. Schmidt, S. & Hall D. (2016). Failure at the Faucet: Lead pipes, antiquated law threaten Wisconsin's drinking water quality. Wisconsin Center for Investigative Journalism. Retrieved from www.wisconsinwatch.org
10. Clark, A. (2016). The City that Unpoisoned its Pipes. Next City. Retrieved from <https://nextcity.org>
11. World Health Organization. (2010). A Conceptual Framework for Action on the Social Determinants of Health. Retrieved from http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf
12. Bailey, Z. et al. (2017). Structural racism and health inequities in the USA: evidence and interventions. *The Lancet*. 389(10077). DOI: [http://dx.doi.org/10.1016/S0140-6736\(17\)30569-X](http://dx.doi.org/10.1016/S0140-6736(17)30569-X)
13. Jacobs, D. (2011). Environmental Health Disparities in Housing. *Am. J. Public Health*. 101(S1). DOI: 10.2105/AJPH.2010.300058
14. Randtke, S. et al. (2017). Evaluation of Lead Service Line Lining and Coating Technologies. Water Research Foundation. Retrieved from <http://www.waterrf.org/PublicReportLibrary/4351.pdf>
15. USEPA. (2016). Sample Letter to Governors - Implementing Lead and Copper Rule. Office of the Administrator. Retrieved from <https://www.epa.gov/sites/production/files/2016-03/documents/samplelettergovernorsfeb2016.pdf>