



Get the Lead Out

Ensuring Safe Drinking Water for our Children at School



Lead in the Water: Statewide Data Reveals Elevated Levels of Lead in School Drinking Water in Washington

By Bruce Speight and John Rumpler
Environment Washington

Executive Summary

Lead is highly toxic, especially for children. In the wake of the crisis in Flint, Michigan, many communities across the country have tested for and found lead in their drinking water - even in schools, where our children go to learn and play each day. But until recently, we did not have data confirming this serious health hazard in Washington's schools. Now we do.

Recent state legislation has caused the Washington State Department of Health to test for lead in schools across the state and the results are shocking.

By reviewing this data, here is what we found:

- Of the more than 8,638 taps tested at Washington schools and preschools, 60.8% had lead levels of 1 part per billion (ppb) or greater.
- Of the 199 schools and preschools tested, 97% had at least one tap where lead was detected at 1 ppb or greater in the water.
- Notably high lead levels are 269 ppb at Washington Elementary in the Auburn School District, 200 at Nine Mile Falls and 192 ppb at ISOM Elementary, among others.

In all likelihood, the confirmed cases of lead in school water are just the tip of the iceberg. Most schools have at least some lead in their pipes, plumbing, or fixtures. And where there is lead, there is risk of contamination.

According to the EPA, even low levels of lead can cause behavior and learning problems, lower IQ, and hyperactivity. Lead exposure has even been linked to damaging children's central and peripheral nervous systems. More than 24 million children are at risk of losing IQ points due to low level lead exposure.¹ Lead in water is a health problem across the country, yet most school districts and states are not taking the health-protective steps to reduce kids' exposure to lead to the lowest possible level.

Washington's children deserve safe drinking water, especially at school where they go each day to learn and play. As these test results show, our state and local decision-makers should take immediate action to get the lead out. We need policies in Washington to "get the lead out" such as proactively removing lead-bearing parts of schools' water systems and installing filters certified to remove lead on every outlet used for drinking or cooking. Washington needs to adopt a 1 ppb standard for lead in school water, as recommended by the American Academy of Pediatrics.

These findings indicate that lead is a problem in Washington schools' drinking water systems, and that significant action is needed. Washington State and communities across Washington State should:

- Proactively get the lead out of schools by removing lead service lines and other lead-bearing parts of schools' water systems;
- Install and maintain filters certified to remove lead on taps and fountains used for cooking or drinking;
- Adopt a 1 ppb limit for lead in schools' drinking water as recommended by the American Academy of Pediatrics and immediately remove from service any taps where testing indicates lead in excess of this level;
- Require testing at all water outlets annually using protocols designed to capture worst-case lead exposure; and
- Disclose all specific test results and plans for remediation and provide funding to ensure schools have the resources to take the steps outlined above.

The federal government should:

- Enforce and strengthen federal rules to protect all drinking water from lead;
- Provide substantial funding to help states and communities remove lead in water infrastructure, including in schools and;

¹ American Academy of Pediatrics, *Prevention of Childhood Lead Toxicity*, (policy statement), July 2016, page 4, available at <http://pediatrics.aappublications.org/content/pediatrics/early/2016/06/16/peds.2016-1493.full.pdf>.

- Marshal the authority of all relevant federal agencies to protect public health from contamination of drinking water.

Introduction

As our nation rushed through a century of unprecedented economic growth, we allowed several toxic health threats to become embedded into the infrastructure of our lives. One of the more enduring threats is the presence of lead. For the past few decades, public health officials have been working to undo the damage. Lead was banned in gasoline and paint to remediate toxic air pollution and childhood lead poisoning. Yet until the tragedy in Flint, Michigan few Americans knew about the pervasive threat of lead in drinking water.

A review of data by USA Today found that nearly 2,000 water systems across the 50 states had levels of lead in their water in excess of EPA standards over four years.² More than 18 million people get their drinking water from systems that violated federal rules for lead in 2015 alone, according to a review of data from EPA's Safe Drinking Water Information System by researchers at the Natural Resources Defense Council.³

Data collected for this report, along with numerous other studies, confirm that lead is a public health issue in many drinking water systems, including many schools.

Lead is Harmful to Children - Even at Low Levels

Lead is a potent neurotoxin that is particularly damaging to children. Children absorb as much as five times more lead into their bodies than adults from any given source.⁴ Once ingested, lead flows from the blood to the brain, kidneys, and bones. Children's organs and bones are not fully developed and thus more vulnerable than adults. They also have an incomplete blood-brain barrier, which, in the face of lead, can lead to behavior and learning problems.⁵ According to the EPA, "In children, low levels of [lead] exposure have been linked to damage to the central and peripheral nervous system, learning disabilities, shorter stature, impaired hearing, and impaired

² Alison Young and Mark Nichols, "Beyond Flint: Excessive lead levels found in almost 2,000 water systems across all 50 states," USA Today, March 11, 2016, accessible at <http://www.usatoday.com/story/news/2016/03/11/near-ly-2000-water-systems-fail-lead-tests/81220466/>.

³ Erik Olson and Kristi Pullen Fedinick, Natural Resources Defense Council, What's in Your Water? Flint and Beyond, June 2016, page 5, accessible at <https://www.nrdc.org/sites/default/files/whats-in-your-water-flint-beyond-report.pdf>

⁴ World Health Organization, *Lead Poisoning and Health*, 23 August 2018. Available at <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health>

⁵ Alan Woolf, Professor of Pediatrics at Harvard Medical School, "Blood Lead Thresholds & Health Effects," webinar presentation for Environment America, slide 7, September 20, 2016.

formation and function of blood cells.”⁶ A Wisconsin study found that 3,757 fourth-graders with relatively low lead levels in their blood “scored significantly lower on reading and math tests than those without elevated blood-lead levels”- an adverse effect that persisted for these children seven to eight years later.⁷ The American Academy of Pediatrics concluded that “[e]xtensive and compelling evidence now indicates that lead-associated cognitive deficits and behavioral problems can occur at blood lead concentrations below 5 µg/dL”(micrograms per cubic deciliter).⁸

Moreover, because lead flows from blood into the organs and bones within several weeks, its damage to a child’s health will not always show up in blood tests. Lead is a persistent toxin, so once absorbed, the lead remains in the body.⁹ So, a child who drinks water from a fountain at school that episodically contains a slug of lead might not show elevated blood-lead levels a month or two later. But the harm persists in her body.

How Do Washington Schools Perform?

{Of the 8640 taps tested in the school used for this report, 60% had lead levels of 1 part per billion or higher.}

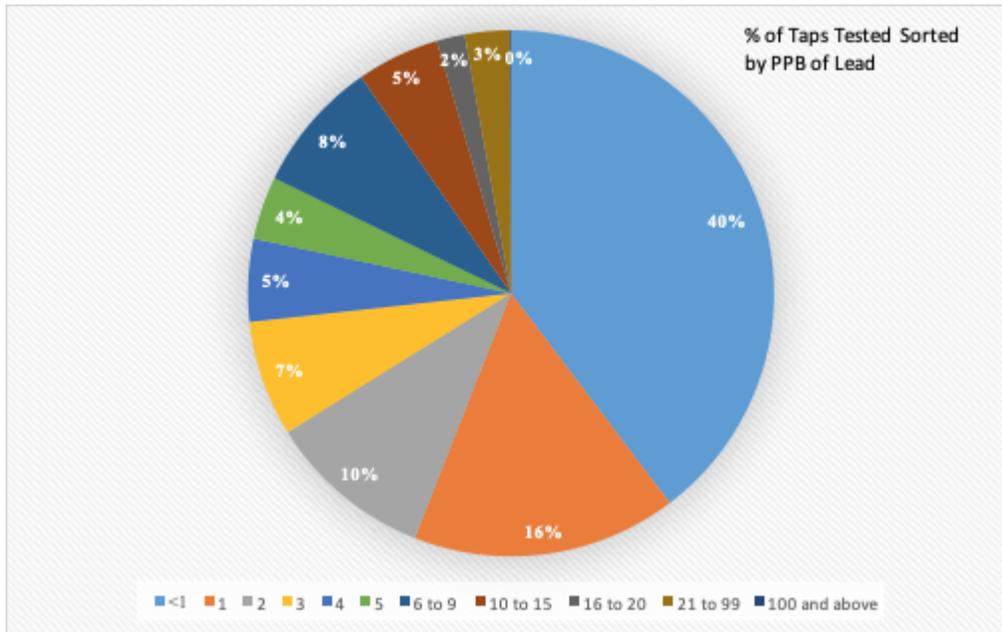
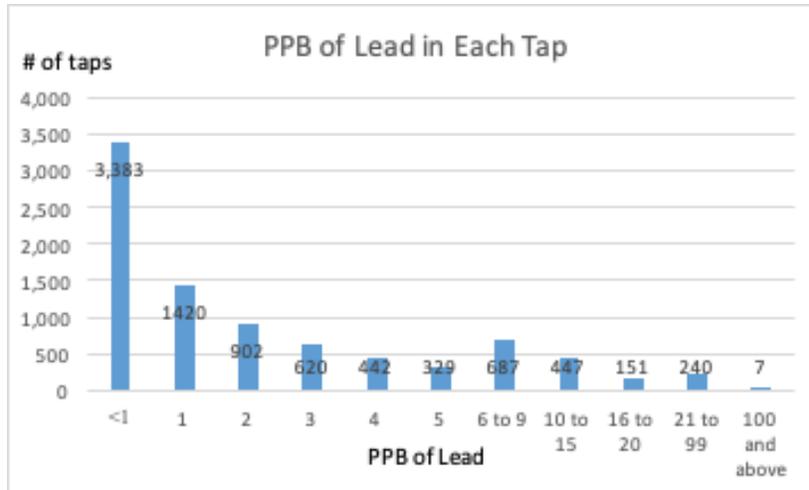
An analysis of Washington State Department of Health data found that more than 60 percent of drinking water taps in schools that were tested for lead had elevated levels of lead, above 1 part per billion (ppb). Of the 199 schools and preschools tested, 97 percent had at least one tap where lead was detected at 1 ppb in the water.

⁶ U.S. Environmental Protection Agency, “Basic Information about Lead in Drinking Water,” *EPA.gov*, updated December 2016, accessible at <https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water>.

⁷ Cara Lombardo and Dee Hall, “‘Regulatory vacuum’ exposes Wisconsin children to lead in drinking water at schools, day care centers,” *WisconsinWatch.org*, December 18, 2016, accessible at <http://wisconsinwatch.org/2016/12/regulatory-vacuum-exposes-wisconsin-children-to-lead-in-drinking-water-at-schools-day-care-centers/>; summarizing the study conducted by Michael Amato et al, “Lead exposure and educational proficiency: Moderate lead exposure and educational proficiency on end-of-grade examinations,” *Annals of Epidemiology* 22(10), 2012, pages 738-743, accessible at <http://www.sciencedirect.com.ezproxy.library.tufts.edu/science/article/pii/S104727971200302X?np=y>.

⁸ American Academy of Pediatrics, *Prevention of Childhood Lead Toxicity*, (policy statement), July 2016, page 3, available at <http://pediatrics.aappublications.org/content/pediatrics/early/2016/06/16/peds.2016-1493.full.pdf>.

⁹ Agency for Toxic Substances & Disease Registry, “Lead Toxicity: What is the Biological Fate of Lead?” (August 20, 2007) accessed at <https://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=9> on 02/08/17.



Lead contamination is a pervasive threat, spread across the state. Elevated levels of contamination were found in every school district and county that had available data. This is not only a problem for city schools; wealthy suburban neighborhoods also face the risk of lead contamination. Before 2014, schools were allowed to be built with pipes that contained significantly higher amounts of lead than is allowable now.¹⁰ So unless your child’s school was just built, the chances that water taps have lead in them are high and must be remedied.

¹⁰ Use of Lead Free Pipes, Fittings, Fixtures, Solder and Flux for Drinking Water, U.S. EPA accessed February 19th 2019 at <https://www.epa.gov/dwstandardsregulations/use-lead-free-pipes-fittings-fixtures-solder-and-flux-drinking-water>

The actual lead contamination of water at Washington schools is likely even worse than these alarming results confirmed in testing for two reasons:

1. Only first draw samples were collected, which only flags contamination caused by a particular fountain or faucet—not the plumbing, solder or other problematic lead further back in the drinking water delivery system, and;
2. Lead corrosion is highly variable, so even properly done testing will sometimes fail to capture the full extent of contamination. The EPA recommends that taps are tested multiple times, but Washington does not require this. Failing to test for worst-case results means that the levels of lead at each tap could actually be higher.

One of the main problems with reducing lead exposure in schools is that many schools don't report lead results unless at least some of their taps exceed 20 parts per billion, an action level that was set in an early version of the EPA's 3Ts for Reducing Lead in Schools Drinking Water.¹¹ The most recent version of this document has stopped using a 20 ppb standard, and instead says that schools should take steps to reduce lead to the lowest possible concentrations.¹² We need schools to report - and make easily available - *all* lead results, regardless of the amount detected.

An Extreme Situation - Lead in Kitsap County School Drinking Water

Kitsap schools reported that half of their taps tested reported lead levels over 20 ppb, but in an article by the Kitsap Sun, they do not mention anything about lead levels between 1 and 19 parts per billion. Even though we already know that harm can come from lead exposure as low as 1 ppb.

Solutions to Ensure Safe Drinking Water At School

All of our children deserve safe drinking water, especially in the place they go to learn every day. Yet the systems that deliver water are laced with lead, which creates an ever-present risk of corrosion and contamination. Given this reality, the following solutions are imperative to ensure safe drinking water at our schools.

¹¹ October 2006: 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities, U.S. EPA. Available at https://19january2017snapshot.epa.gov/sites/production/files/2015-09/documents/toolkit_leadschools_guide_3ts_leadschools.pdf

¹² Revised: 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities, U.S. Environmental Protection Agency, October 2018, available at: https://www.epa.gov/sites/production/files/2018-09/documents/final_revised_3ts_manual_508.pdf

The most effective way to ensure lead-free water is to simply get the lead out. The National Drinking Water Advisory Council has made a clear case for lead service line (LSL) removal saying it is the driving proactive principle to improve public health protection.¹³ Schools should be proactively removing lead-bearing parts and installing filters certified to remove lead, instead of waiting for test results that are likely to show the presence of lead anyways. This preventative measure is critical because tests - even when properly done - can fail to fully capture lead exposure. Some school districts, like Fort Worth, TX, have replaced water fountains,¹⁴ and the District of Columbia has implemented an action level of 5 ppb along with requiring that schools proactively install filters on all drinking water sources.¹⁵

In addition to these preventive efforts, we need to set a health-based limit for lead in schools' drinking water. Recognizing that there is no safe level of lead, especially for children, the American Academy of Pediatrics is urging schools to limit lead in drinking water to 1 part per billion.¹⁶

At a minimum, outlets with water exceeding this concentration should immediately be removed from service until permanent remediation ensures safe drinking water on an ongoing basis.

Proper testing is necessary to ensure that this 1 part per billion standard is being met. Schools and daycares should test at all water outlets used for drinking and cooking annually, and use protocols designed to capture worst-case lead exposure for children. For example, the EPA put out a clarification recommending against pre-stagnation flushing.¹⁷ And given the inherent variability in lead concentrations, officials must be careful to avoid suggesting that a failure to detect lead is the same as a permanent assurance of safe water.

¹³ U.S. EPA National Drinking Water Advisory Council letter to EPA Administrator Gina McCarthy (December 15, 2015) accessed on 12/31/16 from http://media.jrn.com/documents/lead_advisory01.27.16.pdf

¹⁴ <http://www.fox4news.com/news/fort-worth-isd-replacing-some-old-water-fountains-because-of-lead-contamination>

¹⁵ <https://dcps.dc.gov/page/water-testing-lead>

¹⁶ American Academy of Pediatrics, Prevention of Childhood Lead Toxicity, (policy statement), July 2016. <http://pediatrics.aappublications.org/content/pediatrics/early/2016/06/16/peds.2016-1493.full.pdf>

¹⁷ Rumpler, John and Christina Schlegel. Get the Lead Out. February 2017.

<https://environmentwashington.org/sites/environment/files/reports/Get%20the%20Lead%20Out.pdf>

Transparency and accountability are critical to ensure that the many steps required for lead remediation are implemented and effective. Such information should be available both onsite and online, with community-appropriate language accessibility.

Seattle has stronger standards, but still needs to do more

Seattle has adopted a somewhat more protective standard for lead in water. The Seattle school district has a self-imposed limit of 10 parts per billion. In 2006, the city's voters approved capital funding that allowed replacement of drinking water lines at nearly a third of its schools. All Seattle school test results going back to 2004 are published on the district website; this is a best practice, as all test results should be public and posted on a publicly accessible website.

Washington State and Federal Rules Fall Short

We know that there is no safe level of lead, yet Washington's policies do not reflect that knowledge. Washington only requires remediation for lead levels at 20 ppb or above.¹⁸ For taps that have lead levels between 2 and 9 ppb, the Department of Health recommends implementing a flushing system and cleaning aerators. Between 10 and 19 ppb, the department recommends, but does not require, replacing the fixture or system. But we know this isn't enough to fix the problem. Studies have shown that flushing alone is not an adequate step to consistently ensure safe drinking water for children, as it may be subject to human error.¹⁹ All pipes and fixtures that contain any amount of lead should immediately be put out of use and replaced.

Washington also does not require multiple tests at each tap, as is recommended. Since lead contamination is variable, the results may not always show the worst-case scenario contamination levels and multiple tests are more likely to give a better sense of the actual contamination. And, while it is good that Washington is making test results publicly accessible online, there is still a long way to go to ensure that our state is protecting our children from exposure to lead in drinking water.

This problem is not just in Washington. According to an estimate by the American Water Works Association, over 6 million lead service lines remain in use across the nation. Though estimates vary, a conservative estimate is that the drinking water of 15 to 22 million people still passes

¹⁸https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Lead/LeadinSchools/Results?udt_31541_param_orderby=County&udt_31541_param_direction=ascending&

¹⁹ Adrienne Katner et al, Effectiveness of Prevailing Flush Guidelines to Prevent Exposure to Lead in Tap Water, International Journal of Environmental Research and Public Health(2018). DOI: 10.3390/ijerph15071537

through lead service lines.²⁰ Because lead contamination is variable, any pipe with lead in it has the possibility of contamination, regardless of what any one test result indicates.

So why does national policy fall so far short of solving this critical health problem? The Safe Drinking Water Act (SDWA) has provided an important framework for ensuring that the water public utilities send to their customers and communities is clean and safe. The primary focus of regulations promulgated by the EPA is on establishing and enforcing system-wide responsibilities of water utilities.

One such rule pursuant to the SDWA is the Lead and Copper Rule. The rule is primarily designed to get utilities to identify problems that require system-wide action, such as adjusting corrosion control at the treatment plant. To some degree, the Lead and Copper Rule (LCR) has reduced lead concentrations in drinking water in large water systems. Yet there are some shortcomings to this rule. First, the rule relies heavily on testing rather than proactively removing lead-bearing parts. As discussed above, testing for lead can often lead to false negatives due to the variability of lead contamination. Second, the rule only mandates remediation when tests show lead concentrations in water greater than 15 ppb, even though the medical consensus is that there is no safe level of lead in drinking water. Additionally, there is a major shortcoming in the rule when it comes to safeguarding schools' drinking water: because the LCR only applies to water utilities, roughly 90 percent of schools and daycares across the country are exempt and therefore left without a clear federal standard.

Policy Recommendations

To ensure safe drinking water for our children, we need policies that are strong enough to get the lead out at schools and preschools. The onus to address lead contamination should not be on schools alone. Washington State and communities should proactively get the lead out of schools by:

- Removing lead service lines;
- Installing and maintaining filters certified to remove lead on taps and fountains used for cooking and drinking;
- Adopting a 1 ppb standard for lead in schools' drinking water and immediately shutting off taps that exceed this level;
- Requiring testing at all water outlets annually using protocols designed to capture worst-case lead exposure, and;

²⁰ David Cornwell, Richard Brown and Steve Via, "National Survey of Lead Service Line Occurrence," *Journal AWWA* (Vol. 108 No. 4), page E182, April 2016, accessible at <http://www.awwa.org/publications/journal-awwa/abstract/articleid/57880483.aspx>.

- Providing funding to remove lead in schools' water infrastructure and take other key "get the lead out" steps like installing certified filters.

States and schools are not the only entities with a responsibility to address this crisis. The federal government should: enforce and strengthen federal rules to protect drinking water from lead, propose substantial funding to help states and communities remove lead in water infrastructure and marshal the authority of all relevant federal agencies to protect public health from contamination of drinking water.

Methodology

The Washington lead testing data was obtained in the following manner:

The Washington Department of Health provides information about lead in drinking water at schools on their official government website.²¹ The first page provides general information about how lead gets into water and what schools can do to reduce lead levels and how to test for lead. The DOH goes on to discuss what to do if a school tests positive for lead and directs you to a page of their results, which are updated every Monday.²² There were 8,638 publicly available samples taken across 199 schools, as of October 23, 2018. Each school submitted their results in a PDF table format so the results were manually entered into an Excel sheet and then sorted by the amount of lead found in each sample. Each report was downloaded from the DOH website and the relevant information was entered into a spreadsheet to find the statistics used. The relevant information used were the date testing was done, the county, school district and school name, and the level of lead found listed in ppb. This information was entered into the spreadsheet in the same order as was entered in the school results to allow for going back and being able to look up other information about each school or sample. Other information that was not included, but can be found, are the location of each tap, what type of fixture it is, the sample number and what number draw it was.

The data results were counted in the following categories: less than one, 1 ppb, 2 ppb, 3 ppb, 4 ppb, 5 ppb, 6 to 9 ppb, 10 to 15 ppb, 16 to 20 ppb, 20 to 99 ppb and above. Once these results were counted, each category was divided by the total number of results, 8,638. This resulted in the percentages used in the report. While these results are extensive, there were some limitations or caveats with the data.

To begin with, the data submitted did not include any follow up tests. It is important to test a tap multiple times to get the worst possible lead contamination results, but the Washington data only

²¹ <https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Lead/LeadinSchools>

²² <https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Lead/LeadinSchools/Testing>

included a single test for each tap. Additionally, the range of the data is unclear. The lead content reporting starts at *less than 1*, but it is impossible to determine if those results are 0.99 ppb or .001 ppb or even zero ppb. With this data, we were unable to determine if any schools had no lead, only if they had no results higher than less than one.

The data collected for this report was taken on October 23. The site containing the data is updated every Monday, so there will be new results that could skew the resulting percentages taken in this report. When this report was written, 199 schools had submitted their lead results. There are 2,370 schools in Washington and lead testing will continue through June 2019, or until funding runs out according to the Department of Health.²³ While the data taken for this report represents only 8%, the schools are spread across 33 out of 39 counties. It is plausible that these results represent an accurate spread of the lead content of drinking water in public schools across the state.

²³ <https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Lead/LeadinSchools/Testing>