

Testing and Remediating Lead in Water at Child Care Facilities: Preliminary Results from an EDF Pilot

Lead and Drinking Water

There is no safe level of lead exposure, and children are particularly vulnerable to its detrimental effects. Exposure in children can result in intellectual development and behavioral problems.

Drinking water is a common source of lead exposure, especially for infants. Lead contamination rarely occurs naturally from water sources, but rather ends up in tap water due to corrosion of lead pipes, lead solder, or brass fixtures, such as faucets, hose bibs, and drinking fountains, containing lead. When present, lead service lines – lead pipes connecting the main under the street to a building – contribute an estimated 50-75% of the lead in water at a given property. Water testing can help identify sources of lead in water for remediation and raise awareness about the issue.

Why Child Care Facilities?

Children under the age of six are most vulnerable to the detrimental impacts of lead exposure. Children spend a large portion of their days either in schools or child care settings, the vast majority of which are [not required](#) to test their drinking water for lead under federal requirements because they obtain their water from a public water system. The recent national attention on lead in drinking water and reports of high levels in certain schools has spurred action to address the issue in schools. However, child care settings have remained relatively overlooked – even though these facilities serve children at a more vulnerable life stage. Currently only [six states](#) require lead in water testing in child care facilities: Connecticut, Illinois, New Jersey, Oregon, Rhode Island, and Washington.

EDF's Pilot

Environmental Defense Fund is conducting a pilot project to investigate new approaches for lead in water testing and remediation in child care settings. By targeting child care facilities, EDF aims to identify and remove lead hazards potentially affecting many children in one location. Our ultimate goal is to refine the protocol based on the pilot, with the goal of developing best practices for lead testing and remediation at child care facilities broadly. We are working with local partners in four states – Illinois, Michigan, Mississippi, and Ohio – to implement testing and remediation in 11 child care facilities.

The Environmental Protection Agency (EPA) has developed voluntary guidance for officials at schools and child care facilities called the [3Ts for Reducing Lead in Drinking Water](#). While the guidance provides a helpful framework, the standard it relies on to trigger action (20 parts per billion (ppb)) is not based on health risks.

EDF's pilot utilizes and expands on EPA's voluntary guidance for schools and child care facilities. Novel aspects of our protocol include:

Our Partners:

- [Elevate Energy](#) (Chicago)
- [Healthy Homes Coalition of West Michigan](#) (Grand Rapids)
- [Mississippi State University](#)
- [People Working Cooperatively](#) (Cincinnati)
- [Greater Cincinnati Water Works](#)

- Investigation and removal of lead service lines where present;
- Use of [3.8 ppb as risk-based benchmark](#) to trigger remediation, including fixture replacement;
- Use of portable lead meters to screen lead levels at the tap; and
- Testing of hot water and water heater samples.

What did we do?



- ✓ **Replaced two lead service lines** at child care facilities – one in Cincinnati, Ohio and one in Chicago, Illinois
- ✓ Conducted fixture testing and remediation at **11 low income child care facilities serving over 1,000 children**, including:
 - **Testing over 1,400 samples** at 295 fixtures
 - **Replacing over 26 fixtures** (kitchen, classroom, and bathroom sinks) with elevated lead levels
- ✓ Tested 14 water heaters

What have we found so far?

- **While the majority of samples had lead levels below 1 ppb, most child care facilities had at least one fixture requiring remediation.** See table for more detail.
- **Cleaning the aerator at the end of the faucet is important, but if not done properly may increase lead levels.** At one facility, lead levels increased at 15 of 26 fixtures following aerator cleaning (range: 1-91 ppb increase). We did not [soak aerators in vinegar](#) to help remove lead.

Lead levels found in drinking water:

- **7 of 11** facilities had at least one sample above **3.8 ppb**
- **4 of 11** facilities had at least one sample above **20 ppb**
- **2 of 11** facilities had at least one sample above **80 ppb**

- **Flushing fixtures is effective.** Flushing fixtures such as faucets, hose bibs and drinking fountains for as little as 5 seconds reduced lead levels. Flushing for 30 seconds was more effective.
- **Fixture replacement is effective when initial lead levels are high.** We replaced 9% of the fixtures tested based on our 3.8 ppb action level. Initial post-replacement follow-up testing results demonstrate that most (77%) were under our action level but some (23%) were above. Fixture replacement did not always eliminate lead, most likely because even new brass fixtures can have up to 0.25% lead content and leach up to 5 ppb under NSF's current standards.
- **Portable lead meters tend to underestimate lead compared to laboratory results.** For this reason, we did not rely exclusively on screening results to make remediation decisions.
- **High lead levels found in hot water heaters, but not reflected at the tap.** Half (7 of 14) of water heater tanks tested in child care facilities had levels over 50 ppb with one at 2,680 ppb. For all but one of these, flushing through the tank drain significantly reduced the lead levels in the water heater. At the hot water tap, only 4 of 172 (2%) samples were above our action level of 3.8 ppb. [See our blog for more.](#)

What are our policy recommendations?

- Require testing for lead in child care facilities.
- Set an action level of 5 ppb or below to investigate and remediate, including aerator cleaning with vinegar, flushing (at least 5 seconds), and fixture replacement.
- Replace lead service lines in child care facilities when found.