US Water Alliance

ONE WATER BIG IDEA 6.

Reduce lead risks, and embrace the mission of protecting public health.

This is one in a series of policy briefs that comprise the One Water for America Policy Framework.

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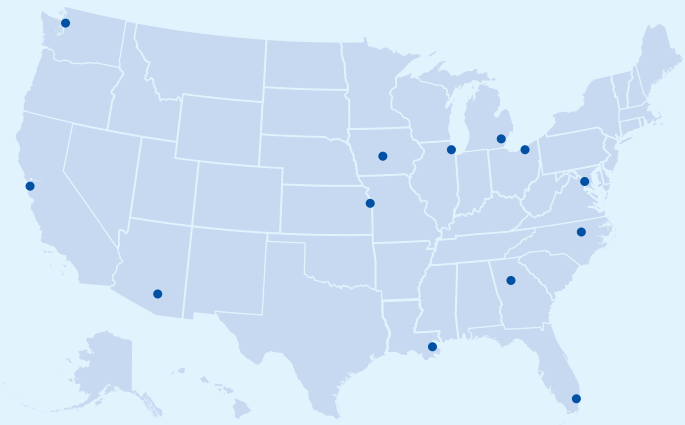
America's water supplies and services are at risk. Climate change, growing income disparities, and the threats posed by our aging water infrastructure call into question the continued availability of safe water supplies and reliable, affordable water service. In light of these challenges, we must come together and create a new era of water management in America—one that secures economic, environmental, and community wellbeing.

To that end, the US Water Alliance worked with more than 40 partner organizations to host 15 One Water for America Listening Sessions across the country. These discussions engaged more than 500 leaders, including water utility managers, public officials, business executives, farmers, environmental and watershed advocates, community leaders, philanthropic organizations, planners, and researchers.

One Water for America
Listening Sessions



What we heard from these stakeholders was truly inspiring. Across the nation, people from all walks of life are collaborating and innovating to advance sustainable water management solutions. Now is the time to spread and scale up these successes to benefit more communities across the country. In these seven policy briefs, we have compiled the strongest, most consistent themes from the One Water for America Listening Sessions into **seven big ideas for the sustainable management of water in the United States**:

1. **Advance regional collaboration on water management**
2. **Accelerate agriculture-utility partnerships to improve water quality**
3. **Sustain adequate funding for water infrastructure**
4. **Blend public and private expertise and investment to address water infrastructure needs**
5. **Redefine affordability for the 21st century**
6. **Reduce lead risks, and embrace the mission of protecting public health**
7. **Accelerate technology adoption to build efficiency and improve water service**

Each of these policy briefs digs further into one of these big ideas—exploring the key issues behind it; presenting policy solutions that are working at the local, regional, state, and national levels; and providing real world examples of how these solutions *are* being implemented and *do* produce positive results.

The One Water for America Policy Framework is a clarion call to action to accelerate solutions for the water management problems of our age. In doing so, we secure a brighter future for all.

Reduce lead risks, and embrace the mission of protecting public health.

Context

The challenge of lead in our drinking water was raised at every one of the One Water for America Listening Sessions. This is a reflection of national attention that started with the Flint water crisis and then began spreading across the nation, as more cities have grown aware of their own lead-in-water problems.

When anyone turns on a tap in their home, school, or place of business, the water from the tap should be safe to drink. Water utilities are responsible for providing safe drinking water by treating water to regulatory standards, and by maintaining safe water quality through the distribution system. However, there are limits to water utilities' ability to assure safe water at the tap, since water utilities do not control the quality of plumbing systems within individual property lines. If communities are committed to providing safe drinking water, while water utilities can lead the charge, we must reach across silos to generate community-wide solutions that engage healthcare systems, school systems, community groups, city and county departments, and state agencies.

It is important to acknowledge that lead is just one of the water quality challenges that communities must address to protect public health. As ever, communities and utilities must balance limited resources across a broad set of priorities. While lead today receives a great deal of attention, each community faces its own array of challenges, and local prioritization of resources is important. In addition, water utilities alone cannot solve pressing problems like lead in tap water, arsenic in groundwater, or pharmaceuticals in water supplies. But the water sector can be a leader in collaborative efforts to define solutions, motivated by the imperative of public health protection.

In this policy brief we review key issues influencing lead-in-water risks, followed by recommended policy solutions and case studies at the local, regional, state, and national levels.

Key issue:
Education and public awareness

Lead is a neurotoxin, and there is no known level of lead exposure that is considered safe for humans.[1] Even low levels of lead in children's bloodstreams can cause significant, lifelong adverse effects on intelligence, behavior, and overall life achievement.[2] Since lead exposure causes serious health effects and has high social costs, there is broad consensus that our drinking water systems and plumbing should be lead-free. Yet, lead-in-water is a legacy issue that reaches across private property lines and different agencies' areas of responsibility, presenting unique challenges from one place to the next. In our listening sessions, we heard that lead is a particularly acute problem because it raises the fundamental issue of trust in those who manage and oversee our water systems. In the wake of the Flint water crisis, elevated lead levels continue to be found in communities across the US, yet generally there is little education on the risks, and little public awareness of how to manage them. Questions remain on lead removal: Who is responsible for it, who will pay for it, and how should it be done? And, in the interim, what should we be doing to mitigate the risk of exposure? Solutions will require extensive work on education and awareness, multi-level policy change, and cross-agency collaboration.

Key Issue:
Regulations—and enforcement—to minimize lead risks

The federal government began to more fully address and reduce the use of lead in plumbing systems in 1986. While limited amounts of lead are still allowed in some plumbing components, much of the lead remaining in our water systems is in lead service lines (LSLs)—the pipes that connect individual properties to the water main in the street—and in older in-home plumbing. Across the nation, there are an estimated six million to ten million LSLs still in place. The actual number is unknown, because many water utilities do not know how many LSLs exist in their communities, and many homeowners have no records of them. Under EPA's direction, states say they are implementing plans to complete service line inventories as required under federal law.

In 1991, EPA published the federal Lead and Copper Rule (LCR) under the Safe Drinking Water Act to protect consumers from lead in drinking water. Under the LCR, many water systems established best practices for corrosion control treatment to reduce the release of lead in water distribution systems, but questions remain about whether the LCR does enough to protect public health. For example, lead testing is voluntary for most schools and day-cares, even though lead affects children most profoundly. EPA is revising the LCR to improve and streamline public health protection. The National Drinking Water Advisory Council (NDWAC) recommended substantial changes to the LCR,[3] including proactive and carefully managed LSL replacement, more robust public education, a commitment to corrosion control based on the latest sound science, and modified monitoring and testing. However, some feel that more is needed, especially around sampling and communication protocols.[4]

LCR enforcement is also a concern. The LCR's testing guidelines are applied differently from one community, and one state, to the next. EPA data shows that more than 5,300 water systems in the US, serving nearly 18 million people, have been found in violation of the LCR, yet state and federal regulators took enforcement action in less than 1,000 of those cases.[5] A key issue is compliance with monitoring and sampling requirements, because some communities use methods that can underrepresent the extent of lead release problems.[6]

Key Issue:
Funding and logistics for lead removal

Removing lead pipes from our water systems is the best way water utilities and communities can reduce the risk of lead in drinking water.[7] A recent study estimates that nationwide, removing LSLs from the homes of children born in 2018 would yield $2.7 billion in future benefits, or about $1.33 per dollar invested.[8]

Fully removing lead service lines is complicated—it requires accessing private property (with attendant questions of liability), and can be expensive, estimated at $5,000 to $7,500 per service line.[9] There are questions in every community about who should bear those costs, and investing in lead removal means reallocating resources from other high-priority needs. Because of these challenges, many water utilities that do tackle LSLs have been replacing only the part of the service line that is in the public right-of-way—but the Centers for Disease Control (CDC) has linked partial LSL replacement to *increases* in blood lead levels.[10] Full LSL replacement requires more collaboration with property owners, some of whom may be skeptical of the effort if it is not fully understood.

As we consider approaches for removing LSLs, we must ensure that they are affordable and implementable for all. Relying on all customers to plan, fund, and implement their own lead mitigation projects will not work. And because solving lead problems will take time (possibly decades), communities need to act in the near term to manage the risks of lead exposure during everyday operations, maintenance, and construction work.

Key Issue:
In-building plumbing and lead

The presence of lead in water systems goes beyond the service line and exists in plumbing systems. The use of lead in pipes and solder was banned under the Safe Drinking Water Act Amendments of 1986, but lead may be present in the plumbing systems of homes, apartment buildings, schools, park facilities, daycare centers, and other structures built before the ban. Some lead content is still allowed in plumbing components, although the permissible amount was reduced in 2014. The problem of lead in in-building plumbing is particularly acute in historically underserved communities, where housing may be dilapidated, and the effects of all sources of lead exposure—from water systems and in-home plumbing, but also paint, contaminated soil, and air—may compound the problem.[11]

Key Issue:
Limitations of corrosion control

Because of the challenges involved in removing all sources of lead from plumbing systems, many water utilities have relied on corrosion control since the 1991 LCR as the primary means of controlling lead exposure in public water systems. Corrosion control strategies involve adding chemicals to treated drinking water to form a protective coating, or scale, inside pipes in the distribution system. This scale, if uninterrupted and stable, reduces the release of lead from pipes and solder into the water. While corrosion control has provided a great deal of protection from lead risks, it has its limitations. Even with effective corrosion control, disturbing a LSL—for example, by partially replacing it, or working on a connected water main, or installing a new water meter—can sometimes result in elevated lead levels at the tap for weeks, and even months, after the disturbance occurs.[12] In addition, low or intermittent use of water in a household in some cases can increase the likelihood of lead in tap water, even in systems with effective corrosion control.[13]

Policy Solutions

Local Level
- Make lead risk management a priority
- Make LSL removal more affordable for residents, and investigate a range of funding options
- Take steps to minimize the interim risks of lead exposure
- Expand public education and communication on lead risks

Regional & State Level
- Strengthen Lead and Copper Rule (LCR) enforcement
- Boost funding for LSL removal, and tie funding allocation to LSL removal goals
- Augment local lead mitigation efforts with statewide testing and assistance
- Provide guidance and education on LSL inventory and removal strategies

National Level
- Strengthen the LCR
- Augment funding for LSL removal
- Provide more and better guidance on lead risk communication and management
- Create a multi-agency program to remove lead from plumbing
- Create a technology incubation program for lead identification and removal solutions
- Revise regulations on plumbing components to make "lead-free" mean lead-free

Solutions: Local Level

Solution:
Make lead risk management a priority

In every community with lead service lines, water utilities should prioritize completing a lead service line inventory and planning for full LSL removal. Steps should be taken to manage the risk of lead exposure in the interim, including the risks associated with utility operations, maintenance, and construction work. These steps should go beyond LCR requirements to fulfill utility missions—and community priorities—of public health protection. In developing lead risk management and LSL removal programs, communities should develop partnerships among water utilities, city and county departments, community health and social service organizations, and housing agencies to ensure that those at highest risk from lead exposure are receiving priority attention. Better partnerships among these organizations will also help speed up detection of problems so that they can be addressed more quickly. The Lead Service Line Replacement Collaborative[14] is a cross-sector coalition that offers a toolkit to help communities develop and implement LSL removal programs.

In Action:

- **Madison, WI.** The Madison Water Utility completed full replacement of all 8,000 LSLs in its water system in an unprecedented program, begun in 2000 and completed in 2011. When elevated lead levels were found in Madison's water system in 1992, the city was advised to add phosphates to its water system for corrosion control. However, Madison's wastewater utility pointed out that phosphate addition would worsen algae blooms in Madison's lakes, and also necessitate costly upgrades to the community's wastewater treatment plant for phosphorus removal. After studying corrosion control alternatives, the utility determined that over the long term, removing LSLs would be less expensive for the community than the combined cost of adding phosphorus for corrosion control and upgrading the wastewater system to remove phosphorus. The utility removed LSLs on public property and required customers to remove LSLs on their own property, with the utility providing rebates toward the cost. The average homeowner's cost for LSL replacement at the time was approximately $1,340, for which they received a $670 rebate from the City of Madison.

- **Lansing, MI.** In Michigan, the Lansing Board of Water and Light (BWL) replaced all of the 12,150 active LSLs in its water system with copper service lines. This $44.5 million program began in 2004 and was completed in 2017. Because BWL owns the entire service line up to and including the meter in the home or building, the utility was able to replace the full service lines without charging customers directly. BWL also devised an innovative construction method to expedite physical replacement of each service line. The program featured extensive customer outreach beginning in 2004. The costs of LSL removal were included in the utility's capital program, and rate revenues were used over time to fund the costs.

Solution:

Make LSL removal more affordable for residents, and investigate a range of funding options

In many communities, low-income residents generally are more likely to be at risk of exposure to lead in their tap water, because they are more likely to live in older housing that has not been fully renovated. LSL removal should be considered as part of affordability programs to help ensure that low-income residents are not inequitably exposed to the risks of lead in drinking water. At the same time, communities should modify building codes to prevent landlords from renting out properties that have unmitigated lead risks. To overcome the issues associated with service line ownership, some cities are investigating transfer of service lines to utility ownership so utilities have jurisdiction for replacement. Some utilities are electing to remove LSLs at low or no cost to customers,[15] and most utilities have the option of building LSL removal into their capital programs, financing the costs over time. Other ideas should be explored as well, like the use of social impact investing as a funding vehicle for LSL removal.

In Action:

- **Philadelphia, PA.** The Philadelphia Water Department has implemented a program to educate consumers on lead risks and address lead service lines in Philadelphia homes. The program includes removing LSLs when found during water main replacement, at no cost to the customer; offering zero-interest loans for customers who choose or need to replace their lead service lines on streets where no water main replacement is scheduled; and encouraging more customers with lead plumbing to take part in the utility's free tap water testing program, through enhanced education and outreach.

Solution:

Take steps to minimize the interim risks of lead exposure

Since it will take years to remove LSLs, communities should take measures in the near term to reduce the risks of lead exposure. This should include ensuring that corrosion control is in place, and sampling to gauge its effectiveness, focusing where lead exposure risk is highest. For schools, lead sampling should be done in a separate sampling pool from compliance sampling. In some situations, the best near-term answer for the highest risk properties may be the use of bottled water, or point-of-use treatment—that is, the placement of filters that are certified to remove lead on taps or fountains used for drinking water. With point-of-use filtration, it is crucial to ensure that people (and institutions) are able to keep filter cartridges replaced and filter units maintained as indicated to sustainably minimize lead exposure risks. In addition, local utilities and communities should make every effort to ensure that all residents are aware of lead-in-water risks and understand how to manage them.

In Action:

- **Baltimore, MD.** When elevated lead levels were detected in water fountains at many of Baltimore's schools in 1992, the city shut off the fountains. But a decade later, it became clear that some of the troubled fountains were back in use. In 2007, school leaders decided that the best way to reliably—and affordably—reduce the risk of lead exposure was to move the entire system to bottled water. The city has since replaced fountains and fixtures at several schools, but high lead levels continue to be found due to lead in pipes, fixtures, and solder throughout the buildings' plumbing systems. Baltimore's schools are continuing to rely on bottled water while point-of-use filters are installed as a longer-term solution.[16]

- **Chicago Public Schools (CPS).** CPS partnered with the Chicago Department of Water Management to implement a Water Quality Testing Program, through which the departments have identified and remediated lead levels in drinking fountains throughout CPS's 526 school campuses. Through a voluntary, ongoing testing program, CPS will test all potable water sources at schools in the district over the next four years, with a target of 25 percent being tested per school year. The program protocols for both long- and short-term lead risk mitigation include installation of automatic flushing systems strategically located at drinking fountains and risers throughout a school to flush water through each independent distribution line. This is intended to eliminate stagnant water in the system, which will reduce the risk of an increase in lead and other particulates in a school's potable water distribution system, as well as stimulate the application of corrosion control throughout the building.

Solution:

Expand public education and communication on lead risks

Many consumers today are unaware of the risks of lead exposure in drinking water, or of the actions they need to take to minimize those risks. Some utilities and communities have robust education and awareness programs to help consumers understand how to reduce lead-in-water risks, with educational materials that provide simple suggestions in multiple languages. Many other utilities should do more. Better information, education, and outreach on lead risks is needed overall; the information available to the public is often confusing and conflicting, raising more questions than it answers. This is another area where communities can benefit from partnerships among water utilities and social service organizations that may have more active pathways for communicating with low-income and hard-to-reach residents.

In Action:

- **Camden County, NJ.** Recognizing their role as an anchor institution in their community, the Camden County Municipal Utilities Authority developed a lead awareness program to encourage residents to flush their taps before drinking to reduce lead risks from in-home plumbing. In partnership with the county school superintendent, the utility gave lead awareness materials to every Camden County school student and their parents. The lead awareness package included a coloring page with a water faucet, telling kids to "lead it run" and flush taps before drinking; a refrigerator magnet with the same message; and an informational page for parents explaining the risk and the solution.

- **Boston, MA.** The Massachusetts Water Resources Authority maintains a website[17] with lead risk management information, including multi-media messages and FAQs on how to reduce the risks of lead exposure in tap water, where to find water test results, and how to get lead service lines replaced. The utility added similar information to its EPA-mandated Consumer Confidence Report in an effort to reach more residents across its service area.

Solutions: Regional & State Level

- **Strengthen Lead and Copper Rule (LCR) enforcement.** EPA generally delegates primacy for enforcing the Safe Drinking Water Act, including the LCR, to state and tribal agencies. The day-to-day responsibilities of LCR compliance and enforcement rest with those agencies, who interact directly with community utilities in their jurisdictions. LCR enforcement varies from state to state, and enforcement practices can be lax. States need to strengthen LCR compliance and support utilities in addressing the challenge of lead in water.

- **Boost funding for LSL removal, and tie funding to LSL removal goals.** States can create a dedicated pool of SRF funding to augment local resources for LSL removal, and to fund point-of-use solutions where they are needed to manage critical risks. In prioritizing the allocation of SRF funds, states can use a community's progress against LSL removal goals as one measure.

- **Augment local lead mitigation efforts with statewide testing and assistance.** Through its Free Lead Testing Pilot Program,[18] the New York State Department of Health is offering free testing for lead in drinking water to residents who are served by either a private well or public water system. Similarly, the State of Massachusetts runs a program to help public schools in the state voluntarily test their drinking water for lead and copper and develop lead drinking water programs.[19] State-run testing programs should go beyond what the LCR requires to help ensure a more accurate assessment of lead-in-water problems.

- **Provide guidance and education on LSL inventory and removal strategies.** States should collect and disseminate information on best practices for lead risk management, consumer education and awareness on minimizing lead risks, multi-agency collaboration on lead risk management, and LSL detection and removal. States should provide stronger guidance to small and medium-sized utilities that need help with lead risk management and LCR compliance.

Solutions: National Level

- **Strengthen the LCR.** As EPA works to update the LCR, a number of important measures have been recommended for inclusion—for example, more rigorous monitoring and sampling and mandatory LSL removal. The revised LCR should clarify sampling requirements and strengthen enforcement provisions. EPA should continue collaborating with state agencies to reform enforcement approaches, intervening directly—and quickly—as necessary. At the same time, states and communities should recognize that carrying out the requirements of the LCR may not adequately protect residents from lead exposure risks.

- **Augment funding for LSL removal.** EPA should make additional funding available to supplement local and state resources for LSL programs, possibly by creating an SRF funding category dedicated to LSL detection and removal.

- **Provide more and better guidance on lead risk communication and management.** The water sector has published extensive guidance on managing lead risks, primarily focused on corrosion control. More focus needs to be placed on updated guidance on LSL removal strategies, funding approaches, and education and communication techniques for better managing lead exposure risks.

- **Create a multi-agency program to remove lead from plumbing.** In addition to LSL removal, a collaborative, multi-agency program is needed to identify and remove lead sources from in-building plumbing—lead pipes, fixtures, fittings, solder, drinking water fountains—with priority given to schools, daycares, rental properties, and low-income and public housing. The funds invested here will return considerable dividends in avoided social costs. This effort could be spearheaded by EPA, or by expanding HUD's lead abatement programs to include plumbing systems. Point-of-use filtration should be utilized as an interim measure to protect those most at risk.

- **Create a technology incubation program for lead identification and removal solutions.** An unprecedented level of energy is being devoted to technology development in the water sector. Why not harness it to encourage solutions for lead detection, sampling, and removal? EPA could host technology competitions to find innovative, scalable solutions for lead identification and risk mitigation, then incubate those technologies in collaborative programs with individual utilities and publicize the case studies to enhance widespread adoption of solutions that work.

- **Revise regulations on plumbing components to make "lead-free" mean lead-free.** EPA should further strengthen regulations on the amount of lead that is allowable in various plumbing components, including pipes, fittings, and fixtures that are compatible with drinking water systems. These regulations enable labeling of plumbing products as "lead-free" when they still contain various quantities of lead. More accurate labeling would help customers make more informed purchasing decisions.

Conclusion

There is broad agreement that we must work together to meaningfully and comprehensively address the problem of lead in water. The benefits over time, in terms of improved human health and avoided social costs, will well outweigh the costs. Solving lead in water calls on communities to develop new ways of communicating and collaborating—across agency and jurisdictional boundaries, across neighborhood lines, and even at the individual household level. This will challenge our traditional ways of thinking and behaving, and if we do it well, it can improve how we manage water overall.

With growing public awareness of the lead-in-water problem, public agencies at every level of government must take action. As this policy brief illustrates, there are good examples to draw from. Now is the time to accelerate the adoption of effective solutions at the local, regional, state, and national levels.

Endnotes

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Thank you to the One Water for America Collaborating Partners

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