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How States Are Handling Lead in School Drinking Water

BY CAROLINE PAKENHAM AND BETHANY OLSON

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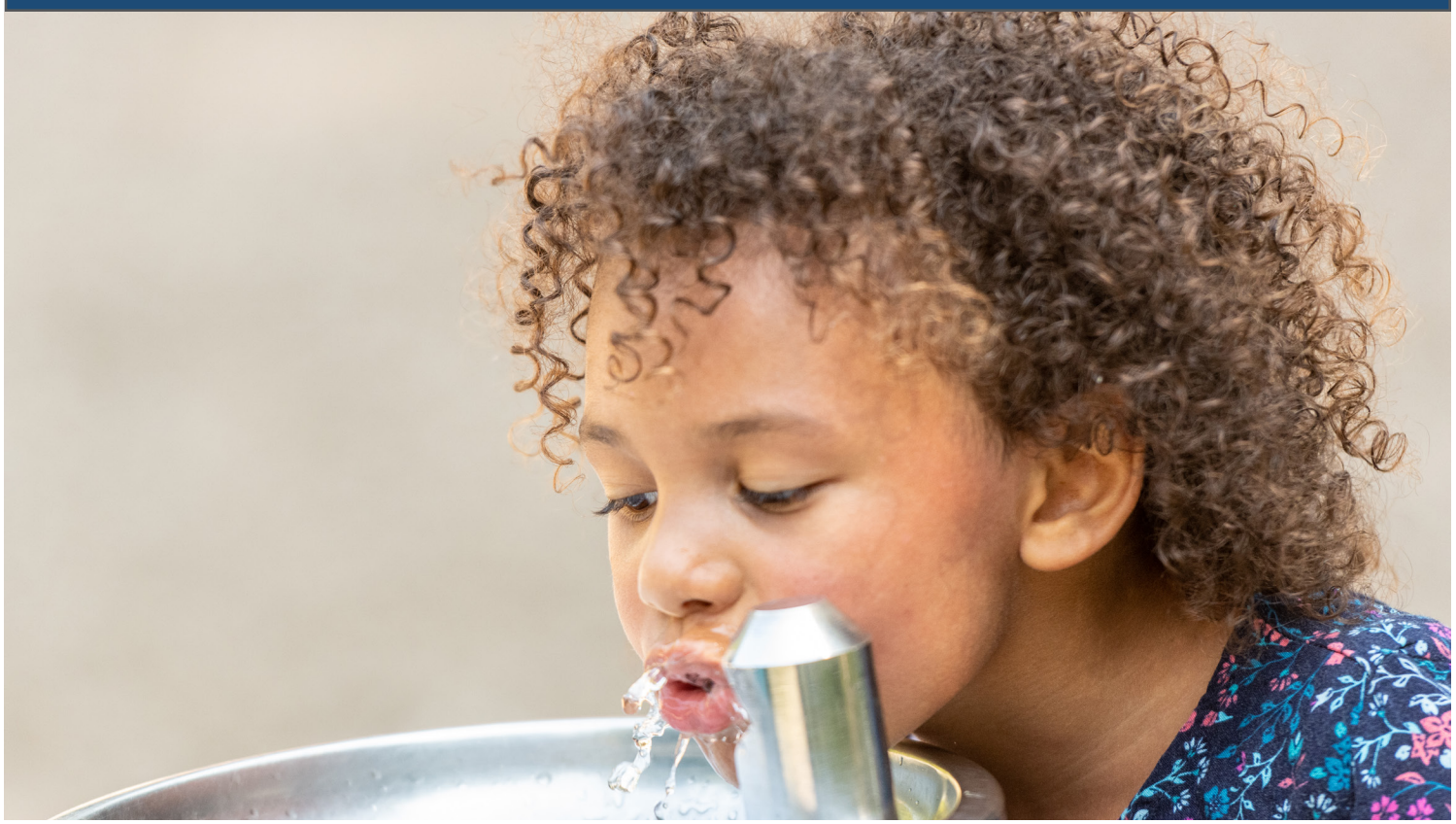

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How States Are Handling Lead in School Drinking Water

By Caroline Pakenham and Bethany Olson

By the time a child graduates from high school, they will have spent an estimated 15,600 hours at school.[1] Because a significant amount of children's daily water intake comes from school water fountains, ensuring their access to safe drinking water at school is essential for their overall health. And one key health challenge that schools across the country may face is the presence of lead in drinking water.

Out of a dozen states with available testing data, nearly half of schools discovered lead in their drinking water, according to a 2018 study.[2] Lead can enter a school's drinking water from pipes, fixtures, and plumbing materials that contain lead.

To date, federal regulations have not required schools or child care facilities to test for lead in drinking water. If finalized, proposed revisions to the U.S. Environmental Protection Agency's (EPA) Lead and Copper Rule will require community water systems to test for lead in the schools and child care facilities they serve (five outlets at schools and two at child care facilities) beginning in October 2024. While there are some mandatory and voluntary testing efforts at the state and local levels, these efforts are not implemented consistently. Additionally, very few of these testing efforts offer schools financial or technical support to mitigate sources of lead in water.

Because requirements and guidance for testing vary from state to state, we conducted a landscape analysis of all states' efforts to test for lead in water in order to learn which states have mandatory and voluntary programs, how these programs operate, and the type of state-level financial and operational support given to schools for addressing lead in drinking water. Conducted from April 2021 through August 2021, our landscape analysis draws on published sources and state-specific surveys (as needed) to learn more about how these testing efforts work. We also conducted interviews with program administrators in 13 states, including the District of Columbia, to learn about the challenges, lessons learned, and best practices that emerged during the rollout and administration of the states' testing programs.

There are 18 states with manatory lead in water testing requirements, and 23 have a statewide voluntary lead testing program (see map). We also found that 2 states have forthcoming efforts, and 4 states have testing efforts that did not meet our definition of a mandatory or voluntary program. We could not find publicly available information on testing efforts in four states. Of the states with mandatory testing requirements, 13 require some level of mitigation if lead is found above the state's recommended action level. There are 15 states that offer some level of financial support for mitigating sources of lead in water.

Interviews with state agencies in charge of administering lead testing shed light on the challenges states face in administering their programs or enforcing their requirements. Ttates interviewed for this report discussed challenges related to the following:

- engaging and obtaining buy-in from schools to test their water for lead;
- communicating effectively about lead testing efforts, including providing guidance to schools to share lead test results and mitigation actions;
- proper management and collection of lead in water testing data; and
- technical and financial support for schools to mitigate sources of lead in drinking water (if found).

Over the past several years, resources for lead in water testing have bright-

[BOX 1]

WIIN Grants

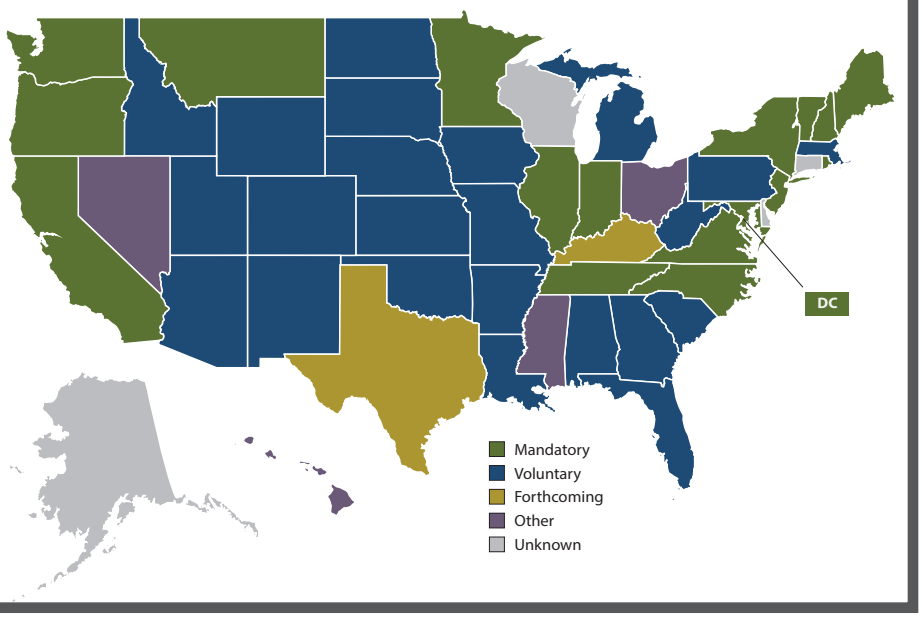
While WIIN Act grant funds have been used to strengthen or expand existing programs, they have also funded programs in states where there had been no state-level testing effort. For example, Georgia, which has no regulation or state-level requirements on testing for or addressing lead, now has a voluntary program to test in schools as a direct result of WIIN Act funding.

Under the WIIN Act, the EPA also awarded $23 million in funding to Indiana; Newark, New Jersey; Massachusetts; the District of Columbia; Chicago; and Virginia in 2020 to assist with lead in water mitigation at schools and child care facilities. The mitigation funds were awarded through a competitive grant process.[a]

a. EPA, "EPA Announces $40 Million in Grant Funding to Reduce Lead in Drinking Water in Disadvantaged Communities and Schools," web page (Washington, DC: EPA, 2020), **https://www.epa.gov/newsreleases/epa-announces-40-million-grant-funding-reduce-lead-drinking-water-disadvantaged**.

[MAP 1]

Lead in Water Testing Efforts, April 2021 to August 2021



ened. Funding from the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act significantly increased access to resources for testing lead in water (box 1). All 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and American Samoa have been allotted funding from the EPA WIIN grants to provide some level of lead in water testing at schools and/or child care facilities.

However, more needs to be done to ensure that all schools have access to comprehensive, well-designed, adequately funded lead testing and mitigation, and state boards of education have a role to play. Based on the landscape analysis and interviews, we developed recommendations for state boards that center on supporting robust communication and outreach, testing coordination, program design and technical support, and funding for both testing and mitigation. State boards can advocate for effective, equitable lead in water testing efforts by doing the following:

- coordinate with state and regional experts on current testing and mitigation strategies;
- promote an understanding of the state landscape;
- share responsibility with appropriate agencies;
- advocate for data-based decision making at the state and local levels;
- advocate for clear, consistent, and comprehensive regulations;
- build awareness of the impact of lead exposure and the need for lead in water testing and mitigation;
- develop joint guidance on effective testing and mitigation practices;
- develop joint communications strategies between departments;
- encourage data sharing between departments;
- develop a statewide data management system;
- support public reporting of data;
- designate a single point of contact for project coordination;
- provide training for the appropriate school personnel on how to test and mitigate; and
- advocate for equitable funding.

RISING CONCERNS ABOUT DRINKING WATER

The quality of drinking water and water infrastructure in the United States gained prominence in the national conversation after news broke of the water crisis in Flint, Michigan. In 2014, a switch in Flint's water sources was highly corrosive to Flint's water service lines, causing lead to leach into drinking water at dangerously high levels. Part of the national conversation has encompassed how to improve the safety of drinking water at schools and child care facilities and the importance of testing for lead in these facilities' sources for drinking and cooking water.

Most schools in the U.S. were built before 1986, when Congress amended the Safe Drinking Water Act to ban the use of pipes and plumbing components that did not meet the definition of "lead free" in public water systems.[3] Thus, many schools may have older plumbing infrastructure that contains lead.[4]

As more schools test their water for lead, the public is learning about the prevalence of lead in schools. In 2016, Portland Public Schools in Oregon found lead in 99 percent of the schools they tested,[5] and 16 out of 24 Detroit public schools found lead when they tested in 2018.[6]

There is no safe blood lead level in children. Thus all sources of lead exposure should be eliminated, especially those affecting children. Because lead can be harmful to human health even at low exposure levels, the EPA has set the maximum contaminant level goal for lead in drinking water at zero.

According to the EPA, lead in children's blood can lead to "behavior and learning problems, lower IQ and hyperactivity, slowed growth, hearing problems, and anemia."[7] Children are most vulnerable to the damaging effects of lead because their bodies are still developing and absorb more of the harmful metal than adults.

While children, pregnant women, and developing fetuses are particularly susceptible to the harmful effects of lead, lead in blood can also result in an increased risk of cardiovascular disease, high blood pressure, and kidney and nervous system problems for adults. Lead poisoning has also been shown to disproportionately affect Black and brown communities. An 18-year study in Chicago found that Black and brown neighborhoods exhibit higher rates of lead toxicity compared with White neighborhoods.[8]

SOURCES OF EXPOSURE

The EPA estimates that about 20 percent of people's exposure to lead in the U.S. comes from drinking water, a rate that can reach up to 60 percent for infants drinking mostly mixed formula.[9] Other common sources of lead in everyday environments include lead-based paint, soil and dust, and some food and consumer products. While we focus on lead in school drinking water, it is important to note that all sources of lead in learning environments need to be addressed to best support the health and development of children and future generations.

Lead rarely occurs naturally in drinking water sources such as lakes or streams. Instead, lead leaches into school water due to corrosion of plumbing materials containing lead, such as pipes, faucets, fixtures, and solder. Water service lines made of lead or galvanized material can also leach or unpredictably release lead particles into drinking water.[10] A water service line connects the water main in the street to a home or building (figure 1). When present, a lead or galvanized service line can be a significant source of lead in drinking water.[11]

Because the federal Safe Drinking Water Act (SDWA) did not ban the installation of lead services lines until 1986,[12] homes and buildings constructed before the late 1980s may have lead service lines. It is also more common for lead service lines to be connected to smaller facilities, because lead was not used in water service lines with a larger diameter, which are what typically serve larger schools or buildings.[13] Even though lead service lines are less commonly connected to larger schools, it is best practice for a school of any size to investigate for the presence of lead service lines before it tests for lead in water.

TESTING FOR LEAD IN DRINKING WATER

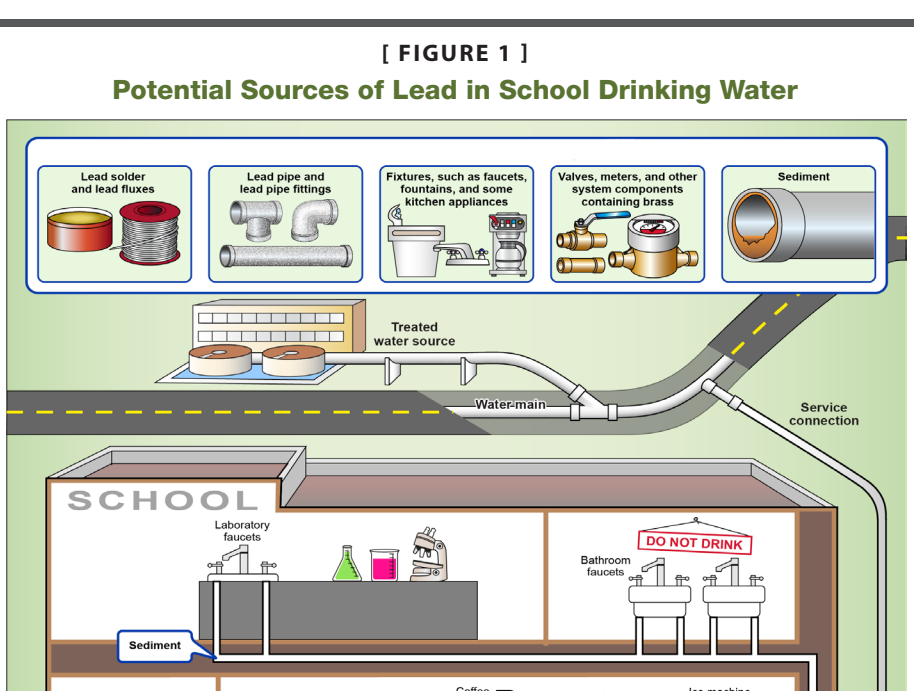
Because it is not possible to see, smell, or taste lead in drinking water, testing a school's cooking and drinking water sources is the only way to know if lead is present. A test is a snapshot of lead levels at the time the sample was collected. Lead levels can vary from tap to tap, season to season, and with changes in water usage, water temperature, the amount of time water sits in pipes, and the flow rate at time of collection.[14] Consequently, schools must test all cooking and drinking water sources to get an accurate assessment.

Due in part to their frequent closures and uneven water use patterns during weekends, holidays, summer break, or extenuating circumstances like the pandemic, the topic of lead in drinking water is of special relevance to schools. Water is more likely to stagnate in school pipes and fixtures during closures, potentially making the water more corrosive and increasing the chances that lead leaches into the water (box 2).

The EPA recommends that schools and child care facilities collect samples from all cooking and drinking water sources through a two-step sampling procedure.[15] This typically involves collecting a first-draw sample and a 30-second flush sample at each tap where water is used for

[FIGURE 1]

Potential Sources of Lead in School Drinking Water



Source: U.S. Government Accountability Office, "Lead Testing of School Drinking Water Would Benefit from Improved Federal Guidance," GAO-18-382 (Washington, DC: GAO, July 2018), **https://www.gao.gov/products/gao-18-382**.

drinking or cooking. These samples are collected after a set period where the water sits unused, typically 8 to 18 hours. A first-draw sample tests water that is used at the beginning of the day, and the 30-second flush sample is collected after the water has been run for 30 seconds. A first-draw sample that contains lead may indicate that lead is coming from the faucet or fixture. A 30-second flush sample that contains lead may indicate lead is coming from the interior plumbing leading up to the fixture. Both samples are critical because they help a school pinpoint internal sources of lead at each fixture.

These sample types work for typical plumbing configurations and can help identify lead in outlets—faucets, fixtures, or fountains—or in piping directly leading up to the outlet and in interior plumbing. For detailed outlet evaluations to pinpoint where lead is getting into drinking water, different procedures may apply. To determine the presence of a lead service line, schools will need to work with a licensed plumber and their water utility provider.

Before sampling, school leaders should identify the lead level at which follow-up action will be taken and plan how they will respond to test results that indicate lead above that level, according to the EPA. We encourage states and schools to keep in mind that there is no safe blood level in children, and they should reduce lead levels to the lowest possible concentrations by using best water quality management practices. The American Academy of Pediatrics recommends that lead levels in school drinking water fountains should not exceed 1 ppb.[16] If testing uncovers lead in drinking water above the identified level, school leaders should immediately involve public health departments to help communicate with parents. Health officials can also advise whether testing for the presence of lead in children's blood is appropriate, and they can suggest ways to ensure students have a safe water supply while long-term plans to mitigate lead are implemented. Primary care providers and school nurses can also be critical partners for disseminating educational materials to parents during wellness visits or supporting on-site blood level testing at schools.

It is critical to provide schools with education on appropriate mitigation strategies, including their potential cost, prior to starting any lead testing effort. Figure 2 summarizes immediate and long-term actions schools can take to mitigate lead in drinking water. While removing the lead source is always the best strategy, schools can explore other interim strategies if fixture or pipe replacement is cost prohibitive. This may include installing NSF/ANSI 53 certified filters at problem outlets or automatic flushing devices to reduce lead levels.

Following mitigation, schools should retest their water to ensure a reduction in lead levels. It is also critical to communicate plans to test, test results, and follow-up actions with parents, students, and school staff throughout the entire process.[17]

RESEARCH ON WATER TESTING AND MITIGATION

In 2018, the U.S. Government Accountability Office (GAO) released a study on the extent to which school districts across the country were testing school drinking water for lead, finding it, and taking action to reduce lead levels.[18] Through a national web-based survey administered from July to October 2017, the GAO found that an estimated 43 percent of school districts conducted testing for lead, and about 41 percent of school districts had not. It was estimated that 37 percent of school districts that tested found elevated lead levels—that is, water samples at or above the state's recommended threshold for mitigation. Respondents were asked about testing efforts in the 12 months preceding completion of the survey. The GAO encouraged the EPA to provide clarity on when schools should take action to mitigate lead in drinking water, and it encouraged the EPA and U.S. Department of Education to

[BOX 2]

Michigan's Outreach on Flushing Stagnant Water

School buildings and their plumbing systems are designed for frequent use. When buildings are vacant for an extended period, water sits in the pipes. Resulting water quality issues may include a buildup of heavy metals like lead or an increased risk for the growth of legionella, a disease-causing bacterium. Many schools were empty during the pandemic and summer break. As a result, schools need to run water through their pipes before children arrive back in the classroom. Flushing water at the beginning of the school day and for 30 seconds before use can also help maintain water quality.

To stress the importance of flushing and maintaining water quality in schools after an extended shutdown, the Michigan Department of Environment, Great Lakes, and Energy developed a series of communications on flushing. The series includes a webinar, memo to schools, fact sheets, and guidance on different flushing scenarios.[a]

a. See Michigan EGLE, "School Drinking Water Program," web page (Lansing, MI: author, N.d), **https://www.michigan.gov/egle/0,9429,7-135-3313_3675_3691-474608--,00.html**.

collaborate to support school districts with lead in water testing.

A 2019 Harvard and University of California study examined lead testing efforts in 25 states and found a lack of uniformity in program management to test for lead, state regulation of action levels, and testing protocols.[19] The research team also observed a lack of strategy and guidance for sharing findings and data, school responses in cases of high lead levels, and formats to maintain and organize data collection.

Between 21 and 25 states had active lead in water testing efforts, according to the GAO and Harvard/University of California studies. The GAO also noted that eight states had mandatory requirements, and 13 had voluntary efforts. Since these studies were released, all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and American Samoa have been allotted WIIN grant funding to conduct some level of lead in water testing at schools and/or child care facilities.

Gary A. Burlingame et al. shared lessons learned from water utilities in Chicago; Portland, Oregon; Cincinnati; Philadelphia; and the state of Massachusetts in helping school districts address lead in drinking water.[20] The 2018 article in the journal of the American Water Works Association outlined necessary components of a lead testing effort, including the importance of clear and timely communications about lead testing efforts, strong collaboration between schools and water utilities on testing and mitigation efforts, clear guidance on which drinking and cooking water outlets should be tested, and clear, streamlined guidance on when mitigation should occur.

In 2021, Elevate and the nonprofit Illinois Action for Children summarized lessons learned from a joint effort to assist child care providers with water testing and mitigation throughout Illinois.[21] About one-third of home-based providers and nearly half of center-based facilities in Illinois found lead in their drinking water. The report outlined strategies for improving water testing at child care facilities that are applicable to other educational settings. The authors stressed engaging child care providers early in conversations about testing efforts, pairing mitigation funding and technical assistance with testing efforts, and training and education about addressing lead in drinking water.

CONDUCTING THE LANDSCAPE ANALYSIS

To better understand the landscape of lead in water testing and mitigation across the country, we conducted a literature scan, online public data review, interviews, and surveys from April 2021 through August 2021. Internet research was conducted for all 50 states and the District of Columbia to determine if a lead in water testing program or regulation exists in the state, if testing is mandatory or voluntary, what lead level determines mitigation, and what resources are available for schools to mitigate. We then selected a subset of states representative of different areas of the country and demographics for in-depth interviews. We focused our outreach on representatives of state agencies responsible for implementing the lead testing program or regulation. Lastly, we used an online survey to reach states where representatives were not interviewed and where public information about state lead-testing programs was not readily available online to gather clarification on missing data.[22]

The analysis we present here is largely based on information that was publicly available through state agency websites. Many states make extensive information about testing regulations or programs available, typically on the website of the agency responsible for oversight. In some cases, only partial information was publicly available. Some states contract out pieces of their testing programs, so information was available from contractor websites.

For states where very little or partial information was publicly available, we sent short surveys to the state agencies charged with administering lead in water testing programs for schools or to the agency that the EPA had indicated would be receiving WIIN grant funding for lead in water testing programs. We sent 21 surveys and received nine responses. The landscape analysis incorporates information provided in the survey responses.

We contacted 16 states including the District of Columbia for insight on the

[FIGURE 2]

Mitigation Strategies

Short-Term Action	Long-Term Action
Install "Do Not Drink" or "Do Not Use for Cooking" signage	Fixture replacement with NSF-approved lead-free devices
Temporarily remove the problem fixture from service	Permanent removal of fixture
Install a point-of-use filter that meets NSF/ANSI standards	Long-term filter use with regular maintenance/filter replacement, and ensure devices meet NSF/ANSI standards
Manually flush water before use	Installation of an automatic flushing device
Use bottled water	Remove and replace lead or galvanized water service line
	Internal plumbing replacement or bypass

Source: U.S. EPA, "3Ts for Reducing Lead in Drinking Water" (Washington, DC: EPA, 2018), **https://www.epa.gov/ground-water-and-drinking-water/3ts-reducing-lead-drinking-water**.

[TABLE 1]

State Programs to Address Lead in Water, April–August 2021

State[a]	Require Testing?	Require Mitigation?	Mitigation Action Level[b] (ppb)	Require Retesting after Mitigation?	Offer Financial Support to Assist with Mitigation?[c]	Share Water Test Results Publicly?[d]	Party Responsible for Collecting Samples
Alabama	No	Unknown	Unknown	Unknown	Unknown	Yes	Schools
Alaska	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Arizona	No	No	15 ppb	Yes	Yes	Yes	Schools
Arkansas	No	Unknown	15 ppb	Unknown	Unknown	Unknown	Schools/district staff
California	Yes	Yes	15 ppb	No	Yes	Yes	Community water system
Colorado	No	Unknown	5 ppb and 15 ppb[e]	No	No	Yes	Schools
Connecticut	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Delaware	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
District of Columbia	Yes	Yes	5 ppb	Yes	Yes	Yes	Certified water sampler
Florida	No	No	15 ppb	Unknown	Unknown	Yes	Certified laboratory
Georgia	No	No	N/A	No	No	Yes	Schools
Hawaii	No	Unknown	15 ppb	Unknown	Unknown	Yes	Health department team
Idaho	No	No	20 ppb	No	No	Yes	Schools
Illinois	Yes	No	5 ppb	No	Yes	No	Schools
Indiana	Yes	Yes	15 ppb	No	Yes	No	Schools
Iowa	No	No	N/A	Unknown	Yes	No	State university extension
Kansas	No	No	15 ppb	Unknown	No	Unknown	Unknown
Kentucky	No	No	N/A	N/A	No	Unknown	Unknown
Louisiana	No	Unknown	Unknown	Unknown	Unknown	Yes	3rd party contractor
Maine	Yes	No	4 ppb	No	No	Unknown	Schools
Maryland	Yes	Yes	5 ppb	Yes	Unknown	Yes	Schools
Massachusetts	No	No	1 ppb	Unknown	Yes	Yes	Schools
Michigan	No	No	5 ppb	No	No	No	State environment agency
Minnesota	Yes	No	N/A	Yes	Yes	No	Schools
Mississippi[f]	No	No	Unknown	Unknown	Unknown	Unknown	State university extension
Missouri	No	Unknown	Unknown	Unknown	Unknown	Unknown	Schools
Montana	Yes	Yes	5 ppb	Yes	Yes	Yes	Schools
Nebraska	No	Yes	15 ppb	Unknown	No	No	Schools
Nevada	No	No	15 ppb	Unknown	Yes	Unknown	Schools/water utility/contractor
New Hampshire	Yes	Yes	15 ppb	Yes	Yes	Yes	Schools
New Jersey	Yes	Yes	15 ppb	Unknown	Unknown	Yes	Schools
New Mexico	No	No	15 ppb	N/A	No	No	Schools
New York	Yes	Yes	15 ppb[g]	Yes	Yes	Yes	Schools
North Carolina	Yes	Yes[h]	15 ppb (10 ppb after 12/21)	Yes	Yes	Yes	Schools
North Dakota	No	No	15 ppb	N/A	No	No	Schools
Ohio	No	No	N/A	N/A	N/A	No	Unknown
Oklahoma	No	No	1 ppb and 15 ppb[i]	N/A	Unknown	Yes	Schools
Oregon	Yes	Yes	15 ppb	Yes	No	Yes	Schools
Pennsylvania	No	Yes	15 ppb	Yes	No	Yes	Schools
Rhode Island	Yes	No	1 ppb and 15 ppb	No	Unknown	Yes	State university extension
South Carolina	No	No	15 ppb	N/A	Unknown	Yes	Schools
South Dakota	No	Unknown	Unknown	N/A	No	Unknown	Schools
Tennessee	Yes	Yes	20 ppb	Yes	Unknown	Yes	Schools
Texas	No	No	No	Unknown	Unknown	Unknown	Schools

[TABLE 1 CONT.]

Utah	No	No	15 ppb	N/A	Unknown	Yes	Schools
Vermont	Yes	Yes	4 ppb	Yes	Yes	Yes	Schools
Virginia	Yes	No	N/A	N/A	Yes	Unknown	Schools
Washington	Yes	Yes	5 ppb	Yes	Unknown	Yes	State health department
West Virginia	No	No	15 ppb	N/A	No	Unknown	Schools
Wisconsin	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Wyoming	No	Yes	15 ppb	Unknown	No	Unknown	Schools

* N/A = Not Applicable

a. Since the landscape of state requirements and programs for lead in water testing changes frequently, it is important to check with your state for the most up-to-date information.
b. The mitigation action level is either suggested or required in a state. To learn if the level is required, see the column titled "Require Mitigation?"
c. This may not be available for all schools or statewide.
d. This means the state agency shares school test results in some public manner, whether through a database, portal, PDF, or other means. Many states require schools to share test results with parents, but that is not the purpose of this column.
e. Colorado recommends different mitigation actions for outlets with results at 5 ppb and 15 ppb.
f. Mississippi offers free testing services to interested schools and child care centers in select counties.
g. New York Senate Bill 2122A would lower the mitigation action level to 5 ppb and include 100 percent reimbursement of remediation, but the bill has yet to be signed by the governor.
h. North Carolina's requirement applies to schools in areas that have a licensed pre-K, Head Start, or afterschool program.
i. Oklahoma and Rhode Island recommend different mitigation strategies for outlets with results over 15 ppb and between 1 and 15 ppb.

history of lead in water testing for schools, challenges and successes in implementing the program or regulation, and lessons learned. Out of the 16 state and state-level jurisdictions contacted, representatives for 13 agreed to be interviewed. In addition, we contacted five school districts, two of which ultimately participated in interviews.[23]

States were selected to ensure that interviews represented a mixture of programs, including states with both mandatory and voluntary participation. From the interviews, we found that some states had a history of funding allocated to testing for lead in school drinking water while others did not. However, at the time of these interviews, all states had recently received WIIN grant funding from the EPA to fund some or all testing activities.

STATE PROGRAMS: MOSTLY VOLUNTARY

Most states have an active lead in water testing initiative, but the majority of these efforts are voluntary (table 1). Twenty-three states have statewide voluntary testing programs or efforts. Eighteen require testing. Some mandatory initiatives are one-time testing; others require recurring testing. Hawaii, Nevada, Mississippi, and Ohio are taking action to conduct targeted testing of schools and child care facilities in their states, but the design of their initiatives does not fit the definition of a mandatory or voluntary statewide testing program as defined for this study (definitions can be found in the appendix). Hawaii has identified schools for testing that are at a higher risk of elevated lead levels and conducted outreach and site visits in preparation for testing. Nevada does not define their efforts as a state-level program but has been conducting projects to screen most elementary, secondary, and high schools for lead in drinking water. The state has funded these efforts through WIIN or other EPA grants. Ohio does not have any current state-level requirements or programs related to sampling for lead in water. However, since 2016, funding has been available for targeted programs.[24]

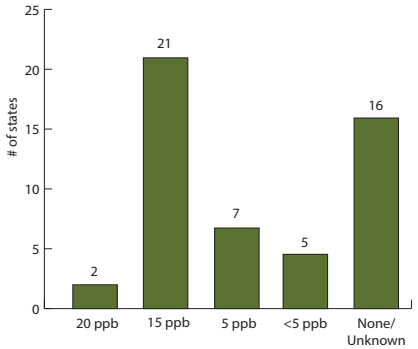
Kentucky and Texas will launch voluntary statewide programs for schools and child care facilities within the next year. Both states plan to use WIIN funding to cover costs associated with testing and provide funding for mitigation. Alaska, Connecticut, Delaware, and Wisconsin have efforts for which we were not able to find sufficient public information to categorize the initiatives as mandatory or voluntary.

STATE GUIDANCE

Of the states with mandatory lead in water testing, 13 require mitigation if lead is found at or above the state's action level for schools. Thirty-five states provide either a suggested or required mitigation action level (table 1).

[FIGURE 3]

Required or Suggested Action Levels for Addressing Lead in Water, April–August 2021



Note: If a state had multiple action levels, we used the lowest for grouping purposes.

The majority of states suggest or require mitigation when lead is present in water at 15 ppb or higher (figure 3).[25] Two states suggest or require mitigation at 20 ppb or above. It is important to note that neither 15 nor 20 ppb is a health-based standard, and states can set their own lead action levels.[26]

Few states offer schools financial resources for mitigation. Fifteen provide schools with some type of financial resources to enact mitigation actions. Without robust financial support for mitigation along with technical assistance, all schools in a state are not likely to be able to address sources of lead in drinking water.

Sharing Results

Twenty-six states share lead in water test results from schools in a publicly accessible format.[27] Often, the state agency that administers the initiative collects the results and makes them publicly available through a database, map, or compiled PDF document. Many states require schools to share lead testing results with the school community within a defined timeframe.

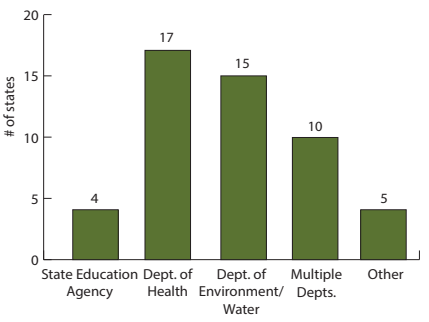
Responsibility for Sampling

In 34 states, schools are primarily responsible for collecting water samples in their buildings. We examined which party is responsible for conducting the sampling, which is critical because of the training and support needed to collect and interpret the data. For example, a school that is brand new to lead in water sampling will need much more training and support than a water utility with decades of experience.

In California, community water systems or water utilities collect samples. Iowa, Mississippi, and Rhode Island have a university or extension service collect samples. The state agency that administers the testing program in Hawaii, Michigan, and Washington collects school water samples. Louisiana has a third-party contractor/administrator collect samples from schools. Florida and the District of Columbia require that samples be collected by a certified laboratory.

[FIGURE 4]

State Agency Responsible for Administering Lead in Water Testing Effort, April–August 2021



State Agency Leads

Each state has at least one agency dedicated to implementing a water testing program for schools and child care facilities or designated to receive WIIN grant funding (figure 4). Four states have the state education agency as lead, 17 the health department, 15 the department of environment or water, and 10 have shared leadership across agencies.

CHALLENGES STATES ENCOUNTER

We spoke with program administrators representing 13 states and 2 school districts about the challenges they encountered in implementing a lead in water testing effort, lessons learned, and best-practice recommendations. We also asked how state boards could bolster testing. Respondents offered common challenges they experienced, and we highlight here those mentioned by interviewees, as well as their descriptions of how their states are navigating the challenges.

Outreach and Coordination

Interviewees said it can be challenging to engage with schools on testing their water for lead. Not only do states face challenges in finding the right person at a school or school district to speak with, there are also obstacles to obtaining buy-in. Many factors influence a school or district's decision to participate in a program and test for lead. While schools may have concerns about the financial cost, there is also the burden of staff time, public pressure to reveal results, and the financial implications of funding any resulting mitigation. Because it is not possible to predict the results or the extent of mitigation that may be needed, schools may resist testing until they are confident they can budget for repairs.

To navigate these challenges, interviewees emphasized engaging stakeholders early on—more specifically, including stakeholders in the program design phase and creating opportunities for them to comment on proposed programs and requirements. They said it is also critical to communicate about the health impacts of lead and the need to ensure that students and staff have access to safe drinking water. States experienced success when they made connections with school professional associations, superintendents, and other stakeholders who promoted their testing program to their members—especially significant for voluntary programs. Other ideas to increase participation included partnering with state education or other agencies to expand outreach and transition from a voluntary effort to a requirement.

A number of states have taken innovative approaches to communicate with school communities about testing. New Hampshire hosts virtual and in-person presentations about their lead testing program for building facility operator groups and principal associations to get the word out about the importance of testing. A 2020 Minnesota statute requires the state health department and education agency to work together on lead in water testing. Oregon's lead testing effort began as a voluntary program, created through a 2016 governor's initiative. It transitioned to a requirement as a result of legislative action in 2017. State administrators subsequently saw a significant increase in school participation.

> "Most states do not have technical or financial resources to help schools mitigate sources of lead in drinking water."

Transparency

Clear, transparent, consistent communication with families and school communities is necessary at every stage of water testing. State agencies and school districts contacted during our analysis shared a desire for more support on effective strategies for communicating about testing efforts, results, and planned mitigation. They also described fears about press coverage and fallout from test results. State agencies shared that many schools experienced a steep learning curve when testing began, particularly when it came to communicating results and next steps. Parents and guardians are naturally deeply interested in the results of testing, what they mean, and what action will be taken afterward. Beyond wanting to provide more support to schools on how to communicate about testing, some state agencies also expressed a desire to create a public database to share test results with parents and the public.

Similarly, it is helpful to publicly communicate about the funding needed for testing and mitigation. School districts may be apprehensive about the potential costs, but mitigation strategies can vary in cost and by each school's unique situation.

To help schools with communications around testing, some states provide letter templates and guidance on communicating with parents before testing occurs, immediately after receiving results, and after the implementation of any mitigation. Other states shared the value of making one-on-one technical assistance available to schools so that they understand their test results and how to communicate them to the public.[28]

Other states have established innovative approaches to maintaining transparency on testing and mitigation plans and communicating with students, families, and school staff. Vermont has a robust website with fact sheets and sample letters for communicating with parents before, during, and after testing. Vermont offers the letters in Arabic, Burmese, French, Kirundi, Nepali, Somali, Spanish, Swahili, and Vietnamese as well as English. Vermont's portal lets the public type in the name of a school or child care facility and see test results and any follow-up actions taken.

California recommends schools communicate with parents about test results before public release, and Vermont requires that schools communicate with parents about results before publishing them in their public database. Pennsylvania's testing program provides tailored guidance upon request to school principals so they understand what their test results mean. Schools also receive a narrative description of their test results that they can use in communications with parents and the community.

Data Collection and Management

Sampling at schools throughout a state produces a lot of data. In Oregon's first year of voluntary testing alone, approximately 58,000 samples were collected from over 52,000 fixtures. Given the sheer amount of data produced, careful thought and planning must go into the development of systems to manage and track them. Many interviewees shared regret or relief about data management planning and development before launch of their testing effort.

State representatives shared the need for consistent labeling of faucets and fixtures when collecting samples and managing data to ensure that sample results are attributed to the proper fixture, both in the event that mitigation is needed and also for long-term data tracking. For many schools, data management also involves mapping of outlets before testing begins.

Interviewees also shared the importance of schools digitally sharing their results with the state agency in charge of lead in water testing and schools receiving a unique identifier to track results and program participation. Interviewees from Vermont, New Hampshire, and Washington, DC, emphasized the importance of digitizing any systems involving data collection and storage and ensuring that these systems are operational before schools begin to test and submit results.[29]

Vermont and Washington, DC, have developed data management and inventory tracking systems that are user-friendly and make lead testing results accessible. Washington, DC, uses a customer relationship management system to manage data. It tracks fixtures and results with a QR code at each fixture to make it easy for staff to monitor during sampling and maintenance. Vermont's system includes a portal for uploading data as well as a public-facing portal with searchable results. When results are uploaded, the system generates an email to kick off the mitigation process for fixtures needing work. This tracking system is tied to another system for other water mitigation; facility managers can access the system to update mitigation action for any tap being tracked.

Technical and Financial Support

The ability to fully support schools in addressing lead in drinking water, particularly with mitigation, was another challenge interviewees expressed. Most states do not have technical or financial resources in place to help schools mitigate sources of lead in drinking water, even when they have the resources to cover some or all of the cost of testing. When states do not prioritize mitigation and maintenance funding in annual budgets, mitigation may not be feasible. In states that require testing but lack state-level funding, schools experience the burden of an unfunded mandate and must make tough decisions about what requirements to meet.

In states that do offer financial assistance for mitigation, approaches vary. Some states set a maximum amount to be available per school or provide a set reimbursement amount for different types of fixture upgrades or replacements. In some states, reimbursements can be issued a limited number of times a year. In others, there are burdensome documentation and bureaucratic hurdles to obtaining funding. Reimbursement requirements put financial strain on some schools, as they will need to allocate budget funding for the initial expenditures, even if the state program will ultimately reimburse them.

In states where testing is required but funding is not provided, it can eat into schools' operational budgets and is especially burdensome for schools that are not well resourced or are situated in underserved areas. Schools in underserved areas may have experienced years of disinvestment in infrastructure in addition to budgetary constraints to voluntary testing.

Supplementary funding is essential to motivate the participation of schools with limited funding for testing and mitigation, as are incentives for them to apply for grants. Fines may be an effective deterrent, but anything too extreme—such as loss of state funding—may cause undue stress or be ineffective.

Interviewees shared the need for states to include an accessible point of contact for individualized support on appropriate mitigation strategies. They also suggest ongoing training and education for strategies such as manual flushing or maintenance projects, like installation of filters, which may require changes to operating procedures and retraining staff. Additional comments from states included a desire to make mitigation required and to lower lead action levels for when mitigation should occur at a school.

Vermont reimburses schools for most costs associated with permanent fixture replacement once mitigation work is complete. To ensure mitigation actions are effective, Vermont also requires schools to retest following mitigation to ensure lead levels fall below the state action level of 4 ppb. The New Hampshire Department of Environmental Services provides support to schools on a case-by-case basis to address elevated lead results. Schools can apply for grant funding to cover up to 50 percent of costs for mitigation, applicable to anything that tests at 5 ppb or higher.

HOW STATE BOARDS CAN HELP

In interviews with states and districts, we asked how state boards can support lead testing. Interviewees shared the need for help with outreach efforts, gaining buy-in from schools, and increasing schools' participation. To support these efforts, state boards can do the following:

- build knowledge about the implications of lead poisoning and the importance of addressing lead in drinking water, especially by connecting with experts to inform decision making and leadership;
- spread awareness about lead in water testing requirements and best water quality management practice programs; and
- consider making voluntary efforts mandatory to increase participation.

They also highlighted the need for enhanced clarity on testing rules, as well as guidance, training, and technical support for schools. To support these efforts, state boards can do the following:

- advocate for clear guidance and consistency at all levels of government on lead in water testing requirements, including what to do if lead is found;
- provide guidance and training on how to communicate with parents, staff, and the school community about results and actions;
- create a guidance manual on maintaining water quality in schools, including flushing best practices;
- communicate about the importance of flushing and have schools implement this into their building procedures;
- encourage the responsible state agency to establish a point of contact to answer questions from schools and provide technical assistance;
- offer training to expand on EPA's 3Ts guidance on reducing lead in school and child care drinking water; and
- develop a tap inventory management system—more standardized guidance will help make it easier for schools to sample and track data and for state agencies to track data.

> "Schools in underserved areas may have experienced years of disinvestment in infrastructure."

Interviewees stressed the importance of prioritizing health and safety in annual budgets. To support these efforts, state boards can advocate to make health and safety, as well as financial resources for mitigation, a priority in annual budgets.

An effective lead in water testing program involves much more than testing. It requires guidance, training, and money to help schools respond to adverse test results, as well as knowledge about how to interpret results, communicate with parents, and mitigate sources of lead in water. To protect all children in all communities, regardless of income or school district, states need to provide the necessary technical and financial resources to test and mitigate sources of lead.

RECOMMENDATIONS

State boards can play an important role in supporting lead in water testing programs

and eliminating challenges schools face in doing this work. State and district interviewees called attention to challenges in four areas: coordination, communication, data collection and management, and implementation. Leveraging their policy, questioning, and convening authority to address these challenges, state boards can contribute to the seamless, effective operation of lead testing programs.

All state boards can convene experts and add important topics to their meeting agendas. They can designate task forces and working groups to study an area and review how it intersects with their strategic plan and educational equity in their state. While not all state boards can implement the following recommendations to the same extent, they can all advocate for effective, equitable lead in water testing and mitigation.

Outreach and Coordination

Coordinate with state and regional experts. State boards should contact their respective state program coordinator for lead in water testing or EPA regional coordinator for information on current lead in water programming and to offer collaboration assistance.[30] State boards can also coordinate with the state education agency, health experts, professional association groups, local school boards and administrators, and community groups.

Promote an understanding of the state landscape. After pinpointing the office(s) responsible for overseeing programs, the state board can invite program leads and experts to present during public board meetings to draw attention to the issue and illuminate challenges, best practices, and opportunities for collaboration and funding.

Share responsibility with appropriate agencies. State boards can develop governance expectations or program perimeters where state education agencies and health or environment departments are encouraged to work together to combine expertise and resources to implement a program.

> "All state boards can advocate for effective, equitable lead in water testing and mitigation."

Advocate for data-based decision making. By partnering with experts on the subject matter, board members can advocate for data-based decision making on the importance of testing in order to help dispel misunderstandings among school districts, staff, parents, and community members.

Advocate for clear, consistent, and comprehensive regulations. State boards should advocate for regulatory clarity and coordination on when schools should test, what requirements should be met, what fixtures need to be tested and when, what level of lead in drinking water requires mitigation, what mitigation actions are appropriate, what resources are available, when retesting is appropriate, and how and when to communicate with students' families and community stakeholders. If duplicative or incongruent testing requirements are uncovered, state boards should resolve the discrepancies under their purview or advocate for them to be resolved.

Transparency

Build awareness of the impact of lead exposure and the need for testing. State boards should use established relationships and communications channels to host informational sessions about the importance of testing and program requirements to children, families, and school staff and disseminate materials that will foster connections with school districts.

Develop joint guidance on effective testing and mitigation practices. With state departments for environment, health, and budget, state boards and state education agencies should develop guidance for district and school leaders on implementing testing and mitigation.

Develop joint communications materials. State boards and state education agencies should develop template communications materials pertinent to each stage of the process (i.e., before testing, during testing, results sharing, and mitigation activities) that school leaders can use to communicate clearly to students, caregivers, and school staff.

Data Collection and Management

Encourage data sharing. State boards should encourage the sharing of data and coordination of resources between departments as well as provide support for data analysis and reporting. Some mechanisms for encouraging such action are public statements, presentation invitations, and requests for information.

Develop a statewide data management system. State boards and state education agencies should develop statewide data management and inventory tracking systems with a searchable database that allow the public to determine the status of physical safety maintenance considerations (e.g., lead testing and asbestos removal) quickly and easily.

Support public reporting of data. State boards should advocate for pertinent agencies to make available the test results and mitigation plans in a comprehensive summary report that is released annually or biannually online and presented to the state board to inform budget requests and strategic planning for building operations.

Technical and Financial Support

Designate a point of contact. State boards and state education agencies should publicly designate an agency point of contact whose responsibilities include supporting local administrators in communicating plans to test, results, and mitigation action

to school communities and providing schools with technical assistance before, during, and after testing.

Provide training for the appropriate school personnel. State boards should provide guidance and training for school personnel on developing inventory management systems, creating state or local databases for publicly releasing results, and developing flushing or filter maintenance programs. These are important parts of testing that can often be overlooked but can contribute greatly to the success of testing, maintaining safe lead levels, and meeting the community's transparency expectations.

Advocate for equitable funding. In their annual advocacy for the education budget at the state legislature, state boards should include a request for funding that addresses testing and mitigation in alignment with the needs identified in the strategic plan for building operations. Funding equity should be emphasized in this and all budget advocacy to ensure that communities at greatest risk for exposure to lead and the most limited access to clean drinking water have the necessary resources to test and mitigate.

Schools are central to children's health and success. Prioritizing their health and safety, providing appropriate resources and support for testing and mitigation, and ensuring coordination among many people and departments will be critical to effectively, equitably addressing lead in school drinking water. State boards have a powerful role to play in supporting and advocating for effective testing. Advocating for comprehensive testing regulations and well-funded programs can help ensure all students have access to clean and safe drinking water at school.

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2 Angie Cradock et al., "Early Adopters: State Approaches to Testing School Drinking Water for Lead in the United States" (Harvard T.H. Chan School of Public Health and University of California, January 2019), **https://www.hsph.harvard.edu/prc/projects/early-adopters/**.

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5 Sara Roth, "99% of Portland Schools Have High Lead Levels," KGW.com, August 12, 2021; Portland Public Schools, "2016 Water Testing Results," web page (Portland, OR, N.d.), **https://www.pps.net/Page/14260**.

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16 Council on Environmental Health, "Prevention of Childhood Lead Toxicity," *Pediatrics* 138, no. 1 (2016): **https://pediatrics.aappublications.org/content/pediatrics/early/2016/06/16/peds.2016-1493.full.pdf.**

17 Ibid. To learn more about mitigation strategies, schools should consult with a water utility or licensed plumbing contractor.

18 GAO, "Lead Testing of School Drinking Water."

19 Cradock et al., "Early Adopters."

20 Gary A. Burlingame et al., "Lessons Learned from Helping Schools Manage Lead in Drinking Water to Protect Children's Health," *Journal AWWA* 110, no. 10 (2018): 44–53.

21 Caroline Pakenham et al., "A Lead Free Future: Research and Recommendations for Protecting Children from Lead in Water" (Elevate Energy and Illinois Action for Children, 2021), **https://www.elevatenp.org/publications/a-lead-free-future-research-and-recommendations-for-protecting-children-from-lead-in-water/**.

22 It may well be that the pandemic created de-

lays in release of public information on recent programs.

23 We conducted interviews with representatives from California, District of Columbia, Georgia, Illinois, Indiana, Iowa, Michigan, Minnesota, New Hampshire, North Carolina, Oregon, Pennsylvania, and Vermont. A small selection of school districts in Chicago and Merrillville, Indiana, provided insight into the implementation of testing programs at the local level.

24 In this report, these states' initiatives are listed as "other."

25 The EPA's Lead and Copper Rule establishes a lead action level of 15 ppb for water systems and facilities that have and/or operate their water source. If the 90th percentile lead-level concentration of tap samples exceeds 15 ppb, water systems must take additional actions, such as optimizing corrosion control, public education, and lead service line replacement. The action level for lead is not a health-based standard and is based upon EPA's evaluation of available data on the ability of corrosion control to reduce lead levels at the tap. The action level is a screening tool for determining when certain treatment techniques are needed.

26 EPA, *3Ts for Reducing Lead*. Revised in 2018, the guidance notes there is no safe blood lead level in children and does not include a mitigation level. Instead, the EPA encourages programs to prioritize efforts based on lead sample results and to reduce lead levels to the lowest possible concentrations by using best water quality management practices.

27 There may be states where there is no state-level database but a public database of results is available at a county, city, or school district level.

28 The EPA also published a parent letter template. EPA, *3Ts for Reducing Lead*, module 1.

29 The EPA also published Data Sampling eTracker for Schools and Data Sampling eTracker for Child Care Facilities. EPA, *3Ts for Reducing Lead*.

30 Contacts for each state can be found at **https://www.epa.gov/dwcapacity/wiin-2107-lead-testing-school-and-child-care-program-drinking-water-state-grant-program**.

[APPENDIX]

Glossary

Inventory management system: An inventory management system is a means to catalog and track physical assets in a school. In this report, an inventory management system refers to the tracking of faucets, fixtures, and outlets used to provide drinking and cooking water to students and staff. Commonly, each fixture in a building is assigned a unique identifier, as well as attributes such as location, type of fixture, make and model, year installed, date of last repair, etc. Some schools may have an inventory management system already in place for their water fixtures as part of their maintenance tracking and work order system. This system will be important for tracking lead sample results for each fixture, especially when mitigation and retesting activities occur. An inventory management system also helps track lead test results over time.

Lead action level: The lead action level refers to the level of lead in water at which action must be taken to reduce lead levels in water.

Lead and Copper Rule: The Lead and Copper Rule was first promulgated in 1991 to minimize lead and copper in drinking water. As part of this rule, water systems need to monitor the water at customer taps according to established timetables and take various actions if 10 percent of samples exceed the 15 ppb action level for lead or 1.3 parts per million action level for copper. According to the EPA, proposed revisions to the rule will "require a more comprehensive response at the action level and introduces a trigger level of 10 ppb that requires more proactive planning in communities with lead service lines." The outcome of rule review is expected in December 2021.

Mandatory program: Mandatory testing includes a state regulation for schools to test for lead in their water or that participation in a testing program is required. Mandatory testing initiatives may require one-time testing or recurring testing.

Mitigation: When it comes to lead in water, mitigation refers to the activities taken to reduce lead levels in drinking water. It can encompass a range of activities: replacing pipes, plumbing parts, and fixtures and installing point-of-use filters or cleaning aerators.

Parts per billion (ppb): This is a unit of measurement to indicate the amount of lead in a water sample.

Retesting: Retesting in the context of lead in water testing refers to additional rounds of sampling that occur after mitigation actions have been taken. The goal of retesting is to ensure the mitigation action has been successful in reducing lead levels.

Safe Drinking Water Act: The Safe Drinking Water Act was passed in 1974 and amended in 1986 and 1996. The act and its amendments were intended to protect public health by authorizing the EPA to regulate drinking water contaminants from a wide variety of water sources. The Lead and Copper Rule was promulgated under the act in 1991.

Voluntary program: A voluntary program is defined as a statewide program where testing for lead in water is available or recommended but not required by a state agency or regulation.

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