

# EARLY ADOPTERS

## State Approaches to Testing School Drinking Water for Lead in the United States



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### Executive Summary

This report describes the features of 25 statewide initiatives in operation between January 2016 and February 2018 to test for lead in school drinking water. The report also estimates the prevalence of elevated lead concentrations in tap water in public schools based on the available data in 12 of those states.

Despite an uptick in awareness of and attention to the issue of lead in drinking water, researchers found that many students in the U.S. attend public schools in states where not all taps are tested for lead. Currently, there is no uniformity in states' approaches to create and oversee programs to test for elevated lead in school drinking water. When collected, data on lead in school drinking water are not collected in a uniform manner across states, nor are they regularly made available to guide action to reduce potential exposure to lead. In those states that have tested for lead in drinking water and had data available, nearly half of the schools (44%) have identified one or more water sources with elevated levels of lead and more would do so if lower action levels were used to test all drinking water sources in schools.



Findings suggest that specific, standardized practices for collecting samples of tap water and testing them for lead combined with financial and technical assistance could support more states in adopting programs with the recommended practices for limiting lead exposure in school drinking water. Additionally, up-to-date electronic data management guidance, bolstered by improved federal financial and technical support, could standardize practices for data collection, database development, and reporting to improve timely identification of elevated lead levels in school tap water, thus limiting lead exposure from school water outlets.

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## The Issue

Reports of lead contamination have emerged in schools and communities across the country. The focus on this issue is deserved: even at low levels, lead exposure is harmful, especially in young children.<sup>1-3</sup> Experts agree that there is no safe level of lead exposure.<sup>4</sup> Sugary drinks are the largest single source of added sugar in the American diet and are among the top single sources of calories.<sup>5</sup> Drinking water in place of sugary drinks is an important public health strategy to help all children grow up at a healthy weight and to promote oral health. However, for students,<sup>6</sup> families and decision makers, concerns about school water quality may inhibit consumption. Water must be safe to drink in order to promote its consumption. This report describes the features of statewide initiatives in operation between January 2016 and February 2018 to test for lead in school drinking water. It also estimates the prevalence of elevated lead concentrations in tap water in public schools based on the available data in 12 states.



### Key Terms

#### Tap

*A plumbed outlet for water for human consumption that is accessed in a school building (e.g., drinking fountain, faucet or other dispenser, or kitchen tap used for food preparation or cooking).*

#### First draw sample

*The water sample taken from the tap directly after it is turned on. This sample is taken after a period of non-use called a stagnation period.*

#### Action level

*The concentration of lead in parts per billion (ppb) found in a drinking water sample that triggers a response.*

#### Drinking water testing program

*A program initiated by a state agency or department pursuant to an existing directive or grant of authority.*

#### Drinking water testing policy

*A policy mechanism used to establish the program via state statute, executive order, or funding appropriation.*

#### Sugary drink

*A drink that has added sugars, including soda, sweetened iced tea, sports drinks, energy drinks, fruit punch, and other fruit-flavored drinks.*

## Introduction

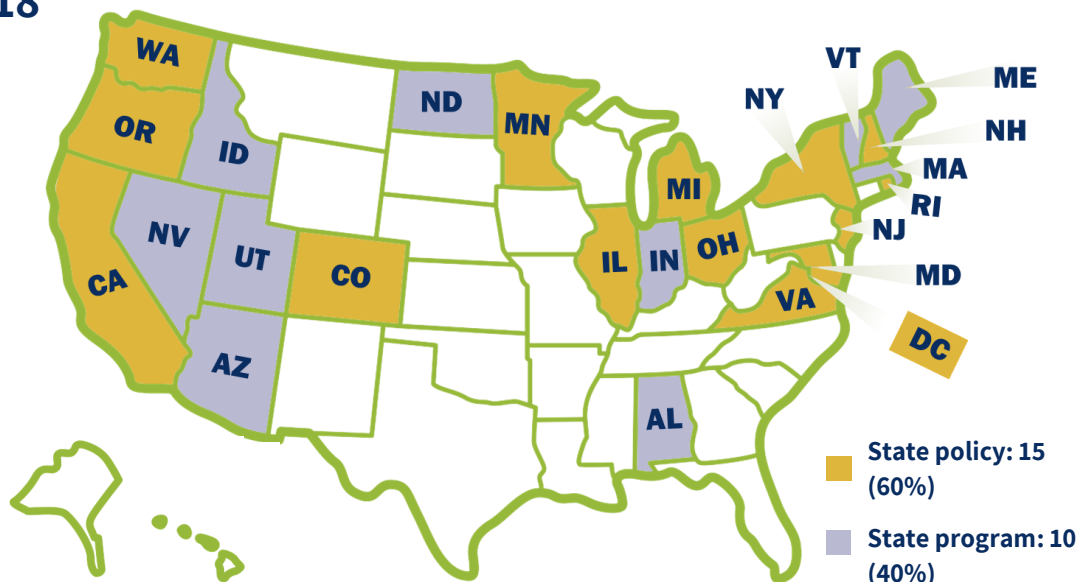
Lead can enter drinking water when water service lines that bring water into a building or components of plumbing, such as solder or fixtures used in the school building, contain lead.<sup>1</sup> School districts across the nation have discovered elevated levels of lead at drinking water taps.<sup>1,7,8</sup> However, locally collected data do not provide a context that allows decision makers to gauge the number of children that may potentially be exposed to lead from school tap water. Most schools (89%)<sup>9,10</sup> are not themselves subject to enforceable federal drinking water standards, including testing for lead, because they obtain their water from a public water supplier, typically a water district or a water utility company. Federal laws do regulate allowable lead content in drinking water among the 11% of schools that provide water for students via sources such as a well or cistern and operate as their own public water supply.<sup>9,10</sup> A water supplier is subject to federal oversight through the Safe Drinking Water Act (SDWA),<sup>1,7,11</sup> however lead may enter the drinking water after it has left the supplier. Federal standards for the allowable lead concentrations in water are intended to guide public water system corrosion control practices to reduce lead in public water supplies and are not based on the potential health effects of lead in drinking water.<sup>1</sup> Yet, students spend many hours in school during which they consume water from school drinking water outlets and through foods prepared or cooked with water. Prior,<sup>12</sup> and more recent federal guidance (known as the 3Ts) released in October 2018<sup>13</sup> suggest, but do not require, practices for training school officials, testing for lead in drinking water in schools and child care facilities, and communicating results of lead testing.

As of February 2018, 24 states and the District of Columbia had developed statewide school drinking water lead testing initiatives (Figure 1). This research summary provides an overview of state school drinking water lead testing programs in these 25 locales and uses available state program-provided data to summarize the findings on lead in drinking water in schools in 12 of these states.

**Figure 1: States with school drinking water lead testing programs as of February 2018**

**Program:** an effort initiated by a state agency or department pursuant to an existing directive or grant of authority

**Policy:** a mechanism to establish a program via state statute, executive order, or funding appropriation

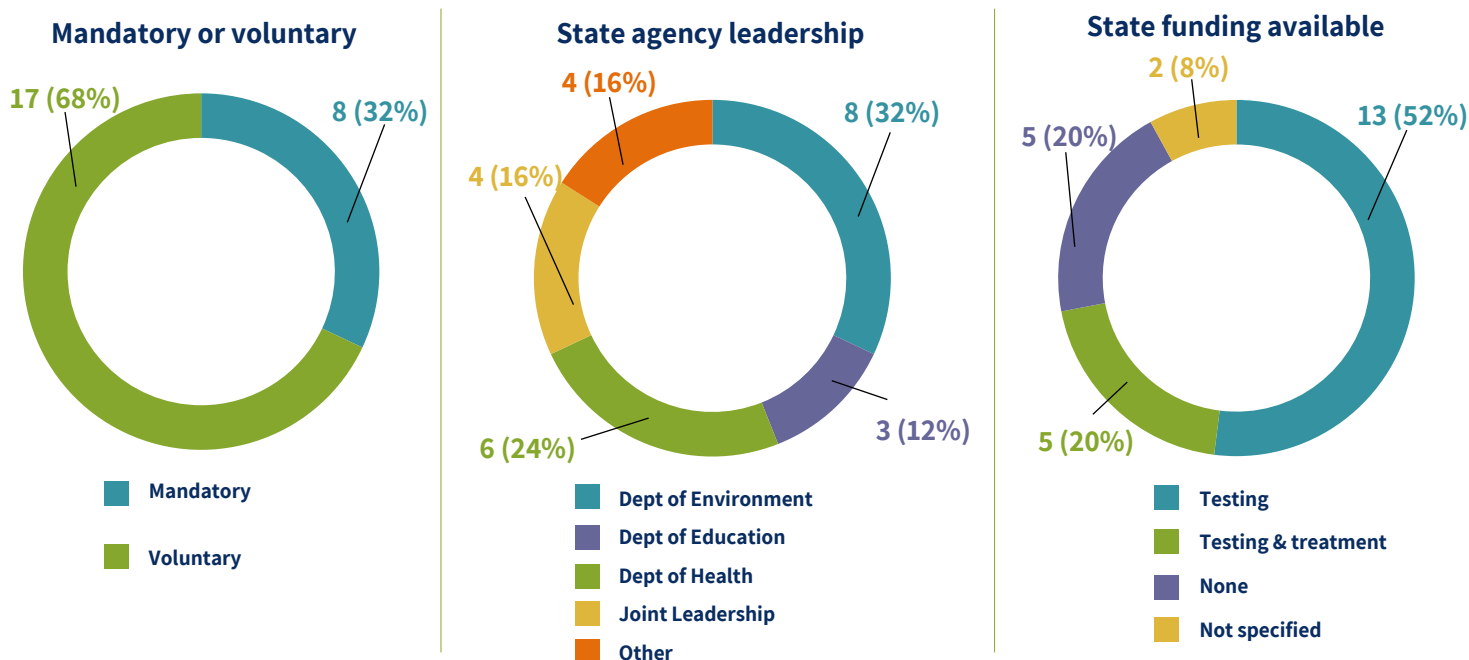


## Brief Methodology

This study describes the state-level policies and programs established in 24 states and the District of Columbia (25 states herein) to conduct testing for lead in school drinking water that were in operation between January 1, 2016 and February 28, 2018. To identify and summarize the features of state policies and programs, researchers conducted online searches using a search engine and by scanning state legislative and department websites and existing resources from public health organizations. Researchers communicated with state government agencies to verify their policy or program and to request relevant documents and up-to-date data on water quality test results for lead. Researchers coded state documents using a structured content analysis protocol to identify key features of the states' protocols and procedures for implementing their state school drinking water lead testing program and to compare the state protocols and procedures to federal guidance available during the study period.<sup>12</sup>

Researchers analyzed state-provided data on lead content in water samples collected in schools in 12 states during their initial testing program implementation. States were contacted in March 2018 and asked to provide up-to-date water testing results or confirm the status of publicly available data; 12 states (Alabama, Arizona, California, Massachusetts, Nevada, New York, Ohio, Oregon, Rhode Island, Utah, Vermont, and Washington, D.C.) responded between March and May 2018 with available data. From the available data and publicly available school directories, researchers identified public schools serving grades pre-Kindergarten through 12 that were assessed through state school drinking water lead testing programs. Some state programs additionally tested other types of organizations, such as private schools, recreational facilities, and child care centers, which are not described here. While some states collected multiple samples from each water outlet, for consistency, this analysis uses only the first draw sample. These data did not permit examination of schools' responses to test results. Data were summarized among public schools participating in the state drinking water testing programs in these 12 states combined in aggregate as well as state-by-state. A state-specific profile for each state program highlighted in this report, with demographic information and available lead content findings can be accessed at <https://www.hsph.harvard.edu/prc/projects/school-research/early-adopters>.

**Figure 2: State school drinking water lead testing program characteristics as of February 2018**





## Key Findings

### ◇ There is no uniformity in approaches to create and oversee programs to test for elevated lead in school drinking water

While the version of the Environmental Protection Agency's "3Ts" sampling guidance available during the study period<sup>12</sup> provides guidance for schools<sup>12</sup>, it does not provide guidance for states. States have adopted a variety of means to initiate testing programs (Figure 2).

**Mechanism:** Of the 25 states with a school drinking water testing initiative between January 1, 2016 to February 28, 2018, 15 states (60%) enacted a new policy mechanism to establish the program via state statute, executive order, or funding appropriation. The remaining ten states (40%) operated programs that were initiated by a state agency or department pursuant to an existing directive or grant of authority.

**Responsible Agency:** In almost one-third (32%) of these 25 states with a program, the state agency responsible for leading the implementation of the program was the state's department of environment. Elsewhere, lead state agencies included departments of health (24%), departments of education (12%), joint departmental leadership (16%), general services (4%) or finance authorities (4%).

**Participation:** In 17 states (68%), a school's participation in the school drinking water lead testing program was voluntary, while in all remaining states, participation was mandatory for specified classifications of schools.

**Funding:** Just over half of the states (52%) with school drinking water lead testing programs provided funds for water testing. Only five state programs (20%) provided funds for both water testing and treatment/remediation. Five states (20%) did not provide funding for either testing or treatment, and two states (8%) did not provide specifics on the availability of funding. In four of the eight states with mandatory testing programs for specified schools, funding for conducting the laboratory lead testing was provided by the state program.

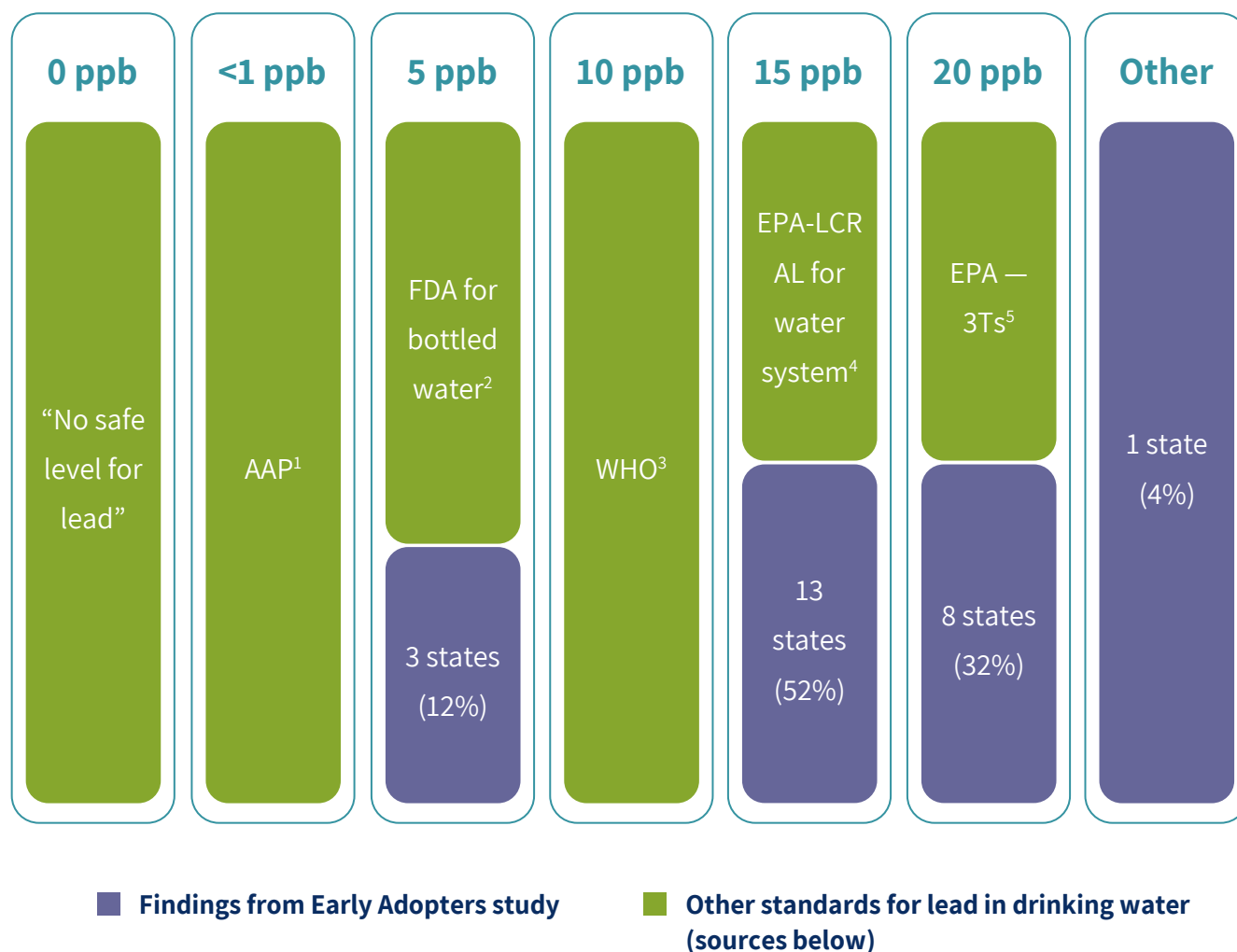


### ◇ There is no uniformity in states' action levels

The action level is the concentration of lead in parts per billion found in a drinking water sample that triggers a response. Figure 3 shows the variety of action levels in use or recommended in February 2018. Though not a health-based benchmark, federal guidance for schools had suggested that schools should use routine measures to reduce lead exposure and take action if the lead content of the water tested exceeds 20 parts per billion in a 250-milliliter sample of water.<sup>1,12</sup>

The study found that state-specified action levels for lead in school drinking water range from 5 parts per billion to 20 parts per billion. Thirteen states (52%) specified an action level of 15 parts per billion, eight states (32%) specified 20 parts per billion, three states (12%) specified 5 parts per billion, and one state did not specify a numeric value.

**Figure 3: Variation in allowable or recommended maximum concentration levels of lead in drinking water**



<sup>1</sup>American Academy of Pediatrics (AAP) COUNCIL ON ENVIRONMENTAL HEALTH. Prevention of Childhood Lead Toxicity. Pediatrics. 2016;138(1):e20161493. AAP available at <http://pediatrics.aappublications.org/content/pediatrics/138/1/e20161493.full.pdf>

<sup>2</sup>Food and Drug Administration (FDA) 21 CFR § 165.110. Subpart B- Requirements for Specific Standardized Beverages (CFR 2016) Title 21- volume2-section 165.110 available at <https://www.govinfo.gov/content/pkg/CFR-2016-title21-vol2/pdf/CFR-2016-title21-vol2-sec165-110.pdf> [Access date September 19, 2018].

<sup>3</sup>Guidelines for drinking-water quality: fourth edition incorporating the first addendum. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO. Available at <http://apps.who.int/iris/bitstream/handle/10665/254637/9789241549950-eng.pdf;jsessionid=3881FE535AD164B693E889262390B0A1?sequence=1%20Guidelines%20for%20-%20apps.who.int>. [Access date September 19, 2018]

<sup>4</sup>EPA (Environmental Protection Agency). Title 40 Chapter I Subchapter D §141.80 General requirements. United States Environmental Protection Agency; 2018. Available at [https://www.ecfr.gov/cgi-bin/text-idx?SID=531617f923c3de2cbf5d12ae4663f56d&mc=true&node=sp40.23.141.i&rgn=div6#se40.25.141\\_180](https://www.ecfr.gov/cgi-bin/text-idx?SID=531617f923c3de2cbf5d12ae4663f56d&mc=true&node=sp40.23.141.i&rgn=div6#se40.25.141_180) [Access date September 19, 2018].

<sup>5</sup>EPA (Environmental Protection Agency). 3Ts for Reducing Lead in Drinking Water in Schools: Revised Technical Guidance. United States Environmental Protection Agency; 2006.

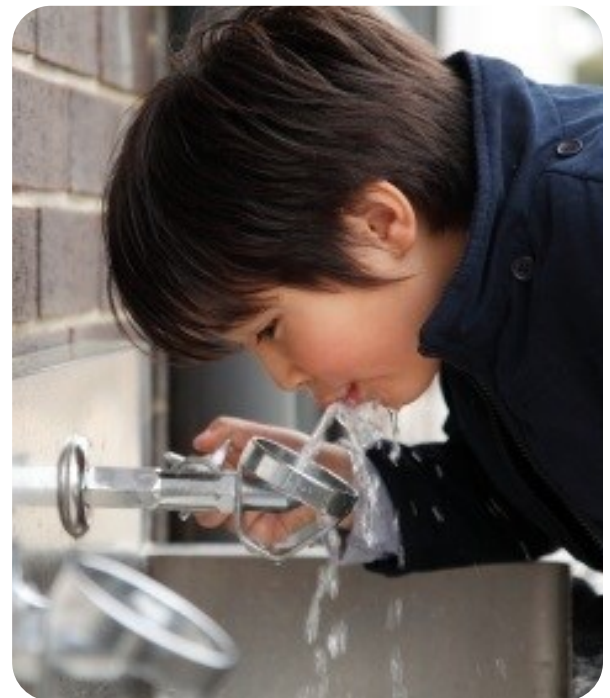
## ◇ There is no uniformity in states' protocols to test school drinking water for lead and to share their findings

Federal guidance makes recommendations for when and where to sample school drinking water taps. While 22 states (88%) reference or use the Environmental Protection Agency's "3Ts" sampling guidance<sup>12</sup> for schools in their program documents, states use varying methods for program planning, sampling, testing and treatment, or remediation. Federal guidance for schools in effect at the time this report was written suggests periodic testing of water outlets by capturing 250-milliliter samples from every tap used for drinking and cooking, at a minimum, and that schools then take specified action if a sample contains an elevated concentration of lead.<sup>12</sup> Further guidance suggests that before drawing water samples from the tap, water should remain motionless, or stagnant, in the pipes for at least 8 to 18 hours.<sup>12</sup> However, state protocols vary in the number and specified types of taps from which a drinking water sample should be collected and tested in school buildings, the frequency and other procedures for collection (Figure 4).

**Number and types of taps tested:** Most states (68%) directed schools to sample all or the majority of taps used for drinking, cooking and/or other forms of human consumption. Seven states (28%) required schools to draw water samples from a specified number of taps per school ranging from 1 to 10. One state (4%) did not include guidance for the number of samples per school in the documents reviewed. Twelve states (48%) specified taking water samples from taps that were used for drinking and cooking. Ten states (40%) specified taking water samples from taps that were used for drinking, cooking and other human consumption. Three states (12%) specified that water samples come from taps used for drinking purposes only.

**Collection procedures:** Seventeen states (68%) provided guidance suggesting that water samples include an initial "first draw" of water with later re-sampling if the initial sample test results indicate elevated lead concentrations. Four states (16%) implemented a collection protocol including a first draw sample and then a second sample collection after the water from the tap was left running for several seconds (a type of "sequential" sampling). Two states' programs (8%) specified first draws only, and two states (8%) did not specify a specific protocol in available documentation. Twelve states (48%) included in their program guidance for schools the recommendation that water remain motionless, or stagnant, in the pipes for at least 8 to 18 hours before samples are drawn. Five states (20%) advised schools to let the water remain stagnant for at least 6 hours, 1 state (4%) for at least 8 hours, and five states (20%) specified other amounts of time. Two states did not specify this process in their available documents.

**Frequency of testing:** Sixteen of the 25 states (64%) conducted a one-time sampling program; the remainder intend to repeat testing. Of these, one state (4%) planned to test annually, one state (4%) planned to test every three years, and four states (16%) planned to test at intervals of five or more years. Three states (12%) did not specify the interval of testing.



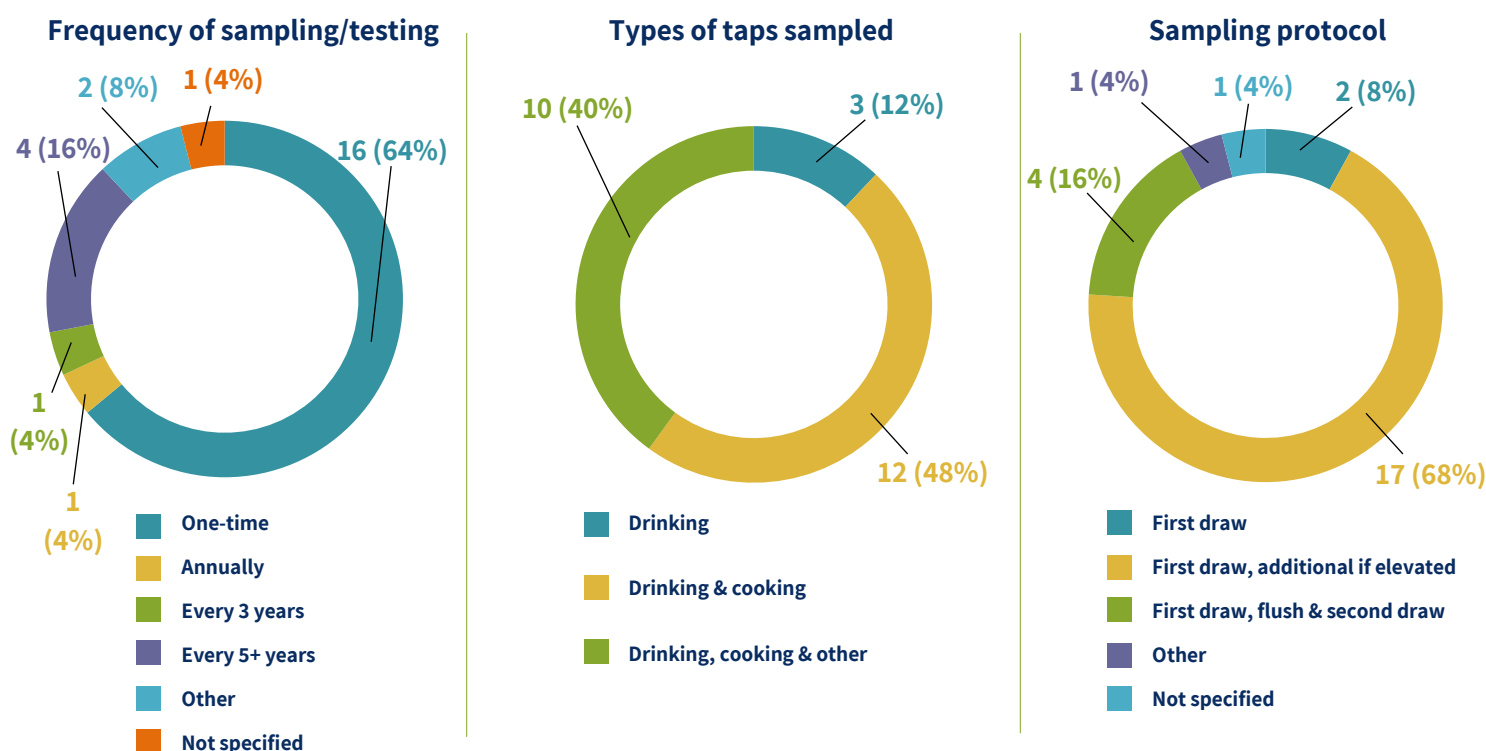
## ◇ There is no uniformity in states' recommendations for school responses to testing

Federal guidance for schools in effect at the time of this report suggests that schools should use routine maintenance measures to reduce lead exposure and prevent action level exceedances. However, if the lead content of the water tested exceeds 20 parts per billion in a 250-milliliter sample of water, remedial actions are suggested to reduce lead levels of drinking water below the action level.<sup>12</sup> Federal guidance advises schools to share test results from lead sampling programs with parent, teacher, student, and employee organizations and make copies of the sampling results available for inspection by the public in accordance with federal law.<sup>12</sup>

**Remediation:** State protocols often outlined multiple measures that could be taken to address lead in school drinking water indicating that they may consider a variety of approaches to reduce lead in tap water. Ten states (40%) listed routine maintenance such as cleaning debris from aerators, 19 states (76%) listed short-term measures such as initiating protocols for flushing the building's piping system or turning off contaminated outlets, and 19 states (76%) listed long-term strategies such as guidance to replace fixtures.

**Information sharing:** State protocols frequently listed multiple stakeholders with whom information on water test results should be shared. Lead testing results are shared with the general public in 17 states (68%), parents/guardians in 16 states (64%), state government or other authority in 12 states (48%), school staff in 11 states (44%), students in five states (20%) and other stakeholders in six states (24%). Plans for remediation or treatment are shared with parents/guardians in nine states (36%), school staff in seven states (28%), general public in six states (24%), state government or other authority in five states (20%), students in four states (16%), and other stakeholders in one state (4%).

### Figure 4: Variation in state school drinking water lead testing program data collection strategies as of February 2018





◇ **There is no uniformity in the formats used to organize and maintain data on water quality**

**Accessibility of data:** Of the 25 states with a program for testing school drinking water, 12 states (48%) shared data documenting results of school drinking water testing collected as part of their testing program in a format that could be used for these analyses. Eleven of the 12 states maintained the data in a single, centralized database. Data supplied by eight of the 12 states included the numeric values of lead concentration levels found for each sample collected in their testing programs.

**Data level of detail:** Three states maintain these data at the school level (e.g., reporting for each school the total number of samples tested and the total number of samples with lead content above the action level). In nine states, data are maintained at the tap or sample level (e.g., reporting each location where a sample was taken and the result of that sample).

◇ **Twelve percent of all water samples tested had a lead concentration at or above the state's action level**

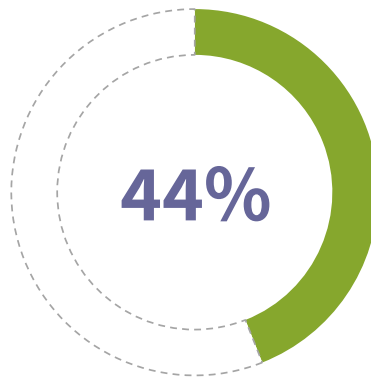
In the subset of 12 states with data describing results of school drinking water testing, a total of 10,888 (40%) public schools serving 6.7 million students (45%) in grades pre-Kindergarten through 12 were covered by the state's testing program. Schools collected a total of 485,152 first draw samples, of which 57,152 (12%) had lead concentration at or above the state's action level (Figure 5). Across states, the median percentage of first draw samples found to have lead concentration at or above the action level was 5% and ranged from 0.4% to 13%.

## Figure 5: Key findings from twelve state school drinking water testing programs

Testing was completed in



**10,888  
schools<sup>1</sup>**



of schools tested had one  
or more water samples  
with a lead concentration  
at or above the state's  
action level



**485,152**

first draw tests were completed

**57,152 (12%)**  
of all tests were above the  
state specified action level

*1. In 12 states; these 12 were those with available data on the lead content found in drinking water in schools*

◇ **Forty-four percent of schools tested had one or more water samples with a lead concentration at or above the state's action level**

In these 12 states, the median number of schools tested per state was 542, with a range of 15 to 3,619. Among the schools tested, 4,777 (44%) found that one or more taps yielded a lead concentration at or above the state's lead action level while 56% did not find a concentration of lead above their state action level. Across states, the median percentage of schools finding one or more first draw samples above the action level was 28%, with a range of 2% to 85%.

◇ **Schools that collected and tested water from a greater number of taps were also more likely to identify a sample with elevated lead concentrations**

In state program implementation guidance, six of the 12 states with detailed water testing data recommended testing all (or the majority of) taps used for drinking and cooking in a school. In these states, schools collected 45 first draw samples on average per school and 73% of schools documented one or more first draw samples at or above the state's action level. In the remaining six states with guidance for a specified portion or number of taps per school rather than all or the majority of taps, schools collected six samples on average per school, and 8% of schools tested found one or more samples with lead concentrations at or above the action level.

◇ **The use of lower action levels by a state program would increase the proportion of schools needing to take steps to address the lead content in the drinking water**

Data collection protocols in eight states that included the numeric value of lead concentration for each sample collected allowed researchers to calculate the proportion of schools within a state that would be classified as having elevated lead levels using different action levels. These eight states (Arizona, California, Massachusetts, Nevada, Rhode Island, Utah, Vermont, and Washington, D.C.) tested 12 taps on average per school (range 1 to 233 taps) in 5,703 schools. A typical state would see a 128% increase in the percentage of schools finding at least one elevated lead sample using a 5 ppb threshold compared with the existing state action level.

**In these eight states:**

- \* Using a lead action level of 15 parts per billion, the median percentage across states of schools finding at least one elevated lead sample would be 19%, with a range of 3% to 61% of schools.
- \* With an action level of 10 parts per billion, the median percentage of schools finding at least one elevated lead sample would be 25% and ranged from 5% to 68% of schools.
- \* Finally, with an action level of 5 parts per billion, the median percentage of schools finding at least one elevated lead sample would be 40%, with a range of 13% to 81% of schools.



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## Conclusions

◇ **Despite an uptick in awareness of and attention to the issue of lead in drinking water, many students in the U.S. attend public schools in states where not all taps are tested for lead**

Just over half (54%) of public school students in grades pre-Kindergarten through 12 in the U.S. attend schools in the 25 states that had developed programs or adopted policies to test school drinking water for lead before March 1, 2018. Most, but not all, of these states direct schools to sample all or the majority of taps.

◇ **Data are not uniformly collected and made available to guide action to reduce potential exposure to lead in school drinking water**

Across all states with current programs, states vary in the ways that they organize their programs to test for lead in water in schools and in what actions are taken if elevated lead concentrations are identified. Lead content data are not uniformly collected in a standardized manner according to existing federal guidance nor are data always maintained in a centralized system that allows for easy accessibility or comparison across programs. Therefore, there are no uniform procedures in place in the United States for testing school drinking water for lead, documenting data that include the content of lead in the water, or for using test data to inform programs and practices at the school level to protect children from potential exposure to lead in school drinking water.

◇ **In schools that have tested for lead in drinking water, many have identified elevated levels of lead and more would do so if lower action levels were used to test all drinking water sources in schools**

In those states with available data, four in 10 schools (44%) have identified outlets that yield water with a lead concentration at or above the state-specific action level. For example, if all state programs used the action level that the FDA allows for bottled drinking water (i.e., 5 parts per billion) for lead content, there could be more than a doubling in the proportion of schools that would need to take steps in order to reduce the lead in their drinking water (Figure 3). Furthermore, schools that conducted more widespread testing within a school were also more likely to have identified a problematic tap, suggesting that sampling only a subset of taps will not enable complete identification of all outlets with problematic lead content levels that may require remediation. Few states provide funding for both lead testing and lead remediation strategies through their state school drinking water program. Therefore, comprehensive testing protocols and use of a lower action level threshold will have financial implications for schools and school districts.

**Ensuring that all children have easy and appealing access to lead-safe school drinking water should be a health policy priority for relevant federal and state agencies and will support the promotion of drinking water as a healthy beverage of choice.**

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## Implications for Policy and Practice

- ◇ **Specified, standardized practices for tap water sampling for lead testing of school tap water together with financial and technical assistance for both testing and remediation could support more states in adopting programs and recommended practices to limit lead exposure in school drinking water**

**Coverage:** More states should adopt programs to lower the lead content of school drinking water. In the United States, nearly half of all public school students are educated in states with no state-coordinated program to test school drinking water for lead. The amount and location of risk of exposure to lead in school drinking water in these states are unknown. In a nationally representative survey of public school districts, only 43% reported lead testing, and 37% of those school districts had identified elevated lead levels in drinking water.<sup>1</sup>

**Systems to ensure identification of elevated lead in drinking water and inform action:** Clearly communicated guidance is needed on practices that states can use to effectively monitor a school's drinking water supply for lead, ideally using a standard for the concentration of lead that will not put children's health at risk. Broader uptake of best practice guidance will minimize the variations in practices and procedures used to implement a testing program. States could consider providing or ensuring sufficient financial resources for testing and remediation as the exposure to unknown, potentially significant costs may be a key barrier to participation in testing programs. Costs for remediation will vary according to the number of schools for which action must be taken where elevated lead levels in water have been identified.<sup>1</sup>

- ◇ **Up-to-date electronic data management guidance bolstered by improved federal financial and technical support, could standardize practices for data collection, database development and reporting to improve timely identification of elevated lead levels in school tap water and limit lead exposure from school water outlets**

**Coverage:** In order to ensure that all students attend public schools in which they are not at risk for exposure to elevated levels of lead in the drinking water, improved financial and technical support will be needed in many states. Mechanisms such as matching funds (as had been considered as part of a former provision in the Lead Contamination and Control Act that is no longer in effect<sup>14</sup>) or a grant program such as that announced on September 24, 2018 by the Environmental Protection Agency<sup>a</sup> could support state program implementation and more uniform implementation across states.

**Systems to ensure identification of elevated lead in drinking water and inform action:** Guidance to states should be provided on standard data collection fields, data management and data recording practices (including the specification to record a numeric value for water lead concentration). These data would enable ongoing program monitoring and the evaluation of remediation effectiveness in reducing the levels of lead in the drinking water that students and school staff consume. Standardized reporting methods would more accurately and effectively inform the public about school drinking water safety.

<sup>a</sup><https://www.epa.gov/dwcapacity/lead-testing-schools-and-child-care-drinking-water-grant-program>, accessed September 25, 2018.

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## Future Research Needs

This study reviews current state practices for addressing lead exposure in school drinking water and provides considerations for program development. However, it does not provide data to identify which approaches, protocols, and remediation strategies are most effective or cost-effective in reducing lead concentrations in tap water nor if these practices were used by states. Additional research and consensus are needed to determine a health-based standard for regulating lead concentration in school drinking water and the optimal approaches for initial assessment and ongoing monitoring of lead content in drinking water in schools in a way that is most protective of children's health. A recent study highlighted how optimal protocols may differ according to the sampling-specific objectives and how flushing practices may not be an effective mitigation strategy in all schools.<sup>15</sup> Future research could therefore also identify remediation strategies that are most effective and cost-effective in reducing lead, and the likelihood of lead, in school drinking water.

Continued research on this topic is warranted. Some states are newly adopting and modifying policies and programs for testing lead in school drinking water. Over the project period, four (16%) of the 25 states made modifications to their water testing programs. Additionally since March 1, 2018, at least two additional states have adopted a policy or program to test for lead in school drinking water.





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## Additional Study Details

Information provided in state-specific profiles and reported in aggregate in this report are those that were identified via document review or verified as happening “in current practice” by the lead agency. As of March 2018, 11 of the 25 states with a school drinking water lead testing program did not have school water quality testing results available in an electronic format or in a centralized system. Two additional states did not have test results that could be used according to our analysis plan (i.e., one state provided data on only one school, and one state did not provide data that allowed for analysis of results at the sample level).

Researchers downloaded lead testing data from publicly accessible websites and confirmed status in five states. Seven states provided data to researchers on the lead content of samples collected through their program. The District of Columbia has an ongoing, recurring testing program. However, only the initial testing results collected by the program in 2015 and 2016 were included in the current analysis to present a “baseline” among states with a testing program; subsequently collected data are not included in the current analysis. In order to identify public schools among other types of organizations assessed through state school drinking water lead testing programs and to better understand the types of public schools assessed, researchers matched demographic data on schools and students available in the National Center for Educational Statistics (NCES) Common Core of Data (2015-2016)<sup>16</sup> school directory to the schools identified in the data available from the state’s drinking water testing program in operation between January 1, 2016 and February 28, 2018. We matched schools from the state-provided data sets to national data on their school characteristics using the school and district names and other public data sources.

Researchers could not verify the characteristics of 921 (7.7%) of the 11,809 total schools assumed to be public schools serving grades pre-Kindergarten through 12 included in state’s data sets against information in the national census of public schools (National Center for Education Statistics (NCES) Common Core of Data, 2015-2016). These records were excluded from subsequent analysis. Overall, the 10,888 verified public schools with testing data in these 12 states represent 40% of all schools in those states that were eligible to participate in the state’s program. Sixty-six percent of these schools were primary schools, 16% were middle schools, 17% were high schools and 1% included middle and high school grades. Thirty-four percent of schools were located in a city, 43% in a suburban area, 9% were in a town, and 14% were in a rural locale. Forty-nine percent of students in these schools were eligible for free or reduced-price meals, 47% were white, 9% were black, 8% were Asian, 30% were Hispanic, and 5% were classified within other racial or ethnic categories.

Compared to the remaining 13 states with a school drinking water testing initiative in operation between January 1, 2016 and February 28, 2018 that did not have testing data available, there were differences in the school location and student demographics in the 12 states with water testing data. These 12 states had more city schools and fewer rural schools, a higher proportion of students eligible for free or reduced price meals, a lower proportion white students, lower proportion black students, higher proportion Asian students, and higher proportion Hispanic students than schools in the other states. These estimates represent a summary across all public schools in each group of states – they are not restricted to schools eligible for the state program.

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