PLACEVIEWS

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GET THE LEAD OUT...OF SCHOOL DRINKING WATER

Lead in drinking water is not a new public health concern. In the 2nd century BC, Nicander of Colophon described the symptoms of lead poisoning; so did Greek physician Dioscorides in the 1st century AD. Julius Caesar's engineer recommended clay pipes for water because lead could leach into water from lead pipes.[1] In the United States, the dangers of conveying water in lead pipes has been recognized since the mid-1800s. Still, they were widely installed in municipal water systems until the early part of the twentieth century,[2] and it wasn't until 1986 that federal regulations limited the lead in pipes and plumbing fixtures that convey water. In buildings constructed before 1986, the plumbing likely has high concentrations of lead. This can pose a serious health hazard, especially at schools, where the water sits in pipes for long periods (think school holidays and summer breaks). What obligations do school districts have to ensure that the drinking water on their campuses is safe? What *is* a safe level? Is any help available for testing and remediation?

WHAT THE LAW SAYS

The Safe Drinking Water Act (SDWA) of 1974, with major amendments in 1986 and 1996, regulates public drinking water in the United States. The SDWA required the US Environmental Protection Agency (EPA) to establish National Primary Drinking Water Regulations for contaminants that might harm people. Water systems must be tested and treated if any contaminant exceeds its maximum contaminant level (MCL). The EPA started with a list of 25 potential contaminants in 1974—it now lists more than 100, including lead. The MCL for lead is 15 micrograms per liter (µg/L), or 15 parts per billion. That's like 15 drops in a backyard swimming pool.

Lead is not normally in source water, but enters through the corrosion of the pipes and plumbing fixtures. Regulatory agencies have therefore attacked the problem by trying to reduce the lead content of water delivery systems and control the corrosiveness of water. The 1986 SDWA amendments required that facilities providing water for human consumption use "lead-free" pipes, solder, and flux for installation and repair. Solder with less than 0.2 percent lead was considered lead-free,[3] as were pipes and fixtures with less than 8 percent. States were required to adopt regulations that were at least this stringent by June 1988, and in 2001 the federal limit for lead in plumbing fixtures was reduced to 4 percent.

In 2006, California passed the first state law with more restrictive limits on lead in pipes, fittings, and fixtures—0.25 percent. The Department of Toxic Substances Control implemented the new law in 2010 and has authority to test fittings and fixtures

for compliance. The federal government matched this more restrictive standard with the Reduction of Lead in Drinking Water Act, which goes into effect January 2014. However, federal and state regulations don't require suppliers to replace lead components, so water quality will improve only as existing infrastructure is upgraded.

The 1986 SDWA amendments also led to new regulations to minimize the corrosiveness and amount of lead in water supplied by public water systems (PWSs)—the Lead and Copper Rule. The rule requires PWSs to sample tap water at high-risk residences (but not schools) for lead and copper. If lead concentrations exceed 15 µg/L in more than 10 percent of the collected samples, the supplier must take corrective actions.

All these laws apply only to PWSs—that is, water purveyors that have 15 or more service connections or that serve at least 25 individuals daily for at least 60 days a year. PWSs are typically municipal water companies, but can include other entities (such as schools) with their own water supply system.

NEW STATE PROGRAM OFFERS FREE LEAD TESTS FOR PUBLIC SCHOOLS!

The State Water Board has a new program of testing for lead in drinking water.
Public schools can request the tests which will be performed and paid for by their water provider.

Interested districts should submit a written request to their water provider.
For more information, visit the program website at:

www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/leadsamplinginschools.shtml

SCHOOLS: THE LEGAL OBLIGATION

Lead in drinking water at schools receives special attention for three reasons: children are particularly vulnerable to lead poisoning; plumbing systems in schools are often very old and so more likely to contain lead; and school water systems are inactive for long periods. The longer the water sits in the plumbing, the more lead it absorbs. Because of the SDWA, schools know that the water from their PWS is regularly tested and meets federal and state standards as it leaves the source.[4] However, the PWS cannot control the materials used in plumbing components other than its own, so it cannot guarantee that lead concentrations are safe when water leaves the tap.

The Lead Contamination Control Act of 1988 required the EPA to create guidance to help schools determine the source and degree of lead in drinking water and remedy contamination. States were required to distribute the guidance documents and establish a program to assist with their implementation. Since then, the EPA has issued extensive guidance and tools for school districts—e.g., specific procedures for testing, determining the source of elevated lead levels, and responding appropriately when problems arise. A clearinghouse for information about the various EPA initiatives can be found at its website.[5]

Federal and state laws only require PWSs to test water, so most existing school programs are voluntary. However, some school districts are compelled to conduct testing by their state or local health departments according to legally binding agreements. For instance, the Philadelphia Health Department ordered the city school district to test drinking water in 1999. The EPA recommends that schools include programs to reduce lead in drinking water with their overall plan for reducing environmental threats. According to the EPA, schools that voluntarily test water and disseminate information about their program will enjoy enhanced credibility, positive publicity, parental and community support, and stature as a standard-setting "best practices" facility.[6] The EPA's program to facilitate actions that reduce children's exposure to lead from drinking water at schools relies on the following components, referred to as the "3Ts":

- Training school officials to raise awareness of the potential occurrences, causes, and health effects of lead in drinking water; assist in identifying potential areas where elevated lead may occur; and establish a testing plan to identify and prioritize testing sites.
- Testing drinking water in schools to identify potential problems and take corrective actions as necessary.
- Telling students, parents, staff, and the larger community about monitoring programs, potential risks, lead testing results, and remedial actions.[7]

WHY TEST FOR LEAD?

School districts choose to address lead in water for a variety of reasons. In a recent nationwide survey, PlaceWorks found that many districts conducted one-time testing in response to new regulations, fleeting periods of public attention, or the availability of financial assistance. Sometimes testing was repeated, but more often than not, only after a specific complaint. A few school districts have routine programs for testing drinking water or regular flushing programs to ensure the safety of their drinking water until problems can be permanently resolved (see sidebar). But these are exceptions—most districts probably don't know for sure whether their schools' drinking water is safe. Just recently, a California school district reported that unsafe lead concentrations had been found in one-third of its schools. This situation developed over little more than 10 years, when all schools were tested and found in compliance.[8]

Although testing is fairly inexpensive, correcting problems may not be. Why voluntarily embark on a program that could add yet another burden on tight school budgets? Mainly because the potential health problems are so appalling, and many are irreversible.[9] Districts can also face unpleasant consequences, such as public relations nightmares and lawsuits. Our advice is to develop a lead-in-drinking-water program—or you may have to explain to an angry community why you didn't.

SEATTLE SCHOOLS SET A STANDARD

The Seattle Public Schools (SPS) has perhaps the most proactive program in the nation for lead in drinking water. This district first started testing water in its schools in 1990 and now tests nearly 100 schools and district buildings on a recurring, three-year cycle. The most recent cycle was completed in June 2013 and tested 3,916 sources. SPS issues annual reports that summarize progress and maintains a website that the public can access to review test results going back to 2004 for all district schools.

While testing was carried out, activated carbon filters were installed at 267 sources, and bottled water was supplied to all schools built before 1997. Pipe replacement projects began in 2007, and 26 schools received major upgrades by 2012. When a piping replacement was completed and testing showed that standards were met, the bottled water was discontinued. The most recent annual report (2013) showed that all sources testing above 10 µg/L on a first draw or flush sample had been remediated, retested, or shut off. As an ongoing precaution, current SPS policy requires all district schools to flush their drinking water sources four times a year.

Even if school buildings are new or recently remodeled, one-time testing will confirm that contractors used lead-free materials and did not disturb debris or scaling in other parts of the plumbing system that may protect the water from coming into contact with lead.

HOW MUCH LEAD IS SAFE?

Although the federal and state drinking water standard for lead (i.e., MCL) is 15 µg/L, this number was not based solely on health risk, but on the economic feasibility of treatment technologies at the time it was first set. In comparison, based on current risk assessment principles, practices, and methods, California's public health goal is 0.2 µg/L for the amount of lead in drinking water that poses no significant health risk over a lifetime. In its guidance documents under the Lead Contamination Control Act, the EPA set an action level of 20 µg/L for lead in drinking water at schools, which is higher than the MCL and the action level used by PWSs. The EPA justifies the higher concentration in part because of differences in the sampling protocol. However, the EPA also believes that a concentration of "zero" is the optimal health-protective goal for lead in drinking water. The human body can use trace amounts of some metals, but lead isn't one of them.

In our recent survey, we found that most school districts take action when lead exceeds either 15 µg/L or 20 µg/L. At least one district has set its action level at 10 µg/L. Other districts have tried to customize an action level using a school-risk-based exposure scenario. In light of the available guidance, a lead concentration of 15 µg/L in drinking water can be considered a default, conservative basis for follow-up action.

GETTING THE LEAD OUT

If a lead problem is identified, remedies should be tailored to the contributing source. Possible sources are the water supply (unlikely, given PWS testing requirements), the PWS distribution system, the school's internal plumbing system, and/or the drinking water outlet. Remedies are generally categorized as either "temporary control measures" or "permanent remedies."

Temporary control measures include flushing the outlet before school opens, cleaning the outlet aerator or screen, providing bottled water, and/or shutting off the outlet until the problem is resolved. Flushing programs need a responsible individual to routinely flush drinking water outlets and keep careful records. Depending on the outlet, the EPA recommends flushing for 30 seconds to 15 minutes. Depending on the severity of the problem, flushing may be required daily or only after long inactivity.

Permanent remedies include replacing the water cooler/bubbler or other contributing components, installing water treatment units at the tap, using time-operated solenoid valves to automatically flush the line, or permanently closing the problem outlet. Reverse osmosis and cartridge units can be effective in removing lead at the tap. The California Department of Public Health (CDPH) has a list of certified treatment devices for lead reduction.[10] With the remedy in place, drinking water should be retested until it shows compliance. Permanent remedies generally resolve the problem so that routine testing and temporary control measures are no longer necessary.

WHO CAN HELP?

For additional information or assistance with lead in drinking water programs, school districts can go to their public water supplier; local health department; and/or the CDPH, the state agency responsible for implementing the SDWA. Public water suppliers are not obligated to test school water systems, but may be willing to assist with sampling or share sampling costs. Some utilities may also be willing to help develop sampling plans and plumbing profiles (i.e., prioritize sites for sampling). Resources from local health agencies are usually limited, but they may be willing to help the district involve the public or to be a liaison with state assistance programs. For school districts in California, contact the CDPH to determine the availability of financial aid or technical assistance. PlaceWorks can always help you get started.

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3 MACARTHUR PLACE, SUITE 1100
SANTA ANA, CA 92707

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Endnotes

1. Plinio Prioreschi, *A History of Medicine*, vol. 3 of *Roman Medicine* (Lewiston, NY: Edwin Mellen Press, 1998) p. 279. Footnote 154 of "Lead Poisoning," *Wikipedia*, http://en.wikipedia.org/wiki/Lead_poisoning.
2. Richard Rabin, MSPH, "The Lead Industry and Lead Water Pipes: 'A MODEST CAMPAIGN,'" *American Journal of Public Health* 98, no. 9 (September 2008): 1584–1592, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2509614/.
3. Solder typically contained 50 percent lead before 1986.
4. That is, the treatment plant. The water often picks up lead in distribution systems, especially if it has corrosive properties.
5. http://water.epa.gov/infrastructure/drinkingwater/schools/guidance.cfm.
6. United States Environmental Protection Agency, Office of Water, "3Ts for Reducing Lead in Drinking Water in Schools," 4-page pamphlet, EPA 816-B-05-009, December 2005.
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8. Beau Yarbrough, "Lead Discovered in One in Three Chino Valley Unified Schools' Water," *Inland Valley Daily Bulletin*, December 6, 2013, http://www.dailybulletin.com/environment-and-nature/20131206/lead-discovered-in-one-in-three-chino-valley-unified-schools-water. See www.dailybulletin.com for subsequent articles.
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10. http://www.cdph.ca.gov/certlic/device/Documents/WTD%202013/Sec%206%20Lead.pdf.

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Questions related to this PLACE**VIEWS** may be directed to:
Dwayne Mears, AICP, at 714.966.9220
dmears@placeworks.com