Testimony on S.40 Lead in School Drinking Water

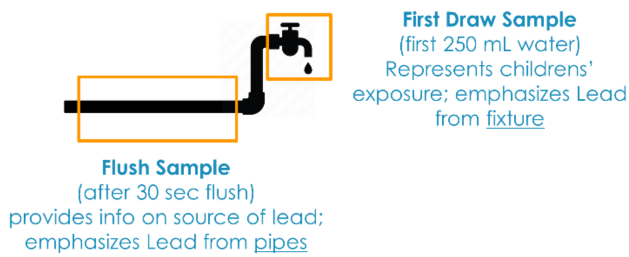
Molly Costanza-Robinson, Ph.D.
Professor of Environmental Chemistry, Middlebury College

Submitted to the Vermont House Education Committee

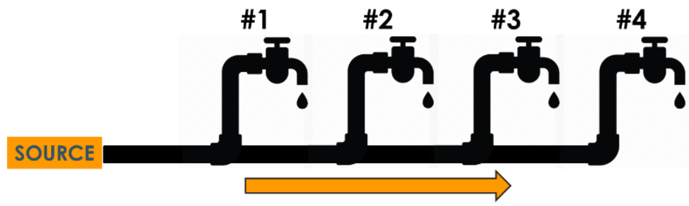
February 26, 2019

1. **Support for S.40: Water Lead Testing in Schools and Child Care Facilities**
    a. **Minimizing exposure to lead is important and urgent**
        i. Neurotoxic effects of lead include damage to the brain and central nervous system, slowed growth and development, learning and behavioral problems, and hearing and speech problems.
        ii. Lead accumulates in the body over the course of repeated exposures
        iii. Even when lead is removed from the body, damage can be irreversible
        iv. No known safe level of exposure
    b. **Children are more at risk from lead exposures than adults, because children**
        i. Experience higher lead exposures
        ii. Absorb a greater fraction of consumed lead than adults, esp. if children are experiencing nutritional deficits (e.g., calcium, iron)
        iii. Are more susceptible to irreversible effects of lead due to their developmental stage
    c. **Lead leaches into water supplies through extended contact with lead-containing plumbing materials (e.g., fixtures, pipes, solder)**
        i. Plumbing materials traditionally contained or were composed of lead
        ii. 1986 Safe Drinking Water Act (SDWA) defined "lead-free" to be ≤8% lead in pipes/fittings; ≤0.2% lead in solder and required newly installed materials to meet this standard
        iii. Vermont (2010) and federal (2011 Reduction of Lead in Drinking Water Act, effective in 2014) laws reduced the "lead-free" definition to ≤0.25% lead for pipes and fittings
    d. **The only way to know if/how much lead is in the water is to test it.**

2. **Support for S.40: Required Appropriate Sampling Methodologies**
    a. **Samples should represent children's exposure on a typical day if they draw water first thing in the a.m.**
    b. **Sampling correctly is not difficult, but it is easy to get wrong**
    c. **Sampling errors generally bias lead levels low, resulting in lead levels that do not represent children's lead exposure and fail to protect children's health as intended** (NYC schools went from 33 → 83% of schools with elevated lead; and one school's water fountains from 35 → 3,500 ppb when they corrected their methods)
    d. **2018 guidelines in "3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities" document should be followed**
        i. Sampling should occur during the typical/active use of the building (i.e., during the academic year), prior to any use of water on a day, following at least an 8-h stagnation period for water in the lines
        ii. Any use or manipulation of the water system that is **not** typical for its daily use (e.g., pre-flushing of pipes, removal of screens/aerators) <u>should be avoided</u> before/during sampling
        iii. 250 mL samples should be collected, as this contains the initial high-lead pulse that a child would typically receive from overnight contact between water and the fixture
        iv. All First Draw water samples (representing children's exposure) should be collected in the building, followed by a second round collecting all Flush samples (providing information on the source of lead). This sequence avoids sampling-induced flushing and low bias for lead in first draw samples.



- **v.** Sampling should proceed from "upstream to downstream" (i.e., from closer to where the water first enters the building to further away), which avoids inadvertent sampling-induced flushing of the lines



3. Support for S.40: Scope of Testing

- **a. All schools and childcare facilities should be tested using the more representative and health-protective methodologies and action level required by S.40**
- **b. All water outlets with reasonable potential to be used for consumption or cooking should be safe for use by children, not only water fountains**

4. Recommendation: lower the action level from 3 ppb to 1-ppb

- a. The only available **safety-based guidelines** for lead in water are a **0 ppb Maximum Contaminant Level Goal** (MCLG, US EPA) and the **1-ppb safety level provided by the American Academy of Pediatrics**. Other guidelines (e.g., the 15-ppb EPA action level) **were not intended as "safe levels,"** but rather as levels that were reasonably achievable by municipal water providers **with the existing higher-lead plumbing materials available (1991) and that are now illegal to sell/install**. Conclusion: The appropriate health-based action level is 1 ppb.
- **b.** In many cases, outlets that show high lead are a result of long stagnation times because the outlets are used infrequently; some high-lead outlets have conveniently located low-lead alternative outlets nearby. Conclusion: Schools often have a low-cost remedy (outlet removal) available to them.
- **c.** Roughly, half of all outlets, which includes many outlets that were installed before new low-lead requirements were in effect, and, indeed, some entire schools currently meet the 1 ppb level. Conclusion: A 1-ppb action level is achievable, and many outlets already meet this level.
- d. Data show that replacing older fixtures with ones that meet newer lower-lead requirements substantially reduces water lead levels. Although data are limited, in every case (VDH pilot, scientific literature) fixture replacement reduced water lead to ≤3 ppb and often met a 1 ppb level. Conclusion: schools have a low-cost remedy (fixture replacement) available that will suffice to meet the 1 ppb level much of the time.
- **e.** In cases where fixture replacement is insufficient to meet a 1 ppb action level, schools can revisit whether the outlet is truly needed or whether filter installation (which I am using generically to stand in for a variety of point-of-use treatment technologies) or larger-scale retrofitting is the preferred option. Filters that are approved for lead removal **easily meet a 1 ppb action level**. Filters require maintenance,

however, (e.g., replacement, cleaning, disinfection) and are best used in outlets that are used frequently. Infrequent flow through filters can result in other water quality concerns, such as bacterial growth. Thus, adding a filter should be undertaken thoughtfully, only where appropriate, and with a clear timetable/plan for maintenance. Without a mandated and clear maintenance plan, schools run the risk of neglecting the filters, of providing a false sense of security, and of introducing other water quality concerns. Conclusion: Filters are highly effective at meeting a 1-ppb action level, but are best used after more permanent remedies that do not require ongoing maintenance are considered (e.g., new fixtures, outlet removal).

5. **Recommendation: For the initial round of testing, grandfather in schools that have already recently tested using methodologies that comply with requirements of S.40**
   a. More than 25 schools have already/recently been tested for lead using sampling methodologies that comply with the EPA's 3Ts guidance and requirements proposed in S.40. There is little to be gained for children's safety, and only more money spent and staff time diverted from lead remediation initiatives, by asking these schools to repeat their testing so quickly. For any lead analysis not already performed by a certified laboratory, the original preserved samples can be sent to a certified lab.

Recommended Changes to S.40 as passed by the Senate

	Language change	Rationale
§1242 (1)	(1) "Action level" means ~~three~~ one parts per billion (ppb) of lead.	See #4 above
§1243 (d)	Interim methodology….shall be at least as stringent as the sampling methodology provided for under the 2018 U.S. Environmental Protection Agency's 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities	There are multiple updates to 3Ts guidance. The 2018 update provides important improvements to the sampling guidance.
§1243 (e.1.A.)	completed sampling of all outlets …in the two calendar years preceding January 1, 2020	See #5 above
§1243 (e.2.)	As a result of sampling ~~conducted~~ completed in the two calendar years preceding January 1, 2020	"Completed" provides consistency with §1243 (e.1.A.). See #5 above
§1246 (b)	Guidance; … shall reference the 2018 U.S. Environmental Protection Agency's 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities	See above
§1247 (a)	…no less stringent than the ~~requirements of~~ the sampling methodology provided for under the 2018 U.S. Environmental Protection Agency's 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities	See above; strike "requirements" because the 3Ts is a guidance document and does not, itself, provide for any enforceable requirements

Resources

American Academy of Pediatrics, Prevention of Childhood Lead Toxicity. *Pediatrics* **2016,** *138*, 17.More t

EPA, *3Ts for Reducing Lead in Drinking Water in Schools and Childcare Facilities*; U.S. Environmental Protection Agency: 2018.

Government Accountability Office, *K-12 EDUCATION: Lead Testing of School Drinking Water Would Benefit from Improved Federal Guidance*; Washington, D.C., 2018.