School Drinking Water Safety

Research Brief • July 2021

NATIONAL STUDY, 2019[1]

A research team from the Harvard TH Chan School of Public Health and the University of California Nutrition Policy Institute performed a structured content analysis of all state policies or programs to test for lead in school drinking water as of 2018. Researchers obtained school drinking water lead test results from the 12 states that had data in a form that allowed analysis.

This first-of-its-kind national study provided statistical analysis of lead test results and a profile of findings for each studied state.

CALIFORNIA STUDY, 2020[2]

A research partnership of Stanford University, the University of California Nutrition Policy Institute and Virginia Polytechnic Institute investigated drinking water quality in a random sample of 240 California public schools. One intent of the study was to understand implementation of CA AB 746, a 2017 state law requiring tap water testing for lead in schools.

This is the only peer-reviewed study of overall water quality in schools across an entire state using data from water system health standards compliance reporting and from school tap lead testing.

To date, the U.S. does not collect national data on school tap water safety. This brief presents findings from two studies of school drinking water.

Snapshot of Findings: National Study

In the 12 states with available data on the lead content in school drinking water,

- 12% of all drinking water samples had a lead concentration at or above the state's action level
- 44% of schools tested had a least one drinking water sample with lead at or above the state's action level
- If the action level were 5 ppb (the FDA limit for lead in bottled water)[4] a typical state would see more than twice as many schools with at least one tap above this threshold (a 128% increase)

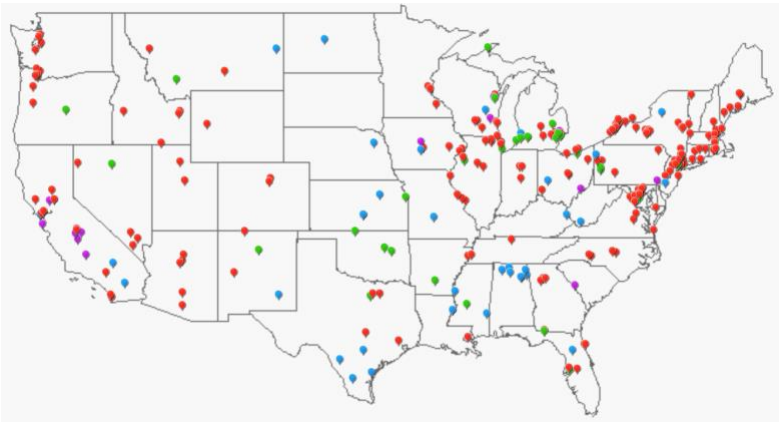
Snapshot of Findings: California Study

California, in general, has less lead in school plumbing systems, yet,

- While only 3% of California schools had at least one sample over the state's 15 ppb action level for lead, 16% of schools had at least one sample exceeding 5 ppb
- 16% of study schools received water from a utility that was in violation of federal Safe Drinking Water Act health standards for contaminants other than lead

What Else Do We Know?

Lacking nationwide data, simply looking at media reports from tap water testing reveals lead in school drinking water – and tap water safety in general – is a widespread problem:



Source: National Drinking Water Alliance, https://www.drinkingwateralliance.org/new-map

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Lead Action Levels

States vary in the amount of lead they consider allowable in school drinking water, ranging from 3 ppb to 20 ppb.[1] Health organizations and U.S. agencies vary in the amount of lead they consider acceptable in drinking water, ranging from 1 ppb (American Academy of Pediatrics goal for school drinking water)[3] to 5 ppb (FDA standard for bottled water in the U.S.)[4] to 15 ppb (EPA action level for water utilities).[5]

Health Implications of Findings

School drinking water can be a contributor to children's lead ingestion. Lead is a toxin that can decrease IQ and increase behavioral problems.[6,7] Studies estimate that even low levels of lead exposure decrease the overall IQ of the U.S. population.[8] Drinking water is important for healthy hydration, including as a substitute for sugary drinks, but it must be safe to consume.[9]

Equity Implications of Findings

Despite an uptick in awareness of and attention to the issue of lead in drinking water, states vary in how effectively they investigate school drinking water lead levels and most U.S. students attend public schools in states where not all taps are tested for lead.[1] The national study found few consistent disparities in test results by demographic variables, but the California study found that rural schools were over 3 times less likely to have tested tap water for lead.[1,2]

Typical Testing Programs May Underestimate the Extent of the Problem

Both studies revealed ways in which most testing programs minimize the number of affected taps. For example, schools that tested more taps had a disproportionately greater percentage of samples with elevated lead, and a lower action level would yield many more samples with unacceptable levels of lead.

Photo credit: Daniel Whitman

[1] Cradock AL, Hecht CA, Poole MK, Vollmer LY, Flax CN, Barrett JL. State approaches to testing school drinking water for lead in the United States. Boston, MA: Prevention Research Center on Nutrition and Physical Activity at the Harvard T.H. Chan School of Public Health; 2019. At https://www.hsph.harvard.edu/prc/projects/ school-research/early-adopters. [2] Umunna IL, Blacker LS, Hecht CE, Edwards MA, Altman EA, Patel AI. Water Safety in California Public Schools Following Implementation of School Drinking Water Policies. *Prev Chronic Dis* 2021;18:200366. [3]American Academy of Pediatrics Council on Environmental Health. Prevention of Childhood Lead Toxicity. *Pediatrics*. 2016;138(1):e20161493. [4]Food and Drug Administration (FDA) 21 CFR § 165.110. Subpart B-Requirements for Specific Standardized Beverages (CFR 2016). [5] Environmental Protection Agency. Title 40 Chapter I Subchapter D §141.80 General requirements; 2018. [6] National Toxicology Program. *Monograph on Health Effects of Low-Level Lead.* Research Triangle Park, NC: National Institute of Environmental Health Sciences; 2012:xiii, xv–148. [7] Lanphear BP, Dietrich K, Auinger P, Cox C. Cognitive deficits associated with blood lead concentrations <10 microg/dL in US children and adolescents. *Public Health Rep*. 2000;115(6):521–529. [8] Lanphear BP, Hornung R, Khoury J, et al. Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. *Environ Health Perspect*. 2005;113(7):894–899. [9] Patel AI, Hecht CE, Cradock A, Edwards MA, Ritchie LD. Drinking Water in the United States: Implications of Water Safety, Access and Consumption. *Ann Rev Nutr*. 2020. 23;40:345-373.

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