

Chicago Public Schools

Lead Remediation Case Study

Chicago Public Schools (CPS), which operates 800 buildings (with a median age of 78 years) across 527 campuses, has implemented an aggressive plan to address lead contamination that could be instructive for New Jersey. Based on new state regulations, CPS has set a goal of less than 2 parts per billion (ppb) in all drinking water sources. With full replacement of lead plumbing estimated to cost billions, CPS initiated a pilot program at 25 of its most contaminated buildings that employed innovative “five-sequential” testing and “auto-flushing” practices.

In CPS, five sequential water samples are collected at each drinking water outlet to determine the location where lead is leaching into the water. Based on the rate of water flow, the timed samples provide a profile of lead in water readings in the school, as each sample contains water that sat overnight in a different part of the plumbing system. For example, if the first sample has elevated lead but the following samples do not, the lead likely is coming from the fixture itself. If the first samples are clean but the last samples have elevated lead, the lead likely is emanating from the vertical main water pipe called a “riser” or a horizontal “branch” line.

Based on this information, CPS is able to design specific solutions on a school-by-school basis. CPS avoids major plumbing repairs, which can be very costly, and instead focuses on a menu of other less costly but effective alternatives.

CPS has been particularly innovative in its approach to flushing, or running a water outlet for a short time after a period of inactivity. Flushing can significantly decrease lead levels by removing contaminated water before it is used for drinking or cooking. However, the time period for flushing a particular faucet or fixture depends on where in the plumbing system the lead is leaching into the water.

Recognizing that manual flushing is difficult to implement in a reliable, cost effective way, CPS innovated the use of *automated* flushing systems. CPS employs two computerized devices. Automated riser flushers (installation cost: \$3,000-4,000) move water through a building’s main pipes once per day, and Noah flushers (installation cost: \$1,000-1,500) automatically flush outlets on a programmable schedule. Schools use a combination of both flushers tailored to their building size, occupancy rate, and the typical usage of each outlet.

Flushing has the additional benefit of improving the effectiveness of corrosion control treatment. By increasing water circulation, flushing better enables orthophosphates to create a coating inside of lead pipes that reduces leaching. In one CPS school where lead levels commonly exceeded 15 ppb, four months of regular flushing improved corrosion control enough that samples taken after a week-long sitting period showed average lead levels of below one ppb.

The success of Chicago's customized, automatic flushing program is best exemplified at Orr Academy, the city's largest high school (i.e., 330,000 square feet with a separate elementary school). Prior to the pilot, the water at this facility had lead levels ranging from 16 ppb (90th percentile) to 25 ppb (95th percentile), with an average of 9.91 ppb. An automatic flushing regime reduced lead levels to an average below 2 ppb at a cost of \$28,000.

(Note: The City of Chicago pays for the cost of water on behalf of the Chicago Public School System.)

More Information

<https://cps.edu/SiteCollectionDocuments/LeadTesting/R2-WaterQualityTestingProgram.pdf>

<https://www.drinkingwateralliance.org/single-post/2018/01/16/Chicago-Public-Schools-Invent-New-Water-Quality-Device>

https://www.mawc.org/sites/default/files/orr_hs_case_study_-_noah_auto_flushing_system_7_17_2017_cps.pdf