February 12, 2020

The Honorable Andrew Wheeler
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Ave N.W.
Washington, D.C. 20460

RE: National Primary Drinking Water Regulations: Proposed Lead and Copper Rule Revisions, Docket ID No. EPA-HQ-OW-2017-0300

Dear Administrator Wheeler:

We welcome the opportunity to provide comment on the proposed revisions to the Lead and Copper Rule (LCR). Our comments are based on over 70 years of our collective experience working in the areas of drinking water treatment and distribution, public health, and premise plumbing in homes and buildings, including schools. We would like to voice several concerns with the proposed revisions to the LCR. We have not listed all concerns, but we believe those we have highlighted require critical revision. Before doing so, we have provided a brief background of our expertise for your convenience.

David Cwiertny is a Professor of Civil and Environmental Engineering at the University of Iowa, where he also directs the Iowa state funded Center for Health Effects of Environmental Contamination (CHEEC). Since January 2019, he has led a program through CHEEC that provides funding for testing and repairing lead contamination in elementary school drinking water. Through the Grants to Schools program, CHEEC tests every water outlet within a school and then works collaboratively with school stakeholders on remedial efforts that prioritize the elimination of lead at outlets used in drinking and food preparation. At UI, he also directs the Environmental Policy Research Program through the University of Iowa Public Policy Center. In 2016-2017, he served as a Congressional Fellow through the American Association for the Advancement of Science.

Andrew Whelton is a Purdue University Associate Professor of Civil, Environmental, and Ecological Engineering. His career with the US Army, NIST, engineering consulting firms, and universities has been defined by uncovering and addressing problems at the interface of infrastructure materials, the environment, and public health. At present he is leading a $1,989,000 EPA plumbing research grant with partners from Michigan State University, Tulane University, University of Memphis, Manhattan College, and 30 nonprofits, government agencies, and corporation partners. Results of this study can be found at his team's website www.PlumbingSafety.org. During his career, he has examined drinking water chemistry, plastic and metal building plumbing material impacts to water, as well as their degradation. Some of his most relevant work has involved determining the degree plumbing is chemically contaminated and identifying best practices for planning for and recovering from natural and made-made disasters that affect water systems. He has extensive experience understanding material aging and chemical fate in water distribution systems and building plumbing, with an emphasis in plastic materials. Through his career he has investigated building water quality in schools, homes, offices, municipal, and institutional buildings.

Joan B. Rose holds the Homer Nowlin Chair in Water Research at Michigan State University. She is an international expert in water microbiology, water quality and public health safety. She promotes new tools for environmental surveillance of waterborne pathogens thorough various exposure pathways to be used in Quantitative Microbial Risk Assessment (QMRA). She served as Chair of the National Academies Committee on *Legionella* and has been part of a *Center on Right Sizing Distribution Systems* studying *Legionella* in large complex buildings. She is also involved in examining watersheds (beachsheds), water and wastewater treatment systems using advanced microbial diagnostics for bacteria, protozoa and viruses and has extensive experience with microbial source tracking. She is involved in new nanopore technology to monitor pathogens in the environment and droplet digital multiplexing PCR. She has published more than 300 manuscripts.

CONCERNS AND REMEDIES

Above all else, our comments are motivated by the overriding principle that decisions in the LCR regarding where, when, and how often to collect a water sample should be prioritized on identifying consumption risks to children, a highly vulnerable population to lead exposure. If a child will consume water at a location, then the safety of that installed fixture should be assessed in full. It is clear that water quality cannot be predicted *a priori* at indoor building faucets at this time. But, holding public health paramount through rigorous testing can move the nation towards this goal.

1. *Test all water outlets used for drinking water and food preparation at elementary schools and childcare facilities.*

The proposed revision includes a requirement to sample drinking water outlets in each school and child care facility served by community water systems (CWSs). The revisions would mandate that CWSs conduct lead in drinking water testing, share testing results and conduct public education at 20% of K-12 schools and licensed child cares in their service area every year, excluding facilities built after January 1, 2014. This is a laudable revision to the rule because such testing is not required in the current LCR, overlooking a group of consumers that are among the most vulnerable to long-term health effects from lead contamination.

Unfortunately, the proposed testing requirement is limited to just *"five drinking water outlets at each school and two drinking water outlets at each child care facility"* and fails to sufficiently protect public health. In our collective experience, most elementary schools have far more than five outlets dedicated to drinking water (e.g., fountains or bubblers) or used in food preparation, another possible route of ingestion. For example, at one Indiana elementary school serving 800 children, more than 120 outlets exist. In one Iowa elementary school, CHEEC sampled and tested 129 different water outlets, including 50 that were dedicated for drinking water. Many of these were in the form of classroom faucets with a bubbler included at the sink basin for the purpose of convenient access to drinking water in the classroom. In schools such as these, collection and testing of five samples would be arbitrary, and the overwhelming majority of dedicated drinking water fountains would remain untested. Given the localized nature of lead contamination in most buildings, results from five locations would provide the school with little actionable data to eliminate the risk of lead exposure to their students, teachers and staff. Data from just five outlets would do little to reassure parents that their children were drinking safe water while at school. In our own testing we have also found stagnation time, or the time the water sits in the plumbing, to be a critical factor influencing the lead concentration in tap water. It is well-known that different faucets are used at different intervals throughout a school. Unless LCR revisions also call for all untested outlets to be designated with "Do Not Drink" warning signs, best practices support testing all available outlets in a school or child care facility that are likely to result in ingestion.

Accordingly, ***we respectfully request that the language in the revision be changed to include testing at all water outlets in a school or child care facility that could be used as a source of drinking water or in food preparation.*** We see no rational public health basis for restricting testing to five drinking water outlets in schools and two drinking water outlets in child care facilities. Notably, such limited sampling also directly contradicts the guidance put forth by the EPA in their *3T's* manual, which cautions that *"schools and childcare facilities should not use sample results from one outlet to characterize potential lead exposure from all other outlets in their facility. This approach could miss localized lead problems that would not be identified."* This has been repeatedly confirmed by peer-reviewed studies since the *3T's* manual was published, and, to the best of our knowledge, there is no way to guarantee an installed fixture does not have lead without testing. We urge you to remedy this shortcoming in the proposed LCR revisions; as written, it does not sufficiently address the problem it intends to solve.

2. ***Provide clarity to elementary schools and child care facilities on interpreting their lead testing results.***

Children are a particularly vulnerable population to lead exposure. As such, the EPA *3T's* manual states that *"There is no safe blood lead level for children"*, which implies that any detectable level of lead in drinking water from an elementary school or child care facility is unsafe. However, there remains no health-based standard for lead in drinking water that can be applied to elementary schools and child care facilities, nor has there been any consistency in identifying a safe level among States that have started their own voluntary lead testing programs.[1] Some States have used the LCR Action Level of 15 parts-per-billion (ppb) in evaluating the safety of school drinking water, while others have settled on values that are higher (20 ppb; from the 2006 *3T's* guidance) and lower (5 ppb; the regulation used by FDA for bottled water).[1]

From our collective experience, any level of detectable lead found in drinking water at a school or child care facility, even if well below the 15 ppb EPA Action Level used to regulated CWSs, can trigger worry, uncertainty and confusion among parents about the health risks posed to their children who may have consumed lead-contaminated water. Given the lack of clarity in what constitutes a "safe" level of exposure, it is highly unlikely that any degree of public education, including the expanded efforts outlined in the proposed LCR revisions, will be sufficient to allay such concerns.

In the LCR revision, ***we urge the EPA to include clearer guidance to parents, teachers and staff about what constitutes an acceptable level of lead in drinking water serving elementary schools and child care facilities.*** We would advocate that the EPA choose a maximum concentration level that is commensurate with their own language in the *3T's* manual, such as the threshold of 1 ppb identified by the American Academy of Pediatrics.[2] This would provide sufficient guidance to parents, teachers and staff in understanding and responding to lead testing results, while also giving schools and child care facilities clearer guidance on how best to prioritize their remedial actions to eliminate any unnecessary exposure risk.

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[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. Available at https:// www.hsph.harvard.edu/prc/projects/ school-research/early-adopters. Address correspondence to Angie Cradock, ScD, MPE at acradock@hsph.harvard.edu.

[2] 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

3. Develop separate criteria for prioritizing buildings most vulnerable to copper contamination.

Copper is an essential nutrient but some people who drink water containing copper in excess of the EPA Action Level of 1.3 mg/L over a relatively short period of time could experience adverse health outcomes including gastrointestinal distress. Extended exposure above the Action Level can lead to more severe health outcomes including liver or kidney damage, and there is a subset of the population with Wilson's Disease, a genetic disorder that affects the body's ability to absorb and metabolize copper, at even greater risk.

The LCR regulates both lead *and* copper. We fear that an unintended consequence of the LCR revisions as drafted will be the underreporting of copper Action Level exceedances. For example, in the LCR revisions the EPA is shifting the focus of tap sample site selection to sites with lead service lines (LSLs) rather than copper pipe with lead solder. We also know that characteristics of buildings likely to contain lead, a legacy plumbing material, are distinct from those likely to contain copper, common in more modern plumbing.

In our experiences, we have routinely encountered copper Action Level exceedances in homes, schools and buildings free of any lead contamination. Further, we have observed copper Action Level exceedances in newer construction, including buildings achieving Leadership in Energy and Environmental Design (LEED) certification. At one Indiana school, we found upwards of 3 mg/L of copper in cold drinking water through the entire 800-person school building. The school had a copper service line, and copper levels were near zero after passing through the building entry water softener. In many cases, the copper Action Level exceedances we have observed would not be captured by the new requirements for sampling site selection in the proposed LCR revisions. In this particular case in Indiana, where the building is 7 years old, it is likely children have been ingesting copper contaminated water for years. The LCR revision ignores this public health risk and continues to allow children to go unprotected.

One way to remedy this shortcoming would be to decouple the sampling design and testing protocols for lead and copper under the revised LCR. The criteria put in place through the LCR revisions are a step in the right direction for improving our understanding of the frequency and extent of lead contamination of drinking water. But, the revisions will produce criteria for sample design that are simply inadequate for copper. ***We recommend that a separate set of sampling site selection guidance be developed for capturing more representative copper data in buildings most likely to have copper in their premise plumbing.***