

CORRECTION

View Article Online
View Journal | View Issue



Cite this: *Environ. Sci.: Water Res. Technol.*, 2021, 7, 1530

DOI: 10.1039/d1ew90023d

rsc.li/es-water

Addendum: Efficacy of corrosion control and pipe replacement in reducing citywide lead exposure during the Flint, MI water system recovery

Addendum for 'Efficacy of corrosion control and pipe replacement in reducing citywide lead exposure during the Flint, MI water system recovery' by Siddhartha Roy and Marc Edwards, *Environ. Sci.: Water Res. Technol.*, 2020, 6, 3024–3031, DOI: 10.1039/D0EW00583E

In the references section, references 21, 25 and 42 should be corrected as follows:

21. M. A. Edwards, Institutional scientific misconduct at U.S. Public health agencies: how malevolent government betrayed Flint, MI. Testimony to the U.S. Cong. Committee on oversight and government reform on examining federal administration of the safe drinking water act in Flint, Michigan hearing, *112th Congress 2nd session*, 2016, <https://oversight.house.gov/sites/democrats.oversight.house.gov/files/documents/Edwards-VA%20Tech%20Statement%202-3%20Flint%20Water.pdf> (accessed May 2021)

25. Status Coup, Here's the REAL National Emergency: Flint Still Without Clean Water 5 Years Later, YouTube, <https://youtu.be/6o-RU4GBO1g> (accessed May 2021)

42. Mid-Atlantic Biosolids Association Biosolids in Flint, 2020, <https://drive.google.com/file/d/0BzlwwqZwAlz8bWVZRWZXb0psZnc/view> (accessed May 2021)

The section beginning "Many Flint residents..." in the Introduction of this article should read as follows:

Many Flint residents still do not trust the safety of tap water for a variety of reasons, including:

1) Misreported official water lead testing before the crisis was exposed by the authors of this paper in late 2015, and resulting public mistrust of local, state and federal government agencies,^{5,20–22}

2) In post federal emergency Flint (2016–19), some residents engaged in improper sampling, and in one case lead fishing sinkers were discovered in a consumer's plumbing, producing water samples with very high WLLs ($>12\,000\ \mu\text{g L}^{-1}$) and suggestions of an ongoing health threat,²³

3) Social media posts and investigative reports, by a "political reporter"²⁴ from December 2016 to present, allege an ongoing conspiracy by government agencies and independent lead sampling programs to cover-up water lead problems,^{23–26}

4) Widespread misinformation on the effectiveness of state-distributed lead filters,²⁷ and speculation by academics that the filters were causing Shigellosis²³ or consumer deaths,^{28–32}

5) Warnings that vibrations and other disturbances arising during pipe replacements, might also be causing massive release of lead from the Flint pipe network,^{33,34} and unfounded assertions by some media, celebrities and politicians who continue to claim that Flint remains mired in a water lead crisis.^{32,35–37}

We recently utilized data on the monthly lead mass captured in sewage sludge (or biosolids) at the Flint wastewater treatment plant from 2010–17, to establish that biosolids lead reliably tracked lead release from plumbing to potable water before, during and in the immediate aftermath of the Flint Water Crisis.³⁸ This biosolids data has important advantages compared to official WLL monitoring data collected under the LCR, including: 1) biosolids samples represent a composite of all lead released to Flint's potable water over a time period of several weeks, 2) the sampling methodology and location have remained the same for over a decade, and 3) this data has been collected by entities who are independent of those engaged in measuring water lead in homes.

In contrast, the official 90th percentile WLL only measures lead in the first litre from the tap (*i.e.*, "first draw"). This sampling protocol has changed substantially in the last few years, and is calculated from a sampling pool of only 60–200 "high risk" homes with lead pipe that has been changing as lead service lines (LSLs) are replaced.⁴ The official 90th percentile data is therefore designed to infrequently (once every three years to twice a year) identify a characteristic level of water lead in "worst case" homes, and does not reflect average or total lead release to water across the entire city. Thus, analysis and monitoring of the lead mass in Flint biosolids is complementary, and in some ways superior to traditional in home monitoring to track progress as the Flint system continues to heal through enhanced corrosion control, and LSLs are replaced.



Herein, we apply our novel approach³⁸ to the most recent data on biosolids monitoring and elevated blood lead in children (January 2018–June 2019), which reflects a time period of unprecedented replacement of lead bearing (*i.e.*, lead and galvanized iron) service line pipe replacements. The tested hypotheses included the following: a) the State of Michigan, the US Environmental Protection Agency, and others, are providing an inaccurate sense of progress in terms of improving Flint WLLs and decreasing childhood lead exposure, b) the combination of pipe and faucet replacements, and corrosion control are reducing overall release of lead to water, and c) replacing lead pipes will greatly reduce (but not eliminate) lead release to drinking water due to remaining sources of lead from brass and solder in consumers' homes.

