Research Brief

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Lessons from Flint Part II: A Follow-Up Report Examining Lead Contamination in Twelve Urban Areas

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Abstract

This research brief provides an update to a 2019 Mississippi Urban Research Center (MURC) report on lead contamination levels in the public drinking water systems of Jackson, MS, Flint, MI, and 10 Southeastern capital cities. The intent of this report is to highlight the ongoing problems of lead contamination in urban areas' water supplies, and to share policy-based approaches to correcting those problems. This updated study found a significant decrease in the level of lead for the city of Jackson – from 15 ppb to 8 ppb, and makes additional policy recommendations based on specific actions taken by some of the cities in this study. Some of the policy recommendations highlighted include increases in federal funding, transparency and education, and site testing and reporting.

Problem Revisited: Lead Contamination & Water Quality

In April 2019, the Mississippi Urban Research Center (MURC) conducted a study of lead contamination levels in the public drinking water systems of Jackson, MS, Flint, MI, and 10 Southeastern capital cities (Montgomery, AL; Tallahassee, FL; Atlanta, GA; Frankfort, KY; Baton Rouge, LA; Raleigh, NC; Columbia, SC; Nashville, TN; Richmond, VA; and Charleston, WV). That study examined the severity of the water quality problems in select urban areas with high concentrations of minority and poor populations like Flint (MI) and Jackson (MS) (United States Census Bureau, 2019). Additionally, the city of Jackson (MS) was one of 3,000 areas throughout the United States identified in a 2016 Reuters study as having higher lead poisoning rates than those in the city of Flint (Pell and Schneyer, 2016).

The 2019 MURC report addressed the specific health risks caused by lead exposure in environmental elements like soil, dust, air, household paints, and public drinking water systems. These risks were found to include high blood pressure and damage to the brain, kidneys, and red blood cells, along with negative impacts to the growth and development of fetuses in pregnant women. The report also found that "lead exposure has been linked to lower IQs in children, and that even low levels of lead detected in children's blood can cause behavioral problems, learning deficiencies, auditory and physical development/growth issues, and anemia" (United States Environmental Protection Agency, "Basic Information about Lead in Drinking Water," n.d.).

A common source of lead contamination in drinking water is aging infrastructure such as water pipes in older housing. The 2019 report noted that this form of contamination is much more common in homes built before 1986. During the year 2011, Hinds County (which houses the city of Jackson) was one of 16 counties named by the Mississippi Department of Health as being "at high risk for lead poisoning" (Nave, 2016; Mississippi State Department of Health, 2011). With regard to the age of housing structures in the city of Jackson, there are approximately 63,467 occupied housing units in Jackson, MS. Of those, 12,440 (or 19.6%) were built between 1980 and 1999; 45,950 (72.4%) were built prior to 1979 (US Census Bureau, American Community Survey, 2012-2016 American Community Survey 5-Year Estimates). Given the prevalence and implications of aging infrastructure in other urban areas similar to Jackson (MS) and Flint (MI), this report provides an update to findings from the 2019 MURC report examining this problem. It appears water quality is not just a local or regional concern, but rather part of a mounting national crisis. Cities in the Northeast like Newark, NJ, and in the Midwest like Gary, IN are also facing issues with elevated levels of lead contamination and lead poisonings (Cross, 2019; Natural Resources Defense Council, 2020). The goal of this report is to highlight the ongoing problem of lead contamination in water supplies at the local level, and to present several policy-based approaches that have proven to help correct this problem.

Methodology

This study conducted a comparative analysis of water quality levels in the following twelve cities: Jackson, MS, Flint, MI, Montgomery, AL, Tallahassee, FL, Atlanta, GA, Frankfort, KY, Baton Rouge, LA, Raleigh, NC, Columbia, SC, Nashville, TN, Richmond, VA, and Charleston, WV. The timeframe for this updated study included the years 2013–2018. The years 2019 and 2020 are excluded due to not all of the cities having water quality reports available for those years. Publicly accessible versions of water quality reports for each respective city were extracted online via official city websites as listed in the bibliography of this report. Data tables included in the MURC 2019 study received updating based upon the availability of new additional data and other information.

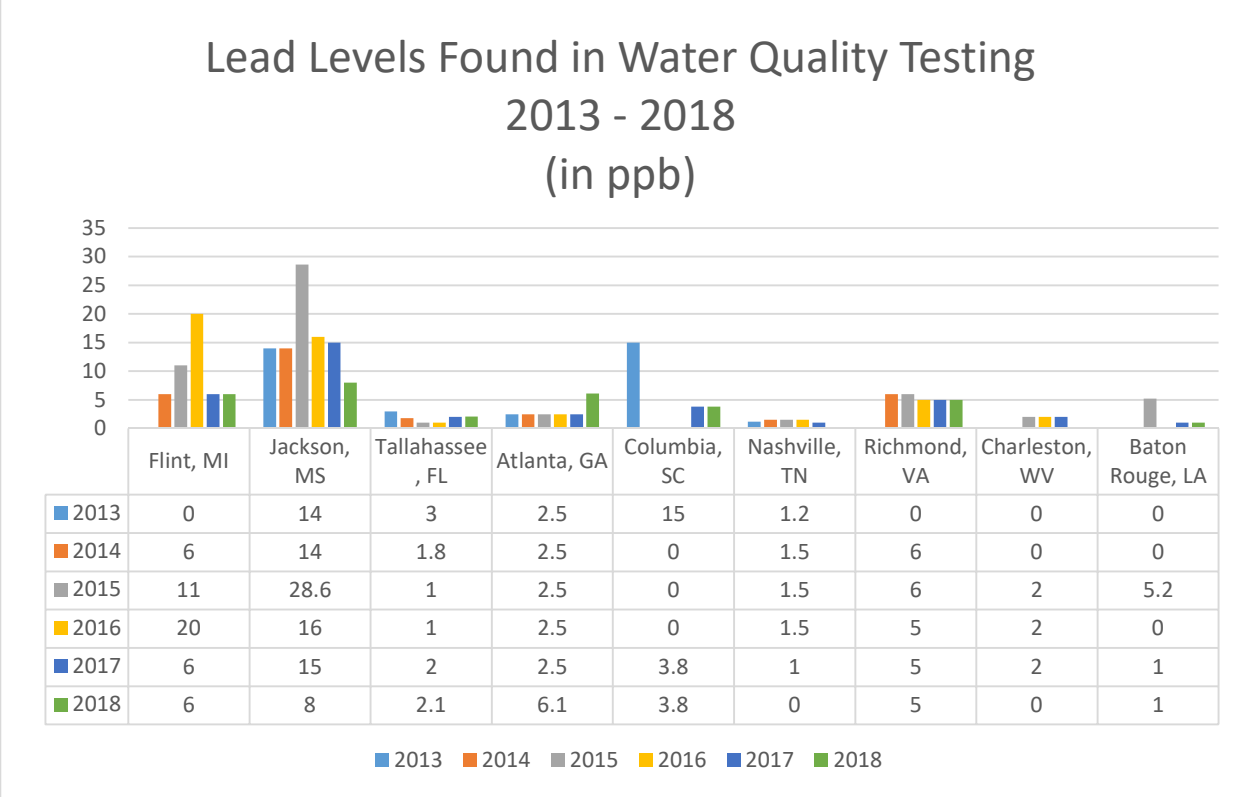
Findings

Upon examining data that included the 2018 water quality reports, the majority of cities remained at the same level of lead content as the previous year. Of particular note was a significant decrease in the level of lead for the city of Jackson – dropping from 15 ppb to 8 ppb, a decrease of 46.7%, or nearly half. Also noteworthy was the increase in lead for the city of Atlanta, rising from 2.5 ppb in 2017 to 6.1 ppb in 2018, more than doubling the presence of lead. Findings for the other cities included in this study are depicted in Figure 1 below. Figure 2 provides an updated comparison between Jackson, MS and Flint, MI for the new timeframe of six years (2013–2018).

Changes in Jackson (MS) Lead Levels

For the 2018 water quality report, the sample size for the city of Jackson increased to 102 sites, and the percent exceeding the federal action level (15 ppb) was reported as 7.8%. This represented a decrease from 11% in 2016. While representing a substantial improvement from the previous year, it is still higher than the initial lead level reported for Flint (6 ppb).

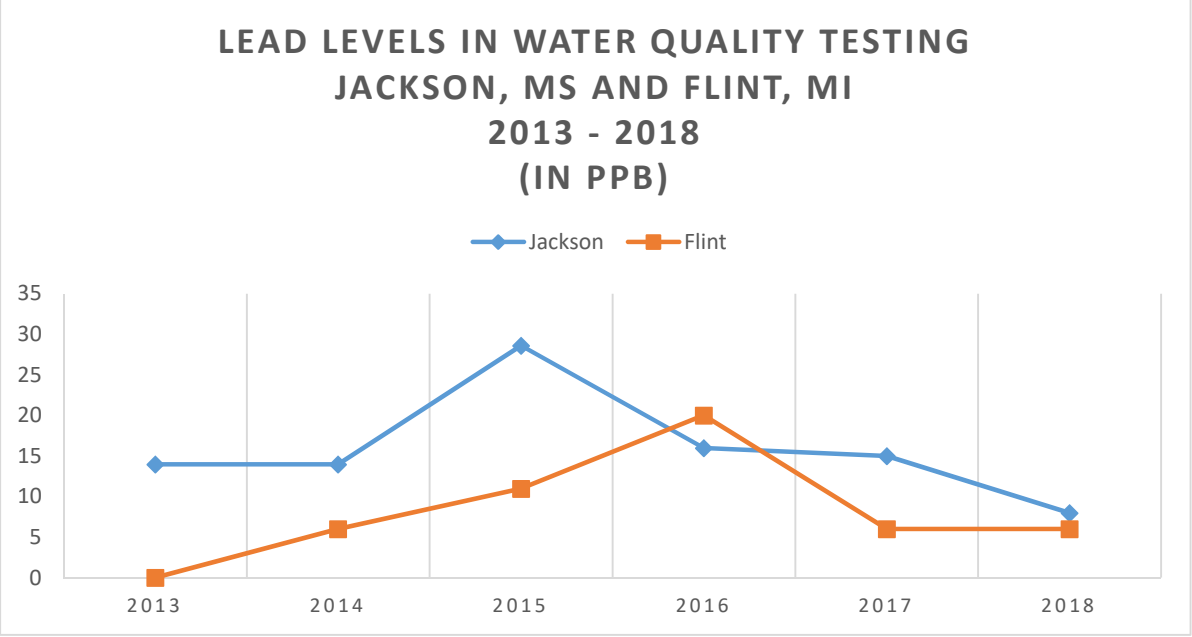
Figure 1. Lead Levels Found in Water Quality Testing Reports (2013–2018)



	Flint, MI	Jackson, MS	Tallahassee, FL	Atlanta, GA	Columbia, SC	Nashville, TN	Richmond, VA	Charleston, WV	Baton Rouge, LA
2013	0	14	3	2.5	15	1.2	0	0	0
2014	6	14	1.8	2.5	0	1.5	6	0	0
2015	11	28.6	1	2.5	0	1.5	6	2	5.2
2016	20	16	1	2.5	0	1.5	5	2	0
2017	6	15	2	2.5	3.8	1	5	2	1
2018	6	8	2.1	6.1	3.8	0	5	0	1

** Figure 1 Note: *This bar graph does not include the cities of Montgomery, AL, Frankfort, KY, or Raleigh, NC. The cities of Montgomery and Frankfort reported as N/D or "non-detectable" for years 2013–2018; Raleigh gave the non-specific reporting of "<3.0" for 2013, 2016, 2017 and 2018, with data unavailable for 2014 and 2015.*

Figure 2. Lead Levels Found in Water Quality Testing: Jackson, MS and Flint, MI (2013–2018)



Similarly, at 6.1 ppb, the city of Atlanta now shares status with the city of Jackson as having higher lead levels than in Flint (MI).

Discussion

The issues around water quality and lead contamination because of aging housing and plumbing infrastructure have the potential for negative long-term social and economic consequences for cities like Jackson. Some say these consequences have already begun presenting themselves. As an example, a 2016 study by the Journal of Pediatrics reported that children in Mississippi saw increasing levels of lead in their bloodstreams across a period of six years (May 2009 – April 2015) (McClure, Niles, & Kauf, 2016). While the Mississippi State Health Department did dispute those findings, study data showed that out of a sampling of 10,000 Mississippi children under the age of six, the number of children with elevated levels of lead in their blood nearly doubled, going from 3.6% to 6.3%. Among all the children identified in the 37-state data set as having elevated or "unsafe" levels of lead in their blood, the state of Mississippi's increase was the highest seen (Wolfe, 2016). That same study reported the national average of elevated levels of lead in the blood amongst child populations was 3%, which is half of the 6.3% rate found in Mississippi children.

The World Health Organization conducted an economic analysis which estimated that the "direct medical and indirect societal costs" created by childhood exposure to lead amounted to approximately $43 billion annually (World Health Organization, 2010). Additionally, the diminished intelligence and lowered IQs resulting from lead exposure contribute to "lower economic productivity, higher welfare use, and additional criminal justice system costs" (Muennig, 2016).

Addressing the Problem

As one means of addressing this problem, the city of Jackson received $1.3 million in 2016 from the U.S. Department of Housing and Urban Development (HUD) for alleviating the risk of lead exposure in low-income households. The funding allowed for repairs and improvements in 77 low-income housing units within the city – however, only 8 homes are currently identified on the city's 2018 Lead Safe Housing Program registry (City of Jackson, MS Official Website, Lead Safe Jackson Housing Program). On September 30, 2019, Secretary of Housing and Urban Development Ben Carson visited Jackson and announced via a press conference that the city would receive an additional $1.8 million to allow for lead exposure reduction in another 78 homes (Bologna, 2019). While the additional grant is a significant increase in resources, thousands of homes left in the city still retain their high risk for lead contamination of children and families.

The ability of the City of Jackson to reduce lead levels in its public water supply from the federal action level of 15 ppb to 8 ppb represents a significant achievement. However, the U.S. Environmental Protection Agency has posited that the maximum contaminant goal for lead levels is 0 ppb for drinking water supplies. Lead levels above that amount are dangerous due to the multiple negative impacts and toxicity of even trace amounts of lead in the human body (United States Environmental Protection Agency, "Basic Information about Lead in Drinking Water,"

n.d.). With this in mind, it is also apparent that opportunities remain regarding further bolstering water quality and safety for residents in urban areas like Jackson.

Additional Policy Recommendations

Based upon the updated data presented in this report, the following policy recommendations can help officials in urban areas correct lead contamination problems in their public water supplies:

- **Continued pursuit of federal assistance.** The $3.1 million in federal grants received by the city of Jackson to assist with turning older Jackson homes into safer, lead-free environments is a tremendous benefit, but it is still just a starting point. The funds are to provide renovations for 155 homes, but as of September 2020, only 33 homes had lead abatement performed through the removal of lead paint but not pipes or plumbing. Another 18 homes are awaiting abatement (currently on hold due to the COVID-19 pandemic); and 113 allocations are available for renovation activities (Hensley, 2020). Even after the improvement of all 155 homes, well over 45,000 homes that were built before 1979 (according to U.S. Census data) are still left unaddressed in Jackson. Federal assistance needs to be aggressively sought as one of the primary means of funding the needed improvements to infrastructure and water quality (for example, pursuing Water Infrastructure Improvements for the Nation (or WIIN) Act funding).

- **Added focus on transparency and education.** In comparing the water quality reports again for each city, one observation became immediate – the water quality report for Jackson was a one-page (front and back) document. By contrast, many cities included in this study went much more in-depth to explain to readers what was in the water and why. To illustrate, the city of Tallahassee's water quality report is a 14-page document. For the city of Flint, the water quality report was seven pages in length and includes detailed explanations of terms and abbreviations used, chemical components, water sources, and other general safety information. The city of Raleigh, NC report includes water treatment information (including specific chemicals used, typical dosage range, and purpose of each chemical treatment) in their water quality report. The city of Nashville, TN report included results for "Secondary Standards" – meaning the measures of color, odor, pH, total dissolved solids, and levels of copper, iron, zinc, silver, and aluminum. The additional transparency and education of these reports not only helps build citizen trust in their local government, but also encourages citizens to be more proactive in protecting their families' health due to having more information on the water they are consuming.

- **More frequent site testing and reporting than every 3 years as mandated by EPA.** The MURC 2019 study suggested more frequent testing and reporting as a recommended policy approach. This study is also recommending more frequent testing and reporting based upon updated data findings. The cities of Jackson, Flint, Columbia, SC, and Frankfort, KY did not have water quality reports available for years after 2018. Every other city (Tallahassee, Atlanta, Nashville, Richmond, Charleston, Baton Rouge, Montgomery, and Raleigh) has their 2019 water quality report posted and available for public viewing; and the cities of Tallahassee and Montgomery also have their 2020 water

quality reports posted and available. Frequent site testing and reporting helps to minimize exposure, and allows public officials to issue advisories and alerts in a timely manner.

Conclusions

This research brief sought to update the 2019 MURC report comparing the lead contamination levels in Flint, MI, Jackson, MS, and other Southeastern cities. In the previous MURC report, the water quality reports for these two cities showed that the lead contamination level in the public water supply for Jackson was higher than for Flint; but by updating the data to include 2018, the difference in the two levels revealed significant reductions. For the city of Jackson, the level of lead content was reduced from 15 ppb to 8 ppb; while this remains higher than the lead content of 6 ppb in the first half of 2018 and 4 ppb in the latter half, it still shows a significant improvement in Jackson's water quality for the period of 2017–2018.

The inclusion of 2018 data also shows that the strategic actions taken by cities as noted in the 2019 MURC report are potentially having a positive effect on reducing lead levels, or at least in maintaining low lead content levels for the majority of these cities. The additional policy recommendations made in this update focus on specific actions taken by some of the cities in this study. For example, increases in federal funding, transparency and education, and site testing and reporting can help public officials across the U.S. lower their lead poisoning rates below those in Flint (Pell and Schneyer, 2016).

After the reviewing of data and standard practices for the cities in this study, it remains clear that the problem of lead exposure is one that requires constant and long-term attention, especially given its impact on the health and well-being of local citizens. It is also clear from the changes in lead levels reported by the city of Jackson that improvement is possible. Yet it is equally clear that there is still an urgent need for additional improvements to protect the health and well-being of current and future generations. This updated research brief provides information that can assist public and private officials in achieving that goal.

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World Health Organization. (2010). Childhood Lead Poisoning. Retrieved from https://www.who.int/ceh/publications/leadguidance.pdf

Listing of Water Quality Reports Reviewed

Atlanta: https://www.atlantawatershed.org/water-quality-reports/
Baton Rouge: http://www.brwater.com/water-quality.html
(Archived 2018 report can be found here: https://ldh.la.gov/assets/oph/Center-EH/engineering/CCR/2018/WestBatonRouge/index.htm)
Charleston: http://www.charlestonwater.com/232/Water-Quality-Reports
Columbia: https://columbiascwater.net/columbia-water-issues-2018-water-quality-report/
Flint: https://www.cityofflint.com/wp-content/uploads/2018-CCR-Flint-Final-1.pdf
Frankfort: https://fpb.cc/documents/2018/4/16/2018-water-quality-report
Jackson: https://www.jacksonms.gov/annual-drinking-water-quality-reports/
Montgomery: https://www.mwwssb.com/en/Community/Water%20Quality%20Reports
Nashville: https://www.nashville.gov/Water-Services/Community-Education/Reports/Water-Quality.aspx
Raleigh:
https://www.raleighnc.gov/home/content/PubUtilAdmin/Articles/WaterQualityReports.html
Richmond: http://www.richmondgov.com/PublicUtilities/WaterQualityReports.aspx
Tallahassee: https://www.talgov.com/you/you-learn-library-documents-water.aspx