Poison in the Pipes: How U.S. Cities Have Responded to Lead-Contaminated Water

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History and present-day examples show that no nation, regardless of geography, economy, or technology, is immune to the threats of unsafe drinking water. In many US cities, aging infrastructure causes or exacerbates lead contamination in public water supplies. The problem is not new. According to estimates, in the 1980s 20 percent of American homes had dangerous levels of lead exposure (New Republic, 1987). The U.S. Centers for Disease Control and Prevention estimated that in 2016, 2.5 percent of young children in the U.S. had elevated lead levels in their bloodstreams (Pell & Schneyer, 2016). As cities respond to lead contaminations, they find that they seldom have the resources to solve the problem.

The problem afflicts big cities such Washington, D.C., and Chicago, and small cities such as Flint, Michigan. When communities are struck with lead contamination, semi-organized local volunteers along with nonprofit advocacies have collaborated to fight for the rights of those affected. Public health agencies have also been essential. While not inherently against one another, the interaction between those affected and those responsible is filled with complicated politics, as their conflicting agendas clash. Following the initial emergency response, local and national organizations have called for policy reforms, and sometimes for reparations. In the aftermath, public health agencies strive to protect water supplies and promote safe practices, in part to deflect public anger and avoid bad publicity.

Review of Research

It has long been known that lead pipes cause to lead poisoning, with research dating back to the late 1800s linking lead pipes with adverse effects in users, especially infants and young children (Rabin, 2008). Under the Safe Drinking Water Act (SDWA), enacted in 1974, the EPA was tasked with monitoring the amount of lead in drinking water and ensuring it stays below a

safety threshold (Job, 2022). Since the SDWA, the United States has seen a number of lead-related drinking water crises. Most notably, Flint, Michigan, Washington, D.C., Chicago, Newark, and New Jersey, have all faced the realities of what lead contamination can do to a city. For Newark, Washington, and Chicago, lead pipes slowly corroding over time caused an eventual public health emergency (Nakamura, 2004; Armstrong, 2021; Chase, 2022). In Flint, aging lead pipes combined with a water source change caused soaring lead levels from taps.

The threat posed by outdated lead pipes is a small piece of a larger discussion of the public health issues related to aging infrastructure. Researchers have studied the enduring health legacies of infrastructure policies. For example, Nicholas (2019) examined the public health burdens in Los Angeles of air pollution from motor vehicles. In both cases, infrastructure policy reflected underestimates of the risks (Triantafyllidou, Lambrinidou, & Edwards, 2009). As a response to these underestimates, authorities in their respective fields have invested in increased monitoring in an attempt to improve forecasting.

Historically, studies have also shown that these water crises have disproportionately affected minority populations (Day et al., 2019). This includes patterns showing both a lack of prevention and a lack of response in racial or ethnic minority areas. Before crises, research shows that continual disinvestment in infrastructure is unequally centered in low-income, minority areas. This lack of maintenance and attention brings about greater vulnerability to an already disadvantaged population (Berglund, 2020). In the aftermath of a lead contamination crisis, those same communities were more likely to receive less government funding for relief initiatives. Flint in particular, as an economically struggling rust-belt town, exemplified these behaviors (Sadler et al., 2021). Consistent government failings at disproportionate rates led many

of the affected communities to feel discriminated against. This has, in many ways, been a catalytic force in mobilizing citizens into organization and action.

Social Groups and Government Responses

Following reports of unsafe public water supplies, many responses from unorganized locals share a sentiment of worry. Responding to reports of unsafe water in 2004, Charles Eason of Washington, D.C., said: “It’s a particular risk for young people, and I have a 4-year-old grandson in my house regularly” (Nakamura, 2004). This example can be seen playing out decades later in present Chicago, where around 400,000 lead service lines transport water throughout the city (Economist, 2020). “If we don’t have our health, we have nothing else” said Angela McGhee, a resident in the Chatham neighborhood of Chicago, when asked to comment on her concerns about the lead pipe crisis (Chase, 2022). These two citizens represent the thousands living in uncertainty of what water is doing to them and their community.

With the consequences of a lead pipe crisis affecting entire districts, residents often unite to advocate for justice for their communities. In Flint, Michigan, for example, residents came together to form Flint Rising, a local advocacy seeking to influence policies in response to the water crisis. The advocacy demands reparations in the form of refunds for the contaminated water that residents paid for, repair of water infrastructure, and health services for affected families (Flint Rising, 2016). In Chicago, existing advocacy groups have pivoted to make lead contamination awareness a top priority. The Little Village Environmental Justice Organization (LVEJO), originally founded by public school parents to protest harmful air particles in schools, is now bringing awareness to the lead pipe situation in the Little Village neighborhood (LVEJO, 2022). It is important to note that not all advocacies are purely rooted in environmentalism. The Concerned Pastors for Social Action, based out of Flint, is one of many examples of social

justice advocacies that provided another voice in the chorus of calls for assistance (ABC12, 2015). These advocacies provide a community for those that may have felt concerned about their health but for whatever reason did not identify with hardline environmentalist organizations. The Concerned Pastors for Social Action also utilizes the already-strong bonds within the religious organization to provide greater comfortability for those within the institution.

As these grassroots organizations raise awareness through media coverage and public outreach, larger organizations often join in. Collaboration between these local and national advocacies has been an essential part of furthering the agenda of those affected. The community experience combined with the resources of a national organization allow for awareness and policy change that otherwise would not have been possible. This is highlighted in an NPR podcast interview that brings together Angela Guyadeen, the director of the National Resources Defense Council's (NRDC) safe water initiative, as well as Brenda Santoyo, the senior policy analyst for the LVEJO. The interview discussed the concerns of the advocacies for Chicago's water crisis. Santoyo provided powerful anecdotes of Chicago residents that are unsatisfied with the progress of the pipe replacement program. Meanwhile, Guyadeen called for immediate access to water filters to residents living with water pipes still over the EPA threshold for lead, citing unmet goals set out by the city (WBEZ, 2022). In the case of Flint, national headlines of the water crisis led to intervention and aid by the American Civil Liberties Union (ACLU) and the NRDC. These organizations helped filed class action lawsuits to provide a legal backing to the appeals of the affected Flint citizens (NRDC, 2022; ACLU, 2022).

Governments in these lead-stricken cities have come under fierce criticism by their constituents. Under this pressure, many have responded with government-funded initiatives as a way to ease advocacy pressure. These include short-term solutions, such as providing bottled

water, and long-term initiatives that aim to fix failing infrastructure. Some local politicians have courted voters' anger and transformed it into electoral support. Chicago Mayor Lori Lightfoot, for example, has taken ownership of Chicago's worsening lead pipe crisis, becoming the first mayor of Chicago to start a program allowing low-income neighborhoods to request a lead-to-copper service line switch. Responses to such requests, however, have been slow. Angela McGhee, the Chatham resident, was one of only 280 Chicago homeowners to get a copper service line. Together their replaced lines amount to less than one tenth of 1 percent of the city's lead service lines (Chase, 2022). There is still plenty of work left to be done.

Accountability

When reviewing recovery policy, it is clear that sweeping government action is required. Accountability, however, is much murkier, with prominent politicians often taking the brunt of the public frustration despite shared responsibility by much more than policy writers alone. Attributing blame in these cases is a matter of perspective and self-interest. Aging infrastructure, an apolitical aspect in itself, is the root cause of most lead contamination, as pipes begin to slowly degrade over time and release toxins. This, however, is not a satisfying conclusion for those negatively affected by the contaminated water. As advocacies ask what could have been done to prevent a water crisis, accountability is found in every echelon of the system.

Historical social groups play a significant factor in the story of every modern lead contamination crisis in the United States, and their impact should not be overlooked. Though lead was known to be toxic when degrading into a water source, it continued to be used as a piping source for almost a century, with lead pipes still being installed in Chicago until 1986 (WBEZ, 2022). Soon after cities first began banning lead pipes in the early 20th century, lead companies organized a trade association to keep the market alive. The Lead Industries

Association (LIA) sought to convince everyone from plumbers to politicians that despite the side effects, lead was the superior piping material (Rabin, 2008). According to Rabin, “The LIA's activities over several decades therefore contributed to the present-day public health and economic cost of lead water pipes” (2008).

The Wrong Response: Flint

Despite being a low-profile city in a sea of cities struggling with lead contamination, Flint, Michigan has been given the most press nationally. This can mainly be contributed to two factors: prominence and preventability. The high level of contaminants affecting over 100,000 people were staggering numbers that garnered attention quickly. The situation escalated to the point that the State of Michigan, followed soon after President Barack Obama, declared it a national emergency (CNN, 2022). Though this alone was enough to bring serious concern to the citizens of Flint, most of the anger and action stemmed from the preventability of the event and lack of immediate response.

Historical context can help shed light on how one of the greatest public health crises in recent American history came to be. Although the outdated infrastructure played a factor in the outcome in Flint, the sudden exacerbation in the pipe flaws can be attributed to an ill-advised switch in water source from the Detroit water system to the Flint River (NRDC, 2022). The reason for the switch cannot be analyzed without understanding the economic situation in the region leading up to the event.

Flint, along with cities like Detroit, was part of the automobile boom in the rust belt. When General Motors closed manufacturing plants in the 1980s and 1990s, though, Flint’s economy suffered tremendous losses. By 2002, a state of financial emergency was declared by Governor John Engler. This allowed the Governor greater control within the city and gave

appointed financial managers the prerogative to make aggressive budget-saving decisions. Though budget cuts were made, Flint continued to suffer from "chronic fiscal stress" for years to come, as noted in a case study conducted by the Michigan State University on the economic decline of Flint in 2011, less than three years before the water crisis began (Scorsone and Bateson, 2011). In 2014, as an attempt to save money, the Flint council and state treasurer approved a switch to switch from the DWSD to the cheaper Flint River water. The switch immediately caused lead to leach from the pipes into the drinking water, with residents noticing the water tasted, smelled, and looked "foul" (CDC, 2020; NRDC, 2022). From there, regulatory agencies and the local government made error after error in attempting to address the issue.

Conflicting information caused confusion and frustration amongst the people of Flint. A boil water advisory issued months after the initial switch lasted less than one month, as the Michigan Department of Environmental Quality (MDEQ) deemed that pipes only needed flushing and higher disinfectants, mainly chlorine (CNN, 2022). In January of 2015, the city informed its residents of the high levels of lead and other particulates in the water, but assured the citizens it was safe to drink. The city even denied an offer from the DWSD to reconnect without any additional fees. Water conditions continued to decline, as flushing the pipes did not address the corrosion causing the lead leaching. By June, home water tests registered lead levels as high as 13,000 parts per billion (ppb), over 2000 times the maximum safe drinking limit, and three times the level classifying hazardous waste (CNN, 2022). A week after this report by the EPA, a Flint water utility company released a contradictory statement, claiming that "the water provided to you today meets all safety standards" (City, 2015). In December of 2015, a month after the NRDC and ACLU coordinated a class action lawsuit was filed against state and city officials, a state of emergency was finally declared, followed shortly by the national declaration

(CDC, 2020). As money flowed in and the dust started to settle, blame was divided along party lines, with Democrats blaming the Republican governor and Republicans blaming the EPA. In the end, though, "The matter of blame appeared to be settled conclusively in March 2016, however, when Snyder's nonpartisan task force released its blistering final report. Primary responsibility for the crisis in Flint was placed on the state, and particularly on the MDEQ". In contrast to Mayor Lightfoot, whose ownership was voluntary, though politically advantageous, officials of Flint and Michigan were forced to take ownership due to legal action. Their motivations rooted in the preservation of their career were evident in the downplaying of the crisis and the eventual indictment of eight officials, including Governor Snyder, on charges related to the water crisis (NPR, 2021).

The Right Response: Newark

In a total juxtaposition of the Flint water crisis stands the city of Newark, New Jersey. In 2019, it was discovered that one in five residents had water lines that were not within EPA standards (PBS, 2021). Two years later, Newark has replaced almost all of the 23,000 lead service lines with copper lines, wildly outpacing the rate of Flint's recovery (Armstrong, 2021). A look at the role of government, as well as lessons learned from Flint, can help explain such a stark contrast in responses.

In a PBS (2021) interview with Ras Baraka, Newark's mayor, he outlined his response philosophy as well as the difficulties faced by those tasked with replacing the pipes. Baraka cited cooperation of city, county, and state entities as the most important piece that allowed for quick policy change and implementation. He also noted that Newark's success is sometimes not realistic in other cities, claiming "And when people say, oh, this is the model, theoretically, yes, right. But it's very difficult… the federal government has to provide the revenue upfront to these

municipalities to get these things done in an expeditious way or else it won't get done" (PBS, 2021). Increased infrastructure funding and greater political pressure, both in response to Flint, paved the way for Newark's success.

Initially, news of the public health hazard sparked panic and frustration, with local advocacies such as the Newark Water Coalition (NWC) calling for greater public transparency for lead levels exceeding EPA standards (NWC, 2023). The NRDC also filed a claim against the city for violating water laws. Public worry was quickly eased, though, as Newark came through on promised solutions. Utility employees worked day and night to replace the countless failing pipes. As a testament to the progress being made, the NRDC claim was settled out of court in early 2021, with the NRDC noting their happiness with the strong response from the city (Armstrong, 2021; PBS, 2021). In an interview with the New York Times, Christopher Daniels, a Newark resident with a 4-year-old, expressed relief and praise for the quick response: "'This could have been disastrous on so many levels," he said. "It's an hallelujah moment'" (Armstrong, 2021). Daniels illustrated that not all public health crises cause government resentment, if treated effectively.

While Newark's response was admirable, the initial state of the crisis reopened dialogue on the effectiveness of EPA guidelines passed in response to Flint. Testing requirements were tightened after the incident in Flint, but discoveries of red flags in Newark's water testing methods, within the EPA guidelines, called the updated policies into question (Stratton et al., 2023). This example calls into question not only the stringency of EPA guidelines, but also the methodology by which policy is updated. Unfortunately, the only way to know when these guidelines are insufficient is usually when they are broken and people suffer as a result. The EPA

has the difficult job of setting strict guidelines to protect humans and the environment, while also keeping standards attainable and economical for states to implement.

Conclusion

In analyzing the behavior of all the different social groups involved, from the affected groups, those held accountable, to those responsible for the response, many of their actions represent very emotional responses. Actions that are against logic and ethics become clearer when looking at participants through the lens of self-preservation. Whether it be preservation of physical health, career, or social status, lead contamination crises, similar to most public health emergencies, made fear a very powerful motivator. It can cause positive action, such as community organization for social justice, but it can also corrupt officials to act against public interest.

In attempting to create a perfect model for what the ideal prevention and response plans are for a city to avoid a lead water contamination emergency, one realizes that a single model does not exist. Each city's response is different based on the severity of the pipe network needs, the population, both in size and demographics, and their economic situation to include federal aid. Though no cookie-cutter response exists, there are certain strategies that every city can implement to best deal with lead contamination. For prevention, cities can immediately replace any existing lead water lines with copper ones, and these lines can be tested ideally at a stricter rate than the EPA minimums. On the response side, informing the public is key. History has shown that the truth in these cases will always come out, and hiding the facts only exacerbates the problem while angering the public down the road.

Though they are difficult to accept, the lessons learned from past mistakes in lead-in-water crises offers guidance for better prevention and response in the future. Though not perfect,

Newark's quick response is proof of the strides taken in responsible management of the lead pipe situation. As mentioned in review of the EPA after Newark, though, each case presents new issues and information that must be taken to heart by future cities as well as regulatory agencies in order for their lessons to be useful. Humility and constant improvement of infrastructure and policy are the building blocks of responsible lead water contamination prevention and response.

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