Measuring the Efficacy of Lead Interventions in Millvale, Pennsylvania

Daly Trimble
University of Pittsburgh

Abstract

Millvale, Pennsylvania is a lower income borough on the outside of Pittsburgh struggling with the risk of waterborne lead exposure, a problem prevalent throughout Allegheny County. This study surveyed recipients of the free filter pitcher distribution program that occurred over the summer of 2017. Researchers investigated pitcher usage behaviors and reasoning, other ways the recipient households invested to prevent lead exposure, water testing rates, and interest in community programs. Surveys were mailed to 136 household addresses from the distribution list. The response rate was 24.6% (n=32) and represented a population with frequent filter use and interest in town initiatives. Respondents also reported a high rate of purchasing bottled water to substitute for tap. Additional data suggests that residents may be filtering their water and purchasing bottled water regardless of whether their homes put them at risk for lead exposure or not, indicating a need for more information about the nature of the region's lead problems. The surveys show that, while the pitchers were a very successful intervention, Millvale would benefit from more organized efforts to spread information, perform lead tests, and offer long-term solutions to its residents.

Introduction

Millvale is a classic "steel town" on the outskirts of Pittsburgh, Pennsylvania. Despite the past few decades featuring disastrous floods, economic depression that began with the collapse of the steel industry, and the exodus of many town residents during its lowest periods, Millvale appears to be entering a new chapter. After a particularly destructive hurricane season that caused heavy rainfall and flooding in 2004, early recovery grants brought financial life to the community. The last ten years have featured an uptick in entrepreneurial investment as well as new inhabitants who are able to count on Millvale's continuing affordability despite gentrification throughout the greater Pittsburgh area. Nationally recognized as an EcoDistrict, it was one of the smallest towns in the country awarded for its sustainable and equitable urban planning (Waltz 2016). With more revenue and residents arriving yearly, it is apparent to community advocates that a renaissance is forthcoming. Despite this bright outlook, however, Millvale still struggles with the challenges of a lower income community. It currently has to grapple with waterborne lead contamination, an issue difficult to detect and correct even in prospering neighborhoods.

In the summer of 2016, Pittsburgh Water and Sewer Authority (PWSA) announced to its customers that some of its service properties had elevated lead levels. Initially using soda ash, a safe water additive that prevents old pipes from corroding and leaking particulate into the water, PWSA had switched in 2014 to a cheaper reagent without notifying the Pennsylvania

Department of Environmental Protection. Following detection and resulting sanctions, PWSA was ordered to test customer households for lead. Data indicated that many houses and neighborhoods now have lead levels that exceed federal standards. PWSA has since switched back to soda ash and also began a free lead test program (Lurie 2016). Over the summer of 2017, the City of Pittsburgh distributed 20,000 free ZeroWater Filter Pitchers as the one of the first steps in a citywide clean water strategy (Smeltz 2017).

Being a smaller neighborhood outside the City of Pittsburgh, Millvale received 200 of the filters. City and Borough officials prioritized the handout process to families with pregnancies and children under the age of six, and pitchers were available for pickup at both the Millvale Borough Office and Millvale Community Library over the summer. Borough and library officials collected recipient addresses, but no follow-up was made to determine filter efficacy, usage rates, lead test results, or town concerns. Given the association of even low blood-lead levels in small children with negative cognitive outcomes, especially for those from lower income communities, Millvale Community Library partnered with the University of Pittsburgh to issue a follow-up survey eight months post-distribution (Shell 2016).

I first became involved with Millvale in the summer of 2017 as a Browne Leadership Fellow within the University of Pittsburgh School of Social Work. I was employed in Millvale Community Library and tasked with administering the Community Needs Assessment (CNA), a questionnaire gauging local challenges and assets. The interviews I ran revealed that citizens were very concerned about waterborne lead exposure. However, they often lacked the knowledge and resources to take appropriate preventative measures on their own. Pittsburgh's filter donations occurred while I was busy with the CNA, and I was asked to informally aid people with test kit and filter acquisition while conducting the assessment. Learning that many families were unaware that they qualified for free resources, I partnered with the Borough office to ensure filters were stocked in Millvale Community Library and to target patrons so they could get supplies on the spot. By the end of the summer and the handout period, one question remained – were Pittsburgh's efforts an adequate and effective strategy in Millvale? That question morphed into a research project within the ACT Fellowship, a community-based research program run through the Pitt Honors College. I spent the 2017-2018 academic year partnered with the library for a second time, and I designed the following intervention review.

Methods

Over the summer, home addresses were recorded into a computer or by hand whenever a household received a filter. Only 136 addresses of the approximately 200 households were recorded and legible, and this subsection became the study cohort. A survey containing multiple choice, checkbox selection, and short answer questions regarding filter use behaviors, other preventative strategies, and community action plans were mailed to each address. An opening letter explained to the pitcher recipients that the survey was a project through Millvale Community Library to better understand town needs. It also stated that respondents who returned their surveys within one week of receiving them would be mailed coupons for discounted filters as well as a $5.00 gift card to a popular local café.

Results

Response Rate and Demographics

The survey achieved a 24.6% response rate (n=32). This excludes six surveys that were returned by the postal service. Of the responses received, the extent of completion was variable. The vast majority of surveys had skipped questions and sections, and a few had additional "write-in" responses added in the margins or on the back of the copy. 68.8% of respondents were homeowners. Only 28.1% of respondents reported having any children in the household. Within that category, each household had an average of 2.2 children. 50% of all survey respondents reported that they had performed a lead test on their homes, and 43.7% reported that they had not.

Pitcher Usage

Most respondents reported consistent pitcher usage, with 75% stating that they had not stopped using their filter for any reason since receiving it and 84.3% claiming that they always filtered their drinking water. Regarding foodborne lead exposure risk, only 25% reported always using the pitcher when cooking. Variable rates of filtration for child, infant, and pet needs were reported and depended on having a child or pet in the home. Common complaints about the pitcher were its inconvenience, tendency to break or leak, and needing to have the filters replaced too often. Additionally, 68.75% of respondents reported that they were unaware of the discount coupons offered on the Pittsburgh Water and Sewer Authority website.

Plans, Expenses, Community Engagement

Residents are currently investing a good deal in short-term preventative strategies but also demonstrated interest in town-wide initiatives (Figure 2). 62.5% of residents reported drinking bottled water in place of their tap water and spend a median of $18.00 per month, and 70% of respondents stated that they intend to buy more replacement filters. While 70% of the cohort indicated that they did not have long-term plans on their own, 68.7% reported interest in at least one larger Millvale program offered on the survey. The most popular options were a communitywide lead screening initiative (43.75% of the cohort indicated interest), general wellness events in town (37.5%), and income-qualified free lead paint testing and pipe replacement (31.25%).

Discussion

Response Rate and Demographics

It is difficult to pinpoint why the response rate was so low despite material incentive, but the demographic data is telling. Compared to community census data collected over the summer of 2017, the respondent cohort has a disproportionate number of people who own homes, have already performed a lead test, and do not have any children. This is especially puzzling given that the filter distribution process was meant to target families. It is likely that the people who responded were more willing or able to do so than the typical filter recipient, perhaps due to a greater personal interest in the lead crisis, greater civic involvement and readiness to voice their opinions, or more time and resources to devote towards the survey. Additionally, survey respondents often skipped questions they did not wish to answer. It is probable that the percentage of respondents who have children is higher than is listed because the respondents did not feel comfortable disclosing this information. The response rate and results may have been different if active surveying were used in place of mailed copies and if parents received extra or better incentives.

Pitcher Usage

The data indicates that the pitchers were largely a successful intervention in Millvale. However, residents made clear that their needs are not fully met. Anecdotally, respondents mentioned the prohibitive cost of filter replacements and the burdens of trying to get the filter in the first place or having to deal with repairs.

High rates of pitcher use also do not mean residents are making the most healthful choice. If possible, tap water is the best option to drink because it is 1) subjected to higher governmental regulation than bottled water and 2) contains beneficial additives such as fluoride. Filter pitchers remove all particulate indiscriminately, but residents seem to be using the pitchers and buying supplies regardless of whether they know they have a lead problem or not. Additionally, mixed responses to the question "Why did you begin filtering your water?" indicate a greater miscommunication in town (Figure 1). While many residents cited potential risks and the overall scare of the lead problem, others simply wrote that there was lead contamination. However, many of those respondents said that they had not performed a test in the past two years or left that question blank. With this data in mind, it can be concluded that many residents need to be informed that Pittsburgh's lead crisis is a house-to-house issue and that filtering is not a panacea despite being helpful in certain situations.

Plans, Expenses, and Community Engagement

Short-term preventative investments have proven costly for residents and are an additional burden in a neighborhood that already struggles financially. It is promising, then, that the programs with greatest demonstrated interest are the ones Millvale Community Library and

other local nonprofits plan to implement in the coming year (Figure 2). The library aims to launch a grassroots testing campaign, and various local organizations regularly hold neighborhood health events. Most importantly, the Borough plans to work with Pittsburgh Water and Sewer Authority as well as Allegheny Lead Safe Homes Program to offer free pipe replacement and lead paint services this year to those who qualify. In the meantime, residents would benefit from knowing about free short-term resources like the coupons and the free lead test program.

Reflection

Despite major gains in public health over the past century, a clean glass of water is still not a given in the United States. Tap water always seemed like the great equalizer - everyone pays for what they use, but it is ultimately a community resource. Before Flint became a household name, the term "water crisis" evoked the images of droughts in far-off deserts or of cholera outbreaks in the slums of distressed nations. Century-long cracks in American infrastructure are now proving that we cannot readily refer to all of this country as developed and durable. Flint, Pittsburgh, and hundreds of other localities nationwide must fully commit to long term reinvestment and immediate interventions to overcome waterborne lead risks.

What struck me as particularly important were the multitude of reasons people gave for filtering their water. General dissatisfaction with water quality, health problems, and having children in the home were common justifications. However, most respondents indicated that they either were "playing it safe" given the potential threat or believed that there was lead in the water. My concern is that people are filtering out the positive additives like fluoride from their tap supply, spending a median of $18.00 monthly on bottled water, investing in more filters, and experiencing real distress without having the evidence that anything is actually wrong with their pipes. At the same time, I believe residents and share their suspicion that the water issues in town are widespread and possibly extend beyond lead contamination. I have never lived in a situation where my water smells bleachy, looks cloudy, or seems to make me ill. They do. Community health research is incomplete if it does not honor the lived experience of its subjects, and I think the collective "play safe" fears merit continued investigation.

Like all other researchers, I have more questions after the survey than I did before. Analyzing my response data, I asked myself continually, "Where are the mothers?" I was astounded that, despite the handout prioritizing young families and pregnancies, less than a third of my samples had a child in the house. Zero households had a pregnancy at the time of the mailing. The overarching goal of this study was to ensure local children were benefitting from campaigns intended to protect them, and the mailed survey model was not an effective way to follow up with their caregivers. I think that a questionnaire strategy must have greater personalization and compensation if it is to get data from parents who are busy, private, or otherwise struggling.

Our immediate next steps are to launch a community-wide testing campaign and to get the town ready for a free pipe replacement program offered this September. Our biggest challenge will be empowering residents to perform lead tests and continue filtering while cooperating with city programs focused on multiyear infrastructure projects. I think lead in

Millvale is a challenge that will not be solved for a number of years, but I also hope that future data shows we overestimated the problem. Regardless, the town residents deserve swift and sustained action on par with the bills they already pay for substandard water.

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Appendix

Figure 1. All Responses to "Why Did You Begin Filtering Your Household Water?"

Possibility of Lead in Water
• "Because of all the water concerns." • "Had intestinal problems. Thought it might be the water." • "We already have health issues and don't need anymore with the possibilities of lead in our water." • "Possible lead in the water." • "Lead scare." "Lead test scares." • "Worried about lead content." • "Because of possible lead contamination."
Certainty of Lead in Water
• "Lead." • "Lead." • "I have kids I don't want exposed to lead." • "Because we were told there was lead in it." • "Because all the lead in the water."
Other
• "Cause smells like chlorine." • "Better drinking water." • "Always did. 'Taste.'" • "The water tasted 'dirty.'" • "Smelled like chlorine and was cloudy." • "Taste/smell/quality was bad." • "I was buying bottled water. I need pure water to drink. Free pitcher great! Less bottles." • "My health." • "I refuse to drink the tap H20…I shouldn't smell bleach from my tap." • "When we had to boil water." • "To have safe water to drink."

Figure 2. Community Initiative Interests

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