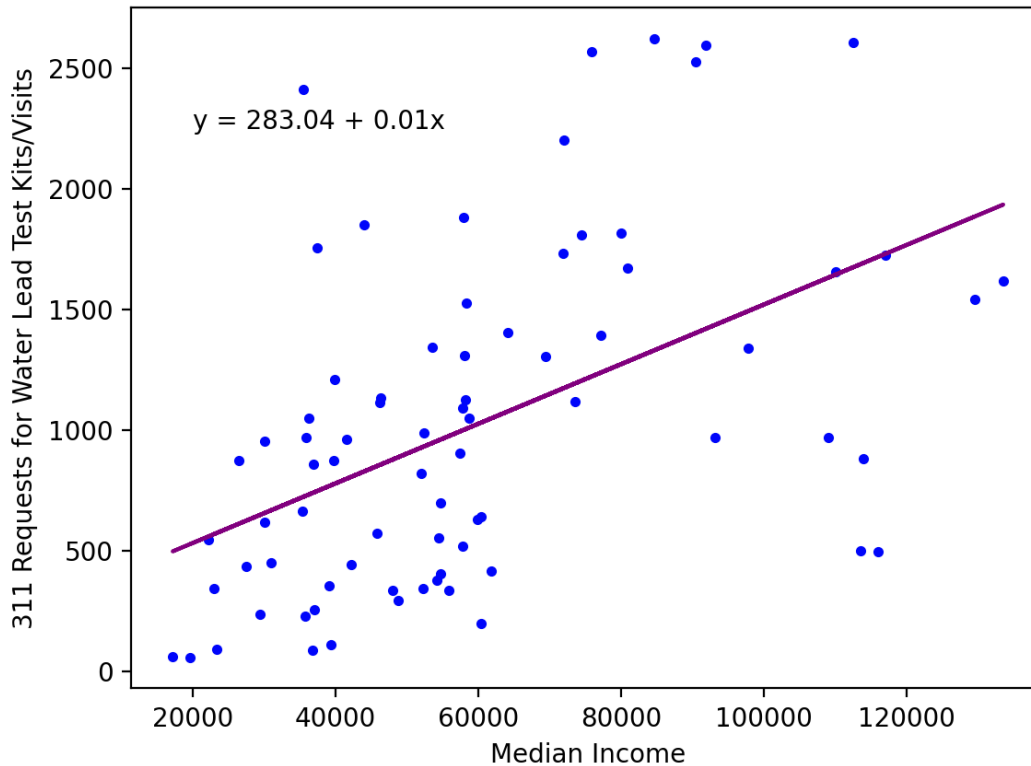


Abstract

Under current legislation, any Chicago resident can call the non-emergency 311 service line to request either a self administered lead water test kit or an in person lead test visit from the city. However, this citizen-initiated process poses risks to the accurate assessment of lead contamination in water throughout Chicago. There is no universal or organized approach to mapping the total prevalence of lead service lines and contamination. Moreover, while the lead tests are free, underprivileged community areas may be less likely to have the time and resources to engage in the system. The following analysis compares the 77 community areas of Chicago. We hypothesized that there would be a positive relationship between the wealth and income of the community area and the level of voluntary testing requests. Indeed, the analysis reveals that neighborhoods with higher median income are also more involved in the resident-initiated testing program. The lowest levels of 311 requests correspond to the poorest areas of the city. Besides the inequity of these results, which indicate the prevalence of health discrimination on the basis of economic disparity, the overall testing levels are low. Even in the richest community areas, there are fewer than 0.1 requests per person (or 10% of the population). While this data does not give information on the number of households that have been tested for lead, it does suggest that there needs to be an increase in lead sampling, especially with a focus on equity.

Relationship Between Community Area Income and 311 Requests



Relationship Between Community Area Income and 311 Requests (Adjusted for Population)

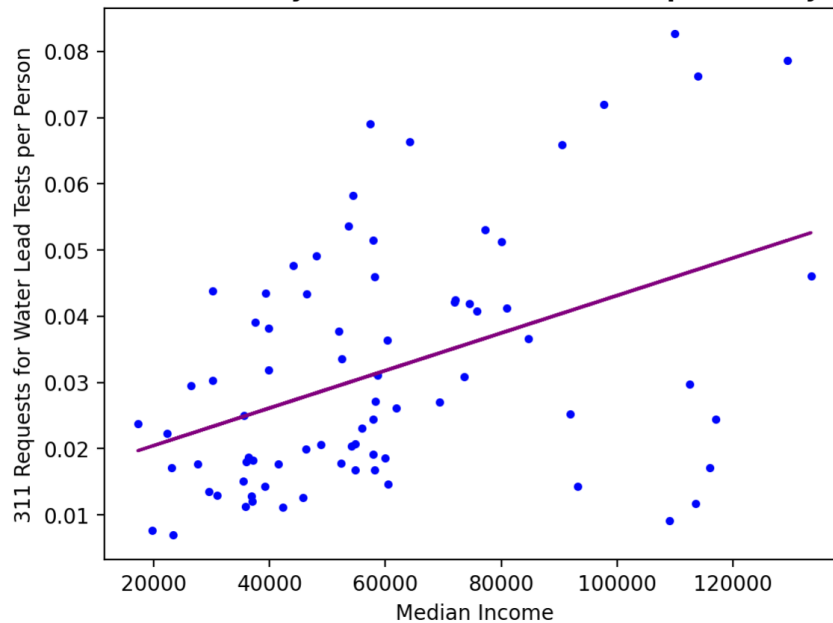


Figure 1, 2: Scatter plots comparing the median income with the quantity of 311 requests for either lead test kits or in person lead test visits. Each data point represents one of Chicago’s 77 community areas. The first figure uses total numbers of relevant 311 requests in each community area, while the second figure divides by the population of each community to adjust for different sizes of the regions. There is a positive correlation between the wealth of the community area (as measured by the median income) and the citizen initiated participation in the testing program. There also appears to be a more significant correlation up until an income level around \$90,000 a year, above which the correlation becomes much more variable. This may be due to disparity in construction of the neighborhoods (either temporally or spatially) which govern whether there are lead service lines. Figure 1: $R^2 = 0.25$, Figure 2: $R^2 = 0.18$

Methodology

This analysis focuses on whether there is an empirical relationship between wealth and citizen engagement with the current structure of the lead testing and mitigation system. The data is sourced from the publicly available Chicago Data Portal. The income data is from a dataset on community area statistics between 2000 and 2020. The 311 requests since the lead testing program’s implementation were tallied using the value counts command in Python for the request codes corresponding to either lead test kit or lead test visit requests.