

Methods & Key Findings

The goal of our analysis was to see if there were relationships between poverty and lead abatement projects that have been carried out by the city of Lewiston and between houses built before 1950 and lead abatement projects.

First, we wanted to develop an understanding of how lead poisoning in Lewiston has changed in the three periods we were given. We created a line graph to visualize the proportion of people who tested positive for lead poisoning over time, and we found that this proportion decreased between the three periods. From the graph, the proportion of people poisoned by lead in 2008-2012 was approximately 7 percent, in 2013-2017 it was approximately 6 percent, and the proportion of people poisoned decreased to around 4 percent in 2018-2022. This downward trend highlights the improvement in lead exposure mitigation, even if we cannot explicitly say that this was the direct result of Lewiston's lead abatement strategies.

Next, we conducted several regressions to determine the relationships between the proportion of people who tested positive for lead poisoning and variables that we believed to be key indicators of lead poisoning (share of poverty and share of houses built before 1950). We first regressed lead poisoning on poverty, and the results showed a positive correlation between poverty rates and lead poisoning proportions, indicating that economically disadvantaged areas have higher lead poisoning rates. We then regressed lead poisoning on housing built before 1950 (pre-1950 housing). We chose to use 1950 as the cutoff because a huge proportion of the houses built before this year used lead paint, particularly compared to houses built before other cutoff years such as 1978, which is what we had in the dataset. (While lead paint was not banned until 1978, the peak use of lead paint was before 1950.) A positive correlation was also found between pre-1950 housing and positive lead poisoning cases. These regressions illustrated that poverty and the share of pre-1950 housing in a region are key indicator variables for lead poisoning. This suggests that the need for lead abatement projects is greatest in poorer places and places with more old houses.

After the regressions, we mapped out the pre-1950 housing units, lead poisoning rates, and lead abatement projects. Both maps for pre-1950 housing units and lead poisoning rates show the highest concentration in the central urban area of Lewiston-Auburn. The map for lead abatement projects reveals targeted interventions in high-risk areas, particularly in central Lewiston-Auburn. Comparing the lead abatement projects map with the pre-1950 housing, the areas of lead abatement projects generally correspond to areas with the highest concentrations of pre-1950 housing. This suggests that the abatement efforts have been appropriately prioritized for older housing stock, but coverage still needs to be completed. Comparing the pre-1950 housing map and the lead poisoning rates map, we can see that the areas with the highest lead poisoning rates correspond to neighborhoods with dense concentrations of pre-1950 housing. While lead abatement projects have been implemented in some high-poisoning areas, there remain clusters of high lead poisoning rates that coincide with untreated pre-1950 housing units.

To conclude the findings from the maps, there are some overlaps between lead abatement projects, pre-1950 housing, and lead poisoning rates in the central city areas. Abatement projects appear to have targeted the most critical areas but have not completely addressed all high-risk zones. There are also some areas that need to be

addressed. For example, the peripheral regions with significant pre-1950 housing and moderate to high lead poisoning rates remain untreated. This suggests that resource allocation for lead abatement should align more with the spatial distribution of risk.

Recommendations

When we regressed pre-1950 housing in Lewiston/Auburn on lead poisoning, we found that the correlation between the two variables was not only statistically significant but meaningful in the context of our study. The percentage of pre-1950 housing in a region was one of the best indicators we had of lead poisoning in that region, and we believe that testing for lead poisoning in areas with high proportions of pre-1950 housing is a good place for the city of Lewiston to start.

We subsequently created maps of both the lead abatement projects that have been done in Lewiston and the pre-1950 housing in Lewiston. Although we found a positive correlation between poverty share and lead poisoning, we only created a map of pre-1950 housing in Lewiston because the pre-1950s houses themselves actually caused lead poisoning due to the fact that these houses contained lead paint. Unlike pre-1950 housing, poverty is only an indicator of lead poisoning and not a cause itself. The poverty regression was done to illustrate the fact that people living in poverty are disproportionately affected by lead poisoning, something we believed the city should be aware of.

Our goal was to see if these two maps lined up; if they did, it was an indication that lead abatement projects were being carried out in parts of the city with high shares of pre-1950 housing. We found that there was a high concentration of lead abatement projects in downtown Lewiston, which also had a high share of pre-1950 housing. However, there was also a huge share of pre-1950 housing in southeastern Lewiston (Lisbon St, Canal St, the streets around Rosedale St and East Ave) and along major roads leading out of Lewiston (Sabattus St, College St, and Main St). As one moves east out of Lewiston on these streets, the share of pre-1950 housing remains high, but there is a dearth of lead abatement programs. We recommend that the city of Lewiston continue to carry out lead abatement projects in southeastern Lewiston and along these major roads. Our regression analysis tells us that these areas likely have high levels of lead, making these a good place to start.

Another recommendation we have is for the city to accumulate (or make accessible) more data. Some data we would find useful are blood lead levels for children, childhood test scores throughout elementary school, and how much the grants were for each household. Data on the first two would tell us more about how children in Lewiston are being affected by lead, although acquiring this data will be ambitious. Learning more about how much the grants were would be very helpful in allowing us to develop a cost/benefit analysis, however.