Early Insights Report: Defining Displacement and Research into Bike Infrastructure. A Preliminary Report

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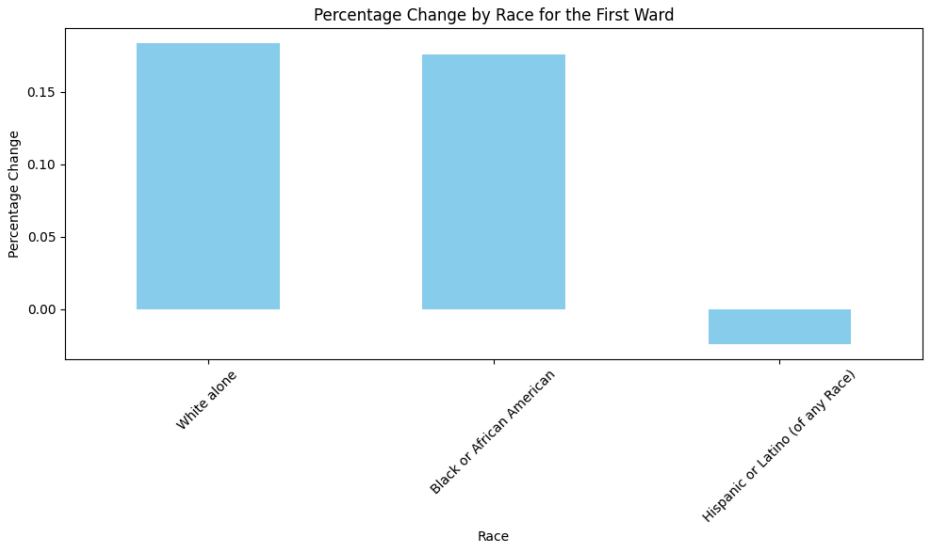
Introduction:

As we researched this topic we realized that displacement itself is not necessarily a statistic but a number of statistics layered on top of one another. Thus the aim of this report is to find preliminary research into different factors such as race, eviction and low income housing to try to understand what displacement is. However, while defining displacement is significant to this project we understand that it is not the only aspect to focus on, therefore we also examined the movement of Blue Bikes and Bike infrastructure in an early attempt to spot any correlation between the two factors. Finally we will attempt to answer the question of what factor has the strongest relationship between displacement and whether or not the factor can be considered a cause of displacement

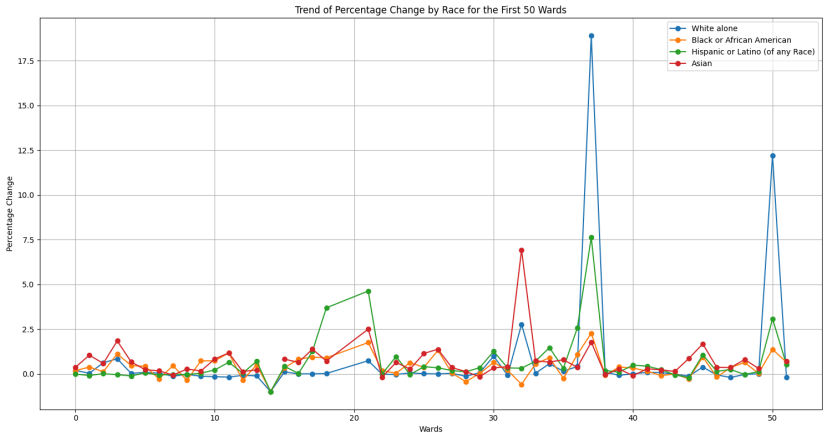
Displacement through Diversity and Race:

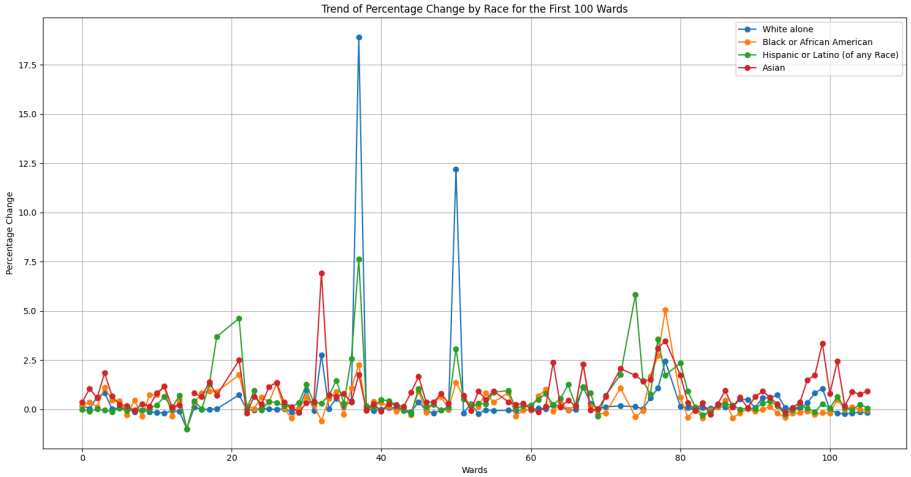
Boston being a very diverse neighborhood, we wanted to see if race itself was a good indicator for displacement. We gathered CENSUS DATA FOR 2022 REDISTRICTING data from data.boston.gov/dataset and preprocessed it to remove unnecessary columns and change '***' to null values. This made performing a preliminary analysis of the data much easier.



We first looked at the percentage change from 2010 to 2020 by race for the first ward (101). We can see from the bar graph above that, there is an increase in White and Black or African American population in ward 101 but decrease in Hispanic or Latino population.

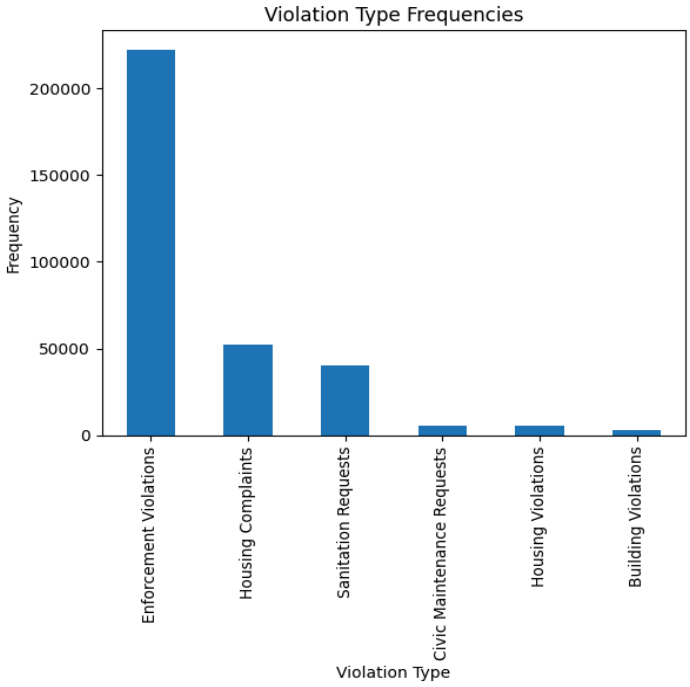
We then looked at the percentage change from 2010 to 2020 in the first 50 wards (101 to 150) between four different races (White, Black or African American, Hispanic or Latino, and Asian). We found out that for some of the wards, for example, wards 137, 138, and 150 have a huge spike in the White population, but wards 132-133 have a spike in the Asian population, and wards 198, 199. 120, and 121 have a spike in Hispanic or Latino population.



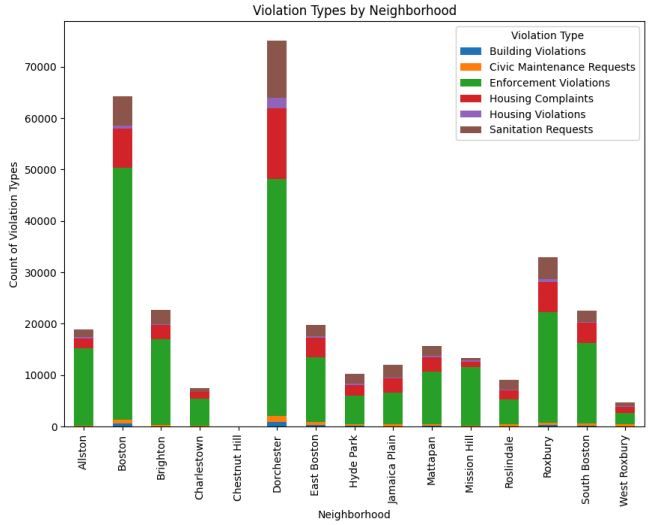


Displacement Through Violations:

As previously mentioned, Displacement is not a hard statistic, there are many factors that can influence displacement, one of them being Building violations and the frequencies of them.

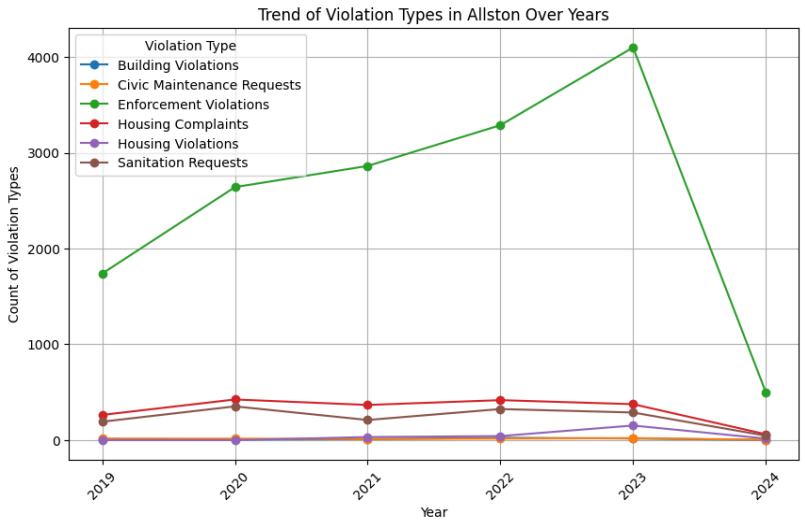


We got the RentSmart data from data.boston.gov/dataset. RentSmart Boston compiles data from BOS:311 and the City's Inspectional Services Division and has information on the types of violations each housing/apartment has received over the years.



To see which neighborhoods received the most violations and which types, we managed to sort the bars by each neighborhood. We also created different colors to represent different violation types. From the graph above, we can clearly see that ‘Enforcement Violations’ are the most common among all neighborhoods, and Dorchester has the most violations along with Boston coming in second and Roxbury coming in third. Chestnut Hill has no violations or no data on the violations, and the other lowest neighborhoods are West Roxbury, Charlestown, and Roslindale.

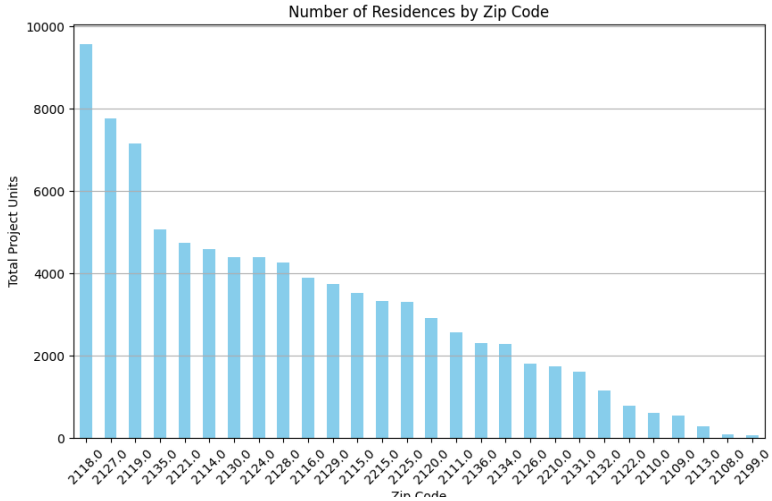
We also wanted to see the trend in the violation types in Allston from 2019 to 2024 (Note that 2024 in this data is incomplete and only accounts for the first two months). So, we sorted the data by Allston, extracted the year from the data, and we graphed trend lines for all violation types over the years.



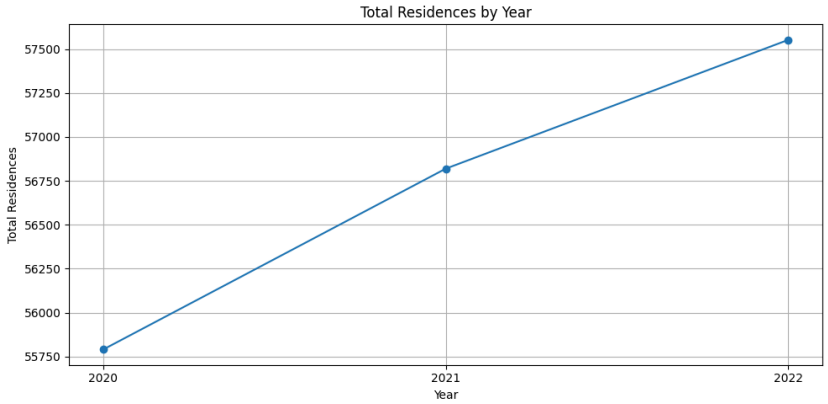
As we can see, the trend for ‘Enforcement Violations’ has been increasing over the years and between 2020 and 2023, it almost starts to assemble an exponential increase. For the other violation types, they seem to be very stable with no noticeable changes over the years.

Displacement Through Income Restricted housing:

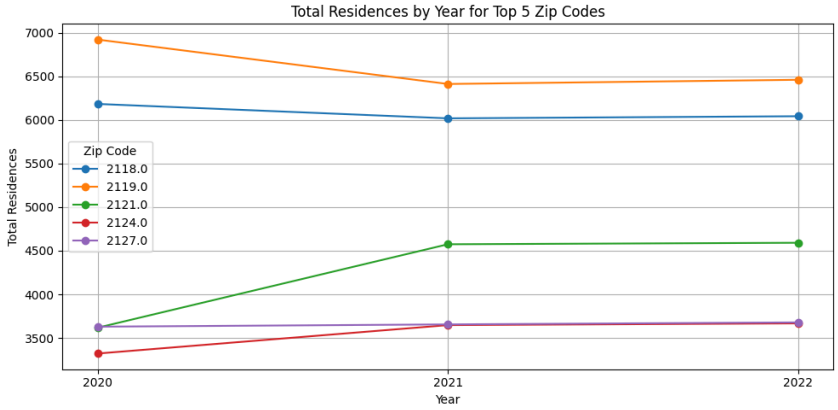
Boston has programs for income restricted housing, we wanted to see if analyzing movements such as growth of these residences in Boston could imply displacement from other neighborhoods that don't offer such programs. Since income restricted housing has an income cap on individuals as a means to incentivize the areas for low income housing. Many times these people are concentrated into certain neighborhoods.



As shown in the following figure , there are several thousands of people living in zip codes with low income housing. The total overall average number of residences in these zip codes was 2055.428. Furthermore, if we are able to track the populations in this neighborhood we may be able to find why certain neighborhoods are more concentrated than others. Do the more populated areas have less bike lanes or Blue Bike Stations? Questions like these help us figure out how the low-income individuals feel about ease of transportation since it is possible that the establishments of bike lanes and bike stations in such neighborhoods forces people to move out simply because they are afraid of 'further gentrification'?. However, more questions can arise once we examine the population of these areas over the years.

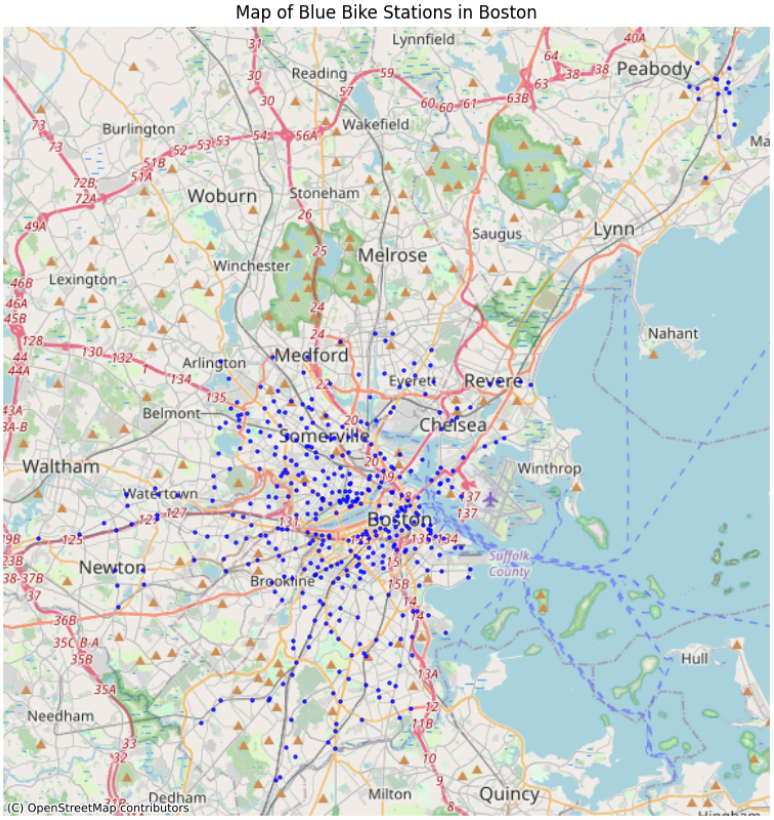


It is quite evident that there is a linear increase of over almost 2000 people just over 2020 to 2022. The rate of increase is about 3.16%. This helps us question whether bike lanes are making costs rise in other neighborhoods in Boston forcing individuals to move to income-restricted areas? A deeper analyzation of the five most populous zip-codes reveals the following:



As we can see there is a bit of back and forth between different low income areas in Boston, this helps us question what is making people move out of certain neighborhoods and move into other areas? Does the primary factor for this relationship have anything to do with bikes at all?

Map of Blue Bike Stations in Boston



Initial Bike Data:

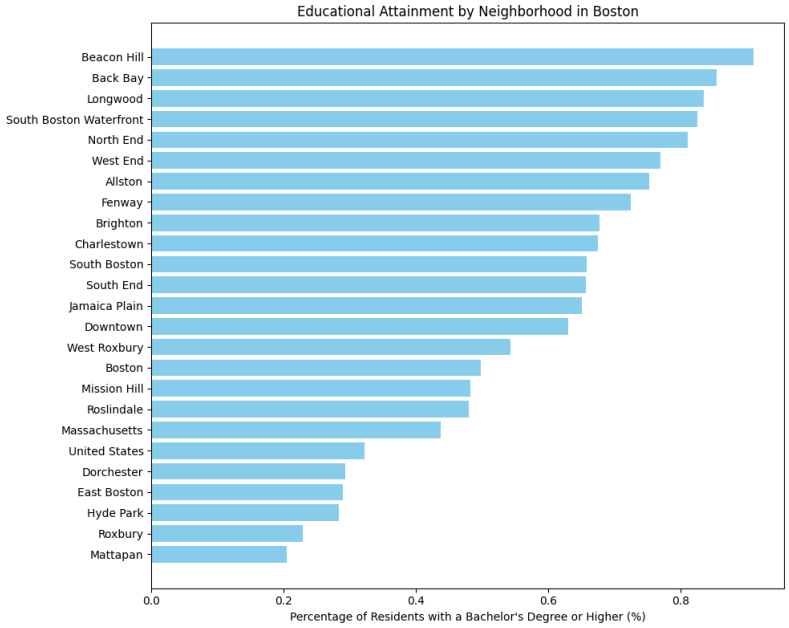
Taking a look at the state of the bike infrastructure in the City of Boston began with looking at data pertaining to Boston's Blue Bike public transportation system. The map to the left has the locations of all of the existing Blue Bike stations in Boston. This data was obtained from boston.gov. It lends good insight as to which neighborhoods have a large concentration of stations and which neighborhoods do not.

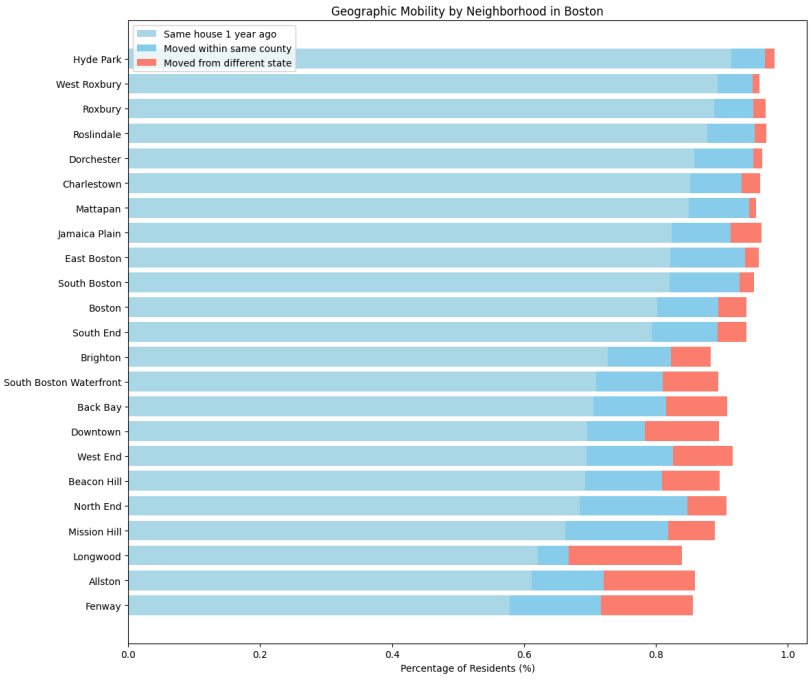
This next map to the right is a map of all of the existing bike lanes in Boston. Just like the Blue Bike location map, this data was acquired from boston.gov and gives insight on which neighborhoods have had clear bike lanes established on their streets. In conjunction, these two maps lay a good groundwork for our goal in looking for a connection between bike infrastructure and displacement.

Map of Bike Lanes in Boston

Some More Demographic Data:

The graph to the right depicts the level of education that has been obtained by citizens living in each of Boston's neighborhoods. This data was obtained from boston.gov. The data indicates that more educated people tend to live in neighborhoods that also have an abundance of bike lanes and Blue Bike stations.





The graph to the left depicts Geographic Mobility statistics amongst the neighborhoods of Boston. The data was acquired from boston.gov. The main takeaway from this data visualization is that many of the more wealthy neighborhoods in Boston have seen new people move in within the last year. These are the same neighborhoods that are seeing higher concentrations of Blue Bike stations and established bike lanes.

Closing Remarks:

Though there are several factors that we examined in our attempts to define displacement. It is within our belief that Income Restricted housing is the factor that shows the strongest relationship with displacement. However it is within our belief that this relationship cannot itself be causative since there are so many other factors we discussed that also play a hand, as we attempt to answer this question, we acknowledge that further research and data collection is needed before making a full conclusion. So, one question that we cannot answer right now with the data we have is “Looking at the data, what might be causing this correlation?” Collecting the data that we did has definitely helped us build our understanding of the issues at hand and how they may relate. As of now we can be positive of our next steps which include taking note of neighborhoods with spikes for underprivileged demographics including but not limited to Hispanic or Latino Population. However, we also want to keep track of trends in building violations to see if they are impacting certain neighborhoods more than others. Finally, while looking at these factors we want to compare them to the trend of blue bike movements and bike lanes to help answer some questions about the correlation between bike infrastructure and displacement. The bottom line is that we have much more data to collect and visualize before we can make any concrete predictions.

Sources:

The majority of the data analyzed through individual graphing techniques came from data.boston.gov/dataset. The methodologies for graphing are included in the pull request on git. We also included the csv’s for the data that we applied in this report.