Public Housing Proximity to Highways in New York City

Environmental justice is the concept that environmental burdens and benefits should be distributed fairly among all people, regardless of race, color, national origin, or income. Exposures to air pollution, heat, and traffic are racialized factors that are associated with poor health outcomes within the City of New York. Air pollution is largely due to automobile emissions. This makes exposure to automobile emissions and air pollution very significant in New York City. For the purpose of my project, public housing residents located in an area with near many highways. It is clear from these maps that areas where there are many public housing units, or public housing residents are also those areas nearest to highways and with the highest density of highways. While these maps do not show air pollution concentration by community district, those areas nearest to highways and with higher density of highways are likely exposed to greater concentrations of traffic-generated air pollution and therefore are more likely at higher risk for adverse health outcomes such as preterm birth and low birth weight. This conclusion cannot be drawn from the map alone, as further statistical analysis would be necessary to show such a conclusion. By using a scoring system, the vulnerability assessment map identifies the community districts that are nearest to highways, with more highway density, public housing residents, and units, and are likely more exposed to traffic-generated air pollution. Therefore, these same community districts are likely at higher risk for adverse health outcomes. Interventions should take place in these community districts in order to lessen exposure to air pollution. Installing effective air ventilation systems in public housing could be one way to remedy this issue.

## Conclusions

The vulnerability assessment shows that community districts with the highest scores are community districts that were likely to have many public housing residents located in an area near many highways. It is clear from these maps that areas where there are many public housing units, or public housing residents are also those areas nearest to highways and with the highest density of highways. While these maps do not show air pollution concentration by community district, those areas nearest to highways and with higher density of highways are likely exposed to greater concentrations of traffic-generated air pollution and therefore are more likely at higher risk for adverse health outcomes such as preterm birth and low birth weight. This conclusion cannot be drawn from the map alone, as further statistical analysis would be necessary to show such a conclusion. By using a scoring system, the vulnerability assessment map identifies the community districts that are nearest to highways, with more highway density, public housing residents, and units, and are likely more exposed to traffic-generated air pollution. Therefore, these same community districts are likely at higher risk for adverse health outcomes. Interventions should take place in these community districts in order to lessen exposure to air pollution. Installing effective air ventilation systems in public housing could be one way to remedy this issue.

## Limitations & Future Research

- Statistical analysis was not performed, but it would need to be performed in order to draw concrete conclusions about whether these areas nearer to highways are those areas that are exposed to greater concentrations of air pollution.
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## Methods

Four factors were analyzed in order to determine the community districts within Manhattan, the Bronx, Brooklyn, and Queens that were most likely to have many public housing residents located in areas with the most highways.

### Road Density

Road density was calculated for each road segment in New York City using the Road Network layer from the New York City Open Data portal. The road network was divided into three categories: highways, interstates, and local roads. The road density was calculated by dividing the total length of each road segment by the number of road segments within that category. The resulting road density values were then categorized into five levels: low, medium-low, medium, medium-high, and high. Each level was assigned a score from 1 to 5, with 1 being the lowest road density and 5 being the highest road density. This categorization was based on the observed differences in road density across different districts. The road density values were then used to create a map of road density for each community district. The map was generated using the GeoDa software, and each community district was assigned a color based on its road density score. The map was then exported as a PDF file for further analysis.

### Public Housing Population

Public housing data from the New York City Housing Authority were processed by community district and reclassified in order to give each district a score of 0 to 5. A score of 0 represented the lowest road density, and a score of 5 represented the highest road density. This categorization was based on the observed differences in road density across different districts. The public housing data were then used to create a map of public housing population for each community district. The map was generated using the GeoDa software, and each community district was assigned a color based on its road density score. The map was then exported as a PDF file for further analysis.

### Public Housing Proximity to Highways

Highway proximity to public housing was calculated using the street network data from the New York City Open Data portal. The street network was divided into three categories: highways, interstates, and local roads. The highway proximity was calculated by dividing the total length of each road segment by the number of road segments within that category. The resulting highway proximity values were then categorized into five levels: low, medium-low, medium, medium-high, and high. Each level was assigned a score from 1 to 5, with 1 being the lowest road density and 5 being the highest road density. This categorization was based on the observed differences in road density across different districts. The highway proximity values were then used to create a map of highway proximity for each community district. The map was generated using the GeoDa software, and each community district was assigned a color based on its road density score. The map was then exported as a PDF file for further analysis.

## Vulnérability Assessment of Community Districts

The vulnerability assessment shows that community districts with the highest scores are community districts that were likely to have many public housing residents located in an area near many highways. It is clear from these maps that areas where there are many public housing units, or public housing residents are also those areas nearest to highways and with the highest density of highways. While these maps do not show air pollution concentration by community district, those areas nearest to highways and with higher density of highways are likely exposed to greater concentrations of traffic-generated air pollution and therefore are more likely at higher risk for adverse health outcomes such as preterm birth and low birth weight. This conclusion cannot be drawn from the map alone, as further statistical analysis would be necessary to show such a conclusion. By using a scoring system, the vulnerability assessment map identifies the community districts that are nearest to highways, with more highway density, public housing residents, and units, and are likely more exposed to traffic-generated air pollution. Therefore, these same community districts are likely at higher risk for adverse health outcomes. Interventions should take place in these community districts in order to lessen exposure to air pollution. Installing effective air ventilation systems in public housing could be one way to remedy this issue.