

# Neighborhood Racial Composition and All-Cause Mortality in New York City

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## BACKGROUND

- Modern medicine, advanced preventive strategies and several public health initiatives have resulted in increased life expectancy and decreased mortality rates over time.
- However, in 1980s, the differences in mortality rates between Blacks and Whites widened.<sup>1</sup> Lower Socioeconomic status (SES) is associated with increased mortality rate attributed to all causes.
- This pattern is consistent across cause specific mortality rates as well. Pregnancy-related mortality is the highest among black women, and within New York City, The Bronx had the highest ratio of pregnancy-related deaths (26.0 per 100,000 live births) followed by Brooklyn (25.7), Queens (24.6), Staten Island (17.4) and Manhattan (13.9).<sup>2</sup>
- This study aims to examine spatial variations in all-cause mortality rates among different racial groups in New York City.

## METHODS

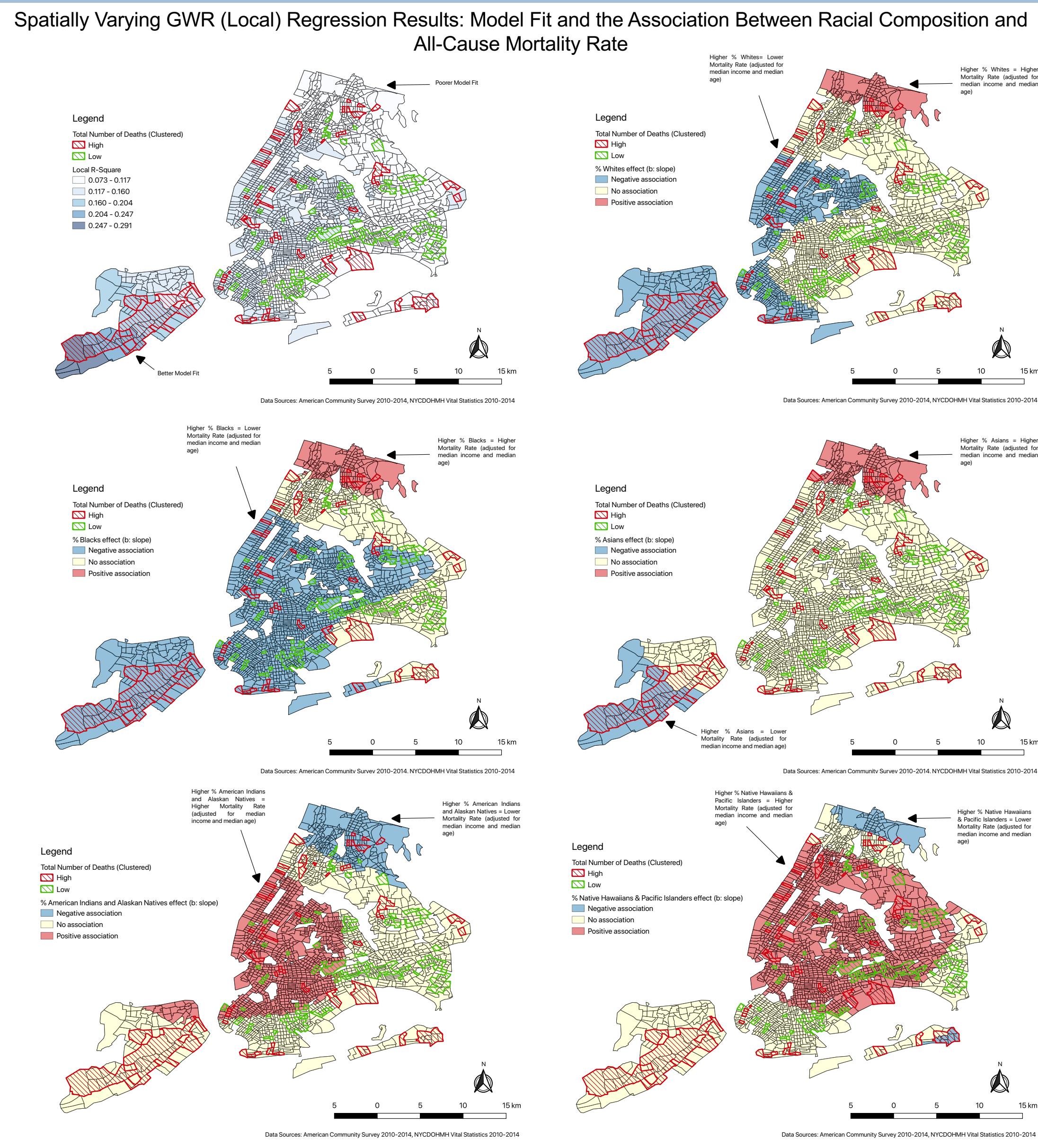
- Census tract level demographic data were obtained from American Community Survey 2010-2014 (5-year estimates). Mortality data were obtained from New York City Department of Health's Vital Statistics database.
- Mortality Rate was measured as follows,

$$\text{Mortality rate} = \frac{\text{Total Number of Deaths within Census Tract}}{\text{Total Population within Census Tract}}$$

- Exploratory data analysis included mapping statistically significant spatial clusters of total number of deaths at the census tract level using GeoDa.
- Local geographically weighted regression model was fit with percentage of racial composition as the independent variable. The model was adjusted for median income and median age within the census tract.
- Results from the regression model were mapped using QGIS and visualized against the statistically significant spatial clusters of total number of deaths due to all causes 2010-2014 (5-year estimated)

## RESULTS

- Statistically significant spatial clusters for high total number of deaths were identified in Staten Island, Upper West Side, Washington Heights, The Bronx and some parts of Queens and Brooklyn at the Census Tract level.
- There appears to be a positive association between % Whites and all-cause mortality rate in The Bronx, upon adjusting for median age and income. The results are similar for the association between % Blacks or African Americans and all-cause mortality rate.
- There appears to be a positive association between % American Indians and Alaskan Natives and all-cause mortality rate in the Manhattan, Queens and parts of Brooklyn, upon adjusting for median age and income. These results are similar for the association between % Native Hawaiians and Pacific Islanders and all-cause mortality rate.



## LIMITATIONS

- Data used for these analyses were 5-year estimates; hence, it does not allow to observe trends over time.
- Racial composition was calculated for one-race only; therefore, the analyses does not include mixed-race populations.
- Data were not disaggregated to capture and explain associations among Hispanics and Latinos. This could be due to data collection limitations from the survey.
- There might be unmeasured confounding due to other variables.
- The model fit poorly in the Bronx, Queens and parts of Brooklyn hence the results might be generalizable to these parts of the city.

## CONCLUSIONS

- Local geographically weighted regression model explains up-to 30% of the association between all-cause mortality and neighborhood racial composition, upon adjusting for median age and income.
- Spatially significant clusters of high total number of deaths indicates areas where potential interventions can be directed to mitigate mortality rates.
- Limitations of this study also indicate the need for better demographic data collection strategies and data disaggregation.

## ACKNOWLEDGEMENTS

- Jeremy Porter, PhD

## REFERENCES

<sup>1</sup> Gillum, Richard F., and Kuo Chang Liu. "Coronary Heart Disease Mortality in United States Blacks, 1940–1978: Trends and Unanswered Questions." *American Heart Journal*, vol. 108, no. 3, 1984, pp. 728–732., doi:10.1016/0002-8703(84)90665-3.

<sup>2</sup> NYC DOHMH (2013) Pregnancy-Associated Mortality in New York City, 2006-2010