Exploratory Analysis of COVID-19 Case Demographics in Gary, Indiana

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Background and Hypothesis:
Health disparities are prevalent in Black populations, and COVID-19 is not an exception. COVID-19 is a pandemic that has been confirmed in 3.8 million Americans and has caused 133,283 deaths in the US (4/20/2020). Recent literature suggests that minoritized and impoverished populations are more severely impacted by COVID-19. Gary, Indiana has a large Black population (80%), high number of residents living below the poverty line (34%), and high unemployment rate (20%). We hypothesized that Black individuals in Gary have a higher rate of positive cases, hospitalizations, and deaths than non-Black individuals. Also, we hypothesized that income (median household income measured by zip code) is negatively correlated with COVID-19 deaths.

Experimental Design and Project Methods:
In collaboration with the Gary Health Department, we analyzed demographic data on all positive cases in the city from 4/16/2020 through 6/19/2020. Case data was de-identified with 16 dimensions including age, race, sex, ethnicity, hospitalization, death, and zip code. Data was analyzed using Pearson's chi-square test and regression analysis.

Results:
Positive cases and hospitalizations are 2-fold and 3-fold more frequent in the Black population compared to the non-Black population in Gary ($p<0.0001$, $P<0.01$, age and population-adjusted), respectively. Median household income of a zip code is exponentially and negatively correlated with COVID-19 related deaths in that zip code ($R^2=0.7450$, $p=0.0123$).

Conclusion and Potential Impact:
In Gary, there is a clear health disparity of both income and race, specifically in the context of COVID-19. Health officials can utilize this data to reallocate resources to highly populated, low income, and predominantly Black neighborhoods. In addition, future predictive analysis could be beneficial in developing a model to predict COVID-19 prevalence and severity. Such a model would help local health departments prepare for a second Covid-19 wave, providing for better outcomes for at risk populations through resource allocation.