

## **A Comparison of COVID-19 Epidemiology, Pathophysiology, and Impact on Vulnerable Populations in Two States within the USA**

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Since late 2019, SARS-CoV-2 has differentially impacted geographies and population demographics as it spread. As of June 30, 2020, two hotspots within the United States of America—the states of Georgia and Michigan—exhibited similar numbers of cases while Michigan had over twice the case fatality rate (CFR) of Georgia. Given the similar populations, land areas, and pandemic timelines of these states, such a large difference is unexpected. The primary goal of this paper is to examine why Michigan experienced much higher COVID-19 mortality than Georgia, which may point to at-risk comorbidities and vulnerable populations.

We examined publicly available data on demographics, rates of comorbidities, environmental factors, and other population differences at the state and local levels (the cities of Detroit, Michigan; Atlanta, Georgia; and Albany, Georgia) that have known or identified associations with health outcomes. We also outlined the timeline of the pandemic in each state to determine if the actions of state governments may have contributed to the observed difference in CFR.

While the difference in state CFR may imply that Michigan handled the pandemic poorly, the data show that inherent characteristics of Detroit may have led to the higher statewide CFR. Notable differences between the states include elderly populations, agricultural statistics, and drinking habits. Notable differences between the cities included population density, health system quality, per capita income, race, education, media access, and air pollution. Hypertension (among blacks), diabetes (at the city level), chronic kidney disease, asthma, heart disease, and cancer differed in prevalence by location and were associated with increased severity and/or mortality of COVID-19. There were more deaths due to COVID-19 in African American communities and nursing homes in Michigan. A combination of these factors likely explains the differential impact between these two states.