**Spatial Disparities in Coronavirus Incidence and Mortality in the**

**United States: An Ecological Analysis**

Purpose: This ecological analysis investigates the spatial patterns of the COVID-19 epidemic in the U.S. in relation to socioeconomic variables that characterize U.S. counties.

Methods: Data on confirmed cases and deaths from COVID-19 for 2,814 U.S. counties were obtained from Johns Hopkins University. We used Geographic Information Systems (GIS) to map the spatial aspects of this pandemic and investigate the disparities between metropolitan and non-metropolitan communities. Multiple regression models were used to explore the contextual risk factors of infections and death across U.S. counties. We included population density, percent of population aged 65+, percent population in poverty, percent minority population, and percent of the uninsured as independent variables. A state level measure of the percent of the population that has been tested for COVID-19 was used to control the impact of testing.

Findings: The impact of COVID-19 has been extremely uneven across the U.S. Although densely populated large cities and their surrounding metropolitan areas are hotspots of the pandemic, it is counterintuitive that incidence and mortality rates in some small cities and non-metropolitan counties approximate those in epicenters such as New York City. Regression analyses support the hypotheses of positive correlations between COVID-19 incidence and mortality rates and socioeconomic factors including population density, proportions of elderly residents, poverty, and percent population tested.

Conclusions: Knowledge about the spatial aspects of the COVID-19 epidemic and its socioeconomic correlates can inform first responders and government rescue efforts. Directives for social distancing and to ‘shelter-in-place’ should continue to stem the spread of COVID-19.

Keywords: Coronavirus, COVID-19, pandemic, metropolitan areas, rural or nonmetropolitan,

spatial disparities.