Abstract

The United States struggled exceptionally during the COVID-19 pandemic. For researchers and policymakers, it is of great interest to understand the risk factors associated with COVID-19 when examining data aggregated at a regional level. We examined the county-level association between the reported COVID-19 case fatality rate (CFR) and various demographic, socioeconomic and health factors in two hard-hit US states: New York and Florida. In particular, we examined the changes over time in the association patterns. For each state, we divided the data into three seasonal phases based on observed waves of the COVID-19 outbreak. For each phase, we used tests of correlations to explore the marginal association between each potential covariate and the reported CFR. We used graphical models to further clarify direct or indirect associations in a multivariate setting. We found that during the early phase of the pandemic, the association patterns were complex: the reported CFRs were high, with great variation among counties. As pandemics progressed, especially during the winter phase, socioeconomic factors such as median household income and health-related factors such as the prevalence of adult smokers and mortality rate of respiratory diseases became more significantly associated with the CFR. It is remarkable that common risk factors were identified for both states.