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Title: Preparing for a COVID-19 Surge

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Dear Editor

As of May 12, 2020, over 4.2 million cases of COVID-19 across 187 countries have been reported, of which 1.3 million have occurred in the United States (US) alone.[1] Although many infected individuals will have mild symptoms, older patients are disproportionately more likely to progress to severe disease (US adults aged 65-84 are hospitalized at a rate of 31-59%, and infected adults over 85 at a rate of 31-70%).[2] As hospital capacity and the population density of older adults vary considerably across the country and worldwide, understanding which regions will face disproportionate burden from a surge in hospitalizations is necessary for targeted preparedness efforts. We analyzed these data in the context of the US, mapping the hospital bed capacity in relation to the prevalence of older adults for all US counties (**Figure 1a**). We also mapped case fatality rate (CFR) of COVID-19 for all US counties to understand which counties may be experiencing a greater burden of severe cases at the present (**Figure 1b**).

Our analysis documents substantial variation within states, but nonetheless, in Arizona, Connecticut, Rhode Island, New York, Nevada, Louisiana, Vermont, Michigan, Massachusetts, Indiana, Oregon, Hawaii, and Utah the average number of beds per 1000 individuals over the age of 65 is below 10. Findings are particularly alarming given that many of these states are some of the hardest hit by the COVID-19 epidemic to date. Connecticut, Michigan, Massachusetts, Louisiana, New Jersey, Ohio, Indiana, New York, Wisconsin, Oklahoma, and the District of Columbia have a CFR for COVID-19 that is greater than 4%, suggesting these states are experiencing a high burden of severe cases that require hospitalization. As half of these are also the states that have less than 10 beds per 1,000 persons over 65, these states are more likely to require assistance given more limited capacity to handle a surge in cases. Furthermore, there is

considerable variability of hospital beds per 1000 individuals over the age of 65 by county within these states, suggesting that state resources will also need to be strategically allocated to counties with the greatest need.

These findings demonstrate the importance of understanding demographics and health infrastructure in the context of COVID-19 to prepare for surges in cases. As the pandemic shifts to more low resource settings, including low-to-middle income countries, where hospital beds and reliable data on hospital capacity are unavailable, obtaining useful data for preparedness will be more difficult. To that end, ensuring that across nations we have clarity on the types of data needed and resources put toward quality data collection should be viewed as fundamental preparedness activities for pandemics and other crisis situations. We may be too late to fully obtain and use data in this manner for this wave of the pandemic, but we can and should be better prepared in this manner for the inevitable second wave.

All authors declare no competing interests.

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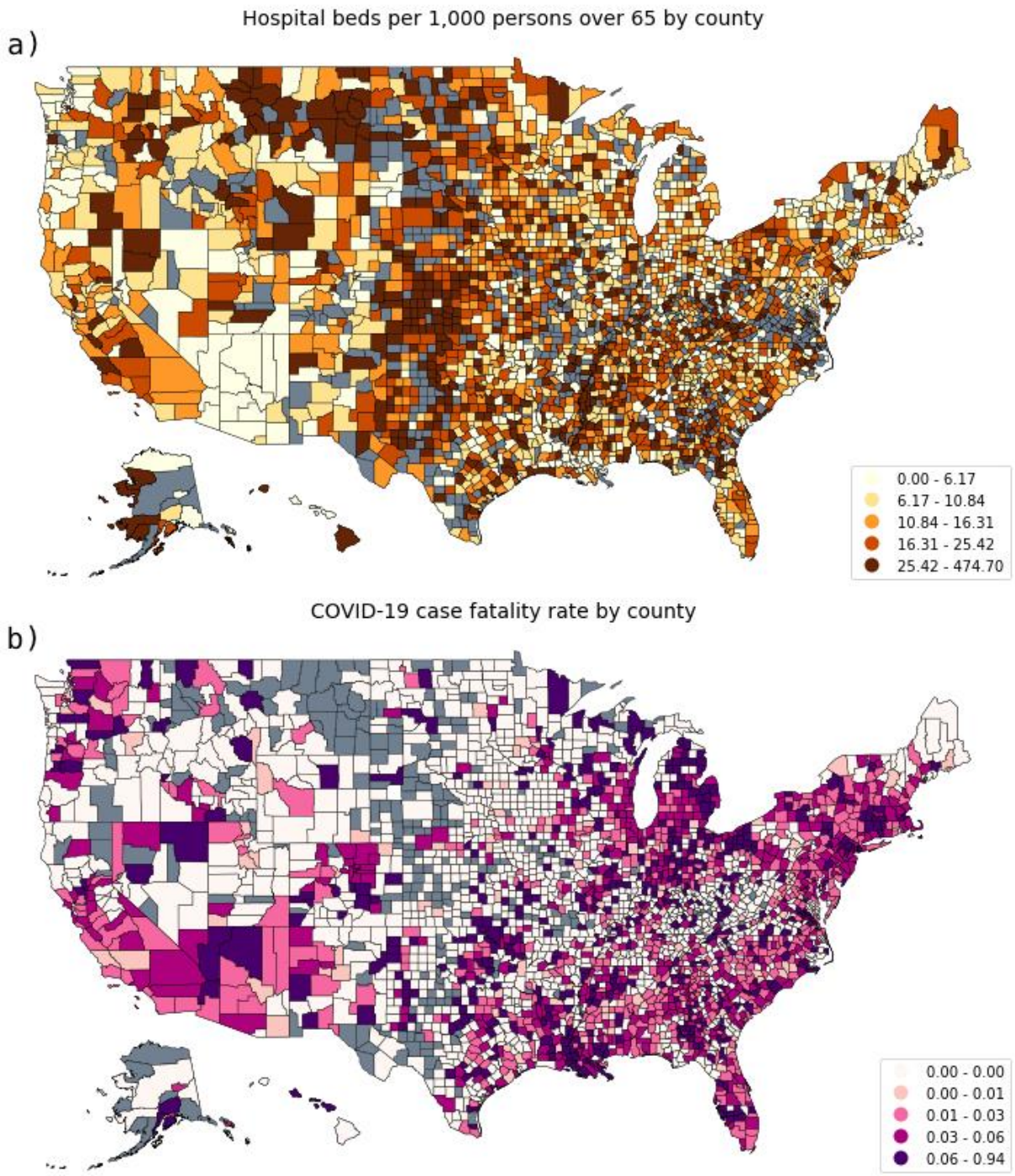

Figure 1. a) This map was created with hospital bed data, sourced from Homeland Infrastructure Foundation-Level Data,[3] and data on individuals over the age of 65 per county, sourced from the 2015 American Community Survey.[4] Counties with unavailable hospital bed data are indicated in grey. b) This map was created using data regarding confirmed COVID-19 cases and deaths sourced from USAFacts.org.[5] Counties with no confirmed COVID-19 cases are indicated in grey.