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# Health Risks for COVID-19 in Mississippi Counties

Jamiko Deleveaux and Vanessa Parks  
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Evidence suggests that individuals with pre-existing health concerns may be more susceptible to becoming seriously ill from the novel Coronavirus Disease 2019 (COVID-19).<sup>1</sup> Such co-morbidities include existing respiratory problems, cardiovascular issues, and immune function.<sup>2</sup> A recent report found that Mississippi and many other southern states had among the highest rates of pre-existing conditions that could contribute to COVID-19 complications.<sup>3</sup> Within Mississippi, health outcomes vary spatially.<sup>4</sup> Though Mississippi as a whole exhibits poor health outcomes, many of the poorest health outcomes are clustered in the Mississippi Delta region.

While it may seem that rural areas, like much of Mississippi, face less of a threat from COVID-19 because of lower population density when compared to urban clusters like New York City and New Orleans (and therefore less chance for community transmission), rural areas may still be at risk because they have less developed healthcare infrastructure and fewer supplies such as ventilators and personal protective equipment.<sup>5-6</sup> So even though the state may have a relatively smaller population and a majority of people living in rural areas, it is critical for Mississippi to take concerted measures to reduce the transmission of COVID-19 to protect its citizens who are potentially more likely than other Americans to develop serious complications due to COVID-19.

To anticipate where there may be the greatest potential for Mississippians to become seriously ill from COVID-19, we developed a health risk index for each county. Table 1 displays the variables included in the measure, the state average, and the data source. The variables included in the health risk measure are not meant to be exhaustive, but rather, illustrative of the breadth of potential health problems that could increase COVID-19 cases within a county.

**Table 1. Variables used to construct the health risk index**

	Average for Mississippi Counties <sup>a</sup>	Data Source
Percent of Adults with Diabetes	12.4%	United States Diabetes Surveillance System 2016 <sup>7</sup>
Percent of Adults with Obesity	67.4%	United States Diabetes Surveillance System 2016 <sup>7</sup>
Percent of Adult Smokers	22.0%	Behavioral Risk Factor Surveillance System 2017 <sup>8</sup>
Asthma Prevalence Rate <sup>b</sup>	9.7	Behavioral Risk Factor Surveillance System 2017 <sup>8</sup>
Hypertension Death Rate <sup>b</sup>	222.0	Division for Heart Disease and Stroke Prevention 2015-2017 <sup>9</sup>
Heart Disease Death Rate <sup>b</sup>	231.6	Division for Heart Disease and Stroke Prevention 2015-2017 <sup>9</sup>
Cancer Incidence Rate <sup>b</sup>	468.6	National Cancer Institute State Cancer Profiles 2012-2016 <sup>10</sup>
HIV Prevalence Rate <sup>b</sup>	383.0	ACS/ National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention 2017 <sup>11</sup>
Primary Care Physicians Ratio	1889:1	Area Health Resource File/American Medical Association/ACS 2017 <sup>12</sup>

Air Pollution (fine particulate matter in micrograms per cubic meter)	9.9	Environmental Public Health Tracking Network 2014 <sup>13</sup>
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Notes

a: N=82

b: All rates presented are equal to the total number over 100,000

For each of these measures, we produced a z-score and then added those scores to create an age-adjusted health risk index, which ranges from -9 to 22.8. The counties were then ranked based on their scores, and we created four categories for low risk, moderate risk, elevated risk, and high risk counties. We then developed two maps, one mapping the health risk categories for each county in Mississippi (Figure 1) and another mapping the COVID-19 case rate for each county in Mississippi (Figure 2), in order to represent these concerns spatially but also to determine if there is overlap between health risk and current case rate. We calculated COVID-19 case rates using data from the Mississippi Department of Health,<sup>14</sup> which was then divided by the 2019 County Population Estimate<sup>15</sup> and multiplied by 10,000.

**Figure 1. Health Risk by County**

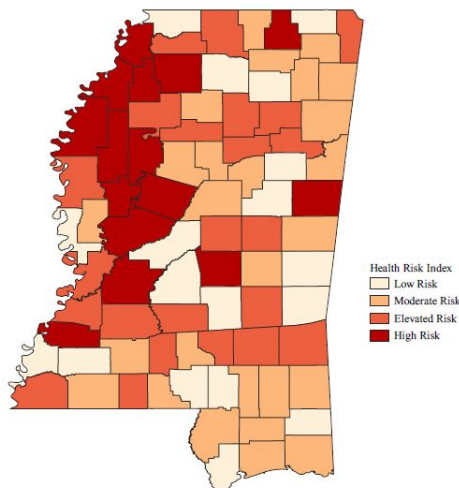


Figure 1 shows that, overall, there is variation in health risk in counties across the state. However, the highest level of risk

does appear to be clustered in northwest Mississippi, including much of the Mississippi Delta region. Though these counties exhibit the highest classification of risk as measured in this analysis, that is not to suggest that other areas of Mississippi are of objectively low risk. Rather, these risk categorizations are relative to other places in Mississippi.

**Figure 2. COVID-19 Case Rate by County**

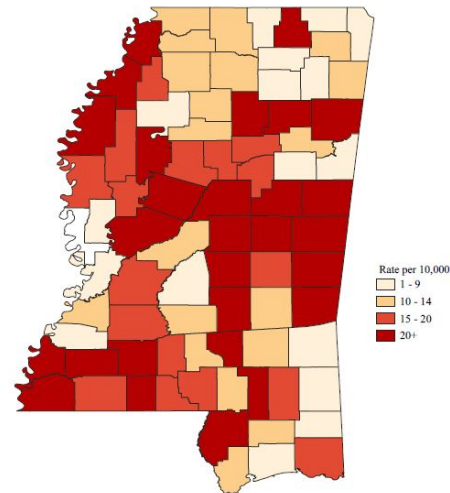


Figure 2 shows the known case rate (per 10,000 residents) of Mississippi counties, as of April 21, 2020. This approach takes into account the population size to show how prevalent COVID-19 is in a place, rather than just the raw number of cases in a county. Seventeen counties in Mississippi have case rates of 20 or higher per 10,000 people. These counties are distributed across the state, though there is a greater concentration of these counties in the northwest quadrant of the state.

The Spearman's rank correlation coefficient between the health risk index and the case rate is 0.290. This suggests that there is a correlation between the relative health risk of a county and the case rate. In other words, counties facing more health issues prior to the pandemic may currently have higher case rates.

The health risk index, when compared to the case rate of a county, is meant to illustrate places where potential need is intersecting with demonstrable need. Figure 1 presents health risk scores of counties to illustrate places that might see a greater share of the population facing health problems that could lead to more severe illness from COVID-19. Again, a county with

lower health risk does not mean that it is a healthy county or in any way immune to COVID-19 cases. In the same way, counties with the highest case rates may not have the greatest number of cases. Rather, counties with high case rates have higher cases per capita. Such information may be of use when considering what areas of the state face the greatest risks.

*The University of Mississippi Center for Population Studies (CPS) engages in outreach, education, and research to advance and apply knowledge to inform community development and promote health and wellbeing. The ideas expressed in this Population Brief are those of the author and do not necessarily reflect the CPS as a whole or its partner organizations. For more information on the CPS, please visit <http://cps.olemiss.edu>.*

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