Potential Implications of Hospital Closure of at-Risk Facilities in the Southeastern US: Findings from the 2020 Release of the American Hospital Association Database

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Since 2005 there have been 180 hospital closures in rural communities in the US (1). This is a public health challenge because loss of hospitals in rural areas of the US can have negative impacts on health outcomes (2), and the quality of care through access to competent providers (3). Among areas of the US at-risk, it appears that according to the Center for Healthcare Quality and Payment Reform (CHQPR) that there are a high number of rural hospitals at risk of closure due to subpar net margins (4). Though hospital closures in urban areas can have negative consequences, there are usually alternative healthcare facilities in urban communities, which reduces the odds of significant reduction of healthcare access should a hospital close. In many rural communities of the nation, when a hospital closes a significant portion of the physician workforce leaves that community (3). In this report, our team assessed the differences in physical access should hospitals at risk of closing remain open and close. Given the number of poor performing hospitals, and historical presence of socioeconomic deprivation (5), the target states in this report will be Kentucky, Tennessee, Alabama, and Georgia along with the United States as a whole.

Contemporary Background Information on Target States

Kentucky

Kentucky has a lot of rural counties, and among them is Wolfe County – one of the least healthy counties in Kentucky. According to the Kentucky Institute of Medicine, “Wolfe County showed high rates of lung cancer, premature deaths and deaths relates to cardiovascular disease” (6). Many citizens in Wolfe County cannot afford health insurance and the county itself has an unemployment rate of 10.3% (6). As the counties change from rural to urban, population health gets better. The Kentucky Institute of Medicine says that the poor health of Wolfe County is a result of a lack of doctors and healthcare workers. It is evident that residents in these rural

counties do not have as much access to healthcare, and when they do, they don't get as quality healthcare as they would if they lived in an urban county.

Tennessee

Tennessee is another state in the south that has a lot of rural counties. Grundy County (the county with the worst population health in Tennessee) has a score of 30 out of 100 when it comes to access to care (7). That includes hospital bed availability, population with no health insurance, and primary care doctors available. Hospital bed availability in Grundy County is 0 (7). After looking at this information, it is no shock that Grundy County has a population health score of 22 out of 100 (7). This includes cardiovascular disease, diabetes, and many different types of cancers. The hospital workforces in Grundy County are very small when compared to the hospital workforces in urban counties like Shelby.

Alabama

Alabama is right there with Tennessee and Kentucky as one of the most-unhealthy states in the country. The problem lies with the rural counties rather than the urban counties. According to AL.com, seven hospitals in rural areas have closed since 2008 (8). While that number doesn't seem high, the population and access to healthcare in rural areas must be considered. Not a lot of people in rural areas have the best access to hospitals, so when the only hospitals in the area do close, there is little or no healthcare available. There are eight rural counties in Alabama that do not have hospitals and for the hospitals that are present in rural counties, there is a shortage of nurses and other healthcare workers (8).

Coming in at 40 out of 50 in overall population health in the country is Georgia. Like the rest of the southern states, Georgia has a lot of rural counties. Among those rural counties is Wilcox. Wilcox County has an overall population health score of 18 out of 100 (9). The reason

for this extremely low population health score is they barely have any access to healthcare. According to US News, Wilcox County got a score of 20 out of 100 on access to care. Hospital bed availability is 0, meaning there is not a single hospital bed in the county that people have access to for healthcare (9). The same goes for all of the other rural counties in the state of Georgia. Many do not have access to high quality healthcare simply because of the rurality of their county. As the counties get more urban, the amount and quality of healthcare increases. As the counties get more rural, the amount and quality of healthcare decreases.

Methods

The dataset used in this analysis to identify hospitals, as well as their bed counts, was provided by the American Hospital Association (AHA) (10). Data from the Center for Healthcare Quality and Payment Reform (4) was merged with the AHA data source to flag hospitals at risk for closing. Population estimates and neighborhood characteristics at the census tract level came from the US Census Bureau American Community Survey 5-year estimates (11). In this report, we operationalized physical access to hospitals as estimated personal automobile travel time between each census tract centroid and each respective hospital in the nation. Travel time estimates were produced by a faculty mentor using GIS software (12). The rurality status of each neighborhood was operationalized using the US Health Resources and Services Administration rural health areas criteria (13). Using T-SQL programming language, we generated queries using SQL Server Management Studio © and Azure Data Studio ©. Thereafter, we used Tableau © to examine maps to interpret findings. A faculty mentor assisted in re-generating maps using ArcGIS Pro © so that maps would have the appropriate cartographic projections for the US Deep South Region. More details about the database schema can be found here: https://bit.ly/3eMbEei.

Results

Figure 1. Distribution of Hospitals in Deep South US

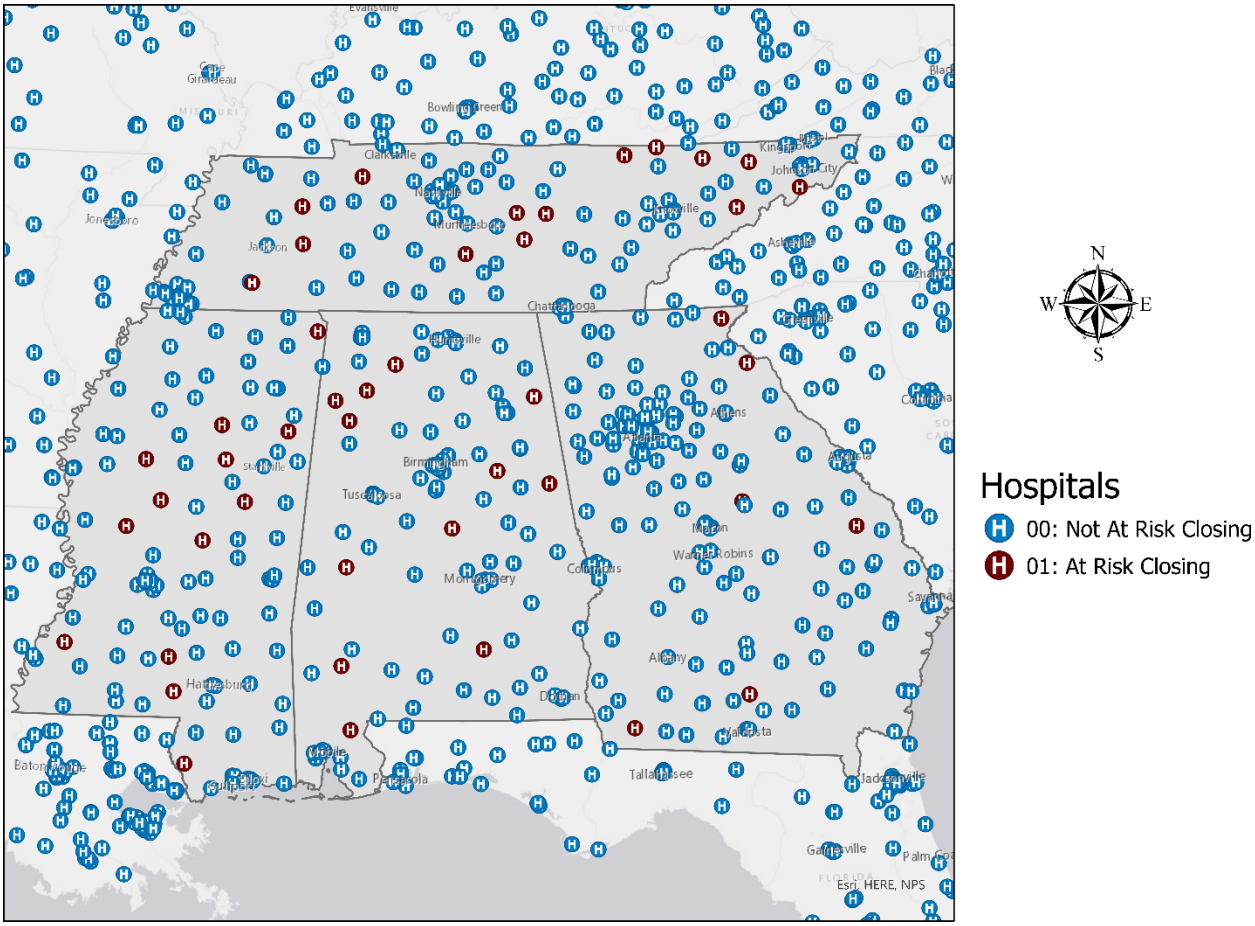

Figure 2. Comparison of County Level Hospital Beds per 1,000 residents with the inclusion of at-risk hospitals and exclusion of at-risk hospitals.

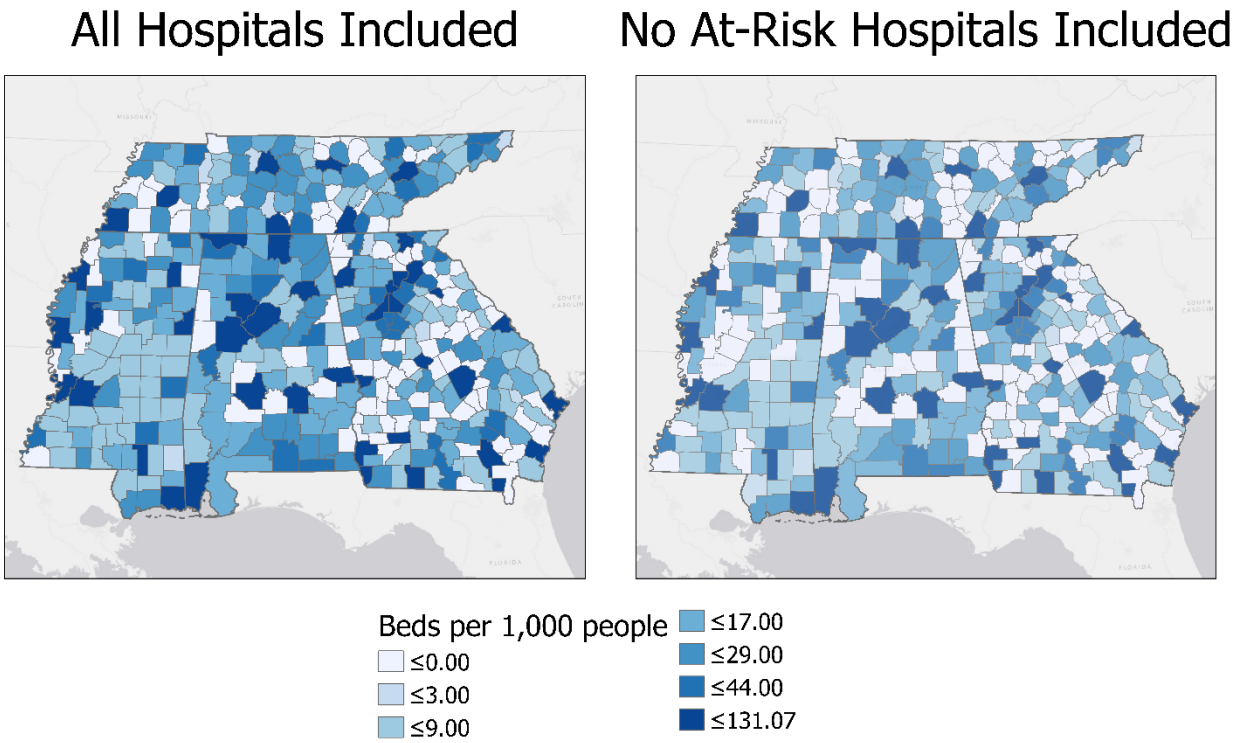

Figure 3. Comparison of travel time to hospitals with the inclusion of at-risk hospitals and exclusion of at-risk hospitals.

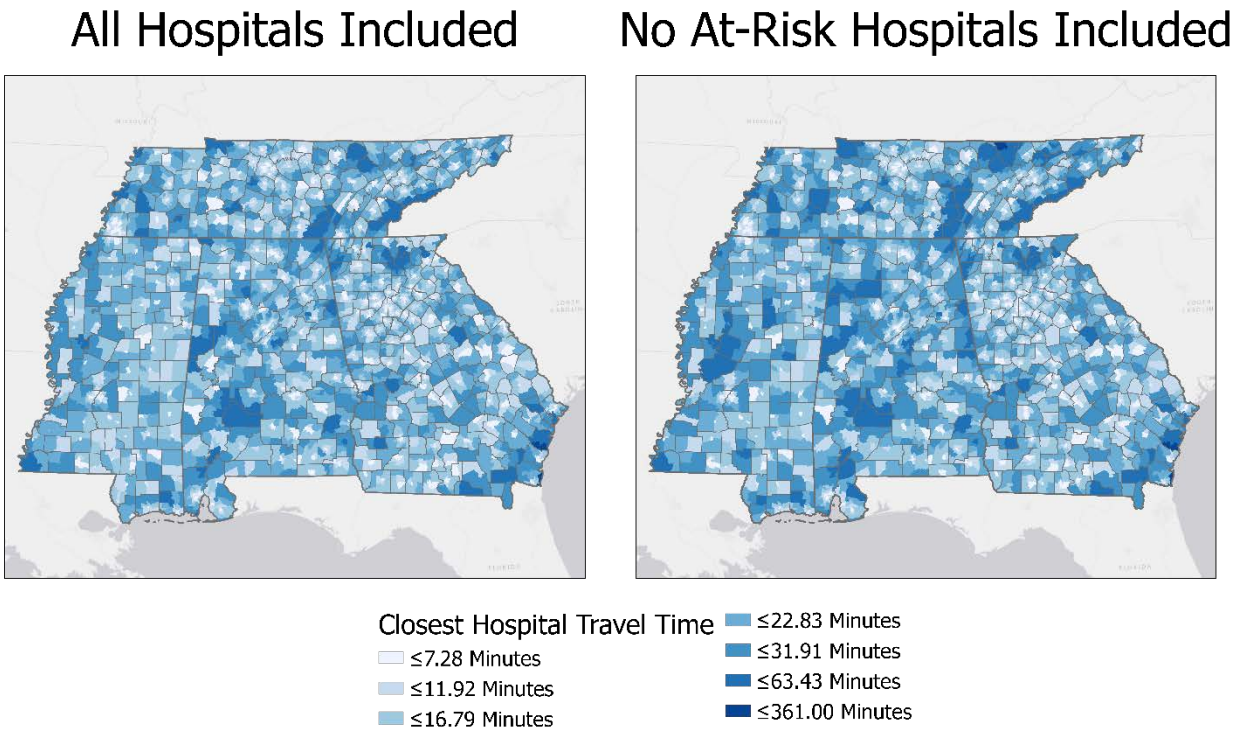

Table 1. Implications of travel time to closest hospital if at risk hospitals closed (Minutes)

State	Median Closest Travel Time All Open Statewide	Median Closest Travel Time at Risk Closed Statewide	Median Closest Travel Time All Open Urban	Median Closest Travel Time at Risk Closed Urban	Median Closest Travel Time All Open Rural	Median Closest Travel Time at Risk Closed Rural
Alabama	11.60	12.15	10.33	10.33	14.92	17.05
Florida	9.67	9.67	9.47	9.47	20.01	20.01
Georgia	11.04	11.10	10.60	10.60	13.44	14.00
Mississippi	11.15	11.76	9.59	9.59	12.44	14.29
Tennessee	11.32	11.59	10.39	10.39	14.92	17.12

Conclusion

In conclusion, there is significantly less hospital workforce in rural areas than in urban areas. The number of hospital beds in rural areas are much smaller than the number of hospital beds in urban areas. Population health in urban counties is much better than population health in rural counties. This is simply due to the access of care that the people have in their community hospitals along with the quality of care they receive. Not only does there need to be an increase in hospital workforce in rural areas, but the quality of care they receive needs to increase as well. The United States has a long way to go before everyone has access to the same level of care.

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