

Characteristics of Communities Served by Rural Hospitals Predicted to be at High Risk of Financial Distress in 2019

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KEY FINDINGS

- Overall, rural hospitals predicted to be at high risk of financial distress serve communities that have statistically significant: higher percentages of non-Whites and Blacks in particular; lower rates of high school graduation; higher rates of unemployment, and worse health status as measured by percentage of fair or poor self-rated health, obese adults, tobacco using adults, and number of premature deaths.
- Even after controlling for Census region, regional disparities remain. Rural hospitals predicted to be at high risk of financial distress serve communities with statistically significant:
 - In the South: higher percentages of unemployment and worse health status as measured by percentage of obese adults and number of premature deaths.
 - In the Midwest: higher percentages of non-Whites and worse health status as measured by percentage of self-rated health of fair or poor, tobacco using adults, and number of premature deaths.
 - In the Northeast: higher number of premature deaths.
 - In the West: higher percentages of non-Whites and lower percentages of high school graduation.

OVERVIEW

In a 2017 article, we presented the Financial Distress Index (FDI).¹ The FDI is an algorithm that uses historical data about hospital financial performance, government reimbursement, organizational characteristics, and market characteristics to predict the current risk of financial distress for each hospital. The model assigns every rural hospital to one of four financial risk categories: high, mid-high, mid-low, or low.² In a previous findings brief, we found rural hospitals predicted to be at high risk of financial distress serve a more vulnerable population than those predicted to not be at high risk- residents are more likely to be black, be less educated, and/or be unemployed, and their communities have significantly higher percentages of residents who report fair to poor health, obesity, smoking, and/or have a greater number of potential years of life lost.³ The purpose of this brief is to use updated results from the FDI to compare the characteristics of communities served by rural hospitals predicted to be at high risk of financial distress to those served by rural hospitals that are predicted to not be at high risk of financial distress in 2019.

RESULTS

The FDI model classified 2,129 rural hospitals: 196 (9.2%) were predicted to be at high risk of financial distress, 361 (17.0%) at mid-high risk of financial distress, 934 (43.9%) at mid-low risk of financial distress, and 638 (30.0%) at low risk of financial distress. Among these rural hospitals predicted to be at high risk of financial distress, 72.9% are located in the South, 17.9% in the Midwest, 5.6% in the West, and 3.6% in the Northeast. Among all rural hospitals, approximately 40% are located in the South, 35% are located in the Midwest, 17% are located in the West, and 8% are located in the Northeast.

Table 1 shows the overall differences in demographic, socio-economic, and health status variables among communities served by rural hospitals predicted to be at high risk of financial distress and those that are served by other rural hospitals. We examined race and ethnicity using Census data. Due to small numbers, we combined all race categories except for “White” to create a “non-White” category. Census data allows for someone of Hispanic ethnicity to identify with any race category, so the “Black” and “non-White” categories include Hispanics who do not identify as White while the “White” category (not listed) would also include Hispanics who identify as “White”. Communities served by rural hospitals predicted to be at high risk of financial distress have significantly higher percentages of non-Whites (18.8% vs. 9.7%) and Blacks (5.2% vs. 1.5%) in particular.

Table 1: Characteristics of Communities Served by Rural Hospitals at High Risk and Not at High Risk of Financial Distress in 2019

| | At high risk of financial distress, median (n ^a) | Not at high risk of financial distress, median (n) | WRS P-value ^b |
|---|--|--|--------------------------|
| DEMOGRAPHICS (MARKET) | | | |
| Percent non-White ^c | 18.8 (196) | 9.7 (1,933) | <0.001 |
| Percent Black ^c | 5.2 (196) | 1.5 (1,933) | <0.001 |
| Percent 65 years or older | 19.0 (196) | 19.0 (1,933) | |
| SOCIO-ECONOMICS (MARKET) | | | |
| High school graduation ^d | 80.5 (196) | 87.0 (1,933) | <0.001 |
| Unemployment ^d | 9.9 (196) | 7.8 (1,933) | <0.001 |
| HEALTH STATUS (COUNTY) | | | |
| Percent in fair or poor health ^e | 20.0 (196) | 15.0 (1,931) | <0.001 |
| Percent of obese adults | 34.0 (196) | 31.0 (1,931) | <0.001 |
| Percent tobacco use | 20.0 (196) | 17.0 (1,931) | <0.001 |
| Years of potential life lost per 100,000 ^f | 9,761 (195) | 7,596 (1,922) | <0.001 |

a. This is the number of hospitals with available county-level or hospital-specific data. County-level data were not available for all hospitals as these variables were not utilized to produce the financial distress results.

b. Wilcoxon rank sum test of medians were used to account for outliers.

c. Blacks are also counted again for the non-White category. Hispanic or Latino ethnicity is not mutually exclusive from the race categories.

d. These values are a percent. Percent graduated high school is assessed for those 25 years of age or older.

e. This measure of health is self-reported.

f. Years of potential life lost is a measure of premature mortality by representing the years of life lost due to death prior to age 75 years.

Communities served by rural hospitals predicted to be at high risk of financial distress have worse outcomes in socioeconomic variables generally known to influence health outcomes. The percentage who graduated high school is significantly lower, and the unemployment percentage is significantly higher. As expected, communities served by rural hospitals predicted to be at high risk of financial distress are located in counties with overall worse health status than counties with rural hospitals predicted to not be at high risk of financial distress. Comparatively, these counties have higher percentages of obese adults, tobacco-using adults, self-rated health of fair or poor, and more premature deaths.

Tables 2-5 show the observed community differences by Census region. Rural hospitals predicted to be at high risk of financial distress serve communities with a higher percentage of black individuals overall, but there are no significant differences in this percentage in any Census region. There are statistically significant differences in the percentages of non-Whites for both the Midwest and the West. For both regions, the communities served by rural hospitals predicted to be at high risk of financial distress have significantly higher percentages of non-Whites (8.8% vs. 6.4% in the Midwest and 32.7% vs. 15.2% in the West).

The only statistically significant difference in percent graduated high school is in the West; 81.8% graduating in communities served by a rural hospital predicted to be at high risk of financial distress compared to 88.7% in other communities. Only in the South Census region is the percent unemployment significantly higher for communities with rural hospitals predicted to be at high risk of financial distress, compared to communities served by rural hospitals predicted to not be at high risk of financial distress.

Counties served by rural hospitals predicted to be at high risk of financial distress in the South and in the Midwest have overall worse health status than counties in those regions served by rural hospitals predicted to not be at high risk of financial distress. Comparatively, these counties have statistically significant higher percentages of self-rated health of fair or poor and had more premature deaths.⁴ Tobacco use among adults is higher for communities with rural hospitals predicted to be at high risk of financial distress in the Midwest while being similar in the South. For the South, the percentage of obese adults is higher for communities with rural hospitals predicted to be at high risk of financial distress.

Table 2: Characteristics of Communities in the SOUTH Served by Rural Hospitals at High Risk and Not at High Risk of Financial Distress in 2019

| | At high risk of financial distress, median (n ^a) | <u>Not</u> at high risk of financial distress, median (n) | WRS P-value ^b |
|---|--|---|--------------------------|
| DEMOGRAPHICS (MARKET) | | | |
| Percent non-White ^c | 24.7 (143) | 22.6 (620) | |
| Percent Black ^c | 11.9 (143) | 7.3 (620) | |
| Percent 65 years or older | 19.0 (143) | 18.0 (620) | |
| SOCIO-ECONOMICS (MARKET) | | | |
| High school graduation ^d | 79.7 (143) | 80.1 (620) | |
| Unemployment ^d | 10.6 (143) | 9.3 (620) | <0.05 |
| HEALTH STATUS (COUNTY) | | | |
| Percent in fair or poor health ^e | 21.0 (143) | 21.0 (620) | <0.05 |
| Percent of obese adults | 34.0 (143) | 33.0 (620) | <0.05 |
| Percent tobacco use | 20.0 (143) | 20.0 (620) | |
| Years of potential life lost per 100,000 ^f | 10,337 (143) | 9,535 (620) | <0.05 |

Table 3: Characteristics of Communities in the MIDWEST Served by Rural Hospitals at High Risk and Not at High Risk of Financial Distress in 2019

| | At high risk of financial distress, median (n ^a) | <u>Not</u> at high risk of financial distress, median (n) | WRS P-value ^b |
|---|--|---|--------------------------|
| DEMOGRAPHICS (MARKET) | | | |
| Percent non-White ^c | 8.8 (35) | 6.4 (810) | <0.05 |
| Percent Black ^c | 1.4 (35) | 1.0 (810) | |
| Percent 65 years or older | 19.0 (35) | 20.0 (810) | |
| SOCIO-ECONOMICS (MARKET) | | | |
| High school graduation ^d | 88.0 (35) | 89.3 (810) | |
| Unemployment ^d | 6.5 (35) | 6.1 (810) | |
| HEALTH STATUS (COUNTY) | | | |
| Percent in fair or poor health ^e | 16.0 (35) | 14.0 (810) | <0.05 |
| Percent of obese adults | 33.0 (35) | 32.0 (810) | |
| Percent tobacco use | 18.0 (35) | 17.0 (810) | <0.05 |
| Years of potential life lost per 100,000 ^f | 7,908 (34) | 6,848 (807) | <0.05 |

a. This is the number of hospitals with available county-level or hospital-specific data. County-level data were not available for all hospitals as these variables were not utilized to produce the financial distress results.

b. Wilcoxon rank sum test of medians were used to account for outliers.

c. Blacks are also counted again for the non-White category. Hispanic or Latino ethnicity is not mutually exclusive from the race categories.

d. These values are a percent. Percent graduated high school is assessed for those 25 years of age or older.

e. This measure of health is self-reported.

f. Years of potential life lost is a measure of premature mortality by representing the years of life lost due to death prior to age 75 years.

Table 4: Characteristics of Communities in the NORTHEAST Served by Rural Hospitals at High Risk and Not at High Risk of Financial Distress in 2019

| | At high risk of financial distress, median (n ^a) | <u>Not</u> at high risk of financial distress, median (n) | WRS P-value ^b |
|---|--|---|--------------------------|
| DEMOGRAPHICS (MARKET) | | | |
| Percent non-White ^c | 6.9 (7) | 5.4 (148) | |
| Percent Black ^c | 3.0 (7) | 1.6 (148) | |
| Percent 65 years or older | 23.0 (7) | 20.0 (148) | |
| SOCIO-ECONOMICS (MARKET) | | | |
| High school graduation ^d | 86.8 (7) | 88.6 (148) | |
| Unemployment ^d | 8.4 (7) | 7.8 (148) | |
| HEALTH STATUS (COUNTY) | | | |
| Percent in fair or poor health ^e | 14.0 (7) | 14.0 (148) | |
| Percent of obese adults | 32.0 (7) | 29.0 (148) | |
| Percent tobacco use | 18.0 (7) | 17.0 (148) | |
| Years of potential life lost per 100,000 ^f | 6,894 (7) | 6,564 (148) | <0.05 |

Table 5: Characteristics of Communities in the WEST Served by Rural Hospitals at High Risk and Not at High Risk of Financial Distress in 2019

| | At high risk of financial distress, median (n ^a) | <u>Not</u> at high risk of financial distress, median (n) | WRS P-value ^b |
|---|--|---|--------------------------|
| DEMOGRAPHICS (MARKET) | | | |
| Percent non-White ^c | 32.7 (11) | 15.2 (355) | <0.05 |
| Percent Black ^c | 0.6 (11) | 0.8 (355) | |
| Percent 65 years or older | 20.0 (11) | 20.0 (355) | |
| SOCIO-ECONOMICS (MARKET) | | | |
| High school graduation ^d | 81.8 (11) | 88.7 (355) | <0.05 |
| Unemployment ^d | 9.2 (11) | 8.6 (355) | |
| HEALTH STATUS (COUNTY) | | | |
| Percent in fair or poor health ^e | 17.0 (11) | 15.0 (353) | |
| Percent of obese adults | 29.0 (11) | 27.0 (353) | |
| Percent tobacco use | 15.0 (11) | 16.0 (353) | |
| Years of potential life lost per 100,000 ^f | 7,106 (11) | 7,138 (347) | |

a. This is the number of hospitals with available county-level or hospital-specific data. County-level data were not available for all hospitals as these variables were not utilized to produce the financial distress results.

b. Wilcoxon rank sum test of medians were used to account for outliers.

c. Blacks are also counted again for the non-White category. Hispanic or Latino ethnicity is not mutually exclusive from the race categories.

d. These values are a percent. Percent graduated high school is assessed for those 25 years of age or older.

e. This measure of health is self-reported.

f. Years of potential life lost is a measure of premature mortality by representing the years of life lost due to death prior to age 75 years.

DISCUSSION

Results suggest that disparities in predicted levels of risk of financial distress among rural hospitals continues to be a reality and the implications of such should be of concern to policy makers. The probability of a rural hospital closure and the associated reduction of services is significantly greater for rural hospitals predicted to be at high risk of financial distress.^{5,6} It is well established that rural residents are typically older, poorer, more dependent on public insurance, and in worse health than urban residents.⁷⁻⁹ Our results indicate that rural hospitals predicted to be at high risk of financial distress serve a more vulnerable patient population than those predicted to be at either mid-high, mid-low, or low risk. These communities have poorer overall health status in addition to a larger burden of socio-economic challenges than communities served by rural hospitals predicted to not be at high risk of financial distress. As such, the populations being served by rural hospitals predicted to be at high risk of financial distress are likely to have a higher need for health care services and may be disproportionately impacted by hospital financial distress and closure.¹⁰

Financial distress may also compromise a hospital's ability to improve quality and to adapt to the demands of value-based care.¹¹ Technology can be a significant up-front and continued expense for rural hospitals. For example, Electronic Health Record (EHR) systems are recognized as a critical element in value-based care and the improvement of population health.¹² Rural hospitals predicted to be at high risk of financial distress serve patient populations that could most benefit from effective population health management but are the least likely to be in a financial position to fully take advantage of EHR technology.

Our results also highlight the need for further examination of the factors by geographic location that may influence predicted risk of financial distress. Most rural hospitals in financial distress are located in the South and in the Midwest; however, this is not surprising because these regions have the most rural hospitals.¹³ In a 2019 FDI companion brief, we find that the percentage of rural hospitals predicted to be at high risk of financial distress is growing in the South as well as among Medicare Dependent Hospitals (MDHs) and Prospective Payment System (PPS) hospitals.¹⁴ And while the Northeast and the South have a similar percentage of MDHs, 12% vs. 10%, respectively, only 10% of the MDHs in the Northeast are predicted to be at high risk of financial distress compared to over 25% in the South.¹⁵ MDHs have at least 60% of inpatient discharges consisting of Medicare beneficiaries, a population that is typically older, poorer, and in worse health than those with private insurance.¹⁶ Differences in populations served by rural hospitals predicted to be at high risk of financial distress are apparent: in the South by socioeconomic status and health status; in the Midwest by race, ethnicity, and health status; in the Northeast by premature death, and; in the West by race, ethnicity, and socioeconomic status.

The FDI predictors include measures of hospital financial performance, government reimbursement, organizational characteristics, and market characteristics. Other factors unaccounted for in our model, such as labor costs, payor mix, and state and federal policies could also be contributing to the differences in community and region. As such it is important for policy makers to consider the characteristics examined in our study in addition to factors we omitted when approaching the issue of rural hospitals predicted to be at high risk of financial distress and the communities they serve.

METHODS

Rural hospital financial performance, government reimbursement, organizational characteristics, and county-level data were obtained from the Centers for Medicare & Medicaid Services (CMS) Hospital Cost Report Information System ("Medicare Cost Reports"), Provider of Services, Hospital Service Area File, County Health Rankings, and Nielsen-Claritas Pop-Facts data. Using data through 2017, we predict the 2019 FDI values for rural hospitals. Our FDI model assigns rural hospitals to high, mid-high, mid-low or low risk of financial distress levels.

Hospital-specific market areas were composed using Medicare discharge counts by ZIP code from the CMS Hospital Service Area File. A ZIP code is included in the market if: when sorted on descending number of that hospital's Medicare discharges, it is among those that comprise 75 percent of that hospital's Medicare discharges; or if it contributes at least three percent of that hospital's Medicare admissions for the year. Except for hospitals in Alaska and Hawaii, ZIP codes more than 150 miles from the hospital are disqualified from being in its market. Hospital-specific markets were used to define communities to assess demographic and socio-economic variables. As health outcome data is not available at the hospital-specific market level, the county where the hospital is located was used to assign health outcomes data.

We identified hospitals as rural based on location outside Metropolitan Core Based Statistical Areas or within Metropolitan areas but in Rural-Urban Commuting Area codes (RUCA) of four or greater (the definition used by the Federal Office of Rural Health Policy). Characteristics of communities served by rural hospitals predicted to be at high risk of financial distress were compared to communities served by rural hospitals that are predicted to not be at high risk of financial distress using bivariate analyses.

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