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## A Comparison of Closed Rural Hospitals and Perceived Impact

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### BACKGROUND

From 2010 through 2014, 47 rural hospitals,<sup>1</sup> ceased providing inpatient services in 23 states across the country (“closed”<sup>2</sup>). Among the 47 closed hospitals, 26 hospitals no longer provide any health care services (“abandoned”), and 21 continue to provide a mix of health services but no inpatient care (“converted”).<sup>3</sup> These closures have affected approximately 800,000 people in the markets with abandoned hospitals and 700,000 people in the markets with converted hospitals. Loss of a rural hospital could impact access to certain necessary health services and is concerning as residents of rural communities are typically older and poorer, more dependent on public insurance programs, and have poorer health status than urban residents.<sup>4</sup> Policy-makers, researchers, and rural residents are concerned and interested in determining why these hospitals are closing, whether the rate will continue to climb, and what effects there could be on local health care providers and the communities they serve.

This brief compares selected characteristics of abandoned rural hospitals and their markets to those of converted rural hospitals. More specifically:

- How do abandoned rural hospitals compare to converted rural hospitals?
- What has been the perceived impact of rural hospital closures?

Empirical data was also collected from a survey questionnaire that was distributed to stakeholders who have experienced a rural hospital closure or conversion in their community.

### KEY FINDINGS

- From 2010 through 2014, 47 rural hospitals ceased providing inpatient services (“closed”). Of the 47, 26 hospitals no longer provide any health care services (“abandoned”) while 21 continue to provide a mix of health services other than inpatient care (“converted”).
- In the year of closure, abandoned rural hospitals had lower profitability and liquidity than converted rural hospitals. A negative cash flow margin may have limited conversion as an option for abandoned rural hospitals.
- Abandoned rural hospitals served markets with a higher proportion of non-Whites (33%), particularly Blacks (12%), compared to converted rural hospitals (17% and 2%, respectively) and were located farther away from other hospitals .
- Survey respondents from the markets of closed hospitals perceived increased travel distances to health care as a stressor and a risk to the health of those communities.

## How Do Abandoned Rural Hospitals Compare to Converted Rural Hospitals?

Figure 1 shows how the 21 converted rural hospitals were allocated to three broad models based on health services provided.

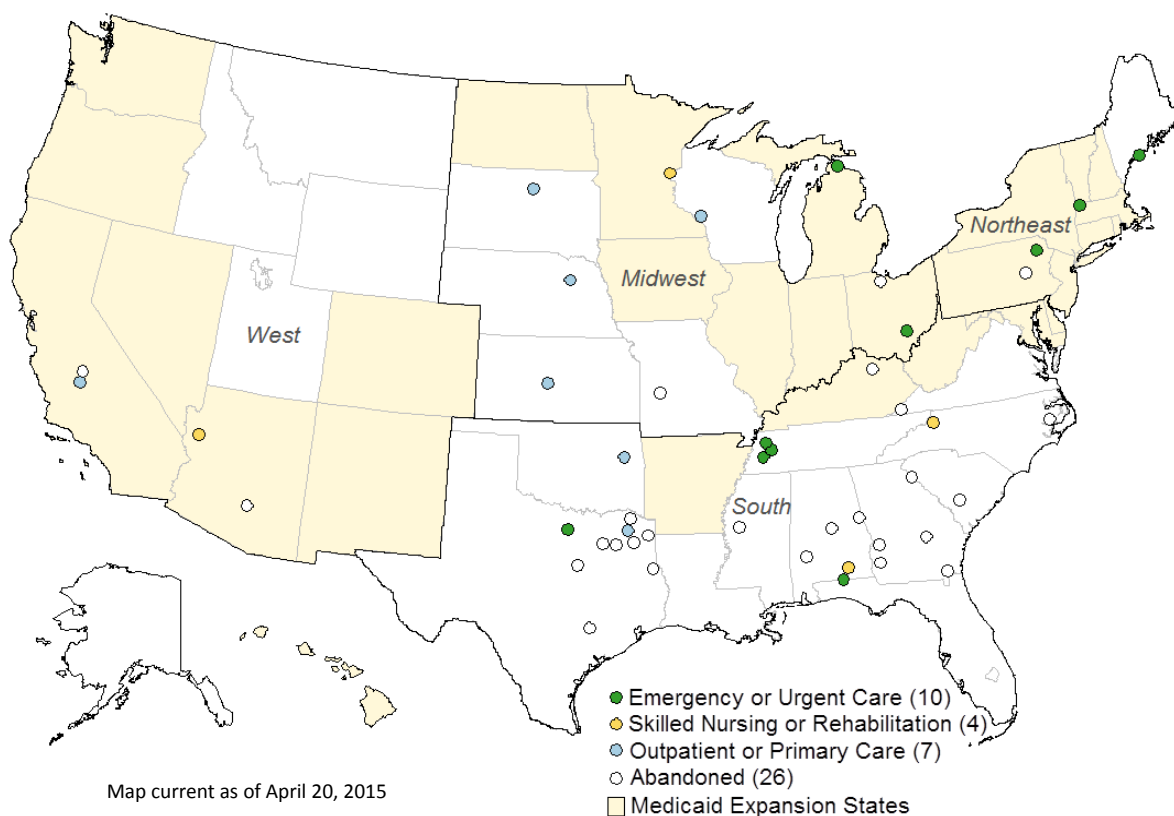
**Figure 1: Three Models of Converted Rural Hospitals**

Urgent Care or Emergency Facility	Skilled Nursing or Rehabilitation Facility	Outpatient or Primary Care Facility
<b>Urgent Care (5 hospitals)</b> <ul style="list-style-type: none"> <li>• Operate 12 hours and 5-7 days per week</li> <li>• Diagnostic, laboratory and radiology services</li> <li>• 2 facilities offer outpatient and specialty services</li> </ul>	<b>Skilled Nursing (3 hospitals)</b> <ul style="list-style-type: none"> <li>• A range of 46-111 beds</li> <li>• Physical, occupational and speech therapy services</li> </ul>	<b>Outpatient Care (3 hospitals)</b> <ul style="list-style-type: none"> <li>• Operate 10-24 hours and 3-7 days per week</li> <li>• Diagnostic and laboratory services</li> <li>• 1 facility offers specialty care</li> </ul>
<b>Emergency Care (5 hospitals)</b> <ul style="list-style-type: none"> <li>• Operate 24 hours and 7 days per week</li> <li>• Diagnostic, laboratory and radiology services</li> <li>• 4 Facilities offer outpatient and specialty services</li> </ul>	<b>Acute Rehab (1 hospital)</b> <ul style="list-style-type: none"> <li>• Individuals are transferred from the inpatient unit of a nearby regional hospital</li> <li>• Operates 8 hours and 7 days per week</li> <li>• Physical, occupational and speech therapy services</li> </ul>	<b>Primary Care (4 hospitals)</b> <ul style="list-style-type: none"> <li>• Operate 8 hours and 5 days per week</li> <li>• Family medicine and preventative care focused</li> <li>• 1 facility offers urgent care services on weekends</li> </ul>

## Census Region

Figure 2 shows the geographic location of abandoned and converted rural hospitals. A majority (21) of abandoned rural hospitals were in the South Census Region. Almost half (9) of converted rural hospitals were also in the South Census Region, but nearly as many (7) were located in the Midwest Census Region. In addition, 80% (21) of the abandoned rural hospitals were located in states that are not expanding their Medicaid programs compared to 67% (14) of the converted rural hospitals.<sup>5</sup>

**Figure 2: Map of Converted and Abandoned Rural Hospitals, 2010 through 2014**



## Hospital Characteristics

Appendix A shows that, in the year of closure, 16 of the abandoned rural hospitals were under the Prospective Payment System (PPS) for Medicare reimbursement and 10 were Critical Access Hospitals (CAHs). Similarly, 14 of the converted hospitals were PPS and 7 were CAHs. While converted hospitals had lower medians for inpatient utilization measures (occupancy rate and acute average daily census), abandoned rural hospitals had a lower median number of employed full-time equivalents (90) compared to hospitals that converted to the emergency room or urgent care model (134), the nursing or rehabilitation model (129), and the outpatient or primary care clinic model (96).

## Financial Characteristics

The medians for profitability measures (operating margin, total margin, and cash flow margin) and liquidity measures (days cash on hand and current ratio<sup>6</sup>) of abandoned rural hospitals were lower than those of the converted rural hospital groups. The most striking difference was in the cash flow margin, which was negative for abandoned hospitals (-4.9%) but positive for all three converted hospital groups (4.9% to 6.9%). This disparity remained even after comparing abandoned and converted rural hospitals by Medicare reimbursement status (PPS or CAH).

All three converted hospital groups had a higher median proportion of hospital charges for surgery and recovery compared to the abandoned rural hospitals. The three groups of converted hospitals had similar financial characteristics with the exception of net patient revenue and emergency revenues. Relative to the other two converted hospital groups and abandoned hospitals, hospitals that converted to the emergency or urgent care model had a higher median net patient revenue (\$13.7 million) and a higher median proportion of emergency room charges (14.1%). The medians among other abandoned and converted groups ranged from \$6.4 million to \$8.8 million in net patient revenue and emergency room revenue ranging from 4.7% to 13.7% of total revenues.

## Market Characteristics

Appendix A shows that abandoned and converted hospitals served markets with similar total populations, age distributions, and population densities. However, there were distinct differences in 1) race and ethnicity and 2) distances to other hospitals. Figure 3 shows that relative to converted hospitals, abandoned rural hospitals were located in markets with substantially higher percentages of non-Whites, particularly Blacks. Although 21 of the abandoned rural hospitals were located in the South, only 7 of these hospitals were located in counties where the majority of the population is Black.

**Figure 3: Demographic Characteristics of the Markets Served by Closed Rural Hospitals**

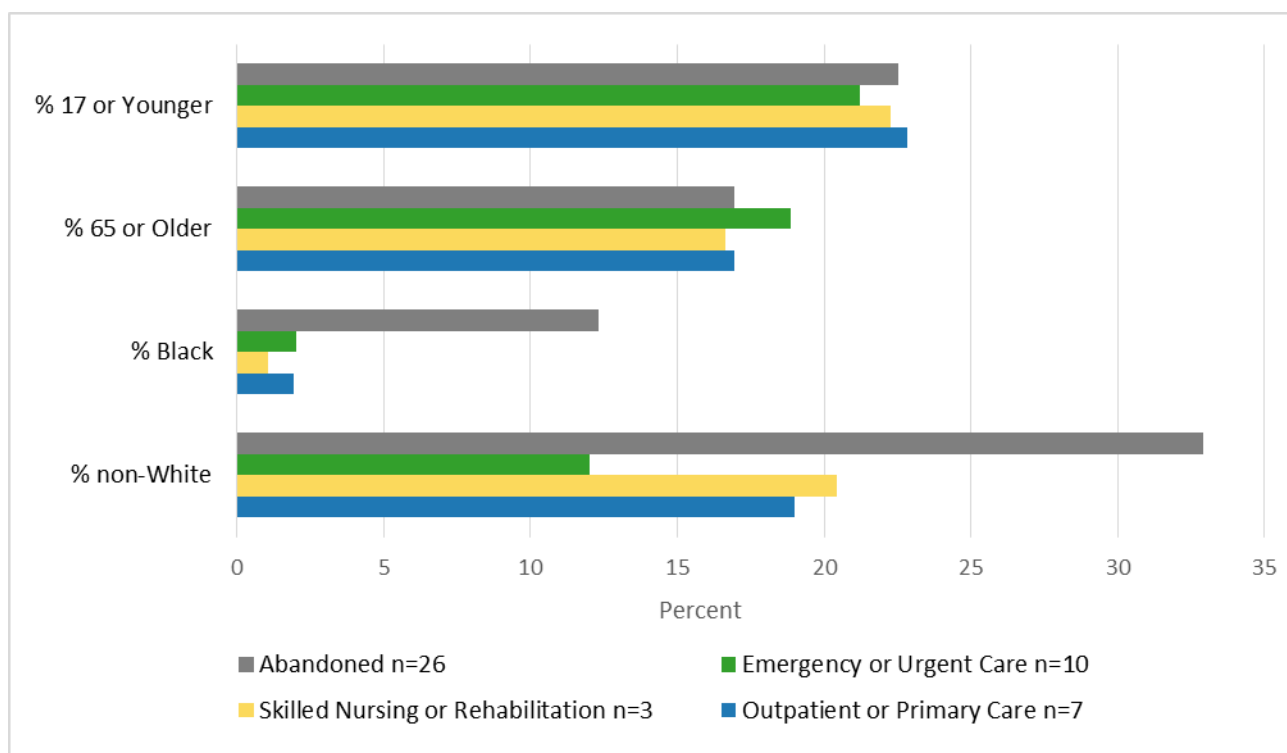
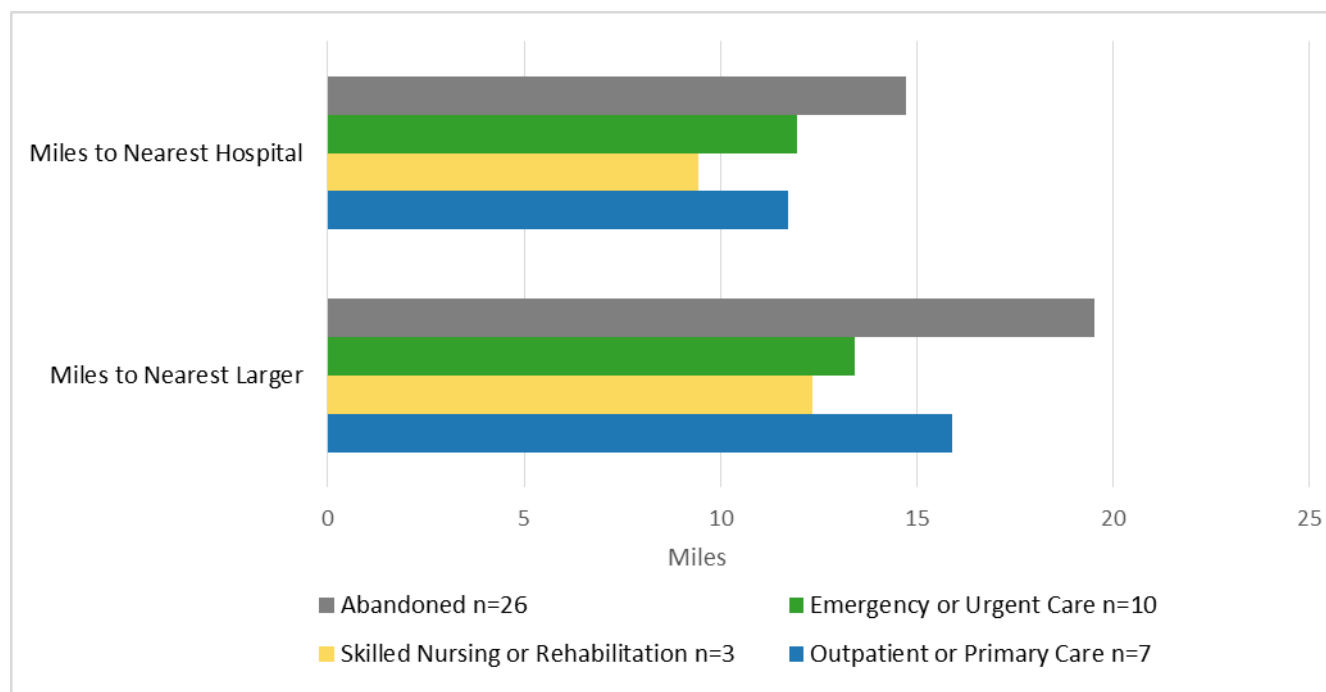


Figure 4 shows that abandoned rural hospitals were farther away from the nearest hospital of any type and also farther away from the nearest larger hospital (based on the number of acute beds) compared to converted hospitals. About half of abandoned hospitals are more than 15 miles away from the nearest hospital.

**Figure 4: Distance of Closed Rural Hospitals to Nearest Hospitals**



## What Has Been the Perceived Impact of Rural Hospital Closures?

To complement the quantitative data being collected on rural hospital closures, stakeholders were also interviewed about the impact hospital closures is having on their communities. The following section summarizes the anecdotal observations reported in a non-random, qualitative survey of community stakeholders in both converted and abandoned markets.

### Health Services Access

*“The community now has NO resident physician.”* Health services in some communities were perceived to be unstable, particularly diagnostic and lab tests, emergency medical care, swing beds or rehabilitation, and obstetrics. Several respondents mentioned rising emergency medical services (EMS) costs. *“The local ambulance services are stretched thin with increased time and cost of transporting patients three times as far.”* In contrast, some respondents felt that the loss of the hospital could be addressed by neighboring community hospitals with more services, more specialty physicians, and better care models. For one community, a new regional hospital located 15 miles away was viewed as a positive outcome after the hospital closure.

*“Many are not receiving needed tests or care due to lack of transportation to get the services.”* Diagnostics tests and scans were the most commonly identified services that now required travel after the rural hospital closed. When asked about alternative inpatient care locations, respondents each identified one or two alternative locations with an average road travel distance of 25 miles from the closed hospital’s address. Some alternative locations were in neighboring states. Major and complex treatments, like dialysis, cancer therapies and treatment for catastrophic injuries were also a concern, regardless of those services having been offered previously by the rural hospital. Overall, an increased distance to health care is perceived to be an issue for members of these communities.

### Community and Economic Outcomes

*“[The hospital] was for many years the largest employer in the county. Health care professionals and their families have left the area. So it's been a huge hit to the local economy.”* In most communities, the economic outcome of rural hospital closure was perceived to be negative, with job loss being the major concern. In addition, participants expressed concerns about high unemployment rates and stunted economic growth due to loss of third party dollars, leading to the loss of business and community residents. Multiple respondents highlighted community loss of prestige and identity

when the hospital closed in their community. Finally, remaining hospital loan debt was identified as a burden in a few counties. Other non-health services were lost with the closure of a rural hospital. One respondent mentioned the loss of accessible daycare services, a top challenge for rural areas.<sup>7</sup> However, there were positive outcomes mentioned, like the formation of advisory committees and partnerships with neighboring communities.

### **Vulnerable Groups**

*“Vulnerable groups include the frail elderly; individuals with developmental, mental, or physical disabilities; pregnant women; and [religious or ethnic minorities].”* When asked who was most affected by a rural hospital closure, participants identified individuals who are elderly, a member of a racial or ethnic minority group, poor and physically or developmentally disabled. Transportation to care was noted as the biggest barrier for these groups. One respondent stated, *“[rural hospital closures are a] huge issue. We... [have] a large elderly population as well as many residents in nursing homes and assisted living facilities [who] now have to travel for any major health issues.”* Many have to rely on family, friends and other members of the community to transport them for care. A few respondents expressed that these groups and their families are further stressed by the time it takes to transfer medical records and for insurance to be processed. Additionally, the elderly may feel a loss of identity which further inhibits them from traveling outside of their community for health care.

## **DISCUSSION**

Twenty-six closed rural hospitals ceased providing health services while 21 were able to maintain certain health services for the individuals in the markets they served by converting to another type of health care facility. The lower profitability and liquidity indicates that the abandoned rural hospitals were under greater financial stress than the converted rural hospitals. A majority of closed hospitals (including abandoned and converted groups) were paid as PPS hospitals in the year of closure. This is consistent with prior literature which suggests cost-based reimbursement provides some financial protection against closure.<sup>8</sup>

A majority of closed rural hospitals were located in the South Census Region, and more than half of closures were in states that have not expanded Medicaid. Although most of these closures occurred before January 2014 (when states could first expand Medicaid as an option under the Affordable Care Act (ACA)), it is possible that the ACA and a state’s decision to expand Medicaid will provide a protective factor in the future by increasing the number of insured individuals in the markets served by rural hospitals.

For hospitals ceasing to provide inpatient care from 2010 through 2014, most (over 75%) ceased to provide emergency or urgent care services as well. Greater travel time to emergency care has been linked to health outcomes including mortality.<sup>9</sup> Markets with the highest proportion of White residents were most likely to retain emergency or urgent care services in this time period. While poverty and per capita income were similar among abandoned and converted groups, the high proportion of Blacks in the markets of abandoned hospitals is an indication that racial residential segregation could be a characteristic unique to abandoned rural hospitals. Further analysis might examine whether racial disparities are a risk factor for rural hospital closure as well as examine the impact of the loss of services on health disparities.

In conclusion, it is important to recognize the impact of hospital closure on rural communities. While not all rural closures have an adverse impact, most communities face additional travel time to access health services and perceived economic consequences as a result of closure. It is important for policymakers to continue to monitor the heterogeneous effects of hospital closures and new models of rural health care on the health and economic well-being of rural communities through community-centered methods such as health impact assessments.

## **METHODS**

### **Hospital and Financial Characteristics**

Variables were constructed using Medicare Cost Report and Hospital Service Area file data from 2000 through 2014. Appendix B has definitions of the variables used.

### **Market Area and Characteristics**

Variables were created from Medicare Cost Report, Nielsen (formerly Claritas) Pop-Facts, and Hospital Service Area file data from 2000 until 2014. Hospital 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 in the first ZIPs that comprise 75% 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.

### Community Stakeholder Survey

A standardized electronic questionnaire was distributed (non-random) to stakeholders identified through media reports and internet searches from every city where a rural hospital closure occurred. Surveys were emailed to 236 recipients using Qualtrics Research Suite and 93 surveys were opened and assumed to be read. Thirty-two individuals responded to the survey (4 opted out) for a response rate of 34%. Responses came from 22 different hospitals across 13 different states. Seven responses were from the South region and three each from the Northeast and Midwest regions. Eight responses were from states that did not expand Medicaid. Ten respondents were from a city organization (government office, chamber of commerce, etc.), nine respondents were members of the media, seven respondents were mayors, and six respondents were health professionals.

## REFERENCES AND NOTES

1. A rural hospital is any general, non-federal, short-term, acute hospital that is: a) not located in a metropolitan county OR b) is located in a Rural Urban Commuting Area Code (RUCA) type 4 or higher OR c) is a Critical Access Hospital (CAH). Therefore, it is possible for a rural hospital to be in a metropolitan county.
2. According to the Office of Inspector General, a closed hospital is "A facility that stopped providing general, short-term, acute inpatient care [....]". We further categorize closed hospitals into two groups: "abandoned" (no longer provide any health care services) and "converted" (continue to provide a mix of health services but not inpatient care).
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6. Current ratio is used to measure how many times a firm can pay its debts over 12 months by comparing assets and liabilities.
7. Brown DL, Swanson LE, eds. Challenges for rural America in the twenty-first century. University Park: Pennsylvania State UP, 2010.
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## Appendix A: Abandoned and Converted Rural Hospitals in Year of Closure \*

	Abandoned Median [Range]	Converted Median [Range]		
		Emergency or Urgent Care	Skilled Nursing or Rehabilitation	Outpatient or Primary Care
	n=26	n=10	n=4	n=7
<b>Census Region</b>				
Northeast	1	3	0	0
Midwest	2	2	1	4
South	21	5	2	2
West	2	0	1	1
Not Expanding Medicaid	21	6	2	6
<b>Hospital Characteristics</b>				
Critical Access Hospital	10	4	1	2
PPS	16	6	3	5
Full-time equivalents	90 [37 - 230]	134 [36 - 415]	129 [63 - 179]	96 [25 - 298]
Acute beds	26 [8 - 106]	31 [22 - 49]	23 [10 - 70]	30 [20 - 45]
Occupancy rate	14% [0 - 43%]	8% [0 - 33%]	5% [0 - 26%]	10% [0 - 36%]
Acute average daily census	4.5 [0 - 14]	2.3 [0 - 16]	1 [0 - 18]	3.2 [0 - 16]
<b>Financial Characteristics</b>				
Net patient revenue (millions)	\$8.8 [\$3 - \$19]	\$13.7 [\$3 - \$56]	\$7.9 [\$4 - \$31]	\$6.4 [\$0.8 - \$36]
Operating margin	-10.0% [-30.9 - 22.2%]	-2.3% [-75.9 - 18.5%]	0.8% [-25.9 - 43.2%]	-7.8% [-66.4 - 6.2%]
Total margin	-10.1% [-30.5 - 13.9%]	-2.3% [-75.9 - 19.5%]	0.8% [-24.4 - 43.2]	-5.8% [-26.3 - 10.3%]
Cash flow margin	-4.9% [-24.5 - 16.2%]	6.0% [-61.8 - 25.4%]	6.9% [-12.2 - 46.8%]	4.9% [-58.5 - 22.8%]
Current ratio	0.7 [0 - 17.5]	0.3 [-1.7 - 1.8]	1.3 [1 - 2.3]	2.5 [-0.6 - 4.5]
Days cash on hand	8 [-5 - 75]	23 [-175 - 167]	13 [0.8 - 72]	10 [-101 - 162]
Surgery / total charges	1.7% [0 - 25.4%]	3.5% [0 - 24.5%]	5.6% [0 - 14.1%]	5.5% [0 - 30.8%]
ER / total charges	13.7% [0 - 39.2%]	14.1% [7.8 - 35.4%]	4.7% [0 - 15.6%]	7.5% [4.9 - 21.2%]
<b>Market Characteristics</b>				
	n=26	n=10	n=3 <sup>†</sup>	n=7
Total population	28,803 [7,431-75,526]	27,226 [7,546-55,142]	48,175 [9,908-63,112]	26,559 [1,019-138,504]
Population density (per square mile)	36 [13 - 296]	63 [24 - 426]	48 [13 - 110]	26 [2 - 224]
Per capita income	\$18,871 [\$9,790 - \$22,722]	\$20,376 [\$15,959 - \$26,902]	\$20,927 [\$18,180 - \$23,327]	\$20,733 [\$7,480 - \$23,462]
Poverty rate	14% [8 - 30%]	13% [7 - 21%]	12% [6 - 15%]	11% [6 - 21%]
Miles to nearest larger hospital	20 [0 - 32]	13 [8 - 30]	12 [8 - 14]	16 [10 - 44]
Miles to nearest hospital with 100 beds or more	28 [3 - 54]	25 [8 - 36]	14 [8 - 49]	33 [11 - 65]
Residential ZIP miles to hospital	12 [0 - 17]	6 [4 - 17]	7 [0.9 - 10]	11 [2 - 18]

## Appendix A (continued): Abandoned and Converted Rural Hospitals in Year of Closure \*

	<b>Abandoned</b> Median [Range]	<b>Converted</b> Median [Range]		
		<i>Emergency or Urgent Care</i>	<i>Skilled Nursing or Rehabilitation</i>	<i>Outpatient or Primary Care</i>
Miles to nearest hospital	15 [0 - 26]	12 [6 - 22]	9 [2 - 14]	12 [0.8 - 16]
White collar workers	5,262 [1,246 - 15,212]	5,426 [1,416 - 13,823]	11,123 [2,025 - 12,730]	4,212 [201 - 27,914]
Non-White	33% [3 - 77%]	12% [3 - 57%]	20% [2 - 28%]	19% [3 - 64%]
Black	12% [0.6 - 75%]	2% [0.4 - 52%]	1% [0.3 - 18%]	2% [0.1 - 14%]
Hispanic	7% [2 - 44%]	2% [0.9 - 19%]	8% [1 - 10%]	4% [0.3 - 66%]
65 years or older	17% [10 - 28%]	19% [14 - 24%]	17% [15 - 22%]	17% [6 - 25%]
Female childbearing age	15% [9 - 19%]	16% [13 - 18%]	17% [13 - 18%]	14% [10 - 17%]
17 years or younger	23% [14 - 30%]	21% [18 - 24%]	22% [22 - 24%]	23% [18 - 29%]

\*Hospital data reports are for the year of closure or within two years of closure

†One hospital had no recoverable market data beyond year 2009

## Appendix B: Definitions of Hospital and Financial Characteristics Variables

<b>Variable</b>	<b>Formula</b>	<b>Operational Definition</b>
<b><i>Hospital Characteristics</i></b>		
Number of FTEs	FTEs are the full-time equivalent positions	
Occupancy Rate	Inpatient days of care / Bed days available	
Acute ADC	Inpatient acute care bed days / Days in period	A high value indicates high use of acute care beds.
<b><i>Financial Characteristics</i></b>		
Operating Margin	Operating income / Operating revenue	Measures the control of operating expenses relative to operating revenue (net patient and other revenue). A positive value indicates operating expenses are less than operating revenue (an operating profit).
Total Margin	Net income / Total revenue	Measures the control of expenses relative to revenues. A positive value indicates total expenses are less than total revenues (a profit).
Cash Flow Margin	[(Net income - contributions, investments and appropriations + depreciation expense + interest expense) / (Net patient revenue + other income - contributions, investments, and appropriations)]	Measures total cash flow as a percentage of total revenues before interest costs.
Current Ratio	Current assets / Current liabilities	Measures the number of times short-term obligations can be paid using short-term assets. Values greater than 1 indicate current assets are greater than current liabilities.
Days Cash on Hand	Cash + Marketable securities + Unrestricted investments / (Total expenses – Depreciation) / Days in period	Measures the number of days an organization could operate if no cash were collected or received.
Surgery Volume	Surgery and recovery charges / Total charges	
ER Volume	Emergency room charges / Total charges	