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Small Rural Hospitals with Low-Volume Emergency Departments that May Convert to a Rural Emergency Hospital (REH)

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INTRODUCTION

The Consolidated Appropriations Act, 2021[1] established a new Medicare provider type called the Rural Emergency Hospital (REH). Effective January 1, 2023, Critical Access Hospitals (CAHs) and Prospective Payment System (PPS) hospitals with no more than 50 beds in rural areas (denoted as "rural hospitals") and open on December 27, 2020, will be eligible to convert and operate as an REH. REHs will provide outpatient hospital and emergency department (ED) services without acute care inpatient services.

Proposed REH Conditions of Participation (CoPs) were issued by the Centers for Medicare & Medicaid Services (CMS) on June 30, 2022 with comments due by August 29, 2022.[2] However, REH is a new provider type for which there is sparse published research or reported experience to guide implementation: small rural EDs are not widely studied.[3,4,5] In particular, there is a paucity of data and evidence to inform REH clinical and operational decisions about patient volumes, services and technology availability, Emergency Medicine Services (EMS), and clinical staffing,[4,6,7,8] and this lack of knowledge may impair success of the REH.

This study uses secondary data and interviews with experts to profile the patient volume, services and technology, EMS, and clinical staffing of rural hospitals that are eligible to convert to REHs. The objective is to characterize rural hospitals with very low ED volume to inform the numerous and complex clinical and operational decisions that will be required to implement this new provider model.

KEY FINDINGS

This study examines Critical Access Hospitals (CAHs) and Prospective Payment System (PPS) hospitals with no more than 50 beds in rural areas that are eligible to convert to a Rural Emergency Hospital (REH). For this study, hospitals with low Emergency Department (ED) volume are considered to be most likely to convert to REH. We identified 356 REH-eligible hospitals with six or fewer ED visits/day, and 325 with between 6.01-12 ED visits/day. In comparison to hospitals with greater ED volume (12.01-30 ED visits/day), the hospitals with low-volume ED

- Are more likely to be in the Midwest, CAHs, government-owned, and not affiliated with a system.
- Have lower acute inpatient volume (median acute average daily census of 0.9 patients for 0-6 ED visits/day and 2.0 patients for 6.01-12 ED visits/day).
- Have lower outpatient volume (median annual outpatient visits of 8,381 for 0-6 ED visits/day and 17,249 for 6.01-12 ED visits/day).
- Are more likely to own and operate their own ambulance service, more likely to have a Rural Health Clinic or a skilled nursing facility, but less likely to be affiliated with an air ambulance company.
- Have similar access to computed tomography (CT) scanner services but are less likely to provide magnetic resonance imaging (MRI) services.
- Have fewer overall physicians with hospital privileges, but a similar number of Advanced Practice Providers (APPs).

METHOD

The study method included two components:

Data profile of REH-eligible hospitals. Data about REH-eligible hospitals were assembled and summarized—the facility characteristics, patient volume, services offered, and clinical staffing.

Observations and assessment by ED physician advisers. The data were reviewed in interviews with geographically dispersed emergency medicine physicians who have experience in rural ED operations, staffing, clinical care, acute care, and emergency medicine. Their observations and assessments contextualize the data and assist in identification of implementation issues.

Key Variables and Data Measurement

Hospital data were obtained from the Healthcare Cost Reporting Information System (HCRIS), produced by the Centers for Medicare & Medicaid Services (CMS). Cost reports for hospitals with a fiscal year ending in 2019[9] and a reporting period of at least 360 days were used to identify or measure hospital ownership, affiliation with a health system, acute average daily census, and swing bed average daily census.

In addition, data from the 2019 American Hospital Association (AHA) Annual Survey of Hospitals were used to measure emergency and outpatient volume, services offered, and clinical staffing of rural hospitals. The AHA Survey is an annual survey of 6,500 hospitals in the United States that collects data about hospital organizational structure, facilities and services, utilization data, physician arrangements, staffing, and community orientation. The AHA reports approximately an 85% response rate to the survey each year and, for those hospitals not responding in a given year, statistical models are used to estimate key variables. In this study, AHA survey data were used to measure: the number of visits to the emergency department; outpatient volume, including visits and surgery procedures; whether a hospital offers ambulance services, air ambulance services, home health services, Rural Health Clinic services, skilled nursing care services provided in a hospital swing bed or distinct part unit, skilled nursing care provided in a facility, telehealth consultation and office visits, computerized tomography (CT) services, and magnetic resonance imaging (MRI) services; and hospital clinical staffing, including total number of physicians with hospital privileges and Advanced Practice Provider (APP) full-time equivalents (FTEs) for a hospital (not just the ED).

Data Analysis

Hospitals were defined as rural using the 2021 definition of the Federal Office of Rural Health Policy.[10] After the 2019 HCRIS and AHA data were merged, the following hospitals were excluded

- PPS rural hospitals with greater than 50 beds (n=480) because they are ineligible to convert to an REH.
- Rural hospitals with greater than 30 ED patient visits per day (n=443) because they were considered unlikely to be interested in conversion to an REH.
- Hospitals with missing volume data (n=35), duplicate hospital reports (n=12), cost reports with a reporting period of less than 360 days (n=24), or missing cost reports (n=2).

After applying exclusion criteria, our final sample included a total of 1,324 hospitals.

Hospitals were sorted into five categories based on the number of ED patient visits per day: 0-6, 6.01-12, 12.01-18, 18.01-24, and 24.01-30. These categories were recommended by the ED physician advisers to the study because clinicians commonly measure ED patient volume by number of patient visits per day. The following statistics were calculated for each category of daily ED volume: inpatient and outpatient volume – median, minimum, and maximum values; hospital services offered – the percentage of hospitals in the category that reported providing a service in 2019; clinical staffing – boxplots of the total number of privileged physicians and APP FTEs for a hospital, thus providing an understanding of the current available workforce for the ED of an REH.

DATA PROFILE OF REH-ELIGIBLE HOSPITALS

Table 1 shows REH-eligible hospital facility characteristics by the number of ED patient visits per day. The majority of hospitals with 0-6 and 6.01-12 ED visits/day are in the Midwest, CAHs, government-owned, and did not report affiliation with a system.

Table 1. REH-Eligible Hospital Facility Characteristics by Number of ED Patient Visits per Day, 2019

ED patient visits per day (per year)		0-6 (0-2,190)	6.01-12 (2,191-4,380)	12.01-18 (4,381-6,570)	18.01-24 (6,571-8,760)	24.01-30 (8,761-10,950)
Number of hospitals		n = 356	n = 325	n = 255	n = 209	n = 179
		Percentage of hospitals				
Census region	Northeast	0.8%	2.2%	3.5%	6.2%	12.9%
	Midwest	52.5%	45.2%	42.7%	46.9%	38.5%
	South	24.2%	31.4%	36.1%	33.0%	31.8%
	West	22.5%	21.2%	17.7%	13.9%	16.8%
Medicare payment	Critical Access Hospital[a]	89.9%	92.0%	83.5%	76.1%	70.4%
	Medicare Dependent Hospital[b]	2.8%	2.5%	1.6%	5.3%	7.8%
	Sole Community Hospital[c]	1.7%	3.1%	6.7%	12.0%	15.6%
	Prospective payment only	5.3%	2.5%	8.2%	6.2%	5.6%
Ownership	Government[d]	55.9%	48.0%	42.4%	29.2%	27.4%
	Not-for-profit	36.2%	47.1%	52.2%	64.6%	63.1%
	For-profit	7.9%	4.9%	5.5%	6.2%	9.5%
Affiliated with health system[e]		22.5%	30.5%	33.7%	44.5%	54.2%

Source: Healthcare Cost Reporting Information System (HCRIS)

[a] Critical Access Hospitals must be in a rural area and more than 35 miles from the nearest hospital, with some exceptions; must have 25 or fewer inpatient beds or 25 or fewer total inpatient plus swing beds; have an average annual length of stay of 96 hours or fewer; and have 24-hour emergency care service using on-site or on-call staff. CAHs are paid 101% of reasonable costs for most inpatient and outpatient services. CAHs are not paid under Inpatient PPS.

[b] Medicare Dependent Hospitals (MDHs) must be in a rural area; 100 inpatient beds or fewer; not be otherwise classified as a Sole Community Hospital; at least 60% of its inpatient discharges were Medicare Part A patients. MDHs are paid based on the higher of the inpatient PPS rate or a blended rate based on a statutorily defined base year.

[c] Sole Community Hospitals can qualify based on various criteria, including being located at least 35 miles from nearest Inpatient PPS hospital; being located 25-35 miles from other hospitals and being the exclusive provider in the area or less than 50 beds; being rural and 15-25 miles from a hospital that is inaccessible; being rural and travel time to nearest hospital is at least 45 minutes. SCHs are paid on the higher of the Inpatient PPS rate or a base year federal rate.

[d] Government-owned hospitals tend to be county or municipally owned hospitals.

[e] Due to the way that system affiliation is reported, we are unable to distinguish between hospitals that are not system affiliated from hospitals that did not respond to the question. Thus, the actual percentage of hospitals affiliated with a system may be higher than reported in the table.

Table 2 shows REH-eligible hospital inpatient and outpatient (non-ED) volume statistics by the number of ED patient visits per day. The 356 rural hospitals with 0-6 ED visits/day have the lowest median acute average daily census, annual outpatient visits, and annual outpatient surgery procedures. As the number of ED visits/day increases, median acute average daily census, annual outpatient visits, and annual outpatient surgery procedures increase.

Table 2. REH-Eligible Hospital Volume Statistics by Number of ED Patient Visits per Day, 2019

ED patient visits per day (year)	0-6 (0-2,190)	6.01-12 (2,191-4,380)	12.01-18 (4,381-6,570)	18.01-24 (6,571-8,760)	24.01-30 (8,761-10,950)
Number of hospitals	n = 356	n = 325	n = 255	n = 209	n = 179
	Median (minimum - maximum)				
Acute average daily census[a]	0.9 (0 - 35.2)	2.0 (0 - 12.4)	2.9 (0 - 21.2)	4.3 (0.1 - 15.2)	5.9 (0.4 - 27.6)
Swing average daily census[b]	1.3 (0 – 19.0)	1.8 (0 - 16.3)	1.7 (0 - 19.1)	1.5 (0 - 12.9)	1.0 (0 - 13.9)
Annual outpatient visits[c]	8,381 (0 – 106,831)	17,249 (0 – 197,649)	26,318 (798 – 397,813)	35,581 (0 – 204,556)	44,760 (1,125 – 835,488)
Annual outpatient surgery procedures	189 (0 – 11,179)	516 (0 – 2,711)	719 (0 – 6,352)	984 (0 – 5,599)	1,117 (0 – 5,582)

Source: 2019 AHA Annual Survey of Hospitals
[a] Acute average daily census is defined as the number of acute inpatient days divided by days in period.
[b] Swing average daily census is defined as the number of swing inpatient days divided by days in period.
[c] Six hospitals in the first category of ED patient visits per day reported negative outpatient visits and were removed.

Table 3 shows REH-eligible hospital service availability by the number of ED patient visits per day. Hospitals with 0-6 and 6.01-12 ED visits/day have a higher percent of ground ambulance ownership, Rural Health Clinic presence, and skilled nursing facility ownership. Hospitals with 0-6 ED visits/day also have a lower percent of air ambulance owned by the hospital, affiliated air ambulance, and presence of CT and MRI scanners. No clear trend in home health presence or telehealth service availability was observed across ED volume categories.

Table 3. REH-Eligible Hospital Services Offered[a] by Number of ED Patient Visits per Day, 2019

ED patient visits per day (year)	0-6 (0-2,190)	6.01-12 (2,191-4,380)	12.01-18 (4,381-6,570)	18.01-24 (6,571-8,760)	24.01-30 (8,761-10,950)
Number of hospitals	n = 356	n = 325	n = 255	n = 209	n = 179
	Percent of hospitals offering service				
Ground ambulance *(% owned by hospital)*[b]	27.5%	29.7%	24.7%	18.5%	14.1%
Ground ambulance *(% affiliated)*	54.6%	56.1%	55.8%	48.2%	45.1%
Air ambulance *(% owned by hospital)*[b]	0.5%	2.4%	4.1%	2.0%	1.4%
Air ambulance *(% affiliated)*	26.1%	33.6%	34.1%	35.8%	33.6%
Home health	21.4%	24.1%	23.0%	25.3%	23.2%
Rural Health Clinic	72.5%	72.0%	60.8%	62.2%	65.4%
Skilled nursing care[c]	92.7%	96.3%	90.2%	86.1%	78.8%
Skilled nursing facility	24.2%	24.3%	18.8%	18.7%	15.6%
Telehealth consultation and office visits	40.6%	39.2%	40.8%	30.3%	34.5%
CT scanner	88.7%	98.1%	99.4%	98.8%	96.5%
MRI scanner	17.2%	37.3%	54.2%	67.2%	74.6%

Source: 2019 AHA Annual Survey of Hospitals.
Table 3 notes [a, b, c] continued on next page.

Table 3 notes continued from previous page:

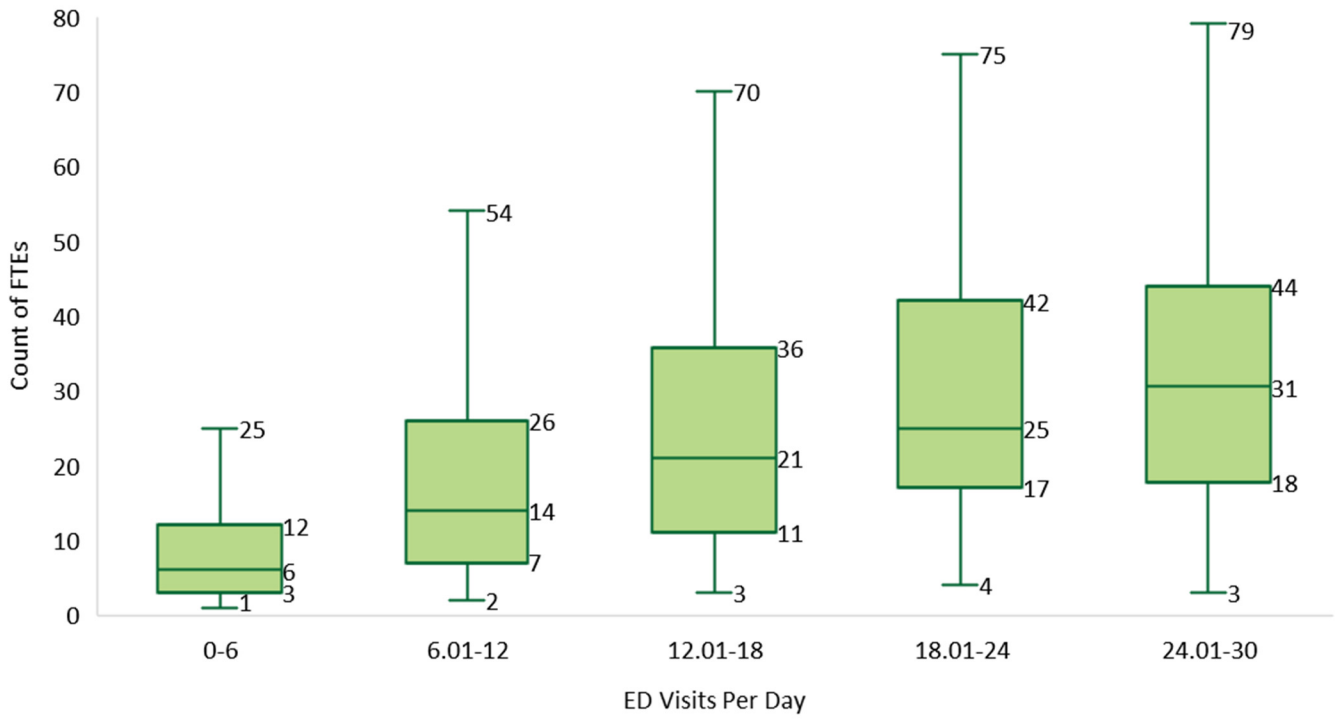
[a] Among hospitals that responded to each question. The maximum percent of missing data in each group was: 37.4% missing in 0-6 ED patient visits per day group; 35.7% missing in 6.01-12 ED patient visits per day group; 33.7% missing in 12.01-18 ED patient visits per day group; 27.3% missing in 18.01-24 ED patient visits per day group; and 22.3% missing in 24.01-30 ED patient visits per day group.

[b] Owned is defined as "Owned or provided by my hospital or its subsidiary" and Affiliation is defined as "Provided by my health system (in my local community)" or "Provided through a formal contractual arrangement or venture with another provider that is not in my system (in my local community)."

[c] Skilled nursing care provided in a swing bed or distinct part unit.

Figure 1 shows REH-eligible hospital total number of physicians with privileges by the number of ED patient visits per day. Among 757 hospitals that answered the survey question, the median number of physicians in a hospital is higher for hospitals with a larger number of ED visits per day.

Figure 1. REH-Eligible Hospital Total Number of Physicians with Privileges



The whiskers of the box plots exclude outliers and represent the maximum and minimum values within 1.5 times the interquartile range.

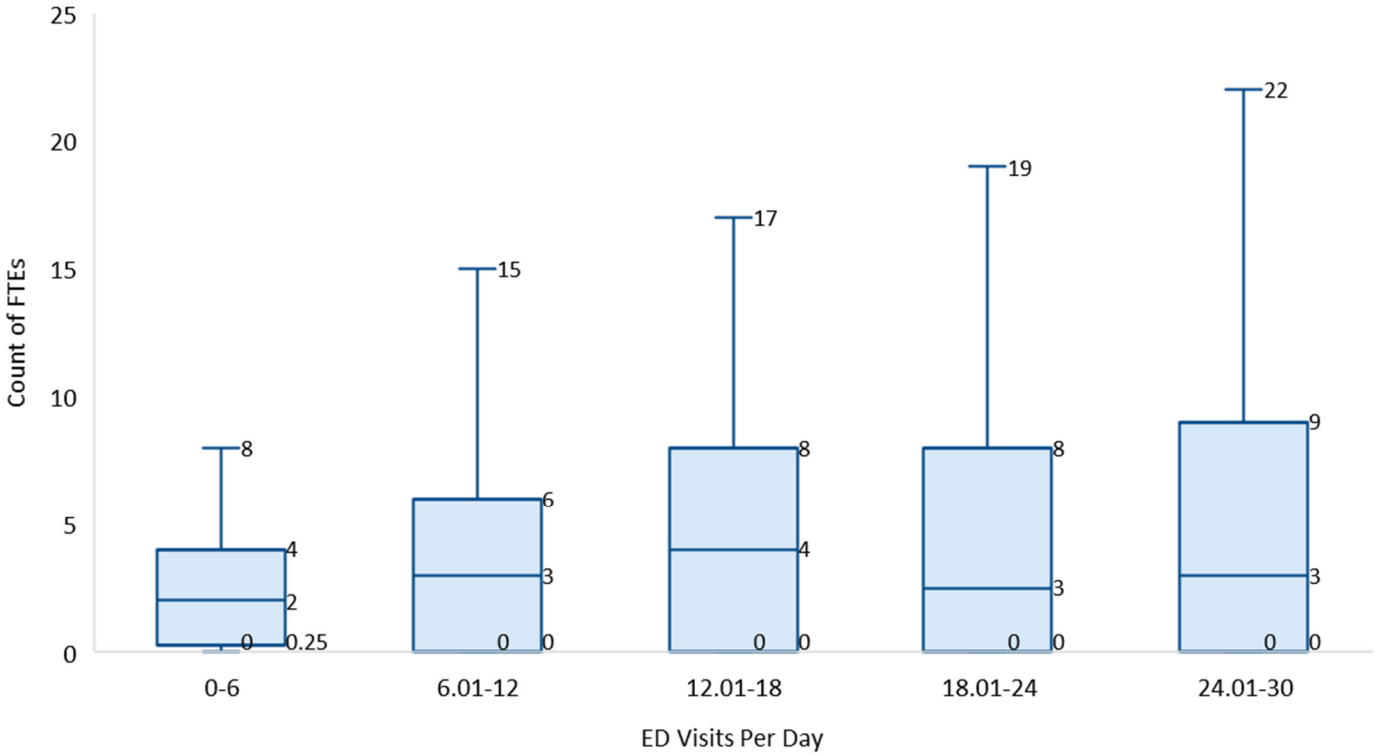
Missing and Non-missing Data:

ED patient visits/day	0-6	6.01-12	12.01-18	18.01-24	24.01-30	Total
Number of hospitals that answered survey question	181	172	148	130	126	757
Number of hospitals that did not answer survey question	175	153	107	79	53	567

Source: 2019 AHA Annual Survey of Hospitals

Figure 2 shows REH-eligible hospital total Advanced Practice Providers (APP) FTEs by the number of ED patient visits per day. An APP is a health care professional who undergoes specialized education, training, and certification to provide services like medical diagnosis and treatment. They include physician assistants, nurse practitioners, certified registered nurse anesthetists, and certified nurse midwives. Among 643 hospitals that answered the survey question, there is little variation in the median number of APPs across ED volume categories (the median number of APPs is generally between 2-4 FTEs). Eighty-three hospitals reported zero APPs**.**

Figure 2. REH-Eligible Hospital Total Number of Advanced Practice Provider Full-Time Equivalents



The whiskers of the box plots exclude outliers and represent the maximum and minimum values within 1.5 times the interquartile range

Missing and Non-missing Data:

ED patient visits/day	0-6	6.01-12	12.01-18	18.01-24	24.01-30	Total
Number of hospitals that answered survey question	170	153	137	102	91	643
Number of hospitals that did not answer survey question	152	136	101	71	52	512

Source: 2019 AHA Annual Survey of Hospitals

OBSERVATIONS AND ASSESSMENTS BY ED PHYSICIAN ADVISERS

ED volume is related to other measures of hospital volume and clinical service availability**.** Acute average daily census, outpatient visits, and total number of physicians with privileges increase as the number of ED visits per day increases. Rural hospitals with relatively low ED volume do not have high inpatient volume, indicating these hospitals already provide limited hospitalization.

Rural hospitals with the lowest ED volumes have the highest rates of ground ambulance ownership, but the lowest rates of affiliation with air ambulance companies. The ED physician advisers for this study observed that REHs will have to balance competing priorities for rural hospital-owned ambulances, maintaining availability for emergency calls while also providing interhospital transfers, which may increase following loss of inpatient capacity. The low rates of study hospitals reporting air ambulance ownership or affiliation (provided by either the hospital's health system or through a contractual arrangement or venture outside the health system) raises concerns regarding rural ED access to

these services, which serve a vital role for most rural communities for transport of critically ill.[11] REH conversion may serve as a catalyst for states to prioritize rural EMS medical direction/quality and regionalization of high-risk medical conditions (e.g., directing EMS to bypass local EDs for more serious conditions like ST-elevation Myocardial Infarction) similar to the trauma system.

In general, there is adequate access to CT scanners, but less access to MRI. The ED physician advisers for this study observed that these findings were expected and that the available technology is adequate. However, concerns were raised about the knowledge and skilled use of advanced technology to perform high-risk procedures (e.g., intubation with video laryngoscopy). Training for non-physician providers is widely variable[12] and minimum training standards for all rural clinicians are recommended by the American College of Emergency Physicians (ACEP). Advisers cited ACEP recommendations about onboarding for newly hired APPs working in rural EDs to include Emergency Medicine-specific knowledge and training on advanced technology with physician tele-supervision.[13]

Hospitals with low-volume EDs report low numbers of physician staffing. The ED physician advisers for this study observed that these findings are consistent with their clinical and operational experience and provided the following assessment

- EDs with <12 visits per day are unlikely to be staffed by emergency physicians and are more likely to be staffed by a clinic-based family physician or non-physician clinicians (e.g., APP).
- EDs with >12 visits per day are more likely to be staffed by a physician (emergency or family) using 24-hour shifts and may also have solo- or collaborative-APP staffing.
- EDs with >20 visits per day are more likely to be staffed by emergency physicians in single-coverage using 12-hour shifts and may include APP staffing during the busiest times.
- Tele-emergency medicine oversight of clinicians in rural EDs is shown to improve care quality and is thus recommended by the American College of Emergency Physicians.[14]

LIMITATIONS

An important limitation to this study is the use of AHA Survey data. A recent study compared ED data in the AHA Survey to the National Emergency Department Inventory (NEDI)–USA data set. The study found that, although several aggregated results were similar between the compared data sources, the AHA data set excluded many U.S. EDs, including many rural EDs.[15] In addition, among hospitals that reported data for the AHA survey, many survey questions were not answered. In this study, for example, 567 hospitals did not answer the survey question about total privileged physicians, and 512 hospitals did not answer the survey question about APP FTEs, which limits the clinical staffing findings. Additionally, the perspectives and experience of the ED physician advisers for this study may not adequately capture the panoply of rural ED settings and are opinions of only one type of health professional who may practice in REHs.

CONCLUSION

The REH may be a viable alternative to an inpatient facility, particularly in communities where a rural hospital is at risk of closure. However, there is little published literature on the characteristics and operations of these facilities from which to generate best practices in implementation. Conversion to REH will require careful attention to many operational issues such as those identified in this study.

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