



Rural Hospital Support for Emergency Medical Services

Final Report No. 100

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EXECUTIVE SUMMARY

Emergency medical service (EMS) personnel provide essential services to rural residents and those visiting rural areas. Rural EMS agencies face continual challenges to ensure a qualified workforce. Affiliation with the local hospital is one option for sustaining rural EMS units.

Little is known about rural hospital operation of EMS units. This study answers the following questions:

- What proportion of rural hospitals support or operate EMS units, and has this changed in last five years?
- What are the characteristics of rural hospitals that support or operate EMS?
- What are the financial investments made by these hospitals in EMS?
- What describes the communities in which these hospitals are located?

We examined all short-term stay acute care rural hospitals. Rural hospitals were defined based on location in either a nonmetropolitan county or in a metropolitan county ZIP code area with a Rural-Urban Commuting Area code of 4 or greater. Medicare Hospital Cost Reports for 2004-2008 were used to identify whether hospitals participated in the provision of EMS. We examined three Cost Report variables: ambulance staff expenses, other ambulance expenses, and ambulance charges. If a hospital provided a dollar amount in salary expenses and/or other expenses (or all three variables) they were considered to support EMS care.

Over 90% of hospitals that reported a dollar amount in any one category reported a dollar amount in all three categories. Some hospitals provide significant support for EMS and likely own the EMS unit or operate a unit owned by another entity, perhaps the county or community. Lesser dollar amounts indicate that the hospital may provide financial support for staff and/or supplies for an ambulance service run by others. Because we cannot determine ownership, nor are there standard guidelines for levels of financial support that indicate ownership, we refer to hospitals meeting these cost report criteria as hospitals that support an EMS unit, without making a distinction between those that own the service and those that do not.

Study findings include the following:

- More than 95% of hospitals had no change in their support for EMS over the five years studied. Almost three-quarters never supported this service (n=1664) and close to one-quarter always supported it (n=523). Only a few hospitals (n=100) added or dropped support for EMS during the five years.
- Rural hospitals supporting EMS were more likely to be Critical Access Hospitals (CAHs) but the difference in percentages in this category was less than 10%.

- Only 10.9% of CAHs that support EMS receive cost-based reimbursement for this service.
- Rural hospitals supporting EMS were slightly farther from the next nearest hospital than were other hospitals.
- Those CAHs that support EMS had a median cost for support of just over \$235,000 per year while charges for ambulance services were twice that amount. Median dollars of EMS support for other rural hospitals was substantially higher at over three-quarters of a million dollars with median charges exceeding \$1.5 million.
- Hospitals that support EMS are located in counties that are less densely populated and that have a higher percent of the population over the age of 65 years. The counties where they are located are also less likely to be designated as counties with housing stress, persistent poverty, or low employment, suggesting that a basic and sufficient level of resources was available to the hospital to take on the additional responsibility of providing EMS.
- The percent of rural hospitals supporting EMS units ranged from 48.9% in Iowa to 0% in six states. States with the highest participation rates were present in all U.S. Census regions but most common in the Midwest.

Using ambulance expenses and ambulance charges as a proxy for support of an EMS unit, it appears that the percent of rural hospitals that support EMS has not appreciably changed over the past five years. There is a marked range of financial involvement for these hospitals and the possible scenarios under which these rural hospitals support EMS are extensive. There is no indication that the challenges to maintaining rural EMS have either increased or eased.

BACKGROUND

Prehospital emergency care is an important component of a comprehensive health care system. In rural areas where there are fewer health care providers and the distance to acute and emergency care may be great, prehospital emergency medical service (EMS) personnel provide essential health care services to rural residents and to those visiting rural areas.

Rural EMS agencies face continual challenges to ensure a qualified workforce to meet the prehospital emergency care needs of their communities. Decreasing volunteerism in rural areas has forced some EMS agencies to close and others to consider changes in organizational structure, including becoming affiliated with other agencies.^{1,2}

Affiliation with the local hospital is one option for sustaining rural EMS units. However, most EMS agencies function as independent entities or are affiliated with fire departments rather than with hospitals. Published estimates of the number of EMS units that are based in hospitals have varied from 6.5% across all geographies³ to 10.0% in nonmetropolitan counties overall and a slightly higher percentage (13.5%) in the most rural areas (non-core based statistical areas, a subset of nonmetropolitan counties).⁴ In 2003, 15.5% of EMS personnel worked for hospital-based EMS units.

Little is known about the rural hospitals that operate EMS units, and most of what is known has focused on critical access hospitals (CAHs). Creation of CAHs was one component of the Medicare Rural Hospital Flexibility (Flex) Program, and there are now 1,309 rural hospitals that have converted to CAH status.⁵ In addition to special reimbursement rules (such as receiving 101% of allowable costs for most services to Medicare beneficiaries), CAHs benefit from the larger Flex grant program to states. The overarching aim of the Flex program is to strengthen the rural health care infrastructure and the program includes integration and improvement of EMS in its goals.

In a study of EMS units serving CAHs, conducted early in the Flex Program, 12.0% were owned by the CAH and 16.9% were owned by a hospital of any type including CAHs.⁶ Units that were owned by the hospital were more likely than independent or fire-based EMS units to have Advanced Life Support (ALS) capability and less likely to use volunteers. In an interview survey with a small number of CAH administrators, respondents reported taking on responsibility for EMS because the local EMS unit was failing and/or government entities requested that they do so.⁷ Administrators also viewed assumption of these responsibilities not just as community service but also as a way to improve EMS. While the availability of additional emergency care staff at the hospital was a benefit, hospital administrators reported challenges recruiting and retaining Emergency Medical Technicians (EMTs) as well as providing educational opportunities for them. The management skills necessary to run an EMS unit were also reported as a barrier.

In addition to staffing-related barriers, there is a major financial barrier that might deter CAH administrators from assuming responsibility for EMS, regardless of community need. The 35-mile rule, a rule in place since the inception of the Flex program, prohibits Medicare cost-based reimbursement to hospitals for EMS if there is another EMS provider within 35 miles,

regardless of the level of care provided by the other service. There are also financial barriers for rural hospitals paid under the prospective payment system. Changes in the Medicare reimbursement rules for nonemergency transfer complicate payment for EMS. Charges for ambulance transport of hospitalized patients may not be billed separately by hospitals, since the cost is considered part of the patient's Diagnostic Related Group payment. Additionally, if local EMS agencies provide those nonemergency transports, they must now bill the hospital for reimbursement.

Beyond the limited studies of critical access hospitals, little is known about rural hospital operation of EMS units. Hospital-based EMS/ambulance services would seem to offer many advantages and possible solutions to the problems facing rural EMS today. EMS staff require extensive training and continuing education to maintain patient care skills, and hospitals are uniquely situated to provide continuing education on patient care. Further, EMTs employed by hospitals may enjoy pay and benefits and have the opportunity to expand their skills and move into other areas of health care. The hospital benefits from the availability of EMTs to provide valuable health care services in the hospital when they are not on an emergency or transport run. Anecdotal reports also indicate that when rural hospitals need to transfer critically ill patients needing a higher level of care, these transports may be more easily provided by in-house EMS. Physician staff affiliated with local rural hospitals might be more willing to fill the role of EMS designated medical director (DMD) if the service is owned or at least based at the hospital. In a recent survey, rural EMS directors in agencies affiliated with hospitals were less likely than other rural respondents to report having difficulty recruiting a DMD.⁴

There are also potential barriers to the operation of EMS/ambulance units by hospitals, not the least of which is a change in "culture" for EMTs who are accustomed to working in other EMS settings. In many rural communities, EMS agencies are often independent and staffed with volunteers who may not be willing to lose their autonomy. In our recent survey, rural EMS agencies affiliated with hospitals were more likely than those affiliated with fire departments to have problems recruiting EMTs.⁴

The secondary data analysis reported here was designed to answer the following questions:

- What proportion of rural hospitals support or operate EMS units, and has this changed in last five years?
- What are the characteristics of rural hospitals that support or operate EMS?
- What are the financial investments made by these hospitals in EMS?
- What describes the communities in which these hospitals are located?

DETERMINING WHICH RURAL HOSPITALS OPERATE OR SUPPORT EMS UNITS

Our universe of hospitals was all short-term stay acute care rural hospitals, both those paid under the prospective payment system and critical access hospitals. Rural hospitals were defined based on location in either a nonmetropolitan county or in a metropolitan county ZIP code area with a Rural-Urban Commuting Area code of 4 or greater.⁸

Because there is no standardized national dataset of EMS agencies to provide a list of hospital-based units, Medicare Hospital Cost Reports⁹ for 2004 through 2008 were used to identify rural hospitals with and without EMS for the study. Despite the detail in these reports, there is no single variable that indicates that a hospital owns or operates an EMS unit. Instead, expense and charge variables can be used to make a determination that a hospital participates in some way in the provision of prehospital emergency care.

We examined three Cost Report variables to determine which hospitals were involved in providing EMS: ambulance staff expenses, other ambulance expenses, and ambulance charges. If a hospital provided a dollar amount in salary expenses and/or other expenses (or all three variables) they were considered to support EMS care in that year. If no dollar amount was listed in any category, they did not support EMS in that year. Hospitals that only reported charges in any year (n=20) were removed from the analysis dataset on the assumption that if they reported charges but no expenses, the hospital could be serving as a billing service for a local EMS unit. Data from the Area Resource File (ARF),¹⁰ the Bureau of Labor Statistics,¹¹ and the US Census Bureau¹² were used to explore the characteristics of the counties where the hospitals were located.

Over 90% of hospitals that reported a dollar amount in any one category reported a dollar amount in all three categories. Because the majority of hospitals reported all three financial indicators, it is reasonable to assume that they support EMS units although the extent of support and, more importantly, the ownership of the EMS unit cannot be determined. It is clear that some hospitals provide significant support for EMS and likely own the EMS unit or operate a unit owned by another entity, perhaps the county or community. Lesser dollar amounts indicate that the hospital may provide financial support for staff and/or supplies of an ambulance service run by others. Because we cannot determine ownership nor are there standard guidelines for levels of financial support that indicate ownership, we refer to hospitals meeting these cost report criteria as hospitals that support an EMS unit, without making a distinction between those that own the service and those that do not.

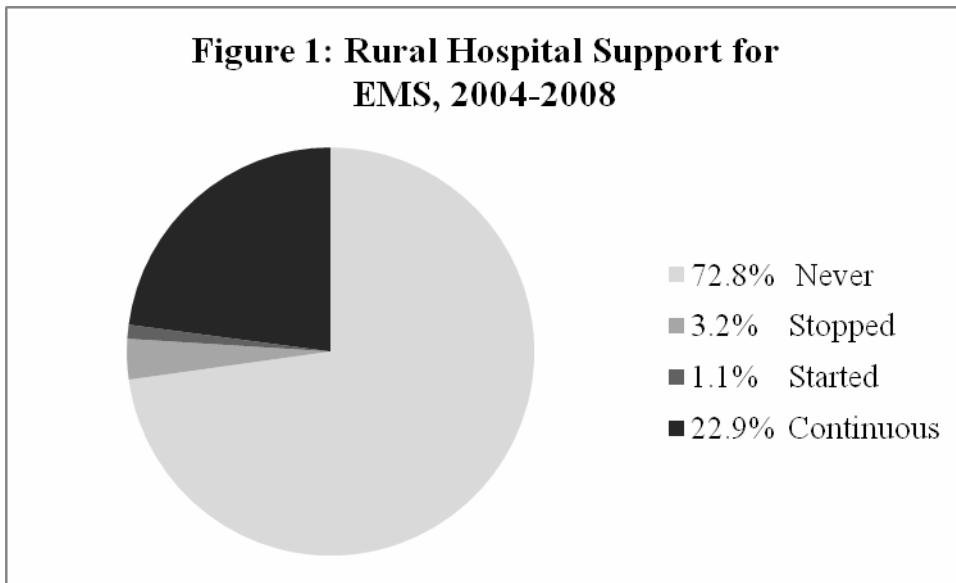
We examined trends in hospital support for EMS by calculating the number of hospitals whose financial data indicated support for EMS in all or some of the five years studied, and the number that had no financial data indicating support in any year. Ultimately, hospitals with support for EMS in the most recent year were compared to those that did not in the most recent year. The Chi-Square statistic was used to determine differences between groups for categorical variables and the Mann-Whitney *U* test was used to examine differences in medians for continuous variables.

RESULTS

Rural Hospital Support of Emergency Medical Services over Time

Medicare Hospital Cost Report Data from 2004 through 2008 was used to classify hospitals into four categories (Figure 1). The categories included hospitals that:

- *started* supporting EMS at some point during the 5-year period and continued through 2008,
- had *continuous* support for EMS for the 5 years,
- supported EMS during the 5-year period but *stopped* support by 2008, and
- *never* supported EMS.



Source: NC RHR & PAC analysis of CMS Hospital Cost Report Information System (HCRIS), September 30, 2009 Release.

More than 95% of hospitals had no change in their support for EMS over the five years. Almost three-quarters never supported this service (n=1664) and close to one-quarter always supported it (n=523). Only a few hospitals (n=100) added or dropped support for EMS during the five years studied.

Because the change over time in the number and percent of hospitals supporting EMS was minimal, no further analysis was done to describe the hospitals in all four categories. In order to explore the characteristics of hospitals with or without ambulance service, all hospitals were aggregated into two categories based on their 2008 status. Rural hospitals with continuous support for EMS were combined with those that had started and maintained support (n=549, 24.0%) and those that had stopped support were combined with those that had never provided support (n=1738, 76.0%).

Characteristics of Hospitals

Measures of hospital reimbursement status, volume of care, and financial health were used to compare rural hospitals with and without support for EMS (Table 1).

Table 1: Hospital Characteristics		
	Supports EMS Unit (N=549)	No Support for EMS Unit (N=1738)
Critical Access Hospital (CAH)*	58.5%	49.6%
<i>Among CAHs supporting EMS (N=321):</i>		
Cost-Based Reimbursement for Ambulance	10.9%	NA
Acute Average Daily Census (median)*	7.4	10.8
Cash Flow Margin (median)	6.0	5.7
Distance to Nearest Short-Term General Hospital (median)*	18.6 miles	17.1 miles

Source: NC RHR & PAC analysis of CMS Hospital Cost Report Information System (HCRIS), September 30, 2009 Release.

*Difference is statistically significant at p<.01

There were significant differences between hospitals that supported EMS and those that did not, although some differences were small. Not surprising, rural hospitals supporting EMS were more likely to be CAHs but the difference in percentages in this category was less than 10%. Only 10.9% of CAHs that support EMS receive cost-based reimbursement for ambulance charges.

Rural hospitals supporting EMS had a lower acute average daily census, most likely a reflection of the higher portion of CAHs in this group of hospitals. The two groups were similar in their cash flow margins, and rural hospitals supporting EMS were only slightly farther from the nearest hospital than those not supporting EMS.

Financial Investment in and Potential Revenue from EMS Units

There was a markedly large range of values across rural hospitals that support EMS for each category of expenses and for charges, indicative of the range in hospital resources and involvement with EMS (Table 2).

Table 2: Expenses and Charges for EMS Units for Rural Hospitals Supporting EMS, 2008					
# of Hospitals	Salary Expense Mean Median Range	Other Expense Mean Median Range	Total Expense (Salary + Other) Mean Median Range	Charges Mean Median Range	
Critical Access Hospitals					
321	\$258,392 \$164,516 \$0 – 3,269,076	\$95,734 \$54,371 \$42 – 3,120,187	\$354,126 \$235,044 \$602 – 4,473,421	\$714,330 \$507,382 \$0 – 5,060,137	
Other Short-Term Stay Acute Care Rural Hospitals					
228	\$717,466 \$621,090 \$0- 8,189,155	\$342,919 \$151,671 \$0 – 9,825,449	\$1,060,385 \$788,632 \$725 – 13,115,335	\$2,363,735 \$1,613,313 \$0 – 70,849,387	

Source: NC RHR & PAC analysis of CMS Hospital Cost Report Information System (HCRIS), September 30, 2009 Release.

Critical Access Hospitals had a median cost for support of EMS of just over \$235,000 per year, while charges for ambulance services were twice that amount. Median dollars of EMS support by other rural hospitals was substantially higher at over three-quarters of a million dollars with median charges exceeding \$1.6 million.

Characteristics of Counties Where Hospitals Are Located

County typology codes were developed by the Economic Research Service of the US Department of Agriculture¹³ to characterize counties on population and economic dimensions with policy relevance. These codes were used along with other markers to describe the counties where the rural hospitals are located (Table 3). County typology codes include two categories¹: economic codes describe the economic base of the county and policy codes describe characteristics that have particular relevance to local, state or federal policy.

¹ Economic type codes include farming-dependent, mining-dependent, manufacturing-dependent, federal/state government-dependent, service-dependent and nonspecialized (those not meeting the threshold level for dependence in the previously listed categories). Policy relevant type codes include low-education, population loss, housing stress, persistent poverty, low-employment, nonmetropolitan recreation area, and retirement destination.

Table 3: Characteristics of Counties Where Hospitals Are Located

	Hospital Supports EMS Unit (N=549)	Hospital Does Not Support EMS Unit (N=1738)
<i>Population Characteristics</i>		
Population over 65 Yrs of Age (median)*	16.7%	15.7%
Population per Square Mile (median)*	27.4	43.7
In a Low Education county	18.4%	20.2%
In a Population Loss county*	25.9%	20.3%
<i>Employment and Poverty</i>		
Population Below Poverty (median)	13.9%	14.6%
% Unemployment Rate (median)*	5.3%	5.6%
In a Housing Stress county*	11.1%	16.9%
In a Persistent Poverty county**	9.5%	12.8%
In a Low Employment county*	11.1%	16.9%
<i>Economic Base</i>		
In a Farming-dependent county**	16.0%	12.1%
In a Mining-dependent county	4.2%	4.6%
In a Government-dependent county	8.0%	10.7%
In a Manufacturing-dependent county	34.6%	30.8%
In a Service-dependent county	5.7%	7.6%
In a Nonspecialized county	31.5%	34.2%
<i>Retirement/Recreation</i>		
In a Retirement Destination county	10.4%	13.5%
In a Non-metro Recreation Area county	11.7%	12.4%

Sources: Area Resource File (ARF), 2007 release, Health Resources and Services Administration, US Department of Health and Human Services; SAIPE State and County Estimates for 2008, US Census Bureau, US Department of Commerce; Local Area Unemployment Statistics, 2008, Bureau of Labor Statistics, US Department of Labor.

*Difference is statistically significant at p<.01

**Difference is statistically significant at p<.05

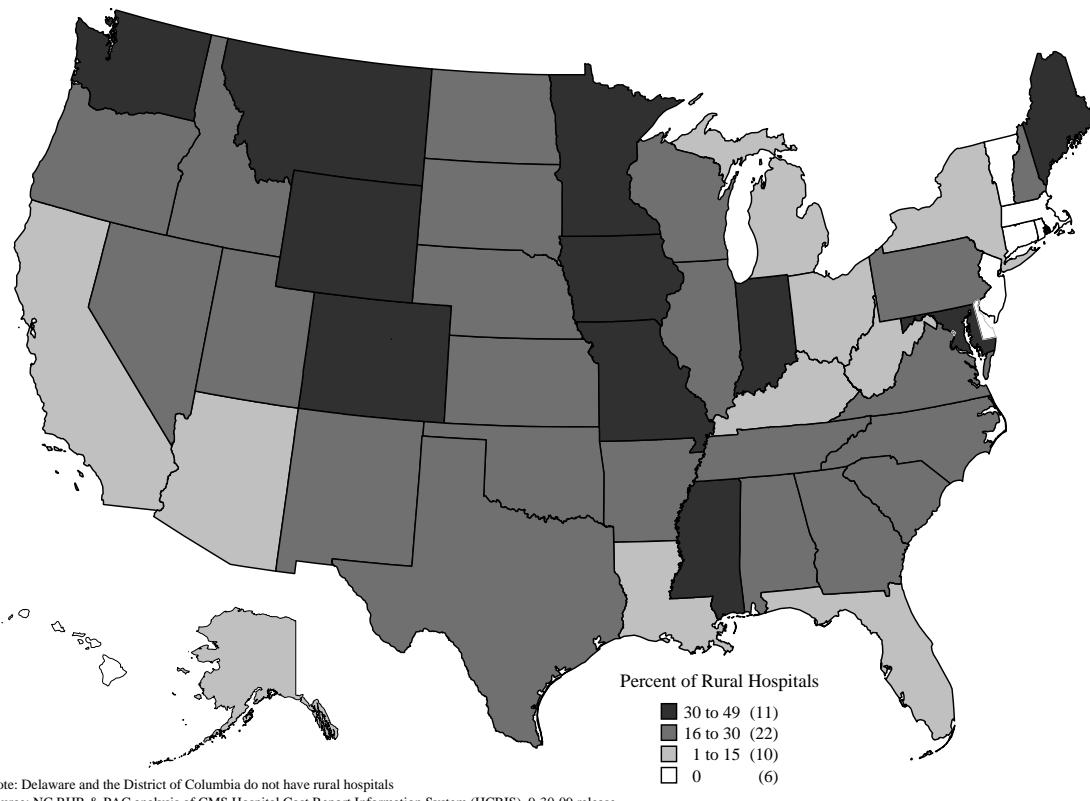
Hospitals that support EMS are located in counties with a higher percent of the population over the age of 65 years, although the difference between groups was minimal. Population density is both statistically and markedly different between the two groups of hospitals, with hospitals that support EMS located in counties that are less densely populated. The counties where they are located are also less likely to be designated as counties with housing stress, persistent poverty or low employment. With the exception of being more likely to be

farming-dependent, the economic base of the counties where rural hospitals with and without support for EMS were located did not differ statistically or appreciably and they were also similar in terms of being retirement destinations or nonmetropolitan recreation counties.

Distribution of Rural Hospitals Supporting EMS Across the United States

States play a significant role in regulating the provision of health care services and there was variation among States in the percentage of all rural hospitals that support EMS (Figure 2).

Fig 2: Percent of Rural Hospitals that Support Ambulance Services



For states with rural hospitals that supported EMS, the percent of supporting hospitals in each state ranged from 48.9% in Iowa to 5.3% in Arizona. In six states, there were no rural hospitals that supported EMS units. These states include five states in the northeast United States and Hawaii.

States with the highest participation rates were present in all Census regions but most common in the Midwest. With a few exceptions, most states with few or no rural hospitals supporting EMS units were located east of the Mississippi River.

DISCUSSION

Using hospital cost report financial markers for ambulance expenses and charges as a proxy for hospital involvement with EMS, the portion of rural hospitals that support EMS units has remained constant at 24% to 26% each year over the years 2004 through 2008 despite anecdotal reports of rural EMS closures during that period. There were 100 hospitals that added or dropped support for EMS during that period and hospitals discontinuing EMS support were more common than hospitals adding EMS support (74 vs 26). Discontinuance of ambulance service was more common in the earlier years.

The level of financial investment and potential financial benefit from supporting EMS varied significantly across the 549 hospitals that we considered to support EMS. The financial markers used cannot tell us if a hospital owns the EMS unit, runs it for another entity (perhaps the county or local community), or supports EMS in other ways. We can speculate, though, about certain levels of financial involvement. Median expenses reported by CAHs are consistent with salary support for EMT personnel, supplies, and maintenance for the ambulance. The cost of an ambulance (\$60,000 to \$100,000) is likely not included in these other costs reported by many hospitals. Hospitals reporting expenses at the lower end of the range may be providing salary support for the EMS medical director or support for a paramedic. Additionally, hospitals may provide limited support to EMS in a smaller way by providing supplies and/or equipment for the local community-based EMS system,¹⁴ and, in these cases, their financial markers would indicate only limited dollars for other ambulance expenses and no salary dollars.

Short-term rural hospitals other than CAHs spend considerably more on EMS salaries and other support. Hospitals in this category include hospitals with more than 25 beds and particularly rural referral centers that may own and/or operate a sophisticated EMS system that could include fixed-wing and/or helicopter transport.

The level of charges for EMS indicates that many hospitals provide a substantial number of EMS transports. A 2002 Minnesota study determined that the cost of an ambulance run averaged \$415, but could be as much as \$575 in rural areas where runs are longer.¹⁵ CMS rules now require that charges for ambulance services incurred during the course of a hospital admission to a PPS hospital be billed as part of the DRG for that hospital stay. These ambulance costs may not be captured in the ambulance charge data analyzed here. However, without knowing each hospital's payer mix and the reimbursement rates per payer type, the actual revenue from EMS cannot be calculated from these data. The Minnesota study found that for rural and urban providers almost a decade ago, the median charges exceed median overall expenses by a factor of two to one, indicating that an overall reimbursement level of 50% would be necessary to cover the cost of providing EMS.

The Medicare Rural Hospital Flexibility Program emphasizes strengthening the health care infrastructure including EMS, and it is not surprising that CAHs are more likely than other rural hospitals to support EMS. Two particular requirements for CAH status further underline the connection between CAHs and EMS. CAHs, however small, must have 24/7

emergency department services and thus receive emergency care patients transported by EMS and are aware of the capabilities and challenges of their local EMS providers. Second, the role of the CAH as a limited-service short-term critical provider requires that they establish network relationships with other hospitals for the care of patients needing services the CAH cannot provide. Further, Flex regulations limit the length of stay of hospitalized patients. The need to transfer critically ill or injured patients requires EMS support to provide needed care en route to the receiving hospital. Hospital administrators report anecdotally that these transfers can present a significant burden to the hospital when appropriately trained community EMTs are not available and the hospital must send a hospital-based RN to provide care during transport.

One factor that continues to discourage provision of EMS by more CAHs is the 35-mile rule that prohibits cost-based reimbursement for ambulance services for hospitals that are located within 35 miles of another EMS provider. Notably, of the CAHs supporting EMS in this study, only 10.9% report that they receive cost-based reimbursement for ambulance service. Rural communities, even in the most remote areas, have stepped up historically to provide essential public safety services for their citizens. Although areas of limited coverage persist, these community efforts have ensured that there is an EMS provider within 35 miles of a hospital. Rural EMS units are, however, often volunteer-based and these units may be the very ones that are currently threatened with closure largely due to their inability to recruit and retain volunteers. Further, rural EMS units are often Basic Life Support (BLS) level services and do not have the equipment or staff to provide the critical care during transport needed by patients initially hospitalized in rural hospitals. Therefore, it is likely that while a number of CAHs have another EMS provider within 35 miles, that provider is not capable of delivering the full range of emergency services that may be needed.

CAH administrators report, again anecdotally, that the 35-mile rule both limits their ability to cover the costs of EMS units that they already run and prohibits them from assuming responsibility for EMS when they would like to. Rescindment of the rule, or, at a minimum, a rule revision that considers the capabilities of the nearby EMS before excluding cost-based reimbursement for hospital-based service, would remove one barrier from the stabilization of existing hospital-based EMS and the addition of new services.

Rural counties where the hospital supports EMS are less densely populated and have a higher rate of population loss than do counties with hospitals without EMS. A certain level of both health care demand and financial and human resources are needed to support rural health care providers and in sparsely populated areas, health care providers may take on multiple functions in order to provide needed services with the limited workforce available. In this analysis, some measures of poverty (persistent poverty, housing stress, and low employment) differed between the two groups of hospitals. Hospitals that support EMS were less likely to be located in counties with these challenges, suggesting that a basic and sufficient level of resources was available to the hospital to take on the additional responsibility of providing EMS. For the most part, the type of economic base did not differ, nor did specific types of rural areas such as retirement destinations and nonmetropolitan recreation areas that may put additional demands on the health care system. With the exception of population density, none of these significant differences were large and more information is needed to determine

the population and economic resources that are needed to facilitate the merger of hospital and EMS.

Hospitals that support EMS were more likely to be in states in the Midwestern United States, an area where CAHs are also more prevalent. State policies regarding EMS, such as a lack of exclusive operating areas, may encourage the provision of EMS by hospitals but without a state-by-state analysis of health care regulation, it is not possible to determine how state policies support or limit hospital-based EMS.

SUMMARY

Using ambulance expenses and ambulance charges as a proxy for support for an EMS unit, it appears that the percentage of rural hospitals that support EMS has not appreciably changed over the past five years. There is a marked range of financial involvement for these hospitals and the possible scenarios under which these rural hospitals support EMS are extensive. There is no indication that the challenges to maintaining rural EMS will ease, and the potential benefit from hospital assumption of these essential health care services remains to be explored in more detail. Programs to support rural EMS would benefit from a comprehensive description of why and how hospitals support EMS and what types and levels of support are best for what types of rural communities. Further research would help inform the discussion and the development of funding and programmatic mechanisms to ensure the viability of high quality rural prehospital emergency care services.

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