

Urban Hospitals with a High Percentage of Inpatient Days for Rural Patients

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BACKGROUND

The special Medicare payment classification system supports hospitals that serve rural communities.¹ These classifications fall into four categories: Critical Access Hospitals (CAHs), Medicare Dependent Hospitals (MDHs), Sole Community Hospitals (SCHs), and Rural Referral Centers (RRCs).¹ To understand the variability in hospitals that qualify for special Medicare payment classifications, it is important to analyze characteristics of urban hospitals, particularly those with substantial rural patient populations.

The purpose of this brief is to describe characteristics of urban hospitals with a high percentage of inpatient days for rural patients and to compare how they differ from urban hospitals with lower percentages of rural inpatient days. CAHs were excluded from this analysis as they are not paid under either an Inpatient Prospective Payment System (IPPS) or an Outpatient Prospective Payment System (OPPS), and have no more than 25 inpatient beds.² Due to their payment system and small size, CAHs would therefore be an unsuitable comparison.

METHODS

All study data are from files produced by the Centers for Medicare & Medicaid Services (CMS). Medicare inpatient days were obtained from the 2018 Hospital Service Area File (HSAF) and hospital statistical and financial data were obtained from the Healthcare Cost Report Information System (HCRIS 3-31-20) file.^{3,4} We defined hospitals and patients as rural using the Federal Office of Rural Health Policy definition. FORHP defines an area as rural if it is a) located outside a metropolitan Core Based Statistical Area OR b) has a 2010 RUCA code of 4 or greater; OR c) is located in one of the census tracts with RUCA codes 2 or 3 that are at least 400 square miles in area with a population density of no more than 35 people per square mile.⁵ The percentage of rural inpatient days in each urban hospital was determined by dividing the total number of rural Medicare inpatient days by the total number of Medicare inpatient days. The assumption was then made that the percentage of rural Medicare inpatient days was applicable to all other patient populations in the hospital. Indicator definitions and Medicare Cost Report accounts are shown in the Appendix.

This study evaluated differences in urban hospitals with high and low percentages of rural inpatient days using several indicators. These indicators fall into five broad categories: Medicare payer mix, size, profitability, distance to the next closest hospital, and wage index. Rural hospitals generally serve populations with a higher prevalence of Medicare beneficiaries, are smaller in size, have a lower wage index, and are less profitable in comparison to urban hospitals.⁶⁻¹⁰ Additionally, rural residents travel longer distances to reach their closest hospital.¹¹ We therefore hypothesized that similar to rural hospitals, urban hospitals with a higher percentage of rural inpatient days would have a higher Medicare payer mix, be smaller in size, be less profitable, be located farther away from the next closest hospital, and have a lower wage index in comparison to urban hospitals with a lower percentage of rural inpatient days. We selected 40% as the cut-off percentage to differentiate between urban hospitals with high and low percentages of rural inpatient days.

KEY FINDINGS

- Nearly 7% of urban hospitals (163) have a high percentage ($\geq 40\%$) of inpatient days for rural patients (determined by dividing the total number of rural Medicare inpatient days by the total number of Medicare inpatient days).
- Ninety-nine of these 163 hospitals have no special Medicare payment classification, 48 are Rural Referral Centers, and nine are Sole Community Hospitals/Rural Referral Centers.
- In comparison with other urban hospitals, urban hospitals with a high percentage of inpatient days for rural patients are more likely to:
 - ~ Be located in the South and Midwest census regions;
 - ~ Have a higher percentage of Medicare inpatients and Medicare outpatients; and,
 - ~ Have a smaller number of acute beds, a higher operating margin, and a lower wage index.
- Some urban hospitals with no special Medicare payment classification but with a high percentage of inpatient days for rural patients might be eligible for a rural classification but have either chosen not to apply or are not aware of their potential eligibility.

Although the 40% cut-off was arbitrary, we believe that it adequately represents a substantial proportion of a hospital's inpatient business. Two sample t-tests determined statistically significant differences between these groups on several variables of interest.

Types of urban hospitals with a high percentage of inpatient days for rural patients

Table 1 shows the frequency distribution of urban hospitals by percentage of rural inpatient days and Medicare payment classifications. Among the 2,352 urban hospitals in the data file, 2,119 (90.1%) have fewer than 40% of their inpatient days from rural residents, and 163 (6.9%) have 40% or more from rural residents. For 70 hospitals (3.0%), data were incomplete and thus a percentage could not be computed.

We focused on the 163 urban hospitals that had rural inpatient days $\geq 40\%$ of total inpatient days. Among these hospitals, 99 (60.7%) had no special Medicare payment classification, 48 were classified as a RRC (29.4%), 11 (6.7%) were classified as either a SCH or both an SCH and RRC (SCH/RRC), and only one was classified as a MDH. It is interesting to note that among the 163 urban hospitals with $\geq 40\%$ rural inpatient days, the majority of the non-PPS hospitals are either RRCs (48) or RRCs and SCHs (9).

Table 1. Number of Urban Hospitals by Rural Inpatient Day Percentage Categories and Medicare Payment Classification

Rural Medicare Payment Classification	Number of U.S. Urban Hospitals					Missing Data	Total
	0-10% Rural Inpatient Days	10-20% Rural Inpatient Days	20-30% Rural Inpatient Days	30-40% Rural Inpatient Days	$\geq 40\%$ Rural Inpatient Days		
None (PPS)	1,068	344	187	102	99	70	1,870
RRC	198	57	52	33	48	0	388
SCH	4	11	10	4	2	0	31
SCH/RRC	3	6	9	6	9	0	33
MDH	6	2	1	0	1	0	10
MDH/RRC	1	1	2	1	0	0	5
Indian Health Service	0	0	1	0	3	0	4
CANCER	6	1	3	0	1	0	11
Total	1,286	422	265	146	163	70	2,352

Geographic distribution of urban hospitals with a high percentage of inpatient days for rural patients

Figure 1 shows the geographic distribution of the 163 hospitals with $\geq 40\%$ rural inpatient days, and Table 2 shows the number of urban hospitals by rural inpatient day percentage categories and census region (excluding the 70 hospitals for which data were missing). Among the 163 hospitals, 86.5% are located in either the South or Midwest regions.

Figure 1. 163 Urban Hospitals with $\geq 40\%$ Rural Inpatient Days

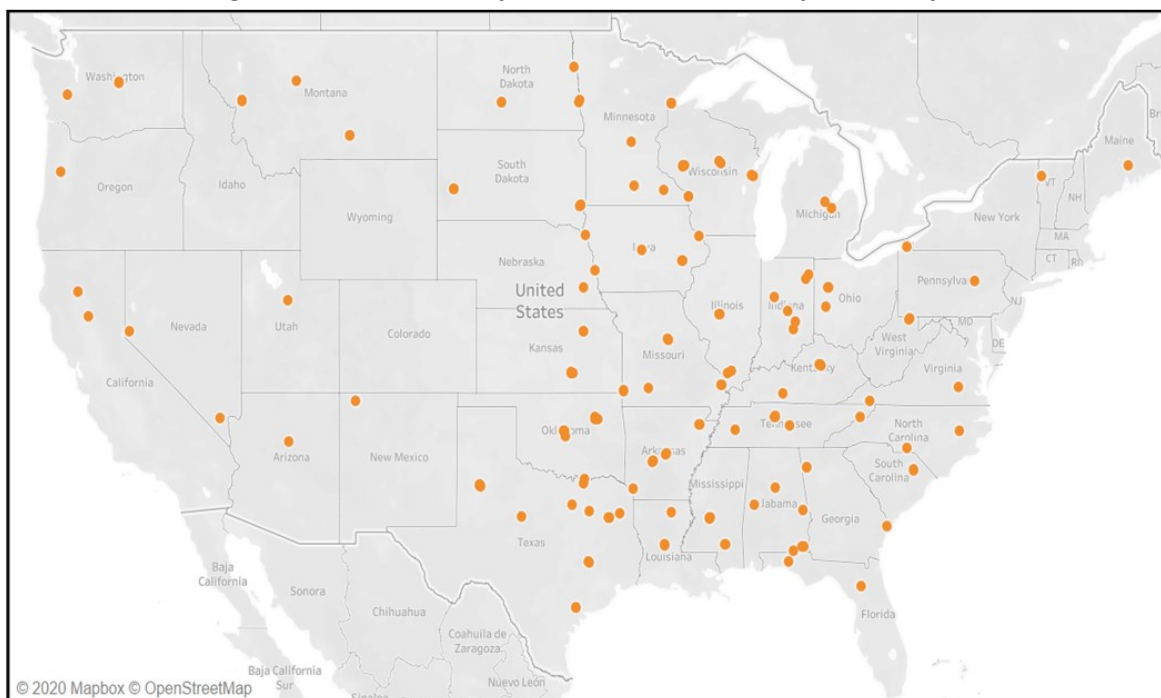


Table 2. Number of Urban Hospitals with <40% and ≥40% Rural Inpatient Days by Census Region

Number of U.S. Urban Hospitals			
U.S. Census Region	U.S. Urban Hospitals with <40% Rural Inpatient Days	U.S. Urban Hospitals with ≥40% Rural Inpatient Days	Total
Midwest	430	65	495
Northeast	385	4	389
South	785	76	861
Territories*	34	0	34
West	485	18	503
Total	2,119	163	2,282

*Guam, U.S. Virgin Islands, Puerto Rico, Northern Mariana Islands, American Samoa

Differences between urban hospitals with a high percentage of inpatient days for rural patients and other urban hospitals

Table 3 shows the median Medicare inpatient and outpatient payer mix, hospital size, profitability, distance to the next closest hospital, and wage index for urban hospitals with <40% and ≥40% rural inpatient days. The table shows statistically significant differences in Medicare inpatient mix, Medicare outpatient mix, number of acute beds, operating margin, and wage index.

Size, profitability, distance to the next closest hospital, and wage index

Urban hospitals with a high percentage of rural inpatient days had a lower median number of acute beds, lower median acute average daily census, and higher total net patient revenue, although the difference is significant for acute beds only. Urban hospitals with a high percentage of rural inpatient days also had a higher median operating margin and a higher median total margin, although the difference is significant for operating margin only. In addition, urban hospitals with a high percentage of rural inpatient days had a lower median straight-line distance (miles), driving distance (miles), and driving distance (minutes) to the next closest hospital, although none of the differences were significant. Finally, urban hospitals with a high percentage of rural inpatient days had a lower wage index, and the difference was significant. One potential explanation for the difference in wage index is that hospitals in the South generally have lower wage indexes and, as previously described, a plurality of the 163 urban hospitals with ≥40% rural inpatients are located in the South.⁹

Table 3. Median Medicare Payer Mix, Size, Profitability, Distance to the Next Closest Hospital, and Wage Index for Urban Hospitals with <40% and ≥40% Rural Inpatient Days

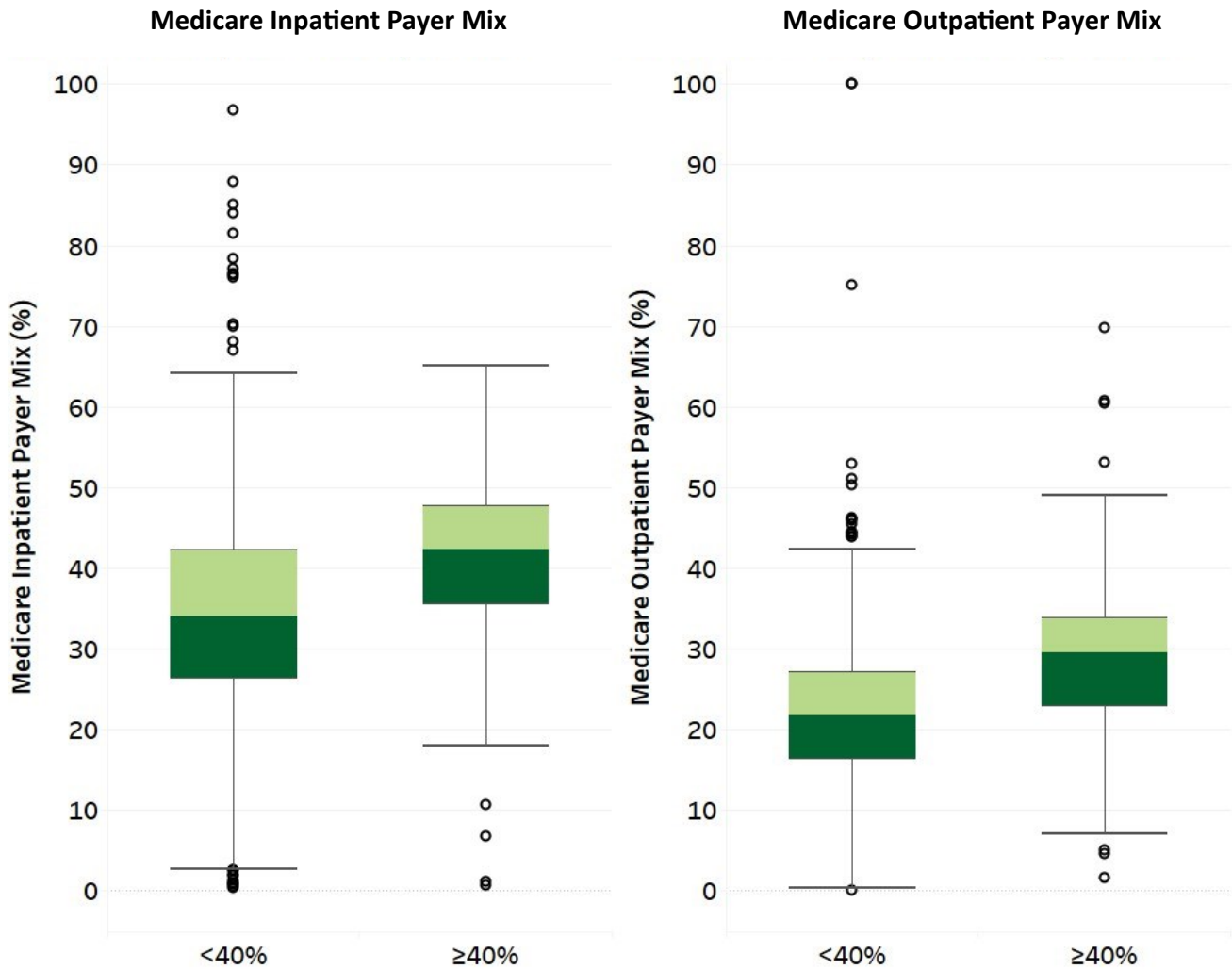
Indicator Type	Indicator	<40% Rural Inpatient Days	≥40% Rural Inpatient Days	p-value
Medicare Payer Mix	Medicare inpatient (%)	34.1	42.3	<.0001*
	Medicare outpatient (%)	21.7	29.5	<.0001*
Size	Number of acute beds	194	171	0.0450*
	Acute average daily census	112	96.1	0.1125
	Total net patient revenue (in \$1,000s)	237,000	242,000	0.4285
Profitability	Operating margin (%)	5.37	6.82	0.0238*
	Total margin (%)	5.82	7.04	0.1004
Distance to the Next Closest Hospital	Straight-line distance (miles)	3.33	2.00	0.2158
	Driving distance (miles)	4.25	2.40	0.5332
	Driving distance (minutes)	9.46	5.82	0.3328
Wage Index	Wage index	0.973	0.890	<.0001*

*Statistically significant at $\alpha=0.05$

Medicare inpatient and outpatient payer mix

The Medicare inpatient payer mix is defined as the percentage of inpatient days that are provided to Medicare beneficiaries, and the Medicare outpatient payer mix is the percentage of total outpatient charges for Medicare beneficiaries (see Appendix). Figure 2 shows boxplots of the Medicare inpatient and outpatient payer mix for urban hospitals with <40% and \geq 40% rural inpatient days. In the shaded box, the horizontal line in the middle represents the median, the top of the box represents the 75th percentile, and the bottom of the box represents the 25th percentile. The difference between the 25th and 75th percentiles is called the interquartile range (IQR), and the “whiskers” denote those observations within 1.5 IQR of the 25th and 75th percentiles. The dots above or below the whiskers are outliers. Figure 2 shows that urban hospitals with a high percentage of rural inpatient days generally have larger median Medicare inpatient and outpatient payer mixes.

Figure 2. Medicare Inpatient and Outpatient Payer Mix for Urban Hospitals with <40% and \geq 40% Rural Inpatient Days



CONCLUSIONS

In comparison with other urban hospitals, urban hospitals with a high percentage of inpatient days for rural patients are more likely to be located in the South and Midwest census regions, have a higher percentage of inpatient days for Medicare beneficiaries (Medicare inpatient payer mix), have a higher percentage of outpatient charges for Medicare beneficiaries (Medicare outpatient payer mix), have a smaller number of acute beds, have a higher operating margin, and have a lower wage index. They do not differ significantly in acute average daily census, total net patient revenue, total margin, or distance to the next closest hospital.

This study finds nearly 100 urban hospitals have no rural Medicare payment classification but have a high percentage of inpatient days for rural patients. Some of these hospitals might be eligible for a special payment classification but have either chosen not to apply or are not aware of their potential eligibility. These hospitals also have a higher Medicare inpatient and outpatient payer mix, consistent with previous studies that show rural hospitals serve older, poorer, and sicker communities where higher percentages of patients are covered through public insurance programs and higher percentages are uninsured.¹² In a previous study, we found that urban hospitals were consistently more profitable than rural hospitals between 2016-18, suggesting that a rural location has a negative effect on profitability.¹⁰ In contrast, this study finds that urban hospitals with a high percentage of inpatient days for rural patients had a higher operating margin. This finding cannot readily be explained by geographic location because there were no significant differences in distance to closest hospital between urban hospitals with a high percentage of inpatient days for rural patients and other urban hospitals. However, it is interesting in that it is rare to find hospitals where having a substantial rural service population improves profitability. Finally, CMS recently announced the Community Health Access and Rural Transformation (CHART) Model,¹³ an initiative that will provide financial support to eligible urban hospitals with more than 20% of Medicare spending in rural counties. Therefore, a deeper understanding of urban providers who serve large numbers of rural beneficiaries will become increasingly important.

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APPENDIX

Indicator Definitions

Financial Indicator	Description	Accounts
Medicare inpatient payer mix	<u>Medicare inpatient days</u> Total inpatient days – Nursery bed days – Nursing facility swing bed days	<u>Worksheet S-3, col. 6, line 14</u> Worksheet S-3, col. 8, line 14-6-13
Medicare outpatient payer mix	<u>Hospital Medicare outpatient charges</u> Hospital total outpatient charges	<u>Worksheet D, Part V, Title XVIII, (Hospital), col. 2-4, line 202</u> Worksheet C, Part I, col. 7, line 200 - (88+89+ 94 to 117)
Total margin	<u>Net income</u> Total revenue	<u>Worksheet G-3, line 29</u> Worksheet G-3, line 3+25
Operating margin	<u>Net patient revenue + Other revenue – Total operating expenses</u> Net patient revenue + Other revenue	<u>Worksheet G-3, line 3+(8 to 22)+24-4</u> Worksheet G-3, line 3+(8 to 22)+24

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