Regional Variation in Rural Hospital Charges Due to Ambulatory Care Sensitive Conditions

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Purpose

In this policy brief, we estimate and document the regional magnitudes of charges associated with hospitalizations due to ambulatory care sensitive conditions (ACSCs) in rural hospitals. This research will inform policy makers about the regional magnitudes of rural preventable hospitalizations and the associated potential savings in hospital resource utilization when rural patients receive timely and effective primary care.

Key Findings

- Rural hospitals in the South region spend a greater portion of their financial resources in caring for patients with possibly preventable hospitalizations than do their counterpart hospitals in other parts of the country.

- The effect of uninsurance and underinsurance on preventable hospitalizations is also greatest in the South region.

- The geographic variation in ACSC-related hospital charges is generally consistent with the geographic variation in patients' socioeconomic status and in the supply of primary care physicians.

Background

ACSCs are "the diagnoses for which timely and effective outpatient care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, controlling an acute episodic illness or condition (such as bacterial pneumonia), or managing a chronic disease or condition (such as asthma and hypertension)" (Billings et al., 1993, p. 163). Because hospitalizations due to ACSCs may be prevented, hospital expenditures associated with the treatment of ACSCs could be unnecessary health care spending. In addition, community hospitals are important safety net providers, and ACSC-related hospital expenditures in those hospitals could reflect the consequences of population uninsurance and underinsurance. Therefore, hospitalizations due to ACSCs have financial as well as health-related implications for communities. Research about such hospitalizations can contribute to the assessment of the access to and quality of primary health care systems across local communities.

Data and Method

We used data from the 2002 Nationwide Inpatient Sample (NIS) of the Healthcare Cost and Utilization Project (HCUP), which was established and is maintained by the Agency for Healthcare Research and Quality (AHRQ). Representing about 20% of U.S. community hospitals, the NIS is the largest hospital inpatient care database in the United States. Because the NIS is a stratified probability hospital sample based on geographic region, urban/rural location, teaching status, ownership, and bed size, it is nationally representative. We created a nationally representative sample of rural hospitals from the 2002 NIS. After excluding hospitals with missing information, 442 rural hospitals were available for this analysis. We used AHRQ's Prevention Quality Indicators to identify 16 ACSCs based on ICD-9-CM diagnosis and procedure codes (see Appendix A). For these 16 ACSCs, we created three

charge measures at the hospital level for our study: (1) total charges ($)[1] for all ACSC-related hospitalizations, (2) ACSC-related charges as a percentage of the charges associated with all hospitalizations due to all types of conditions (i.e., both ACSCs and non-ACSCs), and (3) ACSC-related charges for self-pay and Medicaid patients as a percentage of the charges associated with all hospitalizations. For more details about the rationale for using these charge measures, please see our brief on national rural hospital charges due to ACSCs (Chen et al., 2007). We applied the statistical weights, obtained from the NIS data set, to the sample of rural hospitals to obtain regional estimates. Regions are defined based on AHRQ's HCUP data set and the U.S. Census Bureau. Appendix B shows which states are included in each region.

Findings

ACSC-Related Hospital Inpatient Charges by Geographic Region

Of the 2002 nationwide ACSC-related hospital charges in rural hospitals, more than half ($5.4 billion or 56.7%) were attributed to the 17 states in the South region, followed by the 12 states in the Midwest region ($2.2. billion or 22.8%), the 13 states in the West region ($1.1 billion or 11.9%), and the 9 states in the Northeast region ($0.8 billion or 8.6%). Because each of the four regions includes a different number of states and total population, the proportions of ACSC charges rather than total ACSC charges were used for comparison. Figure 1 shows the ACSC-related charges as a percentage of the charges associated with all hospitalizations due to all conditions, and the ACSC-related charges for self-pay and Medicaid patients as a percentage of the charges associated with all hospitalizations, by region. The South region had the highest values for both percentage measures (20.11% and 3.32%, respectively). This finding means that for each dollar of hospital charges incurred in rural hospitals in the South region, 20 cents was associated with ACSCs. And 3.3 cents out of the 20-cent possibly preventable hospitalization charge was attributed to uninsured or Medicaid patients. This finding indicates that access to timely and effective primary health care is poorest for rural residents in the South region. In addition, the negative effect of uninsurance and underinsurance on access to adequate primary care is also most significant in the South region.

Figure 1. Proportion of ACSC-Related Hospital Charges for All Patients and for Self-Pay and Medicaid Patients by U.S. Region, for Rural Hospitals in the United States, 2002
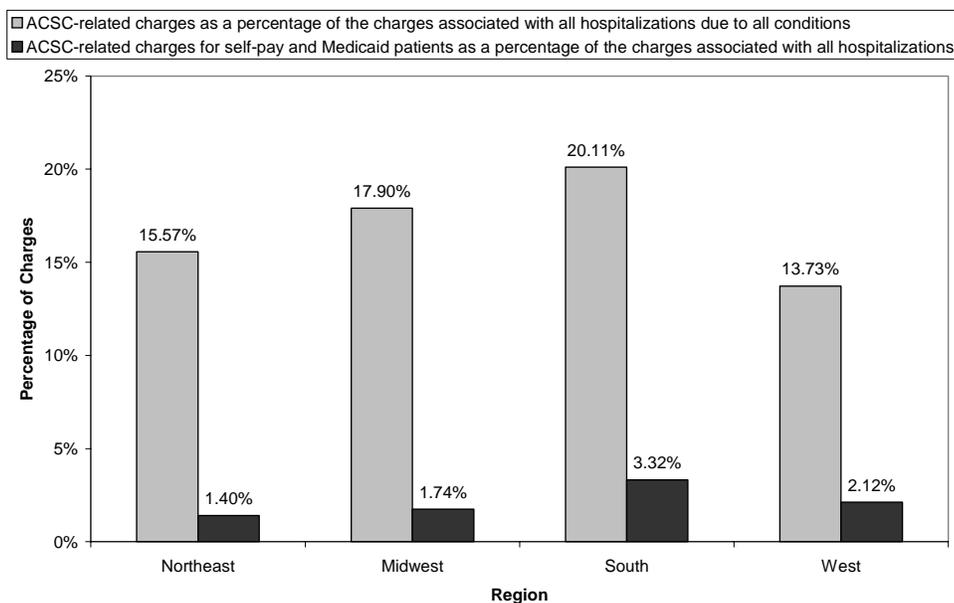
Data source: 2002 Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project.

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[1] We used charges as a proxy for resources consumed by the hospital, realizing they may overestimate actual costs.

Policy Brief PB2007-5

Rural hospitals in the Midwest region had the second highest value for the proportion of ACSC-related charges (17.9%). Rural residents in the West region had the lowest rate of preventable hospitalization (in terms of hospital charges): for each dollar of hospital inpatient charges incurred, only about 14 cents was associated with ACSCs. However, rural hospitals in the West region had a higher percentage of hospital inpatient charges attributable to preventable hospitalizations of the uninsured or Medicaid patients than did rural hospitals in the Midwest and Northeast regions.

Previous studies have suggested that ACSC-related hospital expenditures were associated with socioeconomic factors such as income and poverty (Cable, 2002; Shi et al., 1999) and with market supply variables such as the primary care physician-to-population ratio (Basu et al., 2002; Parchman & Culler, 1994). Income and poverty, as demand-side factors, would affect a patient's ability to afford primary health care. On the other hand, the availability of primary care physicians in communities, as a supply-side factor, would affect a patient's access to primary care. Table 1 shows the mean and median values of these three indicators for each of the four U.S. regions. The results correspond with the ACSC-related findings in that the South region (followed by the Midwest region) had the smallest primary care physician-to-population ratio, the lowest per capita income, and the highest poverty rate.

Conclusion

The resource utilization for rural preventable hospitalizations varies by geographic region and ranges from about 14% of hospital charges for rural hospitals in the West region to more than 20% of hospital charges for rural hospitals in the South region. The pattern of geographic variation in ACSC-related hospital charges is generally consistent with expectations based on patients' socioeconomic status and in the supply of primary care physicians.

Acknowledgments

Table 1. Mean and Median Values for Per Capita Income, Poverty Rate, and Supply of Primary Care Physicians, by U.S. Region, 2002

U.S. Region	Primary Care Physicians per 10,000 Population	Per Capita Income	Percent Persons in Poverty*
Northeast			
Mean	6.08	$25,509	11.05%
Median	5.46	$24,121	11.30%
Midwest			
Mean	4.54	$23,444	11.76%
Median	4.25	$23,620	11.10%
South			
Mean	4.39	$20,938	18.48%
Median	4.09	$20,863	17.70%
West			
Mean	5.21	$23,802	14.31%
Median	5.34	$23,183	13.60%

Source: 2005 Area Resource File.

*Based on 2002 U.S. Department of Health and Human Services Poverty Guidelines.

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Appendix A: Sixteen Hospitalizations Due to Ambulatory Care Sensitive Conditions

Preventable Hospitalization
1   Diabetes short-term complication admission
2   Perforated appendix admission
3   Diabetes long-term complication admission
4   Pediatric asthma admission
5   Chronic obstructive pulmonary disease admission
6   Pediatric gastroenteritis admission
7   Hypertension admission
8   Congestive heart failure admission
9   Low birth weight
10   Dehydration admission
11   Bacterial pneumonia admission
12   Urinary tract infection admission
13   Angina admission without procedure
14   Uncontrolled diabetes admission
15   Adult asthma admission
16   Lower-extremity amputation among patients with diabetes

Source: Agency for Healthcare Research and Quality, Prevention Quality Indicators.

Appendix B: Definitions of U.S. Regions

Region	States
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
Midwest	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
South	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
West	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project; and the U.S. Census Bureau.