

Associations between Hospital Characteristics and American Joint Replacement Registry Participation

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INTRODUCTION:

The American Joint Replacement Registry (AJRR) is a valuable resource for benchmarking and improving hospital quality performance. The registry allows hospitals and other medical facilities to voluntarily enroll for a fee and contribute data. The purpose of our study was to examine associations between hospital characteristics and participation in the AJRR. Our findings are valuable for increasing participation in the AJRR by targeting enrollment efforts among hospitals that are less likely to participate.

METHODS:

In this cross-sectional study, we used the list of participating hospitals from the AJRR 2024 Annual Report. We identified the Medicare Provider Number of these hospitals using the 2024 Medicare Impact File, which is a comprehensive list of acute care hospitals in the United States. We used the hospital characteristics in the Medicare Impact File for AJRR-participating and non-participating hospitals. These characteristics included region, number of beds, teaching hospital status, safety net status (quantified using Disproportionate Share Hospital Patient Percentage), urban/rural location, transfer-adjusted case mix (with higher values representing more complex patient conditions), and ownership control type. We examined differences in hospital characteristics using Chi-squared and Kruskal-Wallis tests. We examined associations between hospital characteristics and AJRR participation using logistic regression models. Future work will include ambulatory surgical centers and other stand-alone facilities participating in the AJRR.

RESULTS:

Of 3,199 acute care hospitals in the United States, 946 (29.6%) participated in the AJRR. There were significant differences in all characteristics between AJRR-participating hospitals and non-participating hospitals (Table 1). Compared to non-participants, AJRR-participating hospitals had a larger number of beds (200-399 beds: 31.5% vs. 19.6%, $p<0.001$; ≥ 400 beds: 16.0% vs. 10.3%, $p<0.001$), teaching hospital status (49.2% vs. 34.7%, $p<0.001$), urban location (88.5% vs. 72.2%, $p<0.001$), and higher transfer-adjusted case mix (1.89 vs. 1.72, $p<0.001$). AJRR-participating hospitals had lower proportions of safety-net hospitals compared to non-participating hospitals (20.4% vs. 26.7%, $p=0.001$). From the logistic regression models, hospitals were more likely to participate in the AJRR if they were: from the Northeast (Odds Ratio [95% Confidence Interval]: 1.95 [1.55, 2.44], $p<0.001$), Midwest (1.69 [1.39, 2.07], $p<0.001$), or West (1.83 [1.49, 2.25], $p<0.001$); larger with 200-399 beds (2.15 [1.80, 2.57], $p<0.001$) or ≥ 400 beds (2.07 [1.65, 2.60], $p<0.001$); teaching hospitals (1.82 [1.56, 2.12], $p<0.001$); urban (2.95 [2.37, 3.68], $p<0.001$), or hospitals with more complex patients (2.49 [2.06, 3.00], $p<0.001$) (Table 2). Safety net hospitals (0.70 [0.59, 0.84], $p<0.001$) and those with government (0.34 [0.26, 0.44], $p<0.001$) or proprietary ownership (0.51 [0.42, 0.61], $p<0.001$) were less likely to participate.

DISCUSSION AND CONCLUSION: Several characteristics indicative of greater resources (larger number of beds, teaching hospital status, and urban location) were associated with AJRR participation. Hospitals with fewer socioeconomic resources are likely underrepresented in the registry. Therefore, analyses using AJRR data may not be generalizable to all patients who undergo joint replacement. Further effort is needed to assist hospitals in participating in the AJRR, which is a promising source for rigorous and important investigations.

Table 1: Descriptive characteristics of overall sample and by AJRR participation status

Hospital Characteristics	AJRR Participating Hospitals (n=266)	Non-Participating Hospitals (n=2,253)	Overall Sample (n=3,199)	P value*
Region				
Northeast	172 (18.2%)	294 (13.0%)	466 (14.6%)	P<0.001
Midwest	246 (26.0%)	493 (21.8%)	739 (22.8%)	
South	408 (42.6%)	1,022 (45.3%)	1,430 (44.7%)	
West	220 (23.3%)	400 (17.8%)	620 (19.4%)	
Puerto Rico	0 (0%)	51 (2.3%)	51 (1.6%)	
Size (number of beds), n (%)				
Small (<200)	497 (52.5%)	1,580 (70.1%)	2,077 (64.9%)	P<0.001
Medium (200-399)	298 (31.5%)	441 (19.6%)	739 (23.1%)	
Large (≥400)	151 (16.0%)	232 (10.3%)	383 (12.0%)	
Teaching Hospital Status, n (%)	465 (49.2%)	782 (34.7%)	1,247 (39.0%)	P<0.001
Disproportionate Share Hospital Patient Percentage				
Overall n (%)	0.28 (0.13)	0.31 (0.19)	0.30 (0.17)	P<0.01
Quartile 1	239 (25.3%)	562 (24.9%)	801 (25.0%)	P<0.01
Quartile 2	258 (27.3%)	541 (24.0%)	799 (25.0%)	
Quartile 3	256 (27.1%)	548 (24.3%)	804 (25.1%)	
Quartile 4 (≥100/100)	191 (20.3%)	602 (26.7%)	793 (24.9%)	
Urban/rural location, n (%)				
Rural	109 (11.5%)	626 (27.8%)	735 (23.0%)	P<0.001
Urban	857 (88.5%)	1,627 (72.2%)	2,484 (77.0%)	
Transfer-adjusted case mix, mean (SD)	1.89 (0.38)	1.72 (0.42)	1.77 (0.42)	P<0.001
Ownership control type				
Voluntary	703 (74.3%)	1,261 (56.0%)	1,964 (61.4%)	P<0.001
Government	72 (7.5%)	384 (17.0%)	456 (14.3%)	
Proprietary	171 (18.1%)	607 (26.9%)	778 (24.3%)	
Unknown	0 (0%)	1 (0.0%)	1 (0.0%)	

*Based on Chi-squared (for categorical variables) or Kendall-Spearman (for continuous variables) testing between AJRR participating and non-participating hospitals

Table 2: Association between hospital characteristics and AJRR participation

Hospital Characteristics	Overall Sample (n=3,199)	P value
Region	REF	
South	1.95 (1.55, 2.44)	P<0.001
Midwest	1.69 (1.39, 2.07)	P<0.001
West	1.82 (1.49, 2.25)	P<0.001
Size (number of beds)	REF	
Small (<200)	2.15 (1.80, 2.57)	P<0.001
Medium (200-399)	2.07 (1.65, 2.60)	P<0.001
Large (≥400)	REF	
Teaching Hospital Status	REF	
Non-teaching hospital	1.82 (1.56, 2.12)	P<0.001
Teaching hospital	REF	
Safety net status	REF	
Non-safety net (Quartiles 1-3)	0.70 (0.59, 0.84)	P<0.001
Safety net (Quartile 4)	REF	
Urban/rural location	REF	
Rural	2.55 (2.17, 3.08)	P<0.001
Urban	2.49 (2.06, 3.00)	P<0.001
Transfer-adjusted case mix	REF	
Ownership control type	REF	
Voluntary	0.44 (0.26, 0.44)	P<0.001
Government	0.51 (0.42, 0.61)	P<0.001
Proprietary	N/A	
Unknown	N/A	