

Analyzing utilization rates of premium technologies in total knee arthroplasty between safety-net hospitals and non-safety-net hospitals

Stefan D Sarkovich, Peter C Krause, Andrew Genius Chapple, Vinod Dasa¹

¹LSU Health Sciences Center

INTRODUCTION: The objective of our study was to utilize the American Academy of Orthopaedic Surgeons (AAOS) American Joint Replacement Registry (AJRR) to investigate the association of safety-net hospital (SNH) status with the use of premium technologies in total knee arthroplasty.

METHODS:

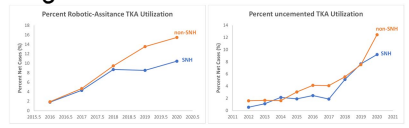
Premium technology was defined as uncemented implant fixation or surgery conducted with robotic-assistance (RA). Patients older than 18 years of age were included and subdivided into uncemented and RA cohorts. SNH status (based on disproportionate share data), patient demographics, geographical region, hospital size, and teaching affiliation were assessed. Multivariate regression analysis was performed to analyze any significant associations.

RESULTS:

A total of 862,181 TKAs between SNHs and non-SNHs were available for analysis. Based on the 2 different premium technology categories, there were 936,343 TKAs for uncemented utilization analysis and 285,920 TKAs for RA utilization analysis. SNHs were associated with lower utilization rates of uncemented TKA and RA TKA. Older patients were more likely to receive RA TKA, while conversely, they were less likely to receive uncemented TKA. Teaching hospitals were associated with significantly increased utilization of RA TKA while there was no association between teaching hospital status and the utilization of uncemented TKA.

DISCUSSION AND CONCLUSION: Trends in utilization of premium TKA technologies are not equal in hospitals with marginalized patient populations such as SNHs. The utilization of uncemented TKA is becoming increasingly common across healthcare systems suggesting a shift for uncemented TKA to becoming a standard of care in the future.

Hospital Factors	OR (CI)	P-value
SafetyNet Hospital	0.49 (0.34-0.7)	0.0001
Multiple implant manufacturers used at Hospital	0.55 (0.23-1.32)	0.179
Size: >= 400 Beds vs <100 beds	1.55 (0.97-2.47)	0.0641
Size: Between 100-399 Beds vs <100 beds	2.17 (1.45-3.1)	<0.001
Major vs non teaching Hospital	2.62 (1.59-4.31)	0.0002
Minor vs non teaching Hospital	1.52 (1.13-2.05)	0.0058
Average yearly hospital Cases (per 100)	1.02 (0.99-1.05)	0.1761
Region		
Midwest vs South	0.3 (0.18-0.48)	<0.001
Northeast vs South	22.97 (15.16-34.82)	<0.001
West vs South	1.43 (1.04-1.95)	0.0258
Surgery Year		
2013 vs 2012	0.14 (0.2527-0.3)	0.696
2014 vs 2012	0.18 (0.1029-0.3)	0.004
2015 vs 2012	0.09 (0.336-0.7)	0.6966
2016 vs 2012	0.16 (0.699-0.4)	0.6966
2017 vs 2012	0.56 (0.2078-0.7)	0.8914
2018 vs 2012	1.63 (0.6012-5.2)	0.3066
2019 vs 2012	3.22 (0.11872-7.4)	0.7799
2020 vs 2012	3.61 (0.13293-0.9)	0.7595
Patient Factors		
Female vs Male	0.94 (0.89-0.99)	0.0134
Age (per 10 year increase)	1.04 (1.01-1.08)	0.0204
Charlson comorbidity index	0.93 (0.91-0.95)	<0.001



Hospital Factors	OR (CI)	P-value
SafetyNet Hospital	1.44 (1.21-1.72)	<0.001
Multiple implant manufacturers used at Hospital	0.81 (0.47-1.38)	0.436
Size: >= 400 Beds vs <100 beds	0.79 (0.63-0.98)	0.036
Size: Between 100-399 Beds vs <100 beds	0.89 (0.75-1.06)	0.1852
Major vs non teaching Hospital	2.04 (1.57-2.65)	<0.001
Minor vs non teaching Hospital	1.09 (0.95-1.26)	0.2272
Average yearly hospital Cases (per 100)	1.03 (1.02-1.05)	<0.001
Region		
Midwest vs South	2.5 (2.13-2.93)	<0.001
Northeast vs South	2.16 (1.71-2.73)	<0.001
West vs South	1.94 (1.65-2.29)	<0.001
Surgery Year		
2013 vs 2012	1 (0.84-1.18)	0.9578
2014 vs 2012	1.51 (1.28-1.77)	<0.001
2015 vs 2012	1.17 (1.1-1.37)	0.0558
2016 vs 2012	0.72 (0.61-0.84)	<0.001
2017 vs 2012	0.82 (0.68-0.99)	0.038
2018 vs 2012	0.52 (0.43-0.64)	<0.001
2019 vs 2012	0.42 (0.34-0.52)	<0.001
2020 vs 2012	0.31 (0.25-0.39)	<0.001
Patient Factors		
Female vs Male	1.9 (1.85-1.95)	<0.001
Age (per 10 year increase)	1.7 (1.67-1.74)	<0.001
Charlson comorbidity index	1.04 (1.03-1.06)	<0.001