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Region and Insurance Plan Type Influence Discharge Disposition After Hip and Knee Arthroplasty: Evidence From the Privately Insured US Population

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ABSTRACT

Background: Little is known about regional variation in the use of postacute care services after elective procedures, such as total hip or knee arthroplasty (THA/TKA), and how insurance type may influence it. The goal of this study is to assess the influence of region and insurance arrangements on discharge disposition.
Methods: A representative sample of the privately insured US population with THA or TKA in 2009 or 2010 was obtained from the MarketScan database applying individual-level weights from the Medical Expenditure Panel Survey. Multivariate logistic regression was used to predict the odds of being discharged to an extended care facility (ECF) compared with being discharged home. The model adjusted for region, insurance plan type, sociodemographic characteristics, comorbidities, and length of stay.
Results: Large variability was observed in ECF use across the US. Patients in the Northeast were 2.5 times more likely to receive care at an ECF compared with patients in the South (odds ratio [OR] = 2.51, 95% confidence interval [CI]: 1.97-3.19). Enrollees in noncapitated plans such as fee-for-service plans or exclusive provider organizations were less likely to be discharged to an ECF compared with health maintenance organizations/preferred provider organizations with capitation enrollees (OR = 0.74, 95% CI: 0.57-0.94; OR = 0.49, 95% CI: 0.34-0.74, respectively).
Conclusion: Region and private insurance plan arrangements are related to extended care use among THA and TKA patients. Understanding regional variation in discharge disposition provides policy makers with important information as to where to focus new tests of hip and knee procedures such as same day arthroplasty.

Primary elective total hip arthroplasty (THA) and total knee arthroplasty (TKA) are among the most commonly performed surgical procedures in the United States for improving functional status [1–3]. They are highly effective at relieving debilitating symptoms and result in vast improvements in quality of life. In 2011, 466,500 persons underwent THA and 718,500 TKA [4]. The

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demand for these procedures has doubled during the last 2 decades [4,5], and it is expected to continue increasing [6]. THA and TKA together were the operations with the highest aggregate hospital costs in 2011 ($19.3 billion, which represents 11% of aggregate costs for stays with operating room procedures), followed by spinal fusion ($8 billion, 7%) [7]. Average length of stay has steadily decreased from 10 to less than 4 days during the last 20 years [7–9]. Medical advances including surgical implants and pain management, outpatient total joint arthroplasty, and the extended use of clinical pathways along with bundled payments have all contributed to shortening length of stay [7,10–13]. Accordingly, there is a limited use of hospital rehabilitation services, with a greater burden placed on postacute care such as inpatient rehabilitation facilities, long-term acute care facilities, and skilled nursing facilities (SNFs) to restore patients' functionality [10].

Evidence supports the benefits of postacute care on health status particularly among older and more medically complex patients [14,15]. Patient preferences, local physician practice culture, the level of collaboration between acute care hospitals and extended care facilities (ECF), and the ECF supply explain discharge disposition variability [16]. Geographic and health insurance-based differences in postacute care services have been documented [17–21]. In the Northeast, home professional support services, inpatient rehabilitation, and SNF use is higher than in other US regions [18,20]. However, regional variation has been explored mostly in the public sector as it is based on Medicare data. Medicare beneficiaries are more likely to be discharged to an ECF compared with those privately insured [18]. Employer-based plan enrollees have a higher utilization of postacute care services including ECF and home health than those uninsured [17,20]. The relationship between region, private insurance arrangements, and discharge disposition among this younger population remains unexplored.

The goal of this study is to assess the influence of region and private insurance arrangement on discharge disposition (differentiating between ECF and home) among a representative sample of the privately insured US population who underwent a THA or TKA in 2009 or 2010.

Methods

Data Sources

We used the Truven Health Analytics MarketScan inpatient database to identify patients who underwent THA or TKA in 2009 or 2010. This data set includes individual-level, deidentified healthcare claims from large employers and health plans across the United States. It details health services use of approximately 56 million employees, along with their spouses and dependents. Private insurance plan type is categorized into a variety of fee-for-service (FFS), preferred provider organizations, and capitated health plans.

The MarketScan database was complemented with income, SNFs occupancy rates, and number of beds. Three-digit zip code level median income was obtained from the “American Community Survey” conducted by the Census Bureau in 2011. SNF occupancy rates at the state level in 2010 were gathered from the Centers for Medicare and Medicaid Services (CMS) Nursing Home Data Compendium data. SNFs represented the large majority of ECFs in our data set. The number of rehabilitation beds was obtained from the Centers for Medicare and Medicaid Services Provider of Service data files in 2009 and 2010.

Patients who underwent an elective THA or TKA in 2009 or 2010 were included in our study sample. These procedures were identified based on diagnosis-related groups (470) and International Classification of Diseases, Ninth Revision codes (THA 81.51 and TKA 81.54) [22]. Patients with simultaneous total hip or knee replacement, partial hip replacement, revision hip or knee replacement, resurfacing procedure, or removal of malignant neoplasms or prosthesis were disregarded. Also, patients discharged against medical advice, transferred to another acute care facility, with more than 2 joint replacements, or who died at the hospital, were further excluded.

Table 1
Main Characteristics of Insurance Plans.[a]

Plan Type	Incentives to Use Particular Providers	Primary Care Physician Assignment	Out of Network Services Covered
HMO/POS with capitation[b]	Yes	Yes	Varies
EPO	Yes	Yes	No
POS without capitation	Yes	Yes	Yes
High deductible	Varies	No	Varies
PPO	Yes	No	Yes
Comprehensive	No	No	N/A

EPO, Exclusive Provider Organization; HMO, Health Maintenance Organization; POS, Point of Service; PPO, Preferred Provider Organization.
[a] Table created based on information available on MarketScan database.
[b] Partially or fully capitated.

Variables

The outcome of interest was discharge disposition, differentiating between discharged home and to an ECF. The discharged home category included patients with or without home care services. The ECF group combined patients transferred to a SNF, a Medicare-approved swing bed, an inpatient care facility, a long-term acute care center, a critical access hospital, or another facility not elsewhere classifiable.

Private insurance plan type, ordered from most to least restrictive, included Health Maintenance Organizations (HMOs)/Point of Service (POS) with capitation, Exclusive Provider Organization (EPO), POS, High Deductible, Preferred Provider Organization (PPO), and comprehensive plan. Table 1 describes the plans based on whether incentives to use particular providers exist, primary care physicians are assigned, and out of network services are covered or not. Regions of the United States were grouped into the Northeast, South, Midwest, and West according to the US Census Bureau [23].

We also adjusted for 3-digit zip code median income tertiles, gender, and age (18-34, 35-44, 45-54, and 55-64 years). The Elixhauser Index was built using the Comorbidity Software, version 3.7, provided by the Healthcare Cost and Utilization Project [24]. The number of comorbid conditions was categorized into 4 groups including 0, 1, 2-4 (both included), and more than 4 comorbidities. Diagnosed rheumatoid arthritis (DRG 545-547) or obesity (DRG 619-621), surgery type (hip or knee), and length of stay at the index admission were also accounted for in the discharge disposition model. Finally, we also controlled for the residential area of the patient (urban/rural).

Statistical Analysis

Descriptive statistics and bivariate analyses were conducted to characterize the study sample and assess differences between patients who were discharged to an ECF and those who went home. The 2 groups were compared in terms of the study variables. The Rao-Scott chi-square test was used for all categorical variables and *t* tests for continuous variables. A weighted multivariate logistic model predicting the odds of being discharged to an ECF compared with home was estimated. The interaction between insurance and region was tested to evaluate if the influence of insurance on discharge disposition varied by region.