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Total Joint Arthroplasty: Trends in Medicare Reimbursement and Implant Prices

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ABSTRACT

Total joint arthroplasty (TJA) continues to be a popular target of cost control efforts. In order to provide a unique overview of financial trends facing TJA, we analyzed Medicare databases including 100% of beneficiaries, as well as industry surveys of implant list prices. Although there was a substantial increase in TJA utilization over the period 2000–2011 (+26.9%), growth has been stagnant since 2005. New coding schemes have made complicated cases more lucrative for hospitals (+2.5% to 6.5% per year), while reimbursements for uncomplicated cases have fallen (−0.7% to −0.6%). Physician reimbursements have declined on all case types (−2.5% to −2.1% per year), while list prices of orthopedic implants have risen (+4.8% to 5.5%). These trends should be kept in mind while contemplating future changes to TJA payment.

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Total joint arthroplasty (TJA) is considered one of the most successful surgical innovations of the 20th century [1]. It is the definitive treatment for patients suffering from advanced joint degeneration due to arthritis [2]. Both total knee and total hip arthroplasties have proven extremely effective at relieving pain and improving function in a durable and cost-effective manner [3–7]. Over 800,000 total hip and knee arthroplasties are performed annually in the United States [8,9]. The prevalence of arthritis will increase as the American population continues to age and gain weight, driving demand for total joint arthroplasty to unprecedented levels [10]. Policymakers fear this will place incredible stress on the Medicare system, which is already the primary payer for more than 60% of total joint arthroplasties performed today [11].

TJA has long been in the crosshairs of Medicare for cost control [12,13]. Since the mid 1990s, researchers have been sounding the alarm about the impacts of substantial declines in per case reimbursements [14,15]. Some providers have documented success in responding to this trend through initiatives to see more patients, shorten post-operative length of stay, and negotiate lower implant costs [16–18]. As a group, however, orthopedic surgeons express increasing concerns about treating the Medicare population, as their operational costs near reimbursements [19]. In the near future, Medicare appears poised to move toward a bundled payment model, which would eliminate the current separation between hospital and physician reimbursement [20,21]. Hospitals would instead receive a single payment for each "episode of care," which they would then determine how to distribute to cover their costs, including physicians. Under this system, surgeons would theoretically be able to share in the profits gained by lowering implant costs and avoiding complications.

In this context, it is important for surgeons to understand the financial trends impacting arthroplasty today. Thus the purpose of this study was to provide an overview of trends in TJA utilization and reimbursement in the U.S. Medicare population over the past decade. To gauge trends in implant costs, we decided to track implant list prices over the same period using a comprehensive industry survey. Together this information provides a national overview of the current economic picture for TJA at the eve of significant reform initiatives.

Materials and Methods

The U.S. Medicare system is divided administratively into several parts, each of which covers specific sorts of services. When considering total joint arthroplasty, Parts A and B must both be included. Medicare's Part A "hospital insurance" will cover hospital expenses and use of a skilled nursing facility, if necessary. It will also cover the cost of surgical supplies, including necessary implants. Part B "medical insurance" will provide payments to the surgeons and anesthesiologists involved in the surgery, as well as any outpatient care required in follow-up [22]. Today each part provides payment separately.

We tracked Medicare expenditures through publically available databases released by the Centers for Medicaid and Medicare Services (CMS) encompassing 100% of patient encounters. Part A data were

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Table 1
Codes Included in the Study.

Part A Data		
Type	Complexity	DRG
Primary	− MCC	470
	+ MCC	469
Revision	− CC or MCC	468
	+ CC	467
	+ MCC	466
Part B Data		
Type	Joint	CPT
Primary	Hip	27130
	Knee	27447
Revision	Hip	27090, 27091, 27132, 27134, 27137, 27138
	Knee	27486, 27487, 27488

available for FY 2008–2011 via the MEDPAR Short Stay Inpatient by DRG Files [23]. These files were organized by diagnosis (MS-DRG v25); we included DRGs 466–470 in our study (see Table 1). Notice that these codes do not differentiate between hip and knee arthroplasty, but do include information on case complexity as well as primary/revision status. For the purposed of this study, "case complexity" is defined by Medicare's extensive list of complications and comorbidities allowing use of different DRG codes [24]. For each code, we recorded annual total discharges and reimbursements, and calculated reimbursements per case.

Part B data were available for FY 2000–2011 via the National Summary Data Files [25]. These files were organized by procedural code; we selected eleven procedures for inclusion (Table 1). These codes do not include any information on case complexity, but do include joint and primary vs. revision status. For each code, we again recorded annual total discharges and reimbursements, and calculated reimbursements per case. In order to account for growth in the Medicare population over the study period, annual utilization rates per 10,000 Medicare beneficiaries were calculated for each procedure [26].

Average implant costs were drawn from the annual industry survey conducted by Mendenhall Associates, Inc. and published in *Orthopedic Network News* [27]. The survey tracks the most popular constructs of implants from eight manufacturers representing 90% of the market, and provides averages for each category. It does not include the prices of disposable instruments, bone cement, or drill bits. We tracked the average list price of three varieties of implant over the period 2000–2011: coated (cementless) hip with poly liner, bipolar hip, and uncoated (cemented) knee.

Since data for Parts A and B were available for different time periods, we elected to present growth in payments and implant costs annually. Compound annual growth rates were calculated using the formula: [(ending value/beginning value)^(1/number of years)]. To present changes in terms of real, inflation-adjusted dollars, we made corrections using the Consumer Price Index [28].

Table 2
Medicare Volume of THA and TKA.

Case		Volume			% Change		
Type	Joint	2000	2005	2011	2000–2005	2005–2011	Overall
Primary	Hip	78,722	107,836	115,103	37.0%	6.7%	46.2%
	Knee	156,025	260,040	255,063	66.7%	−1.9%	63.5%
Revision	Hip	26,450	28,104	28,752	6.3%	2.3%	8.7%
	Knee	18,031	25,293	29,137	40.3%	15.2%	61.6%
Total		279,228	421,273	428,055	50.9%	1.6%	53.3%

Table 3
Medicare Utilization of THA and TKA.

Case		Utilization			% Change		
Type	Joint	2000	2005	2011	2000–2005	2005–2011	Overall
Primary	Hip	19.94	24.84	24.14	24.6%	−2.8%	21.1%
	Knee	39.52	59.91	53.50	51.6%	−10.7%	35.4%
Revision	Hip	6.70	6.47	6.03	−3.4%	−6.8%	−10.0%
	Knee	4.57	5.83	6.11	27.6%	4.8%	33.7%
Total		70.7	97.1	89.8	37.2%	−7.5%	26.9%

Results

In the year 2000, a total of 279,228 total joint arthroplasties were performed on the U.S. Medicare population. By 2005, this number had risen 50.9% to 421,273. Growth in procedure volume plateaued after that, peaking at 428,055 by 2011 (Table 2). The number of primary TKAs performed actually fell from 260,040 to 255,063 (−1.9%) over the period 2005–2011. Over the entire study period, the Medicare population itself grew by 20.8%, from 39.5 million to 47.7 million individuals [26]. After removing this factor by calculating utilization rates, we can still see strong growth in per capita demand for TJA in the 2000–2005 period, with only anemic growth since then (Table 3). Overall utilization rose 37.9% over the period 2000–2005, but declined by 7.5% from 2005 to 2011. The strongest growth was observed for primary TKA (+35.4%), followed closely by revision TKA (+33.7%). Slower growth was observed for primary THA (+21.1%), while declines in utilization were seen for revision THA (−10.0%). The utilization rates of all groups of procedures except revision TKA have actually declined since their peaks in 2005.

The organization of Medicare Part A data allows us to describe differences in reimbursement trends based on case complexity. Overall, reimbursements per case saw modest nominal growth between 2008 and 2011 (Table 4). When looking more closely at case complexity, and factoring in inflation, important differences emerge between groups. Real declines were seen for both primary and revision uncomplicated TJAs (−0.7% and −0.6% CAGR, respectively). In contrast, reimbursements for cases with complications or comorbidities exhibited real growth (+2.5% to +6.5% CAGR).

Medicare Part B data allow us to examine differences in reimbursement between hip and knee arthroplasty. However, reimbursement trends were similar for both joints, regardless of revision status (Table 5). Between 2000 and 2011, reimbursements per case saw small annual declines (−0.3% to 0.0% CAGR). After adjusting for inflation, these declines become more meaningful (−2.5% to −2.1% CAGR). If current trends continue to 2020, reimbursements per case would amount to 87% of their totals in 2000 (Fig. 1). For comparison, if instead Medicare had adjusted Part B payments by the annual Social Security cost of living adjustments for inflation, payments would be 167% of their values at the turn of the century.

We observed strong growth in list prices of TJA implants over the past decade. The bipolar hip, consistently the least expensive implant included in the study, listed at an average of $2,408 in 2000 and $5,916 in 2011. This increase represents an annual growth of 7.8%,

Table 4
Medicare Part A Reimbursement per Case.

Case		Reimbursement per Case		CAGR	
Type	Complexity	2008	2011	Raw	With Inflation
Primary	− MCC	$9,367	$9,484	0.3%	−0.7%
	+ MCC	$13,206	$16,898	6.4%	5.3%
Revision	− CC or MCC	$12,131	$12,332	0.4%	−0.6%
	+ CC	$13,862	$15,907	3.5%	2.5%
	+ MCC	$19,117	$25,596	7.6%	6.5%

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