HHS Public Access

Author manuscript

J Arthroplasty. Author manuscript; available in PMC 2019 February 21.

Published in final edited form as:

J Arthroplasty. 2017 October ; 32(10): 2969–2973. doi:10.1016/j.arth.2017.04.062.

The Impact of Discharge Disposition on Episode-of-Care Reimbursement After Primary Total Hip Arthroplasty

Karim G. Sabeh, MD[a,*], **Samuel Rosas, MD**[b,c], **Leonard T. Buller, MD**[a], **Martin W. Roche, MD**[b], and **Victor H. Hernandez, MD, MSc**[a]

[a]Department of Orthopaedics and Rehabilitation, University of Miami, Miami, Florida

[b]Department of Orthopedic Surgery, Orthopedic Research Institute, Holy Cross Hospital, Fort Lauderdale, Florida

[c]Department of Orthopaedic Surgery, Wake Forest Baptist Health, Winston-Salem, North Carolina

Abstract

Background: Total joint arthroplasty (TJA) accounts for more Medicare expenditure than any other inpatient procedure. The Comprehensive Care for Joint Replacement model was introduced to decrease cost and improve quality in TJA. The largest portion of episode-of-care costs occurs after discharge. This study sought to quantify the cost variation of primary total hip arthroplasty (THA) according to discharge disposition.

Methods: The Medicare and Humana claims databases were used to extract charges and reimbursements to compare day-of-surgery and 91-day postoperative costs simulating episode-of-care reimbursements. Of the patients who underwent primary THA, 257,120 were identified (204,912 from Medicare and 52,208 from Humana). Patients were stratified by discharge disposition: home with home health, skilled nursing facility, or inpatient rehabilitation facility.

Results: There is a significant difference in the episode-of-care costs according to discharge disposition, with discharge to an inpatient rehabilitation facility the most costly and discharge to home the least costly.

Conclusion: Postdischarge costs represent a sizeable portion of the overall expense in THA, and optimizing patients to allow safe discharge to home may help reduce the cost of THA.

Keywords

total hip arthroplasty; postdischarge cost; cost-effectiveness; inpatient rehabilitation facility; skilled nursing facility; home health

[*]Reprint requests: Karim G. Sabeh, MD, Department of Orthopaedics and Rehabilitation, University of Miami, 1611 NW 12th Ave, Miami, FL 33136.

Investigation was performed at the Department of Orthopaedics and Rehabilitation, University of Miami, Miami, FL.

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to http://dx.doi.org/10.1016/j.arth.2017.04.062.

Total hip arthroplasty (THA) is one of the most frequently performed procedures in the United States, and the incidence is projected to rise exponentially over the next 2 decades [1]. Despite being a cost-effective [2–4] and reliable option for regaining motion and improving lifestyle [5], the marked increase in the number of THAs performed annually will have an enormous economic impact on the health care system, which currently accounts for more Medicare expense than any other inpatient procedure [6]. The Comprehensive Care for Joint Replacement (CJR) model was developed to improve the value of total joint arthroplasty (TJA), seeking to decrease cost and improve quality of care. Previous studies have evaluated aspects of care that influence cost [1,7,8], introducing novel reduction strategies including the following: decreasing lengths-of-stay, same-day discharge with additional home physical therapy visits [9,10], quicker recovery strategies [11], multimodal pain management, and more frequent outpatient visits to help reduce the risk of readmission [12–17]. Postdischarge costs after primary THA have been frequently ignored despite being a considerable portion of the total episode payment and having significant variation between patients and procedures [18,19]. This study sought to analyze and quantify the cost variation after primary THA according to discharge disposition to either home with home health, a skilled nursing facility (SNF), or an inpatient rehabilitation facility (IRF) using both the Medicare patient record database and a private payer (Humana) claims database. We hypothesize that the episode-of-care costs for patients discharged to home after primary THA are significantly less than for those patients discharged to an SNF or IRF.

Methods

We conducted a retrospective case-control study, level of evidence III, by analyzing the Standard Analytical Files from Medicare and the Humana private payer insurance database. The Medicare Standard Analytical Files contain 100% of Medicare patients' records. Study subjects were identified through the *International Classification of Diseases, Ninth Revision*, codes. We excluded hemiarthroplasties and revision surgeries as the cost of these has been reported to vary widely compared with primary THA [20]. Patients were stratified into 3 groups according to discharge disposition: (1) home with home health, (2) SNF, or (3) IRF. Medicare database coding was only performed for the years 2011 and 2012, as prior years did not have the discharge coding of interest. Patient demographics were extracted and compared. Cost analysis was performed based on both charges and reimbursements. Reimbursements were available for both Medicare and Humana. However, charges were only available for Medicare patients. Examining the Humana database and comparing it with Medicare allows for a more accurate assessment of what hospitals are being reimbursed from private payers after THA. Moreover, the added benefit of including the Humana database is not only in having the ability to compare the difference in reimbursements between Medicare and a private payer, but also in having a greater sample size which increases the overall power of the study.

Independent analyses were performed to examine both day-of-surgery cost as well as the entire episode-of-care cost (ie, day of surgery + 90 days postoperatively) to simulate an entire episode-of-care payment as put forth by the CJR model. A reimbursement-to-charge ratio was also calculated based on charges data from the Medicare database only, while reimbursements were available from both data sets. We hypothesized that beneficiaries incur

in the same amount of charges regardless of insurance provider (Medicare or private insurance). Statistical analysis was conducted through a 1-way analysis of variance for normally distributed data. A P value <.05 was considered statistically significant. Post hoc analysis was also performed between the groups with the Tukey test. The software SPSS, version 20, (IBM, Armonk, NY) was used for statistical analysis.

Results

A cohort representative of 204,912 patients who underwent THA between 2011 and 2012 was identified within the Medicare database. An additional 52,208 patients who underwent primary THA were identified through the Humana data set between 2007 and 2015 (Table 1).

Medicare Charges

For Medicare patients, the mean day-of-surgery charges varied significantly ($P < .001$) between the 3 discharge disposition locations: $55,246 for patients discharged to home, $58,702 for patients discharged to an SNF, and $63,636 for patients discharged to an IRF. Comparably, the episode-of-care charges showed a similar trend: $61,972 for discharge to home, $70,163 to SNF, and $99,627 to IRF (Table 2).

Medicare Reimbursements

Among Medicare patients, average day-of-surgery reimbursement varied significantly ($P < .01$) when compared between discharge dispositions (Table 3). Patients discharge to home had a reimbursement mean of $10,171 (standard deviation [SD], $25), which was significantly less than either discharge to an SNF $11,855 (SD, $46) or to an IRF $12,293 (SD, $7; $P < .05$). Discharge to an SNF was also significantly less costly than discharge to an IRF ($P < .05$). Episode-of-care reimbursements (day of surgery + 90 days post-operatively) varied significantly as well ($P < .001$) between the different discharge dispositions (Table 3). Discharge to home was reimbursed at a mean of $11,592 (SD, $33), $14,544 (SD, $215) to an SNF, and $25,284 (SD, $524) to an IRF. Post hoc analysis demonstrated that discharge to home was significantly less costly than discharge to an SNF or IRF ($P < .05$ for both), and that SNF remained significantly less costly than IRF ($P < .05$).

Private Payer Insurance (Humana) Reimbursements

Among the private payer data set, the mean day-of-surgery reimbursement for patients discharged to home was $15,848 (SD, $760), which was not significantly different than those discharged to an SNF $15,218 (SD, $1063; $P = .29$). In contrast, the mean day-of-surgery reimbursement for patients discharged to an IRF was $17,889 (SD, $1670), which was significantly higher than discharge to either home or an SNF ($P < .05$ for both). Episode-of-care reimbursements (day of surgery + 90 days postoperatively) also varied significantly between the 3 groups (Table 4). The mean reimbursement for patients discharged to home was $20,838 (SD, $746), which was significantly less than those discharged to an SNF $26,643 (SD, $1080; $P < .01$), or those discharged to an IRF $31,483 (SD, $2263; $P < .01$). Post hoc analysis also demonstrated that patients discharged to an

SNF had significantly lower reimbursements overall compared with patients discharged to an IRF ($P < .01$).

Reimbursements-to-Charge Ratio

Within the Medicare data set, the reimbursement-to-charge ratio for day-of-surgery was 49% for patients discharged to home, 44% for patients discharged to an SNF, and 39% for patients discharged to an IRF. The reimbursement-to-charge ratio for day-of-surgery in the Humana database was 76% for patients discharged to home, and 57% for both SNF and IRF. The reimbursement-to-charge ratio for the episode of care (day of surgery + 90 days postoperatively) among Medicare patients was 19% for patients discharged to home, 21% for patients discharged to an SNF, and 25% for those discharged to an IRF. The reimbursement-to-charge ratio for the episode of care in the Humana data set, was 32% for patients discharged to an IRF, 34% for patients discharged to home, and 38% for patients discharged to an SNF (Table 5).

Discussion

The number of THAs performed annually is predicted to increase exponentially over the next 2 decades [1]. Although THA is a cost-effective procedure, it represents a sizable portion of overall health care expenditure in the United States [6]. Efforts to contain cost without compromising quality by the Center for Medicare and Medicaid Services include the Bundled Payment for Care Improvement initiative and the CJR model [21,22]. Lavernia et al [23] demonstrated that cost associated with THA can be divided into 4 categories: preoperative, intraoperative, immediate post-operative, and postdischarge. Examples of cost in the preoperative phase include time lost from work, physician visits, medical optimization, physical therapy sessions, and imaging costs [24]. Intraoperatively, cost-effectiveness studies have focused on improving surgical techniques, decreasing duration of surgery, and reducing implant cost [25–28]. Postoperative cost analyses have mainly focused on the cost of complications requiring emergency room visits, medical workup, readmissions, and revision surgery [17,29,30].

Within the postdischarge costs, the cost associated with various discharge dispositions after primary THA has received limited attention [31,32], despite being a large portion of the overall bundle. The results of this study demonstrate a significant difference in the day-of-surgery and the entire episode-of-care (day of surgery + 90 days postoperative) costs between different discharge dispositions. There is a significant increase in both day of surgery and 90-day postoperative cost when patients are discharged to an IRF or an SNF, compared with discharge to home, with discharge to an IRF being the most costly. This study found the 90-day global period reimbursements among patients discharged to an IRF were 151% (mean, $31,483) of those who were discharged home (mean, $20,838), and 118% of those who were discharged to an SNF (mean, $26,643). Our cost findings are similar to data published by Bozic et al [33], who reported THA cost an average of $24,170.

Appreciating the financial impact of postoperative cost, Slover et al [34] performed a cost analysis study to evaluate strategies for minimizing after-care costs after TJA and concluded that the cost of additional acute care hospital days was relatively small compared with an

extended postacute IRF stay. By keeping patients in the hospital a few extra days and then discharging them directly to home, they decreased overall costs when compared with discharge after a shorter hospital stay to an expensive postacute care facility. There is a fine balance in the optimal duration of stay; however, as the same group also published an article identifying length of stay >4 days was a significant risk factor for unplanned readmission within 90 days in a Medicare population [35]. Although the ideal inpatient length of stay remains unclear, the cost savings associated with discharge to home, as opposed to an IRF or SNF are clear, and some studies suggest that there is no impact on patient outcomes [36].

This study sought to identify the influence of discharge disposition on 90-day costs after primary THA. We did not assess the influence of discharge disposition specifically on postoperative outcomes or complications, which should be the subject of future studies. Perhaps the most relevant of these postoperative outcomes, in terms of financial impact and impact on the patient, is readmission. Prior studies have evaluated this topic and found that discharge to a higher level of care is associated with a higher rate of readmissions [37]. Along this line, readmissions are a huge cost driver, with medical- and procedural-related readmissions costing an average of $11,682 and $27,979, respectively [29] A study by Kurtz et al [38] also identified readmission as a primary cost driver and concluded that nearly half of the total annual economic burden in the United States for readmissions after TJA was for a medical reason and unrelated to the joint arthroplasty procedure. Preoperatively identifying variables associated with increased cost can improve care pathways and perioperative optimization, particularly in the era of bundled payments. Using the results of this study, hospital systems may justify expenditures on more aggressive preoperative optimization of high-cost comorbidities, which has the potential of reducing the overall cost and risk of postoperative complications.

Another strategy to reduce cost may be outpatient primary THA. Goyal et al [39], demonstrated that there was no significant difference in complication rates after outpatient primary THA compared with conventional THA, suggesting that the procedure can be performed safely in well-selected patients with reduced cost. Similarly, Iorio et al [40] suggested that perioperative optimization and selection of ideal outpatient candidates can result in economic savings in a bundle payment model. Slover [41], directed the attention to including postdischarge costs in the bundle as it is a considerable portion of the costs after THA and further demonstrated the value of the 90-day cost studies. Although this topic remains controversial, our findings offer additional data to help improve such cost-effectiveness studies [41–44]. The results of this study also demonstrate that reimbursement-to-charge ratios vary significantly by payer. Reimbursements for Medicare patients discharged to an IRF were 25% of the charges, while the reimbursements for patients with a private payer insurance were 32% of the charges. Similarly, reimbursements for Medicare patients discharged to an SNF were 21% of the charges, while the reimbursements for patients with a private insurance were 38%. These differences confirm the notion that there is a significant discrepancy in the reimbursement patterns. Although there is paucity of information in the literature discussing the discrepancy between charges and reimbursements [45], our analysis does not provide sufficient evidence to make any meaningful conclusions on this highly controversial topic. However, we hope that these preliminary data encourage future investigation of this topic.

Despite the strengths of using large, national databases for epidemiologic research [46], our study has several limitations. Like all large databases, the data used in this study are subject to coding error or error in data entry [47]. Certain patient factors, such as comorbidities, were not analyzed, which have been shown to impact the cost of THA [19]. Nonetheless, the comprehensive analysis of the most common payer for THA (Medicare) and a nationwide payer (Humana) provide the literature with a large sample size with concomitant data on costs that are currently of limited availability in the literature.

In conclusion, this study elucidates the postdischarge cost variation among patients undergoing primary THA based on discharge disposition. Patients who are discharged to IRFs incur significantly higher costs than patients discharged to home. Furthermore, reimbursements remain considerably lower than charges, and reimbursements from a private payer are higher than that of Medicare.

References

[1]. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. J Bone Joint Surg Am 2007;89:780–5. [PubMed: 17403800]

[2]. Laupacis A, Bourne R, Rorabeck C, Feeny D, Wong C, Tugwell P, et al. The effect of elective total hip replacement on health-related quality of life. J Bone Joint Surg Am 1993;75:1619–26. [PubMed: 8245054]

[3]. Lavernia CJ, Drakeford MK, Tsao AK, Gittelsohn A, Krackow KA, Hungerford DS. Revision and primary hip and knee arthroplasty. A cost analysis. Clin Orthop Relat Res 1995:136–41.

[4]. Lavernia CJ, Iacobelli DA, Brooks L, Villa JM. The cost-utility of total hip arthroplasty: earlier intervention, improved economics. J Arthroplasty 2015;30:945–9. [PubMed: 25865813]

[5]. Learmonth ID, Young C, Rorabeck C. The operation of the century: total hip replacement. Lancet 2007;370:1508–19. [PubMed: 17964352]

[6]. Hawker GA, Badley EM, Croxford R, Coyte PC, Glazier RH, Guan J, et al. A population-based nested case-control study of the costs of hip and knee replacement surgery. Med Care 2009;47:732–41. [PubMed: 19536034]

[7]. Kowalik TD, DeHart M, Gehling H, Gehling P, Schabel K, Duwelius P, et al. The epidemiology of primary and revision total hip arthroplasty in teaching and nonteaching hospitals in the United States. J Am Acad Orthop Surg 2016;24: 393–8. [PubMed: 27213623]

[8]. Kurtz S, Mowat F, Ong K, Chan N, Lau E, Halpern M. Prevalence of primary and revision total hip and knee arthroplasty in the United States from 1990 through 2002. J Bone Joint Surg Am 2005;87:1487–97. [PubMed: 15995115]

[9]. Keswani A, Beck C, Meier KM, Fields A, Bronson MJ, Moucha CS. Day of surgery and surgical start time affect hospital length of stay after total hip arthroplasty. J Arthroplasty 2016;31:2426–31. [PubMed: 27491449]

[10]. Kramer JF, Speechley M, Bourne R, Rorabeck C, Vaz M. Comparison of clinic- and home-based rehabilitation programs after total knee arthroplasty. Clin Orthop Relat Res 2003:225–34.

[11]. Okamoto T, Ridley RJ, Edmondston SJ, Visser M, Headford J, Yates PJ. Day-of-surgery mobilization reduces the length of stay after elective hip arthroplasty. J Arthroplasty 2016;31:2227–30. [PubMed: 27209333]

[12]. Keswani A, Tasi MC, Fields A, Lovy AJ, Moucha CS, Bozic KJ. Discharge destination after total joint arthroplasty: an analysis of postdischarge outcomes, placement risk factors, and recent trends. J Arthroplasty 2016;31:1155–62. [PubMed: 26860962]

[13]. L'Hommedieu CE, Gera JJ, Rupp G, Salin JW, Cox JS, Duwelius PJ. Impact of anterior vs posterior approach for total hip arthroplasty on post-acute care service utilization. J Arthroplasty 2016;31:73–7. [PubMed: 27460301]

[14]. Newman JM, Szubski CR, Barsoum WK, Higuera CA, Molloy RM, Murray TG. Day of surgery affects length of stay and charges in primary total hip and knee arthroplasty. J Arthroplasty 2016.

[15]. Parcells BW, Giacobbe D, Macknet D, Smith A, Schottenfeld M, Harwood DA, et al. Total joint arthroplasty in a stand-alone ambulatory surgical center: short-term outcomes. Orthopedics 2016;39:223–8. [PubMed: 27111079]

[16]. Petis SM, Howard JL, Lanting BA, Marsh JD, Vasarhelyi EM. In-hospital cost analysis of total hip arthroplasty: does surgical approach matter? J Arthroplasty 2016;31:53–8. [PubMed: 26387922]

[17]. Shearer DW, Youm J, Bozic KJ. Short-term complications have more effect on cost-effectiveness of THA than implant longevity. Clin Orthop Relat Res 2015;473:1702–8. [PubMed: 25560958]

[18]. Lavernia CJ, D'Apuzzo MR, Hernandez VH, Lee DJ, Rossi MD. Postdischarge costs in arthroplasty surgery. J Arthroplasty 2006;21:144–50.

[19]. Bozic KJ, Ward L, Vail TP, Maze M. Bundled payments in total joint arthroplasty: targeting opportunities for quality improvement and cost reduction. Clin Orthop Relat Res 2014;472:188–93. [PubMed: 23649225]

[20]. Hopley C, Stengel D, Ekkernkamp A, Wich M. Primary total hip arthroplasty versus hemiarthroplasty for displaced intracapsular hip fractures in older patients: systematic review. BMJ 2010:340.

[21]. Boettcher WG. Total hip arthroplasties in the elderly. Morbidity, mortality, and cost effectiveness. Clin Orthop Relat Res 1992:30–4.

[22]. Salmon P, Hunt GR, Murthy BV, O'Brien S, Beverland D, Lynch MC, et al. Patient evaluation of early discharge after hip arthroplasty: development of a measure and comparison of three centres with differing durations of stay. Clin Rehabil 2013;27:854–63. [PubMed: 23543343]

[23]. Lavernia CJ, Hernandez VH, Rossi MD. Payment analysis of total hip replacement. Curr Opin Orthop 2007;18:23–7.

[24]. Plate JF, Brown ML, Wohler AD, Seyler TM, Lang JE. Patient factors and cost associated with 90-day readmission following total hip arthroplasty. J Arthroplasty 2016;31:49–52. [PubMed: 26278485]

[25]. Antoniou J, Martineau PA, Filion KB, Haider S, Zukor DJ, Huk OL, et al. Inhospital cost of total hip arthroplasty in Canada and the United States. J Bone Joint Surg Am 2004;86-a:2435–9. [PubMed: 15523015]

[26]. Bozic KJ, Wagie A, Naessens JM, Berry DJ, Rubash HE. Predictors of discharge to an inpatient extended care facility after total hip or knee arthroplasty. J Arthroplasty 2006;21:151–6.

[27]. Gholson JJ, Pugely AJ, Bedard NA, Duchman KR, Anthony CA, Callaghan JJ. Can we predict discharge status after total joint arthroplasty? A calculator to predict home discharge. J Arthroplasty 2016;31:2705–9. [PubMed: 27663191]

[28]. Keswani A, Weiser MC, Shin J, Lovy AJ, Moucha CS. Discharge destination after revision total joint arthroplasty: an analysis of postdischarge outcomes and placement risk factors. J Arthroplasty 2016;31:1866–1872.e1861. [PubMed: 27172864]

[29]. Clair AJ, Evangelista PJ, Lajam CM, Slover JD, Bosco JA, Iorio R. Cost analysis of total joint arthroplasty readmissions in a Bundled Payment Care Improvement initiative. J Arthroplasty 2016;31:1862–5. [PubMed: 27105556]

[30]. Hackett DJ, Rothenberg AC, Chen AF, Gutowski C, Jaekel D, Tomek IM, et al. The economic significance of orthopaedic infections. J Am Acad Orthop Surg 2015;23(Suppl):S1–7. [PubMed: 25808964]

[31]. Coyte PC, Young W, Croxford R. Costs and outcomes associated with alternative discharge strategies following joint replacement surgery: analysis of an observational study using a propensity score. J Health Econ 2000;19:907–29. [PubMed: 11186851]

[32]. Inneh IA, Clair AJ, Slover JD, Iorio R. Disparities in discharge destination after lower extremity joint arthroplasty: analysis of 7924 patients in an urban setting. J Arthroplasty 2016;31:2700–4. [PubMed: 27378643]

[33]. Bozic KJ, Katz P, Cisternas M, Ono L, Ries MD, Showstack J. Hospital resource utilization for primary and revision total hip arthroplasty. J Bone Joint Surg Am 2005;87:570–6. [PubMed: 15741624]

[34]. Slover JD, Mullaly KA, Payne A, Iorio R, Bosco J. What is the best strategy to minimize after-care costs for total joint arthroplasty in a bundled payment environment? J Arthroplasty 2016;31:2710–3. [PubMed: 27344351]

[35]. Williams J, Kester BS, Bosco JA, Slover JD, Iorio R, Schwarzkopf R. The association between hospital length of stay and 90-day readmission risk within a total joint arthroplasty bundled payment initiative. J Arthroplasty 2016;31: 2741–5. [PubMed: 27350022]

[36]. Mahomed NN, Davis AM, Hawker G, Badley E, Davey JR, Syed KA, et al. Inpatient compared with home-based rehabilitation following primary unilateral total hip or knee replacement: a randomized controlled trial. J Bone Joint Surg Am 2008;90:1673–80. [PubMed: 18676897]

[37]. Bini SA, Fithian DC, Paxton LW, Khatod MX, Inacio MC, Namba RS. Does discharge disposition after primary total joint arthroplasty affect readmission rates? J Arthroplasty 2010;25:114–7. [PubMed: 19150214]

[38]. Kurtz SM, Lau EC, Ong KL, Adler EM, Kolisek FR, Manley MT. Which clinical and patient factors influence the national economic burden of hospital readmissions after total joint arthroplasty? Clin Orthop Relat Res 2017 10.1007/s11999-017-5244-6.

[39]. Goyal N, Chen AF, Padgett SE, Tan TL, Kheir MM, Hopper RH, Jr, et al. Otto Aufranc Award: a multicenter, randomized study of outpatient versus inpatient total hip arthroplasty. Clin Orthop Relat Res 2016;475:364–72.

[40]. Iorio R, Clair AJ, Inneh IA, Slover JD, Bosco JA, Zuckerman JD. Early results of Medicare's bundled payment initiative for a 90-day total joint arthroplasty episode of care. J Arthroplasty 2016;31:343–50. [PubMed: 26427938]

[41]. Slover JD. You want a successful bundle: what about post-discharge care? J Arthroplasty 2016;31:936–7. [PubMed: 27036924]

[42]. Lovecchio F, Alvi H, Sahota S, Beal M, Manning D. Is outpatient arthroplasty as safe as fast-track inpatient arthroplasty? A propensity score matched analysis. J Arthroplasty 2016;31:197–201. [PubMed: 27378634]

[43]. Nichols CI, Vose JG. Clinical outcomes and costs within 90 days of primary or revision total joint arthroplasty. J Arthroplasty 2016;31: 1400–1406.e1403. [PubMed: 26880328]

[44]. Otero JE, Gholson JJ, Pugely AJ, Gao Y, Bedard NA, Callaghan JJ. Length of hospitalization after joint arthroplasty: does early discharge affect complications and readmission rates? J Arthroplasty 2016;31: 2714–25. [PubMed: 27600301]

[45]. Tokarski AT, Deirmengian CA, Lichstein PM, Austin MS, Deirmengian GK. Medicare fails to compensate additional surgical time and effort associated with revision arthroplasty. J Arthroplasty 2015;30:535–8. [PubMed: 25468783]

[46]. Bohl DD, Basques BA, Golinvaux NS, Baumgaertner MR, Grauer JN. Nationwide inpatient sample and national surgical quality improvement program give different results in hip fracture studies. Clin Orthop Relat Res 2014;472: 1672–80. [PubMed: 24615426]

[47]. Memtsoudis SG. Limitations associated with the analysis of data from administrative databases. Anesthesiology 2009;111:449 author reply 450–1. [PubMed: 19625813]

Table 1

Demographic Description of Patients.

Humana Demographics	SNF	Home	In-Patient Rehab
25–29	0	29	0
30–34	0	77	0
35–39	14	130	12
40–44	48	271	27
45–49	135	673	50
50–54	364	1408	115
55–59	721	2164	175
60–64	1215	2759	288
65–69	3380	6311	611
70–74	4385	5950	696
75–79	4491	3861	626
80–84	3665	1854	486
85–89	1287	372	115
90	1388	235	261
Midwest	6887	6224	657
Northeast	542	748	122
South	11,473	16,156	2353
West	1876	2561	325
Total	20,778	25,689	3457
Medicare Demographics	**SNF**	**Home**	**In-Patient Rehab**
<65	7280	11,350	3276
65–69	14,208	28,750	4962
70–74	16,221	22,015	5431
75–79	18,181	14,820	5894
80–84	17,479	7558	5483
85	12,534	2467	4698
Midwest	25,477	18,076	5344
Northeast	18,860	15,350	8716
South	27,142	37,050	12,414
West	14,176	16,225	3205
Female	60,159	47,603	20,122
Male	25,485	39,075	9557
2011	42,567	42,309	15,388
2012	44,249	45,811	14,588
Total patients	86,816	88,120	29,976

Rehab, rehabilitation; SNF, skilled nursing facility.

Table 2

Comparison Between Day-of-surgery and Episode-of-care Charges to Medicare Following Primary THA per Discharge Disposition.

	SNF	Home	IRF
Day of surgery charges to Medicare ($)			
Average charge	58,702	55,246	63,636
Median charge	49,961	48,495	54,796
Episode-of-care charges to Medicare ($)			
Average charge	70,163	61,972	99,627
Median charge	55,294	51,894	82,177

IRF, inpatient rehabilitation facility; SNF, skilled nursing facility.

Table 3

Comparison Between Day-of-surgery and Episode-of-care Reimbursements by Medicare Following Primary THA per Discharge Disposition.

	SNF	Home	IRF
Mean day-of-surgery reimbursements by Medicare ($)			
2011	11,822	10,189	12,288
2012	11,887	10,153	12,298
Mean	11,855	10,171	12,293
SD	46	25	7
Mean episode-of-care reimbursements (day of surgery + 90 d postoperatively) by Medicare ($)			
2011	14,393	11,569	24,914
2012	14,696	11,615	25,655
Mean	14,545	11,592	25,284
SD	215	33	524

IRF, inpatient rehabilitation facility; SD, standard deviation; SNF, skilled nursing facility

Table 4

Humana Reimbursements

Mean Day-of-Surgery Reimbursements by Humana			
Mean Per Surgery	**SNF ($)**	**Home ($)**	**IRF ($)**
Total reimbursement	322,182,642	415,878,420	62,036,144
2007	16,329	17,253	19,584
2008	16,707	16,066	19,403
2009	16,212	15,923	18,644
2010	15,711	15,922	17,145
2011	14,850	15,403	16,830
2012	14,687	15,217	16,869
2013	14,525	15,386	18,017
2014	14,396	15,611	16,623
2015	13,548	14,455	14,177
Mean	15,218	15,848	17,889
SD	1063	760	1670
Mean Episode-of-Care Reimbursements by Humana			
Mean Per Surgery	**SNF ($)**	**Home ($)**	**In-Patient Rehab ($)**
Total reimbursement	576,191,630	554,466,826	111,517,838
2007	25,083	22,361	31,144
2008	27,310	20,947	31,294
2009	27,233	21,327	33,643
2010	27,643	21,197	33,340
2011	27,324	20,412	33,556
2012	27,045	20,440	32,296
2013	26,853	20,254	32,054
2014	26,752	20,799	29,303
2015	24,541	19,806	26,721
Mean	26,643	20,838	31,483
SD	1080	746	2263

Total reimbursement is subject to differences in sample size between the 3 groups. IRF, inpatient rehabilitation facility; Rehab, rehabilitation; SD, standard deviation; SNF, skilled nursing facility.

Table 5

Reimbursement-to-Charge Ratios.

THA Episode-of-Care Cost	SNF	Home	IRF
Mean charges for primary THA ($)	70,163	61,972	99,627
Mean reimbursements from Medicare ($)	14,545	11,592	25,284
Mean reimbursements from Humana ($)	26,643	20,838	31,483
Percentage reimbursed from Medicare	21	19	25

Mean charges and reimbursements data include day of surgery + 91-d postoperative global period.

IRF, inpatient rehabilitation facility; SNF, skilled nursing facility; THA, total hip arthroplasty