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# The Effect of a Discharge Disposition Algorithm on Patient Outcomes and Satisfaction

Jessica L. Heligman

Total joint arthroplasties are one of the most common procedures performed in the United States. As changes have occurred in the surgical techniques of these procedures, postoperative recovery time has decreased and patients have been able to safely transition to home rather than a post–acute care facility. The demand for total joint arthroplasty (TJA) is expected to grow 44% as the prevalence of lower extremity osteoarthritis continues to rise (Sher et al., 2017) because of an aging baby boomer population. In the next 20 years, it is expected that the demand for total hip arthroplasty will grow by 174% and demand for total knee arthroplasty will grow by as much as 670% (Napier et al., 2013). An area with high variability in the postoperative period is in postdischarge rehabilitation. Post–acute inpatient care can account for up to 36% of the bundled costs of a TJA. There is a lack of evidence that patients recover better or have decreased complications by transitioning to an inpatient rehabilitation setting compared with transitioning to home. The aims of this literature search were to (a) identify the safest discharge disposition for patients following TJA; (b) determine the rate of complications and readmissions among those discharged to skilled nursing facility, inpatient rehabilitation unit, and home; and (c) explore how specified care pathways affect patient expectations and outcomes. The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, ProQuest, and Cochrane were searched using the following key terms: discharge disposition, total joint arthroplasty, joint replacement, hip arthroplasty, knee arthroplasty, care pathway, discharge outcomes and readmissions, discharge protocols, and discharge algorithms. Five key themes emerged. Patients with significant comorbidities may require longer length of stay in the hospital or potentially discharge to a facility, discharge to facility associated with high rate of complications, setting patient expectations increases likelihood of discharge home, discharge to inpatient facilities does not improve outcomes, and discharge to any post–acute care facility is more expensive than discharge to home. This review identified themes in postoperative care of TJA patients that can be utilized to create a discharge disposition algorithm using best practices to stratify patients into the appropriate discharge disposition while setting appropriate expectations for patients undergoing these procedures to ensure high levels of patient satisfaction following these procedures.

Total joint arthroplasties are one of the most common procedures performed in the United States. As changes have occurred in the surgical techniques of these procedures, postoperative recovery time has decreased and the necessity of patients recovering in a post–acute care center such as a nursing home or acute rehabilitation center has all but dissipated. Unfortunately, patient education regarding this matter has lagged and patients still anticipate being discharged to facilities despite no evidence supporting this discharge plan for most patients.

## Background and Significance

Severe arthritis affects more than 15% of the population and projections predict that the prevalence will increase to 20% over the next decade (Bashinskaya et al., 2012). Total joint arthroplasty (TJA) has been accepted as a reliable and safe procedure that can improve the quality of life of those affected by severe osteoarthritis (Sikora-Klak et al., 2017). The demand for TJA was expected to grow 44% by 2020 as the prevalence of lower extremity osteoarthritis continued to rise (Sher et al., 2017) because of an aging baby boomer population. In the next 20 years, it is expected that the demand for total hip arthroplasty (THA) will grow by 174% and demand for total knee arthroplasty (TKA) will grow by as much as 670% (Napier et al., 2013). Between the years of 1993 and 2009, the rate of THA ranged between 260,200 and 436,700 per year and the rate of TKA ranged from 279,101 to 680,839 per year.

The introduction of the Comprehensive Care for Joint Replacement (CJR) program by Medicare has led to

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The author has disclosed no conflicts of interest.

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DOI: 10.1097/NOR.0000000000000753

increased attention on decreasing costs and length of stay for elective TJA patients (Bashinskaya et al., 2012). The CJR program has led to hospitals focusing on decreasing the cost of episode of care by decreasing postoperative complications and seeking alternative discharge dispositions other than to skilled nursing facilities and acute rehabilitation centers. The increased goal of discharge to home is further amplified by studies demonstrating that there is a statistically significant increase in risk in postoperative complications when patients are discharged to inpatient rehabilitation facilities (Fu et al., 2017; Keswani et al., 2016; McLawhorn et al., 2017).

An area with high variability in the postoperative period is in postdischarge rehabilitation. Post–acute inpatient care can account for up to 36% of the bundled costs of a TJA. There is a lack of evidence that patients recover better or have decreased complications by transitioning to an inpatient rehabilitation setting compared with transitioning to home. In fact, patients discharged to these facilities are 1.9 times more likely to be readmitted to the hospital in the 30 days following discharge (Fu et al., 2017). Keswani et al. (2016) found that rates of serious and minor adverse events were higher in patients discharged to a facility rather than home, and discharge to a facility was an independent predictor of 90-day readmission after TJA.

Although there may be patients who exhibit true needs for placement in these facilities, this disposition is often seen in patients who do not require such intensive services and would recover more successfully at home. The goal of investigating this practice problem is to determine whether increasing the percentage of patients discharged home would also decrease postoperative complications and increasing patient satisfaction with the discharge process. By creating a discharge disposition algorithm, patients would be aware of criteria that must be met for discharge to a facility and would prepare patients for the likelihood of their discharge home. Furthermore, this algorithm could be used to ensure that patients who were not recovering well in the immediate postoperative period were identified and given the option to transition to a facility for safe discharge.

*PICO question*: In patients undergoing TJA (population), what is the effect of a discharge disposition algorithm (intervention) compared with discharge preintervention (comparative intervention) 30-day postoperative complications and patient readiness for discharge (outcomes)?

## Aims

The current trend in TJA care is for shorter lengths of stay than were seen historically. Previously, patients were admitted to the hospital for weeks with discharge to acute care facility. This change in practice has led to a higher rate of patients being discharged home. Patient expectations have yet to catch up with current practice and this often leads to incongruities in patient expectations what is best practice for the population. The aims of this literature search were to (a) identify the safest discharge disposition for patients following TJA; (b) determine the rate of complications and readmissions among those discharged to skilled nursing facility, inpatient rehabilitation unit, and home; and (c) explore how specified care pathways affect patient expectations and outcomes.

## Methods

The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, ProQuest, and Cochrane were searched using the following key terms: discharge disposition, total joint arthroplasty, joint replacement, hip arthroplasty, knee arthroplasty, care pathway, discharge outcomes and readmissions, discharge protocols, and discharge algorithms. The Medicare CJR program was implemented in 2016; therefore, only full-text peer-reviewed articles written in English and published between 2013 and 2018, in English, were considered for this review. One additional article was included that was published in 2011 due to its relevance to the topic.

The search yielded 3,654 articles. Many articles needed to be removed because of focusing on surgeries other than TJA. Additional articles were removed because of being related to perioperative practices and various enhanced recovery protocols that did not focus on discharge disposition postoperatively. An additional manual search was conducted by reviewing the reference list in the articles chosen. Two additional articles were included that were identified by a secondary review of references in the chosen articles. A total of 22 articles were included in the literature review (see Figure 1).

Of the 22 articles, 17 were retrospective cohort studies, there was one observational study, two prospective cohort studies, one comparative cohort study, and a systematic review. Hansen et al. (2015) included the Risk Assessment Predictor Tool to determine how to best predict discharge disposition. Edusei et al. (2017) evaluated the effect of social support on discharge disposition by using the MOS-SSS (Medical Outcomes Study Social Support Expectation Score) scale. Four of the studies (Featherall et al., 2018; Froemke et al., 2015; Kee et al., 2017; Pelt et al., 2018) evaluated patient outcomes after the implementation of a care pathway for TJA patients and one study evaluated an educational pilot for both providers and patients to determine whether there was an impact on length of stay and outcomes.

Five key themes emerged. Patients with significant comorbidities may require longer length of stay in the hospital or potentially discharge to a facility, discharge to facility associated with high rate of complications, setting patient expectations increases likelihood of discharge home, discharge to inpatient facilities does not improve outcomes, and discharge to any post–acute care facility is more expensive than discharge to home. Below is a summary of the literature reviewed including the study design, aim of the study, and significant findings as it pertains to the clinical question (see Table 1).

## Results

### Patients With Significant Comorbidities May Require Longer Hospital Stay or Discharge to Facility

Sher et al. (2017) found in a retrospective review of data obtained from the National Surgical Quality Improvement Program (NSQUIP) database that patients older than 80 years or with a history of tobacco use, bleeding disorders, serious adverse events prior to

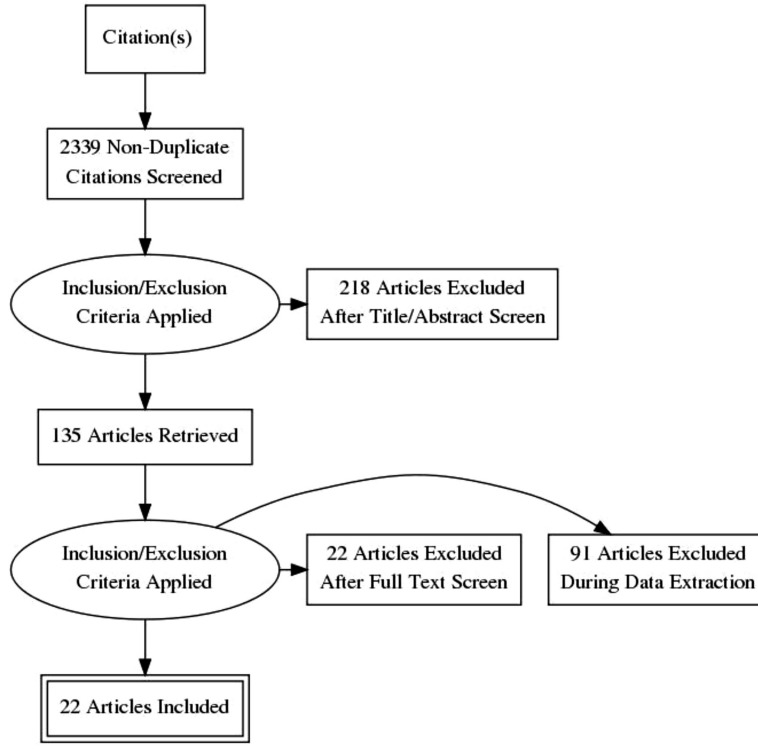


**Figure 1.** The process in a PRISMA flowchart.

discharge, or an American Society of Anesthesiologists (ASA) score of 3 or 4 had a statistically significant increased risk of postoperative complications. These findings were similar to those of Crawford et al. (2011), who also found increased risk for complications in patients with ASA scores of 3 or 4 and in patients with advanced age. Tarity and Swall (2017) also found smoking to be associated with higher risk of postoperative complications; however, Sikora-Klak et al. (2017) did not find higher rates of complications or readmission with this demographic.

Advanced age of more than 75 years as an independent predictor of discharge to a nonhome destination has also been echoed by multiple other studies (Courtney et al., 2017; Sikora-Klak et al., 2017; Tarity & Swall, 2017). Hansen et al. (2015) found that patients with a Risk Assessment Prediction Tool (RAPT) score of 0–6 could be predicted to transition to a facility other than home at the time of discharge from the hospital due to increased functional dependence and advanced age. Patients with intermediate scores of 7–10 were harder to predict discharge disposition; however, this study suggests that patients with preadmission RAPTs of less than 6 should be offered facility placement unless significant support mechanisms are in place for the patients to safely transition home.

The RAPT was originally developed by an orthopaedic surgeon named Dr. Leonie Oldmeadow. This was done with the intention of creating a tool to help stratify patients undergoing elective joint arthroplasty into their appropriate discharge disposition. The tool utilizes the risk factors of age, social support, gender, preoperative activity level, preoperative use of community support, and preoperative use of an ambulation aid to determine their disposition (Oldmeadow, 2001). The study by Hansen et al. (2015) illustrates this tool's appropriateness in determining discharge disposition.

## Discharge to Facility Associated With High Rate of Complications

Fu et al. (2017) evaluated patients retrospectively after unilateral THA and found that complication rates for patients discharged to facility were significantly higher than for those who were discharged to home (5.5% vs. 2.9%; $p < .001$). Rate of readmission and mortality was also higher in patients discharged to facility (5.4% vs. 2.8%, $p < .001$; 0.1% vs. 0.0%, $p < .001$, respectively). McLawhorn et al. (2017) evaluated a similar sample size of patients following TKA and found similar results. The risk of any postoperative complication after discharge was 4.33% in patients discharged to facility compared with 2.72% of patients discharged home ($p < .001$). Major complications following discharge to facility were 3.05% vs. 1.83% in patients discharged home. This illustrates similar outcomes for all TJA patients.

Gholson et al. (2016) conducted a similar study using the same database but included all patients undergoing primary TJA and found that 30-day mortality was 10 times higher in patients discharged to facility (3.9% vs. 0.3%; $p < .001$) and 30-day complications were the same as seen in Fu et al. (2017), Ramos et al. (2014), and McLawhorn et al. (2017), with rates three times higher in patients discharged to facility instead of home ($p < .001$). Pelt et al. (2018) also found readmission rates 2.4 higher after discharge to a facility compared with home ($p = .007$). Reoperation rates at 30 days, 90-day readmission rates, and 90-day reoperation rates were also higher in patients discharged to facilities ($p = .06$,

**Table 1. Review of Pertinent Literature**

| Article Number | Author | Study Design | Study Aim | Study Findings |
|---|---|---|---|---|
| 1. | Bashinskaya et al. (2012) | Retrospective review from Nationwide Inpatient Sample and AHRQ between 1993 and 2009. Total 39,434, 956 TJA patients | Determine trends in utilization of TJA | THA between 260,200 and 436,700 per year, TKA 260,200–436,700 per year<br>174% increase in demand for THA in 25 years, 670% for TKA<br>In population older than 64 years, linear model progression increasing with age |
| 2. | Napier et al. (2013) | Observational study at a single hospital in the United Kingdom. A total of 535 patients in sample | Identify avoidable causes for prolonged admission following TJA. LOS >3 days was considered prolonged. | 5% of patients had delayed discharge due to slow to mobilize<br>dc criteria: patient had to walk 10 m<br>Age associated with longer LOS (gender $p < .001$)<br>Female associated with longer LOS (no statistical significance provided)<br>LOS THA 1–18 days, mode 2 days<br>LOS TKA 1–17 days, mode 2 days<br>52% of delayed discharge related to social issues<br>Delayed dc demographics:<br>Gender (female); $p < .001$<br>BMI >35 ($p = .043$) |
| 3. | Sher et al. (2017) | Retrospective review of TJA patients identified from the NSQUIP database from 2011 to 2014<br>120,847 patients total | Identify patient-specific characteristics associated with postdischarge complications after TJA | Higher risks of postoperative complications for patients undergoing accelerated recovery after THA found in older, obese, smoking patients with significant comorbidities<br>Patients with significant comorbidities may require dc disposition other than home<br>A total of 7,474 patients dc within 24 hours of operation: younger, male, ASA 1 or 2, BMI <40 ($p < .05$)<br>Risk for complications: >80 years of age ($p = .001$), bleeding dx ($p = .01$), smoking ($p = .03$), ASA 3, 4 ($p < .05$), SAE pre-dc ($p < .0001$) |
| 4. | Fu et al. (2017) | Retrospective cohort study of patients undergoing unilateral THA from 2011 to 2014 utilizing NSQUIP database | Evaluate short-term morbidity after primary THA and characterize the association of complications with discharge disposition | 26% of patients dc to facility<br>Postoperative complications 3.6% for all patients<br>All complication rate higher in patient dc to facility: 5.5% vs. 2.9% home ($p < .001$)<br>Readmission: 5.4% vs. 2.8% home ($p < .001$)<br>Death: 0.1% vs. 0.0% home ($p < .001$) |
| 5. | Crawford et al. (2011) | Retrospective cohort study of patients undergoing primary TKA at a single military medical center between 2002 and 2008. A total of 383 patients used for sample | Evaluate preoperative data and compare them with length of stay and discharge disposition after primary TKA | Factors significant for dc to facility: ASA, age<br>Patient dc to facility had longer LOS in hospital<br>Odds ratio of dc to facility 1.6–6.8 per every decade of life over 60<br>No difference in LOS or dispo by gender<br>dc home $15,946 vs. $20,415 dc to facility |
| 6. | Froemke et al. (2015) | Retrospective cohort<br>Pre- and postpilot of patients undergoing TJA after implementation of an educational care pathway<br>351 patients included prepilot and 317 postpilot | Evaluate the effects of a care pathway and educational program for patients undergoing TJA | Care pathway presented patients with expectations preoperatively and during hospital stay<br>Patients had the expectation to dc to home following surgery<br>HTN, DM, obesity, and high ASA scores had increased rate of nonhome dc<br>18% decrease in LOS ($p < .001$) after implementation<br>Increase in home dc 54.1% vs. 63.7%; $p = .01$<br>Discharge to home with HHC from 18% vs. 25.4% postpilot<br>Discharge to SNF decreased from 20.5% to 18.3% postpilot |

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**Table 1. Review of Pertinent Literature (*Continued*)**

| Article Number | Author | Study Design | Study Aim | Study Findings |
|---|---|---|---|---|
| 7. | Hansen et al. (2015) | Prospective cohort of patients undergoing TJA between June 2006 and December 2012. Sample: 1,449 THA; 1,764 TKA | Determine the accuracy of using the RAPT tool at predicting discharge disposition | Patients with RAPT scores <6 had a predictive accuracy of >90% to inpatient facility discharge<br>Predictive accuracy lowest for scores between 7 and 10<br>100% of patients with RAPT between 0 and 6 dc to facility ($p < .0001$)<br>100% of low risk 10–12 dc to home ($p < .0001$) |
| 8. | Padgett et al. (2018) | Retrospective cohort of patients undergoing primary TKA between May 2007 and February 2011. A total of 8,245 patients from AHRQ institution registry used in sample | Determine whether discharge to inpatient rehabilitation center improved functional or patient-reported outcomes | 4,477 patients dc to inpatient rehabilitation<br>3,011 patients dc to home<br>657 patients dc to SNF<br>After propensity matching, no difference in postoperative complications in groups<br>dc to IP rehabilitation higher rate of fracture; $p = .03$ |
| 9.- | Le Meur et al. (2016) | Retrospective analysis of database of patients undergoing TJA during 2011. Sample of 1,739 patients obtained from the National Health Insurance database | Determine the rates of surgical-site infection after TJA and the correlation to discharge destination | 30 suspected SSI found<br>No statistical difference in rate of SSI in patients dc home vs. facility<br>Of patient with SSI, 57% had been dc home |
| 10. | Courtney et al. (2017) | Retrospective analysis of patients undergoing primary TJA between January 2014 and September 2016 at a single hospital. A total of 460 patients in sample | Determine whether Medicaid patients have high hospital costs and resource utilization compared with Medicare and private insurance | Age >75 years predictive of dc to facility<br>Insurance type not a risk factor for dc to facility<br>No difference in readmission due to postoperative complications by insurance<br>dc to rehabilitation higher in those older than 75 years ($p < .001$)<br>BMI, TKA vs. TJA, female, insurance, BMI >35 not statistically significant for dc to rehabilitation<br>BMI >35, higher risk of readmission ($p = .009$) |
| 11. | McLawhorn et al. (2017) | Retrospective observational study of patients undergoing primary TKA between 2011 and 2014. A total of 101,256 patients included from data obtained from NSQUIP | Determine 30-day discharge outcomes for patients post-TKA relative to their discharge destination | Any postoperative complication dc to facility 4.33% vs. 2.72% dc home ($p < .001$)<br>Major complications: 3.05% vs. 1.83% ($p < .001$)<br>No statistically significant difference for cardiac complications; $p = .24$ |
| 12. | Sikora-Klak et al. (2017) | Retrospective observational study of TJA patients obtained from the Michigan Arthroplasty Registry Collaborative Quality Initiative MARCQI database between May 2012 and October 2014. A total of 2,914 patients<br>905 THA, 2,914 TKA | Determine the effect of patient comorbidities on discharge disposition and readmission rates following TJA | Patients with hx DVT/PE higher likelihood of dc to facility: 38.5%; $p < .001$<br>Women more likely dc to facility; $p = .002$<br>Diabetes high rate of dc to facility 24.6% vs. 16.2% home; $p = .001$<br>BMI not a factor ($p = .924$)<br>Age (years): 73.55 facility vs. 62.93 home ($p < .001$)<br>Age, gender, smoking, DVT/PE, DM, not associated with higher rates of readmission for THA or TKA except age for TKA ($p < .001$) |
| 13. | Pelt et al. (2018) | Retrospective cohort study of patients at a single institution following implementation of a comprehensive care pathway. A total of 927 patients total included<br>465 prepilot<br>462 postpilot | Determine whether a comprehensive patient education and management program decreased discharge to facilities and decreased postoperative complications | No statistically significant difference in BMI, age, and ASA in groups<br>Pre-pilot 34% patients dc to facility<br>Postpilot 20% reduction in dc to facility; $p < .001$<br>30-day readmission higher prepilot; $p = .047$ (5.6% vs. 3.03%)<br>dc to facility 2.4 times more likely to be readmitted ($p = .007$)<br>30 reoperations, 90 readmissions, 90 reoperations higher if dc to facility; $p = .06$, $p = .018$, $p = .013$, respectively |

(*continues*)

**Table 1. Review of Pertinent Literature (*Continued*)**

| Article Number | Author | Study Design | Study Aim | Study Findings |
|---|---|---|---|---|
| 14. | Tessier et al. (2016) | Comparative cohort study of patients undergoing TJA with or without care pathway | Determine whether patients with care pathway affected costs related to TJA and disposition after surgery | Statistically significant decrease in facility utilization in surgeons who used pathway<br>TKA cost with pathway $19,005 vs. $22,195 without ($p < .001$)<br>THA cost with pathway $18,866 vs. $21,332 without ($p < .001$) |
| 15. | Sabeh et al. (2017) | Retrospective case-control study of Humana and Medicare patients undergoing TJA<br>Sample was from 2011 to 2012; 204,912 Medicare patients<br>2007–2015 Humana | Compare 91-day postoperative cost and stratify patients by discharge disposition to determine costs difference per destination | $55,246 dc to home, $58,702 dc to SNF, and $63,636 dc to inpatient rehabilitation ($p < .001$)<br>dc to home reimbursement $10,171 vs. SNF 11,855 and rehabilitation $12,293 ($p < .05$) |
| 16. | Tarity and Swall (2017) | Systematic review of literature published in the past 5 years regarding discharge disposition and postdischarge care | To assess recent trends and influencing factors regarding discharge disposition | 40% of total costs related to post-dc care<br>Patient expectation strong predictor of final dc<br>dc to facility higher with age<br>Older, female, BMI >40 higher dc to facility<br>Strongest predictors of dc to facility = ASA ¾, DM, HTN, smoking, COPD, dependent function, renal disease, bleeding disorders, steroid use preoperatively |
| 17. | Gholson et al. (2016) | Retrospective cohort of patients undergoing TJA. Sample from 2011 to 2013 NSQUIP database. Sample size: 107,300 | Identify the risk factors for discharge to a facility other than home to build a tool to predict discharge disposition after TJA | 30-day mortality 10 times higher when patient dc to facility: 3.9% vs. 0.3%; $p < .001$<br>30-day complication 3 times higher when patient dc to facility 25.5% vs. 8.2%; $p < .001$<br>Patients dc to facility: older, female, higher ASA, functional dependent; $p < .001$ for all |
| 18. | Edusei et al. (2017) | Prospective cohort of patients undergoing TJA at two institutions from 2013 to 2015. A total of 189 patients in sample | Determine if the:<br>MOS-SSS (Medical Outcomes Study Social Support expectation score) scale identified patients who were at a higher risk for facility placement | No significant correlation between social support, LOS, disposition, and pain levels<br>No statistically significant association between pain, social support, and LOS ($p = .58$)<br>Patients dc to facility, female, and non-Caucasians had longer LOS ($p = .01$) |
| 19. | Kee et al. (2017) | Retrospective cohort pre- and postcare pathway implementation at one facility between April 2013 and April 2015. Sample of 889 THA patients and 937 TKA patients | Effect of a standardized clinical pathway on clinical outcomes after TJA | Goal for POD 1 discharge<br>dc home >94% throughout entire study for TKA, 97% for THA<br>LOS for TKA went from 1.91 to 1.33 during study ($p < .01$)<br>LOS for THA went from 1.92 to 1.13 ($p < .01$)<br>No statistical power to detect difference in readmission due to low dc to facility rates (1.2% THA, 1.0% TKA)<br>No statistically significant difference in 90-day readmission for dc home vs. facility ($p = .98$)<br>Author surmised that managing expectations can improve LOS and patient satisfaction |

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**Table 1. Review of Pertinent Literature (*Continued*)**

| Article Number | Author | Study Design | Study Aim | Study Findings |
|---|---|---|---|---|
| 20. | Featherall et al. (2018) | Retrospective cohort after implementation of care pathway at one institution. A total of 6,090 THA patients from January 1, 2013, until December 31, 2015, were included. | Determine whether a care pathway effected length of stay, disposition, and 90-day complications | No significant difference in complication rates pre- and postpathway<br>Significant education provided to providers and patients about dc home<br>LOS 3.21–2.55 after pathway; $p < .01$<br>dc home from 66.3% to 78.7%; $p < .001$<br>Cost reduction: $1,329 per patient<br>Theoretical cost savings: $5.3 million<br>Pathway increased likelihood of dc home; $p < .001$ |
| 21. | Ramos et al. (2014) | Retrospective cohort at one institution of patients following TJA. A total of 3,533 patients; 1,865 THA, 1,668 TKA between the years of 2010 and 2011 | To evaluate the effect of discharge disposition on length of stay and readmission after TJA | THA: 3 times more likely for readmission if dc to facility than home; $p = .027$<br>TKA: no significant difference in readmission<br>LOS lower in dc to home vs. facility; $p < .0001$<br>LOS 4.3, 4.31 THA and TKA dc home, respectively<br>LOS 5.31, 4.49 THA, TKA dc rehabilitation ($p < .0001$)<br>LOS 5.36, 4.76 THA, TKA dc SNF ($p < .0001$)<br>Post-dc costs $4,000 for home, $11,000 to facility |
| 22. | Keswani et al. (2016) | Retrospective cohort of patients undergoing TJA. Sample obtained from NSQUIP database from 2011 to 2013. 64,763 TKA and 41,597 THA included | To compare risk of postdischarge SAE after TJA by discharge disposition, identify risk factors for facility placement and stratify patients based on their risk factors | Serious adverse event: 1.9% nonhome vs. 0.8% home, minor event: 1.1% nonhome vs. 0.4% ($p < .001$ both)<br>40% of costs associated with postoperative recovery period<br>dc to facility independent predictor of 90 readmission<br>Strong independent predictor for nonhome dc: renal disease, CAD, smoking, HTN, ASA ¾, prior dependent functional status, bleeding disorders; $p < .001$ for all |

*Note*. AHRQ = Agency for Healthcare Research and Quality; ASA = American Society of Anesthesiologists; BMI = body mass index; CAD = coronary artery disease; COPD = chronic obstructive pulmonary disease; dc = discharge; dispo = disposition; DM = diabetes mellitus; DVT = deep vein thrombosis; HHC= home health care; HTN = hypertension; LOS = length of stay; NSQUIP = National Surgical Quality Improvement Program; PE = pulmonary embolism; POD = postoperative day; RAPT = Risk Assessment Prediction Tool; SAE = serious adverse event; SNF = skilled nursing facility; SSI = surgical site infection; THA = total hip arthroplasty; TKA = total knee arthroplasty; TJA = total joint arthroplasty.

$p = .018$, and $p = .013$, respectively). Rates of wound dehiscence, deep vein thrombosis, pulmonary embolism, and deep and superficial wound infections were higher in patients discharged to both skilled nursing facilities and inpatient rehabilitation centers ($p < .05$ for all; Keswani et al., 2016). Severe adverse events in patients discharged to facility were 1.9% compared with 0.8% discharged home, and minor events occurred at a rate of 1.1% for patients discharged to facility compared with 0.4% for patients discharged home. This same study revealed that discharge to a facility was an independent predictor of readmission within 90 days (Keswani et al., 2016).

## Setting Patient Expectations Increases Likelihood of Discharge Home

Setting appropriate patient expectations has been found to be an independent predictor of postdischarge disposition following these procedures (Tarity & Swall, 2017). Many of the published studies evaluated the effect of the implementation of a care pathway for patients undergoing TJA. Froemke et al. (2015) assessed a care pathway that presented patients with preoperative education that stressed that the expectation was that they would transition home following the acute recovery phase. Education was also provided to the multidisciplinary team that cared for these patients with the emphasis on home recovery following surgery. Following the pilot, there was an 18% decrease in length of stay ($p < .001$) and home discharges increased from 54.1% to 63.1% ($p = .01$).

Similar pathways were piloted by Pelt et al. (2018) and Featherall et al. (2018), and at the end of these pilots, there was a 20% reduction in discharge to a facility ($p < .001$) and an increase in discharge to home from 66.3% to 78.7%, respectively. Both pilots also resulted in a statistically significant reduction in length of stay. Kee et al. (2017) introduced a care pathway for patients with the goal of discharge on postoperative Day 1. The institution already boasted low length of stay for this population, but they were able to maintain rates of discharge home greater than 94% for both TKA and THA and decreased length of stay for TKA from 1.91 to 1.33 days and for THA from 1.92 to 1.13 days ($p < .01$). These studies illustrate that setting patient expectations throughout the continuum of care can positively impact length of stay and discharge to home rates.

## Discharge to Inpatient Facilities Does Not Improve Outcomes

Padgett et al. (2018) sought to determine whether discharge to inpatient facilities following TKA improved patient outcomes. After propensity matching, there was

no difference in postoperative patient-reported outcomes in patients discharged home versus facility. The only difference noted between these groups was that preoperative Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores favored discharge to facility (54.0 vs. 52.6; $p = .042$). Individuals discharged to facilities had slightly highest WOMAC scores than those who were discharged to home. Keswani et al. (2016) found that patients discharged to skilled nursing facilities or inpatient rehabilitation centers had increased rates of unplanned return to the operating room compared with patients discharged home ($p < .001$). Unfortunately, the authors did not specify what procedures were done during the return to the operating room, so this may include procedures related to wound dehiscence, surgical-site infection, and arthrofibrosis requiring manipulation under anesthesia. Le Meur et al. (2016), however, found that rates of surgical-site infection had no statistical difference in patients discharged to home as opposed to a facility.

### Discharge to Facility More Expensive Than Discharge to Home

Multiple studies have illustrated that the costs of discharge to a skilled nursing facility or inpatient rehabilitation center far surpass the costs associated with home discharge. Ramos et al. (2014) estimated that post–acute care costs for patients discharged to home averaged $4,000 whereas discharge to a nonhome facility averaged $11,000. Crawford et al. (2011) had similar findings with costs for patients transitioning home of $15,946 and patients discharged to any facility averaging $20,415. Sabeh et al. (2017) reported costs per episode of care for patients discharged home at $55,246 with total costs for discharge to skilled nursing facility at $58,702 and inpatient rehabilitation at $63,636 ($p < .001$).

Tarity and Swall (2017) estimate that patients could be kept in the hospital for an additional 5.2 days without surpassing the costs of discharging a patient to a post–acute care facility. After the implementation of a care pathway, Featherall et al. (2018) estimated a cost savings of $1,329 per patient, which equated to a theoretical savings of $5.3 million for the facility if the pathway was applied to all TJA patients. Tessier et al. (2016) estimated cost differences of TKA with the use of a care pathway of $19,005 versus $22,195 without ($p < .001$) and costs of THA with the use of a pathway of $18,866 versus $21,332 without ($p < .001$). These studies demonstrate significant cost savings in both increased rates of discharge home and the use of a care pathway to guide patient disposition.

## Discussion

Total joint arthroplasties are one of the most common surgical procedures performed in the United States with one million procedures performed in 2010 alone (Tarity & Swall, 2017). Innovative surgical techniques and enhanced recovery protocols have decreased postoperative pain and recovery times. This has diminished the need for prolonged post–acute care rehabilitation, and patient discharge disposition now favors home discharge over discharge to skilled nursing facilities and inpatient rehabilitation centers. Postoperative complications have been cited by many studies as being substantially higher in patients discharged to facilities following TJA. This trend combined with the increased costs of non–home discharge furthers the argument that most patients should transition to their home following these surgeries.

Certain comorbidities and risk factors do continue to favor discharge to post–acute care facilities as noted by previous studies. Age of 75 years or with a history of bleeding disorders, serious adverse events prior to discharge, functional dependence preoperatively, or an ASA score of 3 or 4 was found to have statistically significant increased rates of postoperative complications and 30-day and 90-day readmission rates. History of tobacco use was not unanimously found to be an independent risk factor; however, these patients should be carefully stratified according to their other comorbidities to determine the best disposition for them.

## Conclusion

Severe arthritis affects more than 15% of the population and projections predict that the prevalence will increase to 20% in the next decade (Bashinskaya et al., 2012). Total joint arthroplasty has been accepted as a reliable and safe procedure that can improve the quality of life of those affected by severe osteoarthritis (Sikora-Klak et al., 2017). The demand for TJA is expected to increase for THA by 174% and demand for TKA will grow by as much as 670% (Napier et al., 2013).

The introduction of the CJR program by Medicare has led to increased attention on decreasing costs and length of stay for elective TJA patients (Bashinskaya et al., 2012). This has led to hospitals focusing on decreasing the cost of episode of care by decreasing postoperative complications and seeking alternative discharge dispositions other than to skilled nursing facilities and acute rehabilitation centers. An estimated 40% of episode of care charges arise from the post–acute care period, signifying an area where cost savings mechanisms may have the greatest impact. This review identified themes in postoperative care of TJA patients that can be utilized to create a discharge disposition algorithm using best practices to stratify patients into the appropriate discharge disposition while setting appropriate expectations for patients undergoing these procedures to ensure high levels of patient satisfaction following these procedures.

### References


Bashinskaya, B., Walcott, B. P., Antoci, V., & Zimmerman, R. M. (2012). Arthroplasty utilization in the United States is predicted by age-specific population groups. *ISRN Orthopedics*, *2012*, 185938. https://doi.org/10.5402/2012/185938

Courtney, P. M., Edmiston, T., Batko, B., & Levine, B. R. (2017). Health policy & economics: Can bundled payments be successful in the Medicaid population for primary joint arthroplasty? *The Journal of Arthroplasty*, *32*(11), 3263–3267. https://doi.org/10.1016/j.arth.2017.05.035

Crawford, D. A., Scully, W., McFadden, L., & Manoso, M. (2011). Preoperative predictors of length of hospital

stay and discharge disposition following primary total knee arthroplasty at a military medical center. *Military Medicine*, *176*(3), 304–307. https://doi.org/10.7205/milmed-d-10-00042

Edusei, E., Grossman, K., Payne, A., Perez, B., Inneh, I., Nelson, C., & Slover, J. (2017). Impact of social support and pain coping ability on length of stay and discharge disposition following hip and knee arthroplasty: A prospective study. *Bulletin of the Hospital for Joint Diseases*, *75*(2), 137–139.

Featherall, J., Brigati, D. P., Faour, M., Messner, W., & Higuera, C. A. (2018). Implementation of a total hip arthroplasty care pathway at a high-volume health system: Effect on length of stay, discharge disposition, and 90-day complications. *The Journal of Arthroplasty*, *33*(6), 1675–1680. https://doi.org/10.1016/j.arth.2018.01.038

Froemke, C. C., Wang, L., DeHart, M. L., Williamson, R. K., Ko, L. M., & Duwelius, P. J. (2015). Standardizing care and improving quality under a bundled payment initiative for total joint arthroplasty. *The Journal of Arthroplasty*, *30*(10), 1676–1682. https://doi.org/10.1016/j.arth.2015.04.028

Fu, M. C., MacLean, C. H., McLawhorn, A. S., Padgett, D. E., Samuel, A. M., & Sculco, P. K. (2017). Health policy and economics: Discharge to inpatient facilities after total hip arthroplasty is associated with increased post discharge morbidity. *The Journal of Arthroplasty*, *32*(9S), S144–S149. e1. https://doi.org/10.1016/j.arth.2017.03.044

Gholson, J. J., Pugely, A. J., Bedard, N. A., Duchman, K. R., Anthony, C. A., & Callaghan, J. J. (2016). Health policy and economics: Can we predict discharge status after total joint arthroplasty? A calculator to predict home discharge. *The Journal of Arthroplasty*, *31*(12), 2705–2709. https://doi.org/10.1016/j.arth.2016.08.010

Hansen, V. J., Gromov, K., Lebrun, L. M., Rubash, H. E., Malchau, H., & Freiberg, A. A. (2015). Does the risk assessment and prediction tool predict discharge disposition after joint replacement? *Clinical Orthopaedics and Related Research[R]*, *473*(2), 597–601. https://doi.org/10.1007/s11999-014-3851-z

Kee, J. R., Edwards, P. K., & Barnes, C. L. (2017). Health policy & economics: Effect of risk acceptance for bundled care payments on clinical outcomes in a high-volume total joint arthroplasty practice after implementation of a standardized clinical pathway. *The Journal of Arthroplasty*, *32*(8), 2332–2338. https://doi.org/10.1016/j.arth.2017.03.007

Keswani, A., Tasi, M. C., Fields, A., Lovy, A. J., Moucha, C. S., & Bozic, K. J. (2016). Health policy & economics: Discharge destination after total joint arthroplasty: An analysis of post discharge outcomes, placement risk factors, and recent trends. *The Journal of Arthroplasty*, *31*(6), 1155–1162. https://doi.org/10.1016/j.arth.2015.11.044

Le Meur, N., Grammatico-Guillon, L., Wang, S., & Astagneau, P. (2016). Health insurance database for post-discharge surveillance of surgical site infection following arthroplasty. *Journal of Hospital Infection*, *92*(2), 140–146. https://doi.org/10.1016/j.jhin.2015.10.006

McLawhorn, A. S., Fu, M. C., Schairer, W. W., Sculco, P. K., MacLean, C. H., & Padgett, D. E. (2017). Health policy and economics: Continued inpatient care after primary total knee arthroplasty increases 30-day post-discharge complications: A propensity score-adjusted analysis. *The Journal of Arthroplasty*, *32*(9S), S113–S118. https://doi.org/10.1016/j.arth.2017.01.039

Napier, R. J., Spence, D., Diamond, O., O'Brien, S., Walsh, T., & Beverland, D. E. (2013). Modifiable factors delaying early discharge following primary joint arthroplasty. *European Journal of Orthopaedic Surgery & Traumatology*, *23*(6), 665–669. https://doi.org/10.1007/s00590-012-1053-5

Oldmeadow, L. (2001). *Risk assessment and prediction tool (RAPT)*. Retrieved April 7, 2018, from https://www.ahsa.com.au/web/patient_info/rapt_form/download

Padgett, D. E., Christ, A. B., Joseph, A. D., Lee, Y., Haas, S. B., & Lyman, S. (2018). Discharge to inpatient rehab does not result in improved functional outcomes following primary total knee arthroplasty. *The Journal of Arthroplasty*, *33*(6), 1663–1667. https://doi.org/10.1016/j.arth.2017.12.033

Pelt, C. E., Gililland, J. M., Erickson, J. A., Trimble, D. E., Anderson, M. B., & Peters, C. L. (2018). Health policy & economics: Improving value in total joint arthroplasty: A comprehensive patient education and management program decreases discharge to post-acute care facilities and post-operative complications. *The Journal of Arthroplasty*, *33*(1), 14–18. https://doi.org/10.1016/j.arth.2017.08.003

Ramos, N. L., Karia, R. J., Hutzler, L. H., Brandt, A. M., Slover, J. D., & Bosco, J. A. (2014). The effect of discharge disposition on 30-day readmission rates after total joint arthroplasty. *The Journal of Arthroplasty*, *29*(4), 674–677. https://doi.org/10.1016/j.arth.2013.09.010

Sabeh, K. G., Rosas, S., Buller, L. T., Roche, M. W., & Hernandez, V. H. (2017). The impact of discharge disposition on episode-of-care reimbursement after primary total hip arthroplasty. *The Journal of Arthroplasty*, *32*(10), 2969–2973. https://doi.org/10.1016/j.arth.2017.04.062

Sher, A., Anderson, M., Keswani, A., Koenig, K., Moucha, C. S., & Yao, D. H. (2017). Primary arthroplasty: Predictors of same-day discharge in primary total joint arthroplasty patients and risk factors for post-discharge complications. *The Journal of Arthroplasty*, *32*(9), S150–S156.e1. https://doi.org/10.1016/j.arth.2016.12.017

Sikora-Klak, J., Zarling, B., Bergum, C., Flynn, J. C., & Markel, D. C. (2017). Health policy and economics: The effect of comorbidities on discharge disposition and readmission for total joint arthroplasty patients. *The Journal of Arthroplasty*, *32*(5), 1414–1417. https://doi.org/10.1016/j.arth.2016.11.035

Tarity, T. D., & Swall, M. M. (2017). Current trends in discharge disposition and post-discharge care after total joint arthroplasty. *Current Reviews in Musculoskeletal Medicine*, *10*(3), 397–403. https://doi.org/10.1007/s12178-017-9422-7

Tessier, J. E., Rupp, G., Gera, J. T., DeHart, M. L., Kowalik, T. D., & Duwelius, P. J. (2016). Health policy and economics: Physicians with defined clear care pathways have better discharge disposition and lower cost. *The Journal of Arthroplasty*, *31*(9 Suppl.), 54–58. https://doi.org/10.1016/j.arth.2016.05.001

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