Hip and Knee Arthroplasty Care Pathways: Process Improvement Methods Increase Quality and Lower Care Cost

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Introduction

For high volume, elective procedures, including hip and knee arthroplasty, variability is a key factor that degrades value, defined as delivering high-quality care at low cost. Medical education has traditionally focused on individualizing patient care. But as care has become more complex, individualized variation in patient care may not add value. Total hip arthroplasty and total knee arthroplasty clinical teams are challenged to the "memory test" of completing all of the steps of a patient's care, repeated approximately 3,000 times a year within UPHS hospitals. Variability in care delivery increases as providers' preferences and opinions cause care to drift away from evidenced based medicine (EBM). Quality improvement methods rooted in EBM can provide high-value, low-variability care pathways.

A care pathway maps the current-state process of a patient's experience from initial presentation through recovery. Care pathways should be developed to be EBM-driven and appropriately modifiable for unique care needs. Use of a pathway supports EBM-driven care, relieves the memory workload, and frees the care team to focus on value-added variability. Clinical decision support (CDS) is needed in the electronic medical record to guide care variation for individual patient needs. For example, the venous thromboembolism prophylaxis default should be the standard of care. However, for a post-operative mechanical heart valve patient, CDS should prompt team to consider ordering a heparin to Coumadin bridge. Care pathways are effective tools for monitoring opportunities within defined episodes of care (EOC). An EOC is a value-based payment model that includes all services provided to a patient for a particular condition or procedure within a specific period of time across a continuum of care.

Pathways: Preoperative

Pre-admission care for anemia, diabetes, poor nutrition, smoking, obesity, and psychosocial and physical home barriers will improve perioperative and postoperative quality and lower cost. Surgeons and interprofessional teams should work with the patient and his primary care physician to provide personalized preoperative preparation before an elective surgical procedure [1,2].

Pathways: Acute care

Acute-care quality efforts ideally are hospital cost neutral and because DRG payments are fixed, acute care costs will not directly impact EOC costs. For example, mobility programs in the hospital will lower the risk of falls and decrease the length of stay. Lowering the cost of implants and improved OR efficiency are also important for the hospital margin.

Even in a coordinated health system, cost impacts do not precisely align. Postoperative subacute rehabilitation in a skilled nursing facility (SNF) lowers length of stay cost to the hospital, but it is a significant cost within an EOC. Hospitals are reimbursed for readmissions, but readmissions routinely push the EOC cost above the budget. Hospitals do pay penalties for readmissions to Medicare and Independence Blue Cross (IBC) unrelated EOC.

Pathways: Post-Acute Care

Most of the opportunities for EOC cost savings are during the post-acute period where data shows post-acute care variability. Increased quality of post-acute care improves patient safety and lowers post-acute care cost. Lower utilization of skilled nursing facilities (SNF) and inpatient rehab facilities (IRF) and lower readmission rates have led to significant savings from improved post-acute care within Bundled Payment for Care Improvement (BPCI) (Figure 1, 2) and IBC EOC (Figure 3).

Skilled Nursing Facilities

SNF planning has been an important success. Preoperatively, a Risk Assessment and Prediction Tool (RAPT) score assesses post-acute care needs. A RAPT score of 9 or greater predicts a patient can return home safely. UPHS has seen a steady decrease of SNF usage from approximately 66% to approximately 33% of THA and TKA patients. The UPHS readmission rates from home are stable, which confirms we are increasingly returning patients home safely. EOC payments reflect number of patients who go to a SNF and IRF, SNF length of stay and IRF DRG. To meet the goals of returning patients home safely, decreasing utilization of SNF and IRF, and decreasing SNF length of stay, multidisciplinary effort is needed select to high-value post-acute care location.

Physical therapy

Physical Therapy (PT) after surgery has become an important cost within our most recent IBC bundle. Our work to lower SNF use and readmission rates can be seen to directly explain cost savings (Figure 4). With SNF and readmission costs lowered, we now see PT costs (Figure 5) driven by a highly variable distribution of 8 to 30 sessions per patient (Figure 6). We have partnered with our physical therapy colleagues to try to define PT endpoint with metrics based on activity and functional scores. PT should direct the patient toward

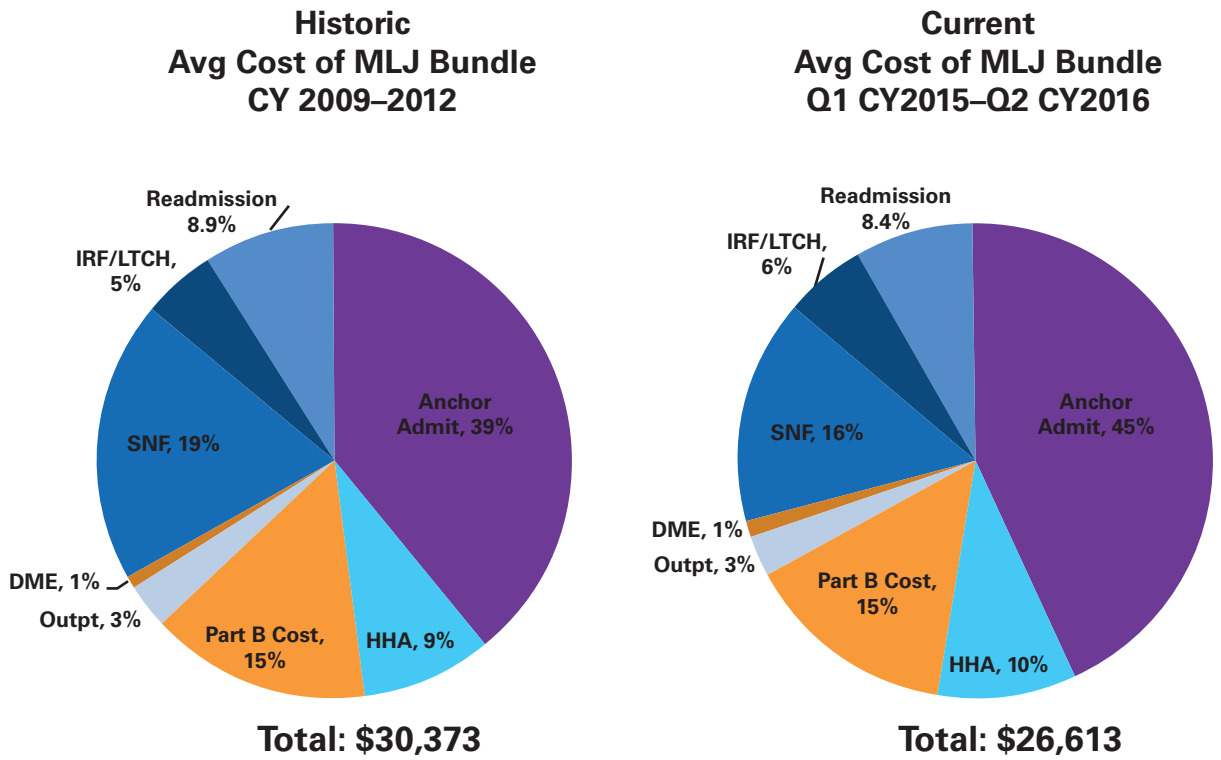

Figure 1. CMS Bundle Payment Care Initiative (BPCI) Historical Costs and Savings.

CMS BPCI Total Spend	2017Q2	
Major joint replacement of the lower extremity	Performance Avg	Performance %
Total Episode Cost	$24,543	
Anchor Admit	$12,033	49%
Part B	$3,626	15%
Skilled Nursing Facility	$2,904	12%
Inpatient Rehabilitation Facility/LTCH	$893	4%
Home Health	$3,122	13%
Outpatient	$802	3%
Readmission	$1,064	4%
Durable Medical Equipment	$98	0%

Figure 2. CMS Bundle Payment Care Initiative (BPCI) Most Recent Reconciled Cost Data.

IBC Hip and Knee Replacement Legacy Bundle			
Period	Performance	Shared Savings (50/50 upside only)	Episodes
Oct '13 - Jun '14	($590,687)	$0	221
Jul-Dec "14	$105,273	$52,637	140
Jan-Jun '15	($391,111)	$0	184
Jul-Dec '15	$318,747	$159,374	169
Jan-Jun '16	$550,008	$275,004	208
Jul-Dec ' 16	$719,612	$359,806	193
Jan- Jun '17	$731,494	$365,747	221

Figure 3. IBC Savings.

a self-directed exercise program, with long-term health benefits. The physical therapy post-acute care cost and value is a new focus for the EOC.

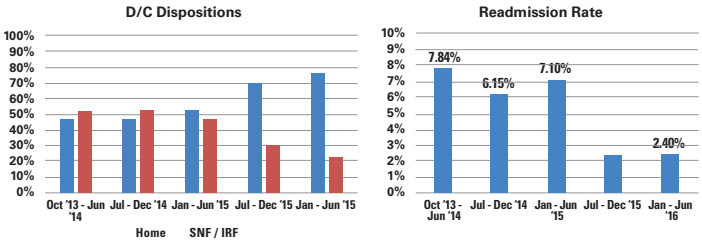

Figure 4. IBC Readmission and SNF Rate Changes Correlate with Figure 3.

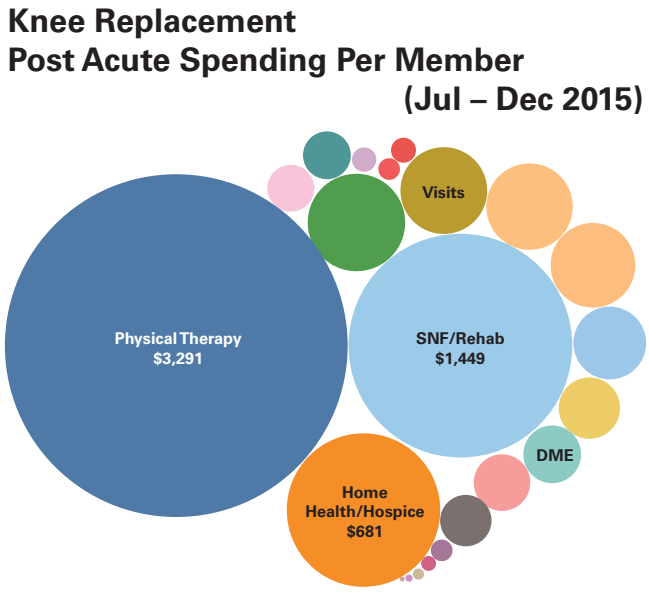

Figure 5. IBC Post-Acute Care Costs.

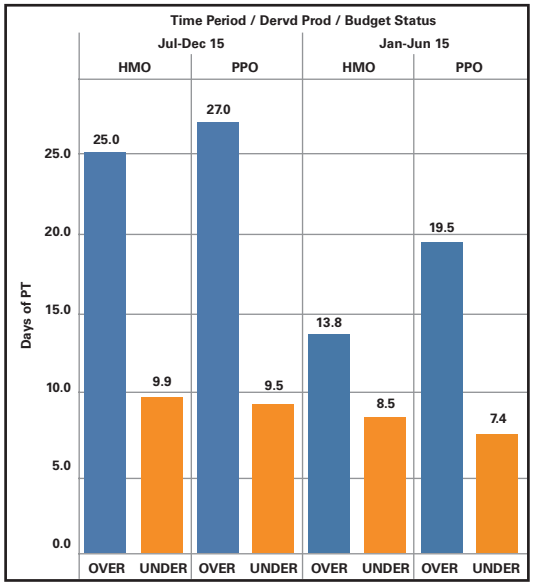

Figure 6. IBC Physical Therapy Session Variability.

Readmissions

Readmissions are poor value, both for low quality and high cost. Readmission prevention starts with preoperative preparation and medical comorbidity risk mitigation. Risk stratification work is focused on patients with multiple medical comorbidities that can be managed preoperatively. Urgent, unplanned patients are high risk, because we do not have the preoperative opportunity to manage comorbid risk. The third high readmission risk group is the patient discharged to SNFs and IRFs. Active collaboration, including sharing pathways and clinical processes supported by nurse navigators, helps manage the risk of readmission for all three groups.

Conclusion

Total joint arthroplasty pathways start when a patient signs surgical consent and continue through 90 days of postoperative care. All components of the pathway are amenable to reducing variability. Formal pathways can manage the majority of our patients. Process metrics allow us to understand quality impact. The resulting decreased variability has improved safety and lowered EOC costs. Realization of these opportunities comes with the Home Safely program and with preferred provider SNF and IRF collaboration. To prevent readmissions, we focus on improving care delivery across the whole episode of care. We have added a new focus with physical therapy progression to a self-directed exercise program to develop the healthy lifestyle that should start with a total hip or total knee replacement. We have been pleased that efforts aimed at improving quality have led directly to episode of care cost savings.

References

1. 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 Jun; 31(6):1155-1162.

2. Yao DH, Keswani A, Shah CK, Sher A, Koenig KM, Moucha CS. Home Discharge After Primary Elective Total Joint Arthroplasty: Postdischarge Complication Timing and Risk Factor Analysis. *J Arthroplasty.* 2017 Feb;32(2):375-380.