

HSS

Cost, Utilization, and Outcomes for Revision Total Hip and Knee Arthroplasty by Pre-Operative Indication

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Background

- The increasing prevalence of prosthetic knee and hip joints in aging populations world-wide portend an increasing incidence of rTKA and rTHA in the future.
- Revision total knee (rTKA) and revision hip arthroplasty (rTHA) are complex procedures performed for different indications.
- There is heterogeneity of indications for rTKA and rTHA within diagnosis-related groups (DRGs).
- **Study Objective:** To compare across rTKA and rTHA pre-operative indications - rates of emergency department (ED) visits, readmissions, complications, and reoperations as well as total cost over 365-days.

Methods

- **Historical cohort study** of the Merative (formerly Truven Health) MarketScan database which included commercial claims data for 62.3 million individuals in the United States from 2015-2019, including adjudicated paid amounts.
- **The study cohort included** adults 18 years or older who underwent a rTKA or rTHA during the study period and had at least two years of continuous enrollment including one year before and one year after the index revision arthroplasty.
- **Care episodes** were defined as 365-days.
- **Hierarchical and mutually exclusive revision categories** were developed based on a combination of DRG and ICD-10 codes for the following pre-operative indications: infection > periprosthetic fracture > instability > other mechanical (aseptic loosening, bearing surface wear, implant failure, osteolysis) > other.
- **Primary outcomes** included:
 - ED visits
 - Readmissions [unplanned readmissions per Centers for Medicare & Medicaid Services (CMS) definition]
 - Complications [during index revision or upon readmission, per CMS definition, the outcome (complications) includes certain complications within 7 days (acute myocardial infarction, pneumonia or other acute respiratory complication, and sepsis), within 30 days (surgical site bleeding or other surgical site complication, pulmonary embolism, and death), and 90 days (mechanical complication and periprosthetic joint infection/wound infection)]
 - Reoperations (any surgeries on the same laterality)
 - Episode costs (index hospitalization and post-discharge costs)

Results

Table 1. Number of revision arthroplasty cases identified and 365-day rates of ED visits, readmissions, complications, and reoperations by preoperative indication.

Knee					
	n	ED Visit (%)	Readmission (%)	Complication (%)	Reoperation (%)
Overall	3947	34.5	22.2	52.4	11.1
Infection	1307	41.9	39.4	9.3	25.1
Periprosthetic Fracture	55	34.5	27.3	52.4	9.1
Instability	885	35.3	17.1	62	6.1
Mechanical	1954	30.1	15.3	50.5	6.1
Other	16	31.3	12.5	12.5	12.5

Hip					
	n	ED Visit (%)	Readmission (%)	Complication (%)	Reoperation (%)
Overall	3271	36.6	25.1	48.8	14.1
Infection	944	44.9	38.2	52.0	30.3
Periprosthetic Fracture	408	31.4	18.1	48.8	5.6
Instability	452	44.5	27.4	62.8	12.4
Mechanical	1364	30.7	18.5	39.7	6.9
Other	103	25.2	7.8	2.9	1.9

Figure 1. Median costs of care for revision TKA index hospitalization and periods after discharge stratified by indication

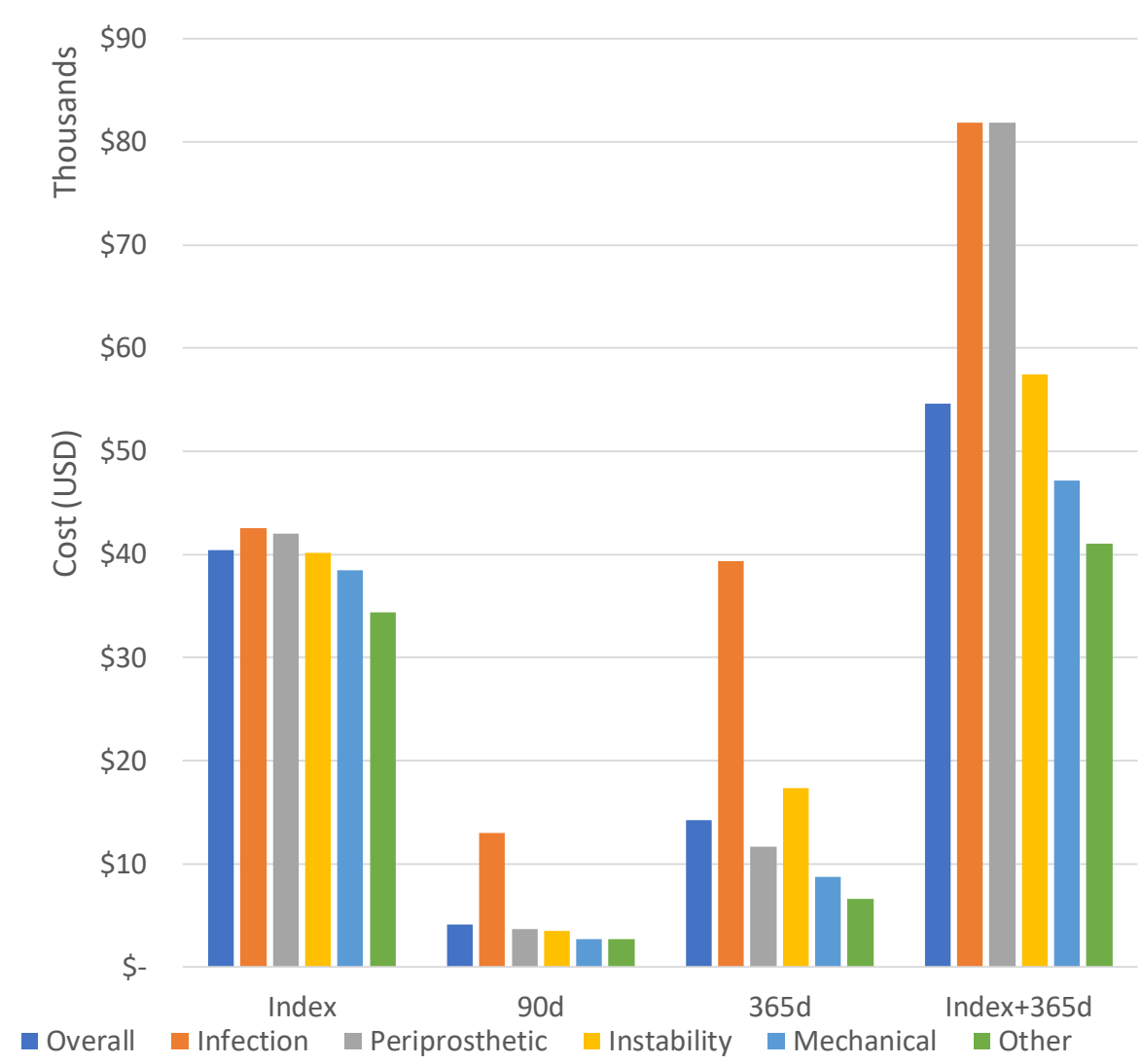
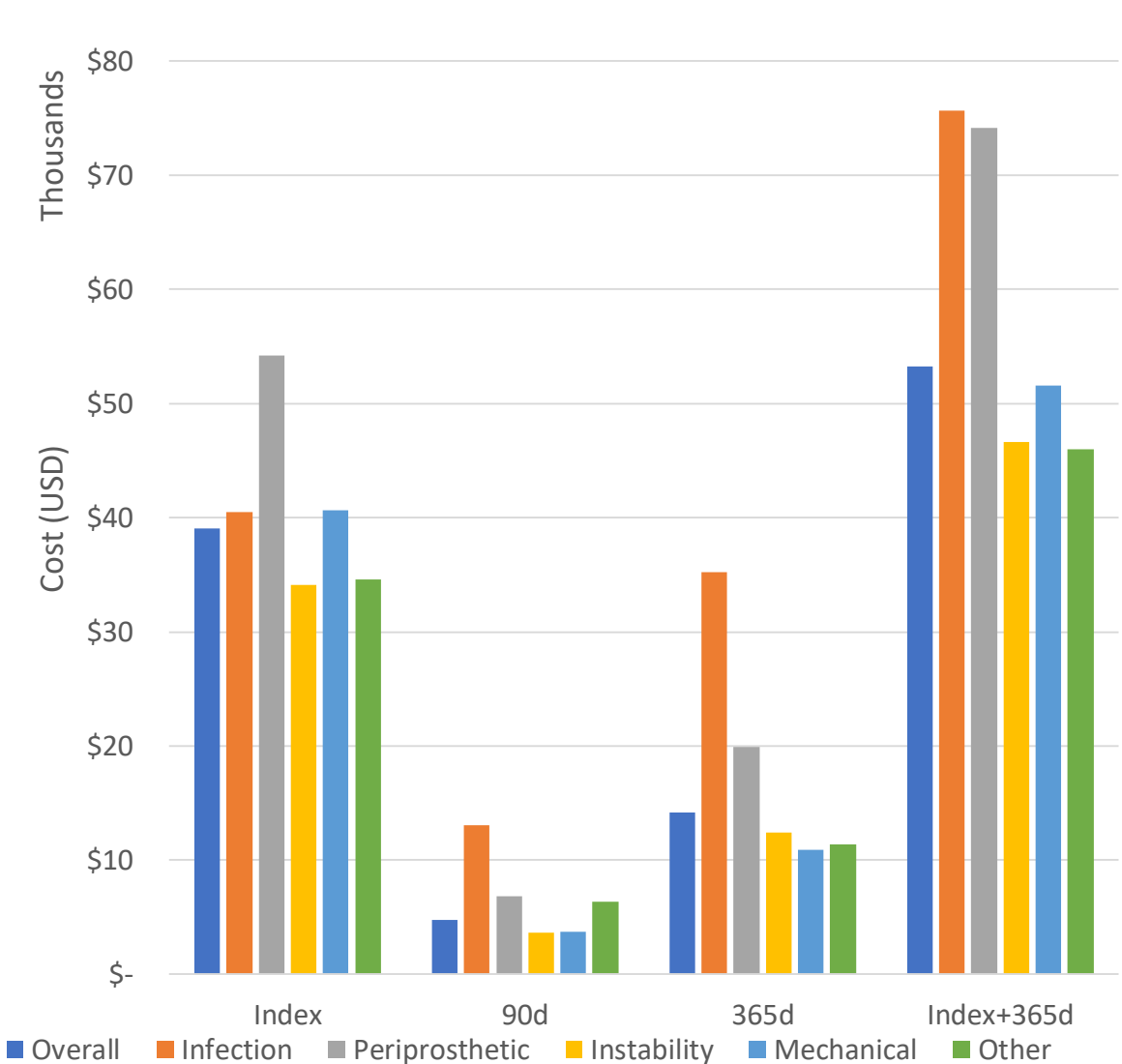


Figure 2. Median costs of care for revision THA index hospitalization and periods after discharge stratified by indication



Discussion and Conclusion

- The most common indications for rTKA and rTHA were mechanical complications followed by infection.
- Over a third of each rTKA and rTHA patients had one or more ED visit during the year after the procedure. The highest ED visit rates, >40%, occurred for infection (TKA, THA) and instability (THA).
- Readmissions occurred in >20% of rTKA and rTHA, with the highest rates for infection (rTKA, rTHA), periprosthetic fracture (rTKA) and instability (rTHA) indications.
- Complications occurred in ~50% for each rTKA and rTHA. The highest complication rate, 62.8%, was for rTHA performed for instability.
- Reoperations occurred in >10% of rTKA and rTHA cases. The highest rates were rTKA (25.1%) and rTHA (30.3%) performed for infection.
- The median 365-d episode costs for rTKA and rTHA across all indication types were >\$53,000 USD.
- The 365-d episode costs for rTKA and rTHA were ~42% and ~49% higher, respectively, for periprosthetic fracture and infection indications compared to other indications.
- Utilization, complications and costs for rTKA and rTHA are high and vary widely based on by pre-operative indications.

Implications

- These findings underscore the need for tailored hospital-level clinical pathways and budgeting strategies based on pre-operative diagnoses to optimize health outcomes and manage healthcare costs effectively.
- Research to understand variations in utilization, complications and costs for rTKA and rTHA across hospitals is warranted.
- The intra-, peri-, and post-operative complexity of these cases warrants evaluation of population-level strategies and policies such as regional centers of excellence to optimize health care value.

**Certain data used in this study were supplied by Merative as part of one or more MarketScan Research Databases. Any analysis, interpretation, or conclusion based on these data is solely that of the authors and not Merative.*