

Trends in Billing Practices of Revision Total Hip and Knee Joint Arthroplasty: A Medicare Part B Claims Data Study from 2017-2021

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INTRODUCTION: Revision total hip and knee joint arthroplasties (TJAs) are associated with poorer outcomes, higher mortality, and expenditures, costing 76% more than primary TJAs, on average. Although cost containment measures to optimize resource utilization in revision TJA have been implemented recently, their success remains uncertain. Furthermore, with a 22% decline in Medicare payments on average between 2001-2021, there is an underlying need to understand the change in reimbursement trends in arthroplasty to reduce overall costs of revision TJA. This study aims to investigate the trends in billing practices of revision TJA in Medicare patients by analyzing changes in hospital charges, reimbursements, and markup ratios between 2017 and 2021.

METHODS: This study was an analysis of Medicare claims data in the Physician/Supplier Procedure Summary Database by the Centers for Medicare and Medicaid Services. Current Procedural Terminology (CPT) codes for revision TJA (Total Hip Arthroplasty – 27134, 27137, 27138; Total Knee Arthroplasty – 27486, 27487) were used to query the database for patients undergoing revision TJA between 2017 and 2021. Yearly service counts, submitted charges from providers, allowed reimbursement from Medicare, and markup (=charge/reimbursement) were analyzed. All monetary values for charges and reimbursements were adjusted to the 2021 US dollars.

RESULTS: The overall study cohort comprised 697,245 patients with Medicare undergoing revision TJA between 2017 and 2021. Weighted mean hospital charges decreased steadily from 2017 to 2021, with an overall change of -9.3% and an annual change of -1.9% (from \$ 6,382.5 to \$ 5,785.5, $r^2 = 0.99$). Similarly, reimbursement also decreased with a change of -9.8% and -2.0% annual change (from \$ 1,219.9 to \$ 1,100.0; $r^2=0.88$). However, markup ratios (=charge/reimbursement) were relatively consistent across the study period, with a change of 0.5% (5.23 to 5.26, $r^2 = 0.00$) (**Table 1**) (**Fig. 1**). The number of procedures per million Medicare B enrollees also remained relatively unchanged at a -0.7% change (4235.1 to 4204.3, $r^2 = 0.14$) (**Table 2**). Additionally, trends in utilization and billing were found to vary across different procedural types, service settings, and states.

DISCUSSION AND CONCLUSION: Hospital charges and reimbursement for revision TJA decreased between 2017 and 2021. However, markup for revision TJA remains largely unchanged, potentially placing a greater financial burden on uninsured/underinsured patients undergoing revision TJA. With the decrease in the annual average reimbursement observed in our study, hospital reimbursement may be inadequate in the coming years, potentially limiting patient access to essential orthopaedic care.

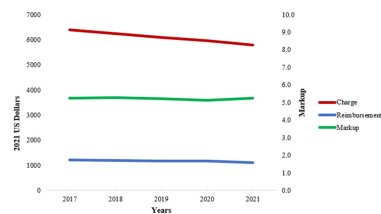


Figure 1. Trends in hospital charge, reimbursement, and markup of revision total hip and knee joint arthroplasty from 2017 to 2021, adjusted to the 2021 US Dollar.

Table 1. Trends in Average Charge, Reimbursement, and Markup Ratio of Revision Total Joint Arthroplasty (CPT 27130-THA, CPT 27447-TKA) from 2017 to 2021.

CPT	Variables	2017	2018	2019	2020	2021	Total % Change	Annual % Change
27134	Charge	8120.9	7739.6	7546.6	7272.4	7056.9	-13.1	-2.8
	Reimbursement	1403.3	1354.0	1333.6	1328.2	1258.7	-10.3	-2.2
	Markup	5.79	5.72	5.66	5.48	5.61	-3.1	-0.6
27137	Charge	6059.0	5881.0	5746.2	5347.2	5287.1	-12.7	-2.7
	Reimbursement	1058.8	1029.7	1031.2	1002.4	955.9	-9.7	-2.0
	Markup	5.72	5.71	5.57	5.33	5.53	-3.3	-0.7
27138	Charge	6179.2	6078.8	5809.5	5727.1	5486.7	-11.2	-2.3
	Reimbursement	1089.1	1055.9	1047.7	1008.4	987.1	-9.4	-1.9
	Markup	5.67	5.76	5.60	5.66	5.56	-2.0	-0.4
27486	Charge	4853.8	4826.1	4798.3	4649.0	4591.5	-5.4	-1.1
	Reimbursement	1005.6	969.2	961.8	946.2	897.0	-10.8	-2.3
	Markup	4.83	4.98	4.99	4.91	5.12	6.0	1.2
27487	Charge	6386.9	6278.8	6137.7	6126.7	5870.6	-7.4	-1.5
	Reimbursement	1311.2	1274.1	1259.9	1252.9	1178.3	-10.1	-2.1
	Markup	4.83	4.93	4.87	4.89	4.98	3.1	0.6
Total	Charge	6182.5	6230.4	6096.7	5966.2	5785.7	-9.3	-1.9
	Reimbursement	1219.9	1180.7	1169.2	1161.7	1100.0	-9.8	-2.0
	Markup	5.23	5.28	5.21	5.14	5.26	0.5	0.1

Table 2. Number of procedures per million Medicare B enrollees.

CPT	2017	2018	2019	2020	2021	Total % Change	Annual % Change
27134	1018.9	1045.9	1066.6	978.7	1013.7	-0.5	-0.1
27137	368.4	345.3	319.5	287.8	281.9	-23.5	-5.2
27138	389.9	419.1	431.4	397.9	386.0	-1.0	-0.2
27486	984.9	1046.2	1079.7	936.7	974.7	-1.0	-0.2
27487	1472.9	1548.2	1597.3	1424.3	1547.9	5.1	1.0
Total	4235.1	4404.7	4494.5	4025.4	4204.3	-0.7	-0.1