Underutilization of Preoperative Optimization Services Prior to Total Joint Arthroplasty: A National Database Study

Introduction: Preoperative optimization of modifiable risk factors has emerged as an important strategy to improve outcomes following total joint arthroplasty (TJA). Despite increasing emphasis on risk stratification and medical optimization, national utilization of dedicated CMS-recognized preoperative optimization services remains unclear. This study evaluated contemporary patterns in the use of CPT codes 99424, 99425, 99426, and 99427 prior to arthroplasty and examined variation by procedure type, geographic region, payer type, comorbidity burden, and year.

Methods: A national all-payer database was queried for patients undergoing primary and revision total knee arthroplasty (TKA), total hip arthroplasty (THA), and primary unicompartmental knee arthroplasty (UKA). Preoperative optimization was defined as CPT codes 99424–99427 billed within 90 days prior to surgery. Utilization rates were calculated per 1,000 procedures using total TJAs from 2021–2023 as the denominator, corresponding to the availability of these codes. Rates were stratified by procedure type, geographic region, payer, and Elixhauser Comorbidity Index (ECI).

Results: Among 719,835 procedures, 184 patients received preoperative optimization (0.26 per 1,000). Utilization was slightly higher in primary THA (0.293) and TKA (0.237), and lower in revision cases. Regional variation was observed, with highest use in the West (0.650) and lowest in the Midwest (0.041). Rates were highest among Medicaid (0.485) and Medicare (0.446) beneficiaries. Mean ECI did not differ between optimized and non-optimized patients (5.58 vs 5.58, $p = 0.975$). Utilization was minimal before 2022 but increased >2,000% from 2022 to 2023, with a rising linear trend ($\beta = 50.8$ encounters/year).

Conclusion: National utilization of CMS-recognized preoperative optimization services prior to arthroplasty remains exceedingly low, despite recent growth. Substantial regional and payer-based variation exists, and higher comorbidity burden was not associated with increased use. These findings highlight a significant gap between guideline-supported optimization practices and real-world billing adoption.

Table 1. Annual Utilization of Preoperative Optimization

Year	Optimization (n)	No Optimization (n)	Optimization Rate (/1000 procedures)
2020	0	267,409	0.000
2021	0	318,623	0.000
2022	22	325,155	0.068
2023	162	112,649	1.436

Figure 1: Distribution of Preoperative Optimization CPT Codes (99424–99427) Prior to Total Joint Arthroplasty