Quantifying the &Idquo;Lemon Drop” Effect Among Medicare Patients with Periprosthetic Joint Infection

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INTRODUCTION: Decreasing compensation for complex total joint arthroplasty (TJA) care among Medicare beneficiaries may lead to biased patient selection and avoidance of high-risk patients (ie the “lemon drop” effect). Patients undergoing revision TJA for periprosthetic joint infection (PJI) may be particularly vulnerable. This study quantified temporal trends among the highest risk Medicare beneficiaries undergoing revision TJA for PJI at both teaching and non-teaching hospitals.

METHODS: The Premier Healthcare Database was queried for Medicare patients diagnosed with PJI between 2016 and 2023 who underwent stage-one antibiotic spacer placement of PJI of the hip or knee. ICD-10 procedural codes and hospital charges for antibiotics and spacers were used to identify patients. Patients were classified based on whether they had their surgery performed at a teaching vs non-teaching hospital. Comorbidity burden was measured via Elixhauser Comorbidity Index (EI) and “lemons” (high-risk patients) were categorized as an EI >95th percentile (EI >9) of the group average. Average annual change in EI and prevalence of high-risk patients were compared between hospital types using Chow’s test on linear regression models and chi-squared tests. Patient demographics were compared via Student’s t-test.

RESULTS: Of 32,321 PJI patients, 16,723 (51.7%) were treated at teaching hospitals, who on average had longer hospital stays (8.4 ± 7.6 vs. 7.2 ± 6.1 days, p<0.001) and incurred more costs per admission ($31,730.9 ± 25,389.2 vs. $28,591.2 ± 24,379.3, p<0.01) than patients at non-teaching hospitals. The proportion of high-risk PJI patients treated at teaching hospitals was significantly greater at teaching vs nonteaching hospitals (6.92% vs 5.14%, p<0.001) and the disparity between these proportions increased annually from 2016–2023. (Figure 1) There was an overall increase in EI for PJI patients treated at teaching hospitals over the study period (4.07 to 4.55) and each year, the average EI at teaching hospitals was significantly greater than at non-teaching hospitals (p<0.001). (Figure 2)

DISCUSSION AND CONCLUSION: Teaching hospitals are treating the highest risk PJI patients at an increasingly higher rate, reflecting biased selection among Medicare beneficiaries. If this widening trend persists, increasing financial strain on systems may limit access to care among the highest risk patients.

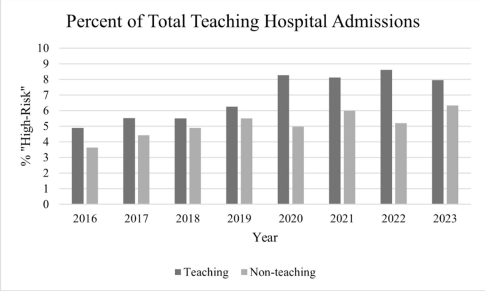

Figure 1. The proportion of high-risk “lemon-dropped” periprosthetic joint infection (PJI) Medicare patients is significantly greater at teaching hospitals compared to non-teaching hospitals from 2016-2023.

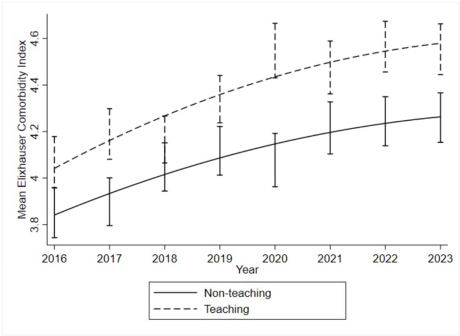

Figure 2. Trends in mean Elixhauser Comorbidity Index in Medicare patients with periprosthetic joint infection (PJI) between teaching and non-teaching hospitals from 2016-2023.