Bundled Medicare Payment Model is Associated with Lemon Dropping of High-Risk Patients Total Joint Arthroplasty Patients at Teaching Hospitals

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INTRODUCTION:

The Comprehensive Care for Joint Replacement (CJR) Medicare model may not adequately compensate for increased resource utilization in complex total joint arthroplasty (TJA) cases, raising concern for potential biased selection of healthier patients ("cherry-picking") and avoidance of complex or high-comorbidity patients ("lemon-dropping"). This study quantified national trends among Medicare beneficiaries undergoing TJA, comparing comorbidity characteristics at teaching versus non-teaching hospitals.

METHODS:

The Premier Healthcare Database was queried for adult patients (≥65 years) who underwent total knee (TKA) or total hip arthroplasty (THA) from 2015 to 2021. Patients with Medicare insurance reimbursement were examined at teaching and non-teaching hospitals. Elixhauser Comorbidity Index (EI) was determined using International Classification of Disease, Tenth Revision and Current Procedural Terminology codes. High-risk ("lemon-dropped") patients were defined as EI above the 95th and 99th percentiles. Average EI was examined by year. Univariate analysis was performed to assess the impact of hospital type on the proportion of high-risk patients in each cohort.

RESULTS:

Of the 686,229 patients identified with Medicare, "lemon-dropped" patients comprised 6.67% (95th percentile) and 1.23% of their respective cohorts (99th percentile). The percentage of high-risk patients was significantly greater at teaching hospitals compared to non-teaching hospitals (95th percentile: 7.39% vs 6.16% and 99th percentile: 1.43% vs 1.10%; $p < 0.001$ for all) and this disparity increased annually. (Figure 1) There was an overall increase in EI for TJA patients at teaching hospitals between 2016 and 2023. (Figure 2)

DISCUSSION AND CONCLUSION:

High-risk patients comprise a significantly greater proportion of the TJA population at teaching hospitals compared to non-teaching hospitals, quantifying the increased burden of a sicker "lemon-dropped" cohort at teaching hospitals since the introduction of the CJR model in 2016. Medicare reimbursement models should incorporate stratification-based payment strategies that account for this population's increased healthcare needs, ensuring protected hospital spending and equitable TJA access for high comorbidity patients.
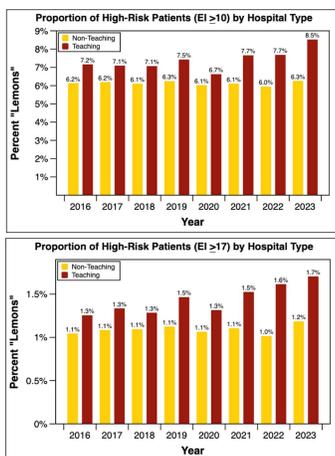

Figure 1. The proportion of "lemon-dropped" patients defined as either (EI ≥10) or (EI ≥ 17) is significantly greater at teaching hospitals compared to non-teaching hospitals in the Medicare cohort. Due to the integer nature of EI, these thresholds span multiple percentile levels, resulting in an increase in the proportion of patients at or above these thresholds.
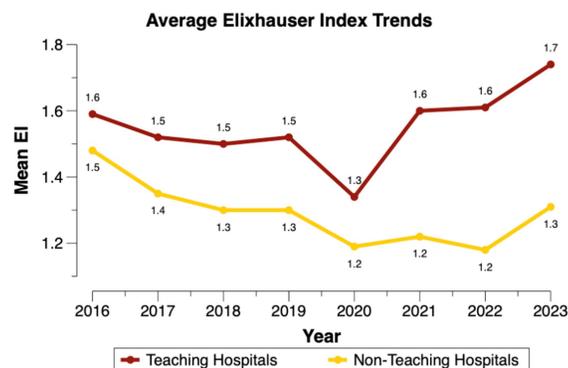

Figure 2. Trends in Elixhauser Index between 2016-2023 in Medicare Patients