

Will Arthroplasty Demand Outpace Surgeon Capacity? Total Joint Arthroplasty Procedure-to-Surgeon Ratios by State from 2013 to 2019

Oluwapeyibomi Ireoluwapelumi Runsewe, Precious Chiedozi Oyem, Pedro Javier Rullan, Matthew Edward Deren¹, Trevor G Murray, Robert M Molloy, Nicolas Santiago Piuizzi

¹Cleveland Clinic

INTRODUCTION:

Total Hip and Total Knee Arthroplasties (THA, TKA) are two of the most common elective procedures performed in the US today. Recent studies project increasing utilization for these procedures and highlight concern for the arthroplasty surgeon workforce to meet this growing demand. Therefore, this study aims to characterize shifts in the state-level ratio of orthopaedic surgeons to Total Joint Arthroplasty (TJA) procedures in United States.

METHODS:

We examined Medicare annual claims and payments to orthopaedic surgeons performing TJAs from 2013 to 2019 using the Medicare Provider Utilization and Payment Data: Physician and Other Practitioners Dataset. The Healthcare Common Procedure Coding System was used to extract associated claims, procedure volume, and provider information by state for both primary and revision THA and TKA. Trend analyses were performed with 2-sided correlated Mann-Kendall tests. All analyses were conducted, and statistical significance was set at $P < 0.05$.

RESULTS: Between 2013 and 2019, the nationwide THA procedure to THA performing-orthopaedic surgeon ratio grew 114% from 30.2 to 34.5 procedures per surgeon, while the TKA procedure to TKA-performing orthopaedic surgeon ratio grew 113% from 37.7 to 42.5 procedures per surgeon. Delaware, New Hampshire, Maryland, Florida, and Massachusetts had the highest average number of THA procedures per THA-performing orthopaedic surgeon (46.0, 39.0, 38.6, 37.8, and 37.7, respectively) while Wyoming, Minnesota, Louisiana, Wisconsin, and New Mexico had the lowest number of THA procedures per THA-performing orthopaedic surgeon (17.1, 23.5, 24.7, 25.1, and 26.5, respectively). Delaware, Kansas, Missouri, South Carolina, and Nebraska had the highest average number of TKA procedures per TKA-performing orthopaedic surgeon (67.2, 51.8, 49.6, 47.9, and 47.6, respectively) while Wyoming, Alaska, Minnesota, Wisconsin, and Rhode Island had the lowest number of TKA procedures per TKA-performing orthopaedic surgeon (22.6, 23.9, 24.9, 31.3, and 32.5, respectively).

Vermont, Missouri, Montana, South Dakota, and New Mexico had the highest increase in number of THA procedures per THA-performing orthopaedic surgeon (167, 145, 141, 140, and 138 percent, respectively) while Alaska, Connecticut, Maine, Michigan, and Hawaii had the lowest increase in number of THA procedures per THA-performing orthopaedic surgeon (80, 91, 92, 99, and 100 percent, respectively). Vermont, Wyoming, Rhode Island, Delaware, and Minnesota had the highest increase in number of TKA procedures per TKA-performing orthopaedic surgeon (150, 146, 137, 136, and 133 percent, respectively) while West Virginia, Alaska, Alabama, Utah, and Montana had the lowest increase in number of TKA procedures per TKA-performing orthopaedic surgeon (92, 95, 97, 99, 99 percent, respectively).

DISCUSSION AND CONCLUSION:

The ratio of THA procedures to THA providers and TKA procedures to TKA providers grew 114% and 113%, respectively, between 2013 and 2019. Delaware, New Hampshire, Maryland, Florida, and Massachusetts had the highest procedure to orthopaedic surgeon provider ratio while Wyoming, Minnesota, Louisiana, Wisconsin, and New Mexico had the lowest. Delaware, Kansas, Missouri, South Carolina, and Nebraska had the highest procedure to orthopaedic surgeon provider ratio while Wyoming, Alaska, Minnesota, Wisconsin, and Rhode Island had the lowest. An increasing trend in the ratios for both THA and TKA was seen in around half of the US states.

The significant shortage of trained providers during COVID-19 highlights the importance of managing the pool of available trained personnel using an evidence-based approach. Though osteoarthritis sequelae may not surmount the morbidity and mortality of a devastating pandemic, the progression of the orthopaedic surgeon workforce shortage risks a potential system-wide compensation. It also brings into question the value of care to be provided as future TJA volumes indicate the number of TJAs performed per surgeon will have to double by 2050 to meet projected demand. Though we utilized primary TJA to measure a common procedure performed by providers across multiple subspecialties, this may underestimate the actual shortage, given the presence of highly subspecialized providers with practices lacking TJA. Considering the rapidly increasing pace of TJA procedure-to-surgeon ratio projections, increased attention on planning and resource allocation in Orthopaedic Surgeon training will allow the field to meet TJA needs across the US, while maintaining quality in a value-driven healthcare model.

Table 1. Total/TEA Primary and Revision Procedures per TPA (TEA Billing Orthopaedic Surgeon)

Year	Total Procedures	TEA ¹ Procedures	TEA ² Procedures	TEA ³ Surgeries Total	TEA ⁴ Surgeries Total	TEA ⁵ Surgeries Total	PPH (TEA)	PPH (TEA)	PPH (TEA)	% Change PPH (TEA)	% Change PPH (TEA)	% Change PPH (TEA)
2013	115590	263696	379286	3833	6990	10823	30.2	37.7	35.0	NA	NA	NA
2014	119503	255126	374629	3997	6806	10763	30.2	37.5	34.8	100.1	99.4	99.3
2015	127038	264474	391512	4041	6939	10980	31.4	38.1	35.7	104.2	101.0	101.7
2016	135752	285253	421005	4214	7078	11292	32.2	40.3	37.3	106.8	106.8	106.4
2017	140632	288456	430088	4253	7053	11306	33.1	41.0	38.0	109.6	108.8	108.5
2018	147537	292908	440445	4353	7035	11388	33.9	41.6	38.7	112.4	110.4	110.4
2019	155345	299578	454923	4504	7057	11561	34.5	42.5	39.3	114.4	112.5	112.3

¹TEA: Total/TEA Orthopaedics, ²TEA: Total/TEA Orthopaedics, ³TEA: Total/TEA Orthopaedics, ⁴TEA: Procedures by Surgeon/Total