

Utilization of Total Knee Arthroplasty in the United States by Settlement Type: Is there Equity of Access?

Precious Chiedozie Oyem, Oluwapeyibomi Ireoluwapelumi Runsewe, Pedro Javier Rullan, Ignacio Pasqualini, Viktor Erik Krebs, Trevor G Murray, Matthew Edward Deren¹, Robert M Molloy, Nicolas Santiago PiuZZi

¹Cleveland Clinic

INTRODUCTION: Total knee arthroplasty (TKA) is the most common joint replacement surgery performed per year with over 600,000 performed annually. The literature is littered with investigations assessing the patterns of utilization of TKAs by age, gender, race, and socioeconomic class. However, little information exists regarding utilization of TKA as it relates to settlement types, specifically the number of surgeons that perform the procedure in these areas. The aim of the study is to quantify the number of surgeons performing TKAs in each settlement type in the United States, as well as the presence of trends in the number of surgeons and procedures by settlement type.

METHODS:

We retrospectively queried the Medicare Provider Utilization and Payment Data: Physician and Other Practitioners Dataset to quantify all physicians reporting orthopaedic surgery as their specialty and performing primary and/or revision TKA from 2013 through 2020. This database contains all services rendered to Medicare beneficiaries except surgeons whose aggregated procedures were fewer than 11 to protect patient confidentiality. The data set is aggregated by Healthcare Common Procedure Coding System (HCPCS) code and includes provider information and billing volume. HCPCS codes used to designate primary and revision TKA procedures were used to extract associated utilization and billing provider information. Rural-urban commuting area codes (RUCA) classify US census tracts using measures of urbanization, population density, and daily commuting from the decennial census. These RUCA codes were used to classify settlement types into 4 groups: Urban/Metropolitan, Micropolitan (Large Town), Small town, and Rural. Providers for which no RUCA codes were entered for billing were classified as unknown. Statistical analyses were performed. Trend analyses were performed with 2-sided correlated Mann-Kendall tests to evaluate trends in settlement types where TKAs in the United States took place.

RESULTS:

Between the years of 2013 and 2020, overall 6,206 to 7,192 surgeons billed for primary and/or revision TKA (Table 1). Of this number, an average of 85.2% took place in urban/metropolitan areas, 11.5% took place in micropolitan areas, 2.6% took place in small towns, and 0.6% took place in rural areas.

Averaged over all 9 years, urban/metropolitan areas had the overall highest median surgeries per year at 28 per year, followed by micropolitan at 25.37, small towns at 21.44, and rural areas at 20.69 (Figure 1).

Over all 9 years, there was no significant trend in the number of billing surgeons in any of the settlement types. Neither was there a significant trend in the median number of TKAs performed in each settlement types (Figure 1).

DISCUSSION AND CONCLUSION:

While there is a considerable difference between the number of surgeons in each settlement type, the median number of surgeries performed in each settlement type annually was not considerably different. Rural America contains 17% of the US population but accounts for only 0.6 to 2.6% of billed TKA surgeries over a 9-year period, revealing a significant mismatch in access to care. Efforts should be made to recruit and retain skilled surgeons to serve these areas in need.

Table 1: Number of Surgeons that billed for Primary and/or Revision TKAs per year by Settlement Type

Settlement Type	2013 (N=7066)	2014 (N=6882)	2015 (N=7004)	2016 (N=7136)	2017 (N=7192)	2018 (N=7087)	2019 (N=7102)	2020 (N=6206)	Trends (P value)
Urban/Metropolitan	5931 (83.9%)	5829 (84.7%)	5954 (85.0%)	6061 (84.9%)	6140 (85.4%)	6065 (85.6%)	6094 (85.8%)	5363 (86.4%)	0.3865
Micropolitan	887 (12.6%)	815 (11.8%)	820 (11.7%)	833 (11.7%)	823 (11.4%)	786 (11.1%)	797 (11.2%)	663 (10.7%)	0.06349
Small Town	192 (2.7%)	182 (2.6%)	187 (2.7%)	195 (2.7%)	183 (2.5%)	184 (2.6%)	171 (2.4%)	142 (2.3%)	0.1078
Rural	39 (0.6%)	44 (0.6%)	35 (0.5%)	40 (0.6%)	40 (0.6%)	42 (0.6%)	36 (0.5%)	34 (0.5%)	0.4544
Unknown	17 (0.2%)	12 (0.2%)	8 (0.1%)	7 (0.1%)	6 (0.1%)	10 (0.1%)	4 (0.1%)	4 (0.1%)	

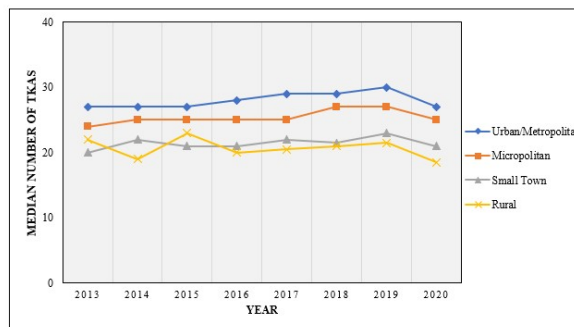


Figure 1: Annual Median Number of TKA by Settlement Type (no significant trend observed)