

# From Birth to Practice: Geographic Migration of U.S. Orthopaedic Surgeons Highlights Opportunities for Workforce Retention and Residency Redistribution

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**INTRODUCTION:** Access to healthcare varies dramatically across the United States, with rural and underserved populations facing significant barriers to timely and specialized care. The proximity of physician training impacts overall workforce distribution; however, this trend has not been evaluated within orthopaedic surgery. This study investigates whether birthplace and training location predict where orthopaedic surgeons practice in the United States.

**METHODS:** 8,676 orthopaedic surgeons who completed residency training between 2004 – 2017 were identified from the American Medical Association (AMA) Physician Masterfile. Demographic and practice data were extracted, including locations of birth, medical school, residency and attending practice as of January 1<sup>st</sup>, 2023. Locations were stratified by state and census division.

**RESULTS:** The cohort represented 94.84% of orthopaedic surgeons trained nationally during the study period when compared to annual ACGME reports. Attendings returning to their state of birth, medical school, or residency to practice were 21.7%, 31.8%, and 33.9%, respectively, with pronounced state-level variability (birthplace: 2.50–47.95%; medical school: 3.94–61.8%; residency: 11.71–63.95%). Indiana (population 6,880,131) trained the fewest residents per capita (1 per 1.15 million), while neighboring Ohio (population 11,824,034) ranked 5<sup>th</sup> nationally (1 per 191,000). Univariate logistic regression revealed significant associations ( $p < 0.01$ ) between practice location and census division at all career stages. Attending distribution per capita showed strong correlations by state ( $R^2 = 0.98$ ) and census division ( $R^2 = 0.99$ ), while birthplace ( $R^2 = 0.71$ ), medical school ( $R^2 = 0.53$ ), and residency ( $R^2 = 0.63$ ) were more moderately associated.

**DISCUSSION AND CONCLUSION:** This study demonstrates that birthplace and training location are strongly predictive of practice location for US orthopaedic surgeons. Although significant geographic inequities exist during training, the distribution of practicing surgeons corrects by population, likely driven by economic incentives, local workforce demands, and market conditions. Importantly, this study also represents the most up-to-date census of orthopaedic surgeons in the United States since 2018. Given the strong statistical association for surgeons to practice near their training location, aligning programs with underserved or high-need areas may offer a potential strategy to reduce regional disparities and improve access to orthopaedic care.

**SIGNIFICANCE AND CLINICAL RELEVANCE:** Our analysis provides an updated census of orthopaedic surgeons in the US, and characterizes their migratory patterns throughout training and into practice. Understanding the factors that influence this distribution allows for more effective future intervention by orthopaedic leadership and policy makers.

**FIGURE LEGEND:** (Top-Left) Proportional depiction of the migration of orthopaedic surgeons from birthplace, training and attending location. (Bottom-Left) Univariate linear regression of the number of orthopaedic surgeons by (A) birthplace, (B) medical school, (C) residency and (D) attending state versus 2023 state population. (Right) Percentage of attendings currently practicing in the state they were (A) born, (B) completed medical school or (C) completed residency.

