## Low-Volume Surgeons Operating at High-Volume Hospitals Have Low Rates of Periprosthetic Joint Infection after Hip and Knee Arthroplasty

Julian Wier, Ryan Christopher Palmer<sup>1</sup>, Sagar Sham Telang, Andrew Anthony Dobitsch, Nathanael D. Heckmann, Jay R Lieberman<sup>2</sup>

<sup>1</sup>Department of Orthopaedic Surgery, <sup>2</sup>Keck School of Medicine of USC INTRODUCTION:

While the impact of surgeon volume and hospital volume on postoperative risk following total joint arthroplasty (TJA) has been described independently, there is a lack of data describing the interplay between these two factors on complication risk. This study aimed to assess the relationship between surgeon volume, hospital volume, and PJI risk following TJA.

METHODS: The Premier Healthcare Database (PHD) was used to retrospectively identify all primary, elective TJAs from October 2015 to December 2021. Restricted cubic splines were used to characterize the relationship between hospital and surgeon volumes and PJI risk. High-volume hospitals were defined using Markov chain Monte Carlo Simulation, which identified a volume beyond which PJI rates no longer decreased significantly with increasing hospital volume. A similar methodology was used to identify low-volume surgeons operating in high- and low-volume hospitals. Multivariable models accounting for potential confounding covariates were created to determine the odds of PJI between cohorts.

RESULTS: 605,254 patients who underwent TJA (total hip arthroplasty [THA]: 37.71%; total knee arthroplasty [TKA]: 62.29%) by low-volume surgeons (<57 THAs and <68 TKAs) were identified and divided into high-volume and low-volume hospitals. Thresholds for high-volume (>508 THA and >812 TKAs) and low-volume (<145 THAs and <243 TKAs) hospitals were defined. After taking confounding variables into account, low-volume surgeons at high-volume hospitals had lower rates of PJI relative to their counterparts at low-volume hospitals (THA: 0.67% vs. 0.80%, aOR=0.69 [95%-confidence interval (CI)=0.54-0.88], p=0.002; TKA: 0.51% vs. 0.69%, aOR=0.73, [95%-CI=0.61-0.87], p=0.007).

DISCUSSION AND CONCLUSION: These results highlight that institutional volume directly mediates the risk of PJI after TJA performed by low-volume surgeons, suggesting that annual hospital volume is a more important consideration when predicting postoperative risk than surgeon volume in isolation.

