

# Projected Volume of Primary and Revision Total Joint Arthroplasty in the United States, 2030-2060

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## INTRODUCTION:

Total joint arthroplasty (TJA) is one of the most commonly performed surgical procedures in the United States. The volume of primary and revision TJA has risen continuously over recent years. To anticipate the future expense of TJA, we developed a model to predict the volume of primary and revision TJA in the United States through 2060.

## METHODS:

Retrospective review of the National Inpatient Sample, a representative sample of hospital discharges within the United States, was performed to determine the volume of primary and revision TJA from 2000 to 2014. Over 116 million records were reviewed to determine annual TJA volume. Procedures were identified by International Classification of Disease, 9th edition, codes corresponding to primary total hip arthroplasty (THA), primary total knee arthroplasty (TKA), revision THA, and revision TKA.

Prevalence of each procedure was determined by combining procedure volume with census data by sex, age, race, and geographic region. Linear regression was performed to project future prevalence of procedures among each subpopulation. Subpopulation prevalences were combined with census projections to predict national procedure volume for 2030-2060. Pairwise correlation assessed consistency among models.

## RESULTS:

Projections for primary and revision TJAs were similar among all five models ( $r = 0.99$ ,  $p < 0.01$ ). By 2030, primary THA is projected to reach 635,000 (171% increase) and primary TKA is projected to reach 1.28 million (189% increase). Revision THA will reach 72,000 (142% increase), and revision TKA will reach 120,000 (190% increase). By 2060, primary THA will reach 1.23 million (330% increase), primary TKA will reach 2.60 million (382% increase), revision THA will reach 110,000 (219% increase), and revision TKA will reach 253,000 (400% increase).

## DISCUSSION AND CONCLUSION:

Prior studies have attempted to project future growth of TJA procedures in the United States. However, previously anticipated exponential growth of TJA procedures is not consistent with current trends. We produced multiple models based on a variety of subpopulations to estimate the volume of TJA procedures through the year 2060. The high correlation among these models validates these predicted values. This data may guide healthcare economic policy and allocation of future surgical resources in order to optimize the delivery of patient care.

