

# Descriptive epidemiology of hip and knee replacement among rheumatoid arthritis patients in England and Wales: variation by age, sex, geography and socioeconomic status

Samuel Hawley, Christopher J. Edwards, Nigel K. Arden, Antonella Delmestri, Cyrus Cooper, Andrew Judge and Daniel Prieto-Alhambra

## Background

Many outcomes of rheumatoid arthritis (RA) have been well characterised for patients within the UK and have allowed comprehensive estimation of the disease burden attributable to RA. Such estimates are important for patients and for planning healthcare provision. However, long-term outcomes such as the incidence of orthopaedic surgery remains less well studied. We aimed to provide descriptive data on rates of total hip (THR) and total knee replacement (TKR) within a large national cohort of incident RA patients, and describe the potential influence of age, sex, geographic region and socio-economic status.

## Methods

Patients with a first diagnosis of RA between 1995-2013 were identified from the Clinical Practice Research Datalink (CPRD). Those with diagnoses of multiple types of inflammatory arthritis were excluded. First occurrence of subsequent primary THR and TKR were identified using validated (to hospital records) Read code lists and patients were followed up until date of first event (THR and TKR analysed separately), death, transference out of CPRD or end of study period. Unadjusted incidence rates were calculated per 1,000 person-years (PYs) and stratified by sex, age category (<55 years, 55-69 years and ≥70 years) geographic region (11 regions) and quintiles of the index of multiple deprivation (IMD) score. We also calculated 5-year cumulative incidence among those surviving 5-years.

## Results

We included 23,830 patients with newly diagnosed RA, of whom 16,779 (70.4%) were female. The average age was 61 (IQR: 50-72) and regional variation ranged from 556 to 3,260. There was a total occurrence of 884 THRs and 1,201 TKRs, at an overall incidence rate per 1,000 PYs (95% C.I.) of 6.26 (5.86-6.69) and 8.62 (8.14-9.12), respectively. Among men, the rates of THR and TKR were 5.10 (4.45-5.85) and 8.57 (8.01-9.16), respectively and among women these were 6.72 (6.24-7.25) and 8.74 (7.86-9.71), respectively. Rates of THR and TKR rose in a monotonic fashion according to age, from 2.96 (2.52-3.46) and 4.82 (4.26-5.45), respectively for patients aged <55 years to 9.53 (8.55-10.62) and 11.32 (10.24-12.52), respectively for patients aged ≥70 years. Rates of THR and TKR decreased in an approximately monotonic fashion according to socio-economic status, from 7.51 (6.47-8.73) and 9.09 (7.92-10.42), respectively for those in the least deprived quintile of IMD to 5.08 (4.03-6.07) and 7.31 (6.02-8.89), respectively for those in the most deprived quintile of IMD. Regional variation ranged from 3.82 (2.22-6.58) to 7.60 (6.35-9.10) for THR and from 6.60 (5.59-7.81) to 10.29 (8.75-12.11) for TKR. The 5-year cumulative incidence was 3.20% (2.89-3.51) and 4.57% (4.20-4.94) for THR and TKR, respectively.

## Conclusion

We provide generalizable estimates of incidence of THR and TKR in the English and Welsh RA patient population, and note variation across several key demographic variables.