

## SUPPLEMENTARY METHODS

WHI data were linked to Centers for Medicare and Medicaid Services (CMS) data using social security numbers, birth dates, and death dates, with 97% of WHI participants successfully linked. This study included women who aged into Medicare and were continuously fee-for-service beneficiaries (i.e., enrolled in Medicare Part A or Parts A and B) from study baseline until the end of follow-up in 2012. Women who were enrolled in a Medicare managed care plan at any time during follow-up were not considered for inclusion in this study, because claims data are incomplete for managed care participants.

Procedure and diagnosis codes from the Medicare Provider Analysis and Review (MedPAR) data file, which includes hospitalization discharge data for fee-for-service beneficiaries, were used to identify TJR for hip or knee OA. THR and TKR were identified by *International Classification of Diseases (Ninth Revision, Clinical Modification [ICD-9-CM])* procedure codes 81.51 and 81.54, respectively. A principal diagnosis for OA (*ICD-9* diagnosis code 715.xx; see Supplementary Table 1) at the time of the TJR must have also been present. Revision procedures for THR (*ICD-9-CM* codes 81.53, 00.70, 00.71, 00.72, 00.73) and TKR (*ICD-9-CM* codes 81.55, 00.80, 00.81, 00.82, 00.83, 00.84) were also identified.

In total, 2,684 THR and 5,199 TKR procedures were initially identified (Supplementary Figures 1 and 2). THR (n=471) and TKR (n=825) with diagnosis codes for metastatic or bone cancer, joint infection, fractures, rheumatoid arthritis, or traumatic arthritis at the time of TJR were excluded (Supplementary Table 1) [1,2]. THR (n=4) or TKR (n=26) that occurred within a 30-day window were excluded, since it is not possible to determine from Medicare data whether two TJR that occur in this time frame are separate bilateral procedures or whether the second procedure represents a complication due to the initial procedure [1]. To make this analysis

exclusive to elective procedures, THR (n=41) or TKR (n=59) occurring after transfer from an emergency department or an acute-care hospital were excluded [1,2]. Women who self-reported at study baseline having previously received a joint replacement (n=274 for THR; n=400 for TKR), those with missing physical activity data (n=76 for THR; n=161 for TKR), and those whose first THR (n=320) or TKR (n=517) occurred after age 84 were excluded. Finally, women with missing information on mobility and physical function around the time of their 85<sup>th</sup> birth year (n=358 for THR; n=683 for TKR) were excluded. Women with missing late-life functional data were more likely to be obese, non-white, less educated, and non-married at baseline. They were also more likely to have lower income, depressive symptoms, mobility limitation, fair or poor self-rated health, and severe joint pain/stiffness at baseline. In the final analytic cohort, there were 2,818 women with TJR (N=1,034 with 1,247 THR and N=1,986 with 2,551 TKR).

## REFERENCES

1. Cram P, Lu X, Kates SL, Singh JA, Li Y, Wolf BR. Total knee arthroplasty volume, utilization, and outcomes among Medicare beneficiaries, 1991-2010. *JAMA* 2012;308:1227-1236.
2. Singh JA, Lu X, Rosenthal GE, Ibrahim S, Cram P. Racial disparities in knee and hip total joint arthroplasty: an 18-year analysis of national Medicare data. *Ann Rheum Dis* 2014;73:2107-2115.

Supplementary Table 1. International Classification of Diseases (Ninth Revision, Clinical Modification [ICD-9 CM]) diagnosis codes

Condition	ICD-9 Diagnosis Codes
Knee Osteoarthritis	715.00, 715.09, 715.10, 715.16, 715.20, 715.26, 715.30, 715.36, 715.80, 715.89, 715.90, 715.96
Bone cancer (knee)	170.7, 170.8, 170.9
Metastatic cancer (bone)	198.5
Joint infection (knee) at time of surgery	711.00, 711.06, 711.09, 711.10, 711.16, 711.19, 711.20, 711.26, 711.29, 711.30, 711.36, 711.39, 711.40, 711.46, 711.49, 711.50, 711.56, 711.59, 711.60, 711.66, 711.69, 711.70, 711.76, 711.79, 711.80, 711.86, 711.89, 711.90, 711.96, 711.99
Fracture (lower leg [knee])	821.00, 821.10, 821.20, 821.21, 821.22, 821.23, 821.29, 821.30, 821.31, 821.32, 821.33, 821.39, 822.0, 822.1, 823.00, 823.01, 823.02, 823.10, 823.11, 823.12, 823.20, 823.21, 823.22, 823.30, 823.31, 823.32,

---

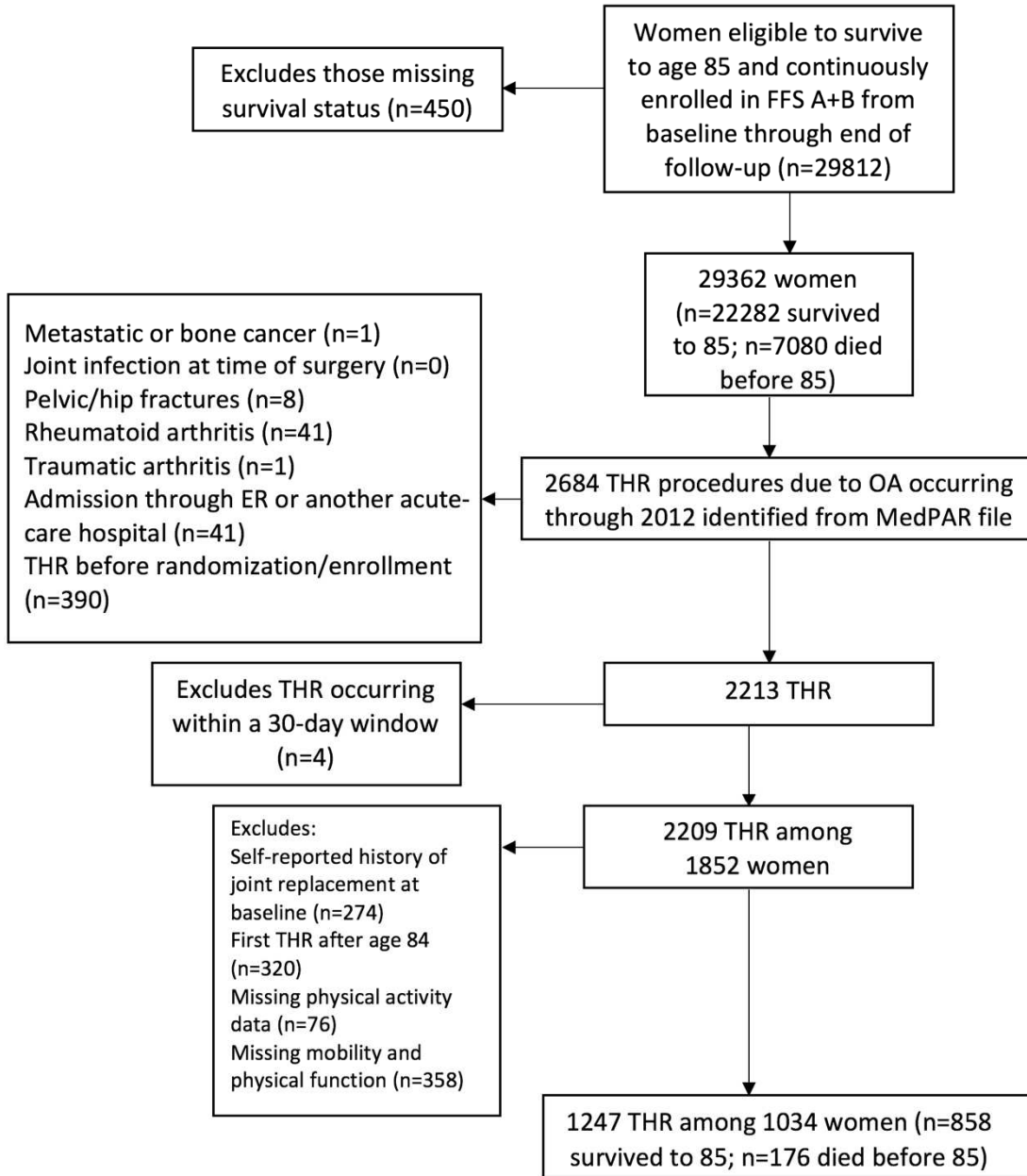
	823.40, 823.41, 823.42, 823.80, 823.81, 823.82, 823.90, 823.91, 823.92, 827.0, 827.1, 905.4, V5414, V5416, V5424, V5426
Traumatic arthritis (knee)	716.10, 716.16, 716.19
Hip osteoarthritis	715.00, 715.09, 715.10, 715.15, 715.20, 715.25, 715.30, 715.35, 715.80, 715.89, 715.90, 715.95
Bone cancer (hip)	170.6, 170.9
Metastatic cancer (bone)	198.5
Joint infection (hip) at time of surgery	711.00, 711.05, 711.09, 711.10, 711.15, 711.19, 711.20, 711.25, 711.29, 711.30, 711.35, 711.39, 711.40, 711.45, 711.49, 711.50, 711.55, 711.59, 711.60, 711.65, 711.69, 711.70, 711.75, 711.79, 711.80, 711.85, 711.89, 711.90, 711.95, 711.99
Pelvic fracture (hip)	808.0, 808.1, 808.2, 808.3, 808.41, 808.42, 808.43, 808.44, 808.49, 808.51, 808.52, 808.53, 808.54, 808.59, 808.8, 808.9

---

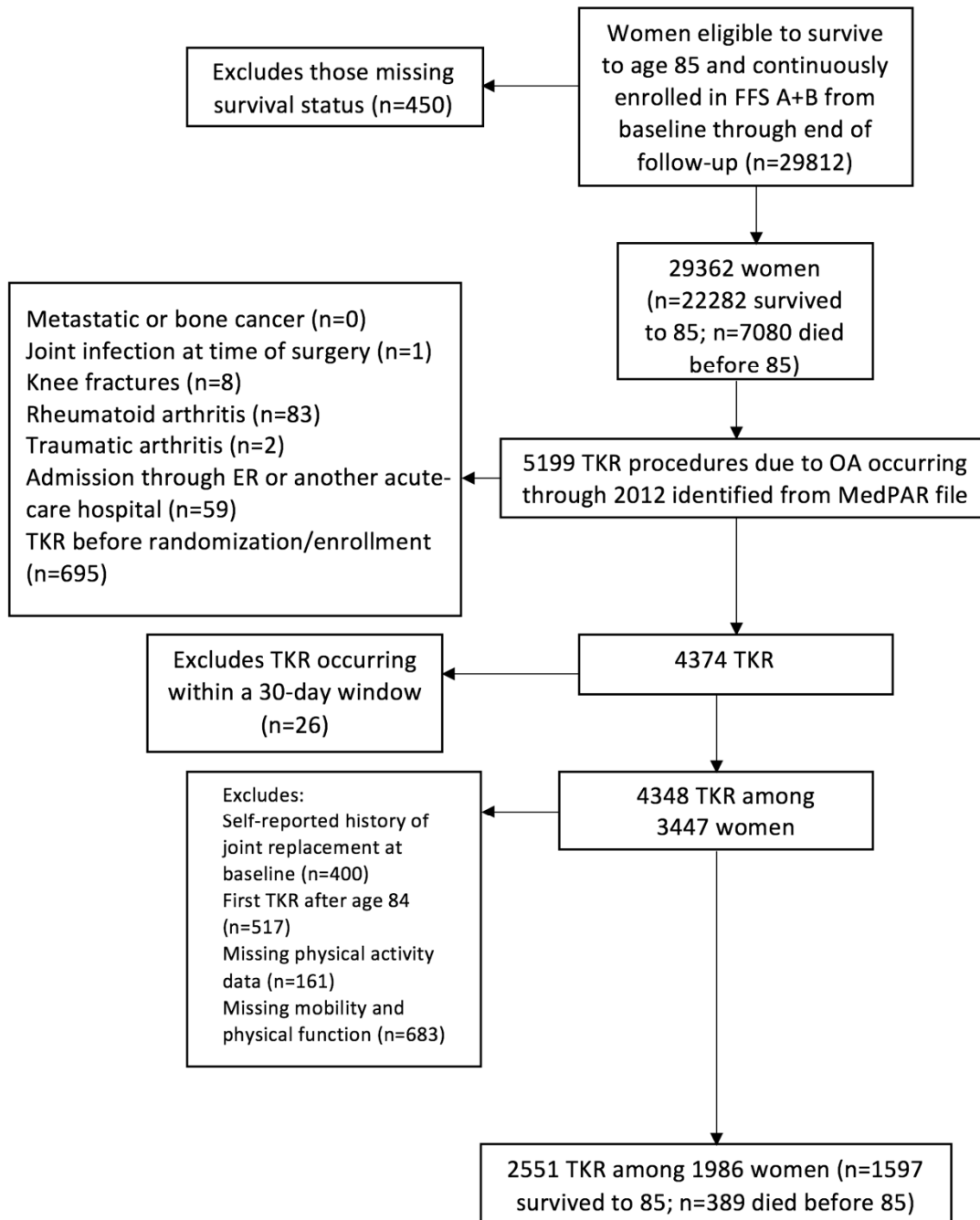
---

Femoral neck fracture (hip fracture)	820.00, 820.01, 820.02, 820.03, 820.09, 820.10, 820.11, 820.12, 820.13, 820.19, 820.20, 820.21, 820.22, 820.30, 820.31, 820.32, 820.8, 820.9, 9053, V5413, V5423
Traumatic arthritis (hip)	716.10, 716.15, 716.19
Rheumatoid arthritis/other inflammatory arthritis	714.0, 714.1, 714.2, 714.4, 714.81, 714.89, 714.9

---



Supplementary Figure 1: Derivation of Final Analytic Sample: Total Hip Replacement Cohort. FFS, fee-for-service; OA, osteoarthritis; THR, total hip replacement.



Supplementary Figure 2: Derivation of Final Analytic Sample: Total Knee Replacement Cohort.  
FFS, fee-for-service; OA, osteoarthritis; TKR, total knee replacement.