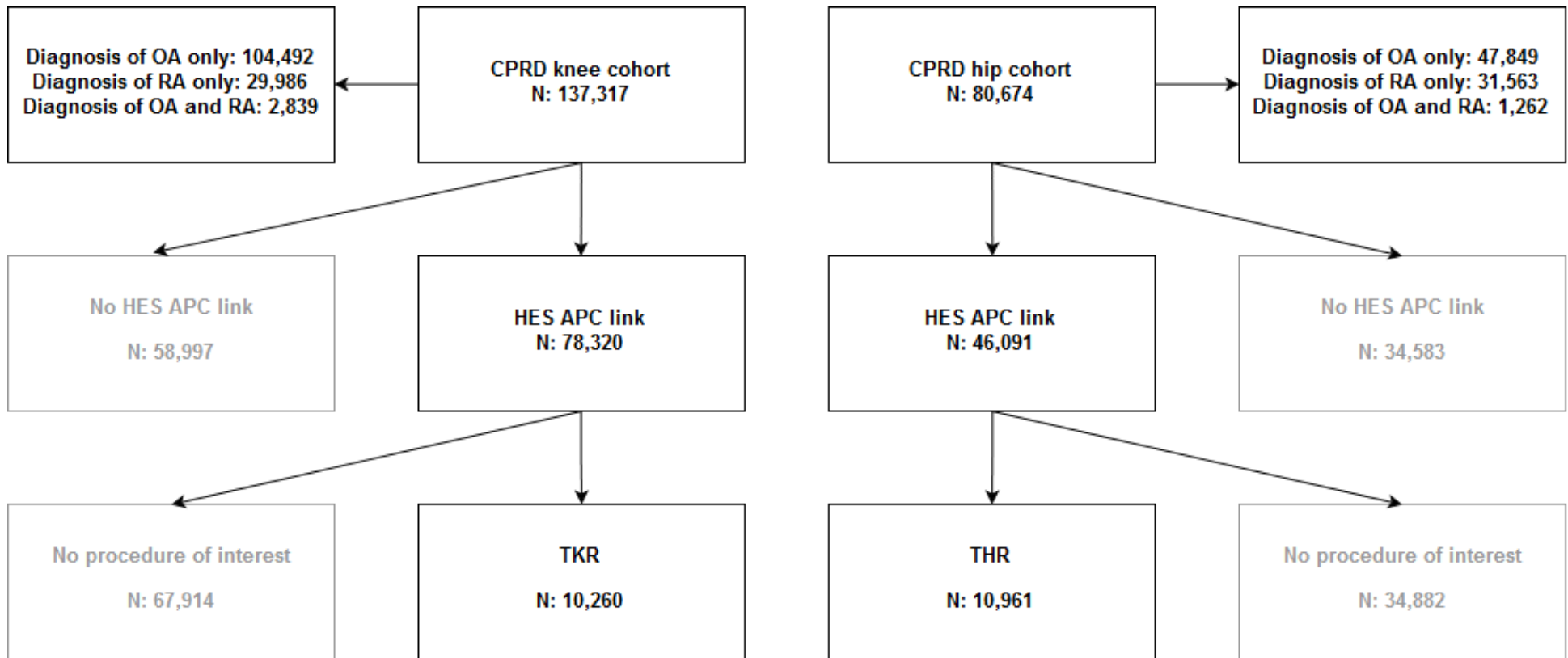


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STUDY INCLUSION



## FULL MODEL SPECIFICATIONS

Total knee replacement

*Venous thromboembolism (90 days)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.01 (0.98 to 1.03)	1.01 (0.98 to 1.03)
Gender:			
Male		1.04 (0.67 to 1.60)	1.02 (0.66 to 1.58)
Diagnosis:			
RA	0.70 (0.29 to 1.74)	0.71 (0.29 to 1.76)	0.70 (0.28 to 1.74)
Year of surgery		0.99 (0.93 to 1.05)	0.98 (0.93 to 1.04)
Charlson: 1+			1.32 (0.81 to 2.14)

Hazard ratios for venous thromboembolism over ninety days following total knee replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Myocardial infarction (90 days)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.11 (1.06 to 1.16)	1.11 (1.06 to 1.16)
Gender:			
Male		3.96 (1.80 to 8.71)	3.88 (1.76 to 8.55)
Diagnosis:			
RA	2.69 (1.10 to 6.59)	3.57 (1.45 to 8.80)	3.54 (1.44 to 8.73)

Year of surgery	0.95 (0.87 to 1.04)	0.94 (0.86 to 1.04)
Charlson: 1+		1.37 (0.62 to 3.04)

Hazard ratios for myocardial infarction over ninety days following total knee replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Death (90 days)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.10 (1.06 to 1.14)	1.09 (1.05 to 1.14)
Gender: Male		1.47 (0.82 to 2.63)	1.38 (0.77 to 2.47)
Diagnosis: RA	0.77 (0.24 to 2.47)	0.85 (0.26 to 2.74)	0.82 (0.25 to 2.64)
Year of surgery		0.92 (0.86 to 0.99)	0.90 (0.84 to 0.97)
Charlson: 1+			2.65 (1.45 to 4.82)

Hazard ratios for death over ninety days following total knee replacement associated with explanatory variables. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Revision of total knee replacement (10 years)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		0.96 (0.94 to 0.97)	0.96 (0.94 to 0.97)
Gender: Male		1.32 (1.04 to 1.68)	1.32 (1.04 to 1.68)
Diagnosis: RA	0.79 (0.49 to 1.28)	0.71 (0.43 to 1.14)	0.71 (0.44 to 1.15)

Year of surgery	0.99 (0.95 to 1.02)	0.99 (0.95 to 1.02)
Charlson: 1+		0.91 (0.66 to 1.25)

Hazard ratios for revision over ten years following total knee replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

Total hip replacement

*Venous thromboembolism (90 days)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		0.98 (0.97 to 1.00)	0.98 (0.97 to 1.00)
Gender:			
Male		0.89 (0.61 to 1.31)	0.89 (0.61 to 1.30)
Diagnosis:			
RA	0.77 (0.31 to 1.89)	0.74 (0.30 to 1.83)	0.74 (0.30 to 1.81)
Year of surgery		0.91 (0.87 to 0.95)	0.91 (0.87 to 0.95)
Charlson: 1+			1.19 (0.74 to 1.91)

Hazard ratios for venous thromboembolism over ninety days following total hip replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Death (90 days)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
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Age		1.13 (1.09 to 1.16)	1.12 (1.09 to 1.15)
Gender: Male		1.95 (1.21 to 3.17)	1.81 (1.12 to 2.94)
Diagnosis: RA	1.85 (0.85 to 4.05)	2.31 (1.05 to 5.07)	2.17 (0.98 to 4.77)
Year of surgery		0.91 (0.86 to 0.96)	0.89 (0.84 to 0.94)
Charlson: 1+			2.52 (1.53 to 4.15)

Hazard ratios for death over ninety days following total hip replacement associated with explanatory variables. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Revision of total hip replacement (10 years)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		0.99 (0.98 to 1.00)	0.99 (0.98 to 1.00)
Gender: Male		1.14 (0.90 to 1.45)	1.13 (0.89 to 1.43)
Diagnosis: RA	1.63 (1.07 to 2.48)	1.64 (1.08 to 2.50)	1.61 (1.06 to 2.46)
Year of surgery		1.01 (0.97 to 1.04)	1.00 (0.97 to 1.04)
Charlson: 1+			1.29 (0.96 to 1.73)

Hazard ratios for revision over 10 years following total hip replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

## ADVERSE OUTCOMES AT 1 YEAR

Total knee replacement

*Venous thromboembolism (1 year)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.01 (0.99 to 1.03)	1.01 (0.99 to 1.03)
Gender:			
Male		1.15 (0.79 to 1.68)	1.13 (0.77 to 1.66)
Diagnosis:			
RA	0.77 (0.36 to 1.66)	0.77 (0.36 to 1.67)	0.76 (0.35 to 1.65)
Year of surgery		0.95 (0.90 to 1.00)	0.94 (0.90 to 0.99)
Charlson: 1+			1.41 (0.92 to 2.16)

Hazard ratios for venous thromboembolism (VTE) over one year following total knee replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*MI (1 year)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.06 (1.04 to 1.09)	1.06 (1.03 to 1.09)
Gender:			
Male		3.06 (1.91 to 4.90)	2.96 (1.85 to 4.75)
Diagnosis:			
RA	2.37 (1.33 to 4.22)	3.02 (1.68 to 5.41)	2.99 (1.67 to 5.36)

Year of surgery	0.97 (0.92 to 1.03)	0.96 (0.90 to 1.02)
Charlson: 1+		1.81 (1.12 to 2.91)

Hazard ratios for myocardial infarction (PJI) over one year following total knee replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Death (1 year)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.10 (1.07 to 1.13)	1.10 (1.07 to 1.13)
Gender: Male		1.56 (1.08 to 2.24)	1.51 (1.05 to 2.17)
Diagnosis: RA	1.37 (0.77 to 2.44)	1.54 (0.86 to 2.75)	1.52 (0.85 to 2.71)
Year of surgery		0.92 (0.88 to 0.97)	0.91 (0.87 to 0.96)
Charlson: 1+			1.64 (1.10 to 2.43)

Hazard ratios for death over one year following total knee replacement associated with explanatory variables. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

Total hip replacement

*Venous thromboembolism (1 year)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		0.98 (0.97 to 1.00)	0.98 (0.97 to 1.00)



Gender:			
Male		1.01 (0.71 to 1.42)	1.00 (0.71 to 1.41)
Diagnosis:			
RA	0.77 (0.34 to 1.74)	0.76 (0.33 to 1.72)	0.74 (0.32 to 1.68)
Year of surgery		0.93 (0.89 to 0.97)	0.92 (0.89 to 0.96)
Charlson: 1+			1.41 (0.93 to 2.12)

Hazard ratios for venous thromboembolism (PJI) over one year following total hip replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

*Myocardial infarction (1 year)*

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.07 (1.04 to 1.09)	1.07 (1.04 to 1.09)
Gender:			
Male		1.52 (0.99 to 2.33)	1.47 (0.96 to 2.26)
Diagnosis:			
RA	1.43 (0.66 to 3.09)	1.60 (0.74 to 3.48)	1.54 (0.71 to 3.34)
Year of surgery		0.95 (0.91 to 1.01)	0.95 (0.90 to 1.00)
Charlson: 1+			1.71 (1.07 to 2.74)

Hazard ratios for myocardial infarction over one year following total hip replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

Death (1 year)

	Unadjusted model	Multivariable (age, gender, and year of surgery) model	Multivariable (age, gender, year of surgery, and RCS Charlson*) model
Age		1.11 (1.09 to 1.13)	1.11 (1.09 to 1.13)
Gender: Male		1.32 (0.96 to 1.82)	1.23 (0.89 to 1.70)
Diagnosis: RA	2.34 (1.46 to 3.73)	2.60 (1.62 to 4.17)	2.46 (1.53 to 3.95)
Year of surgery		0.96 (0.92 to 1.00)	0.94 (0.91 to 0.98)
Charlson: 1+			2.45 (1.77 to 3.39)

Hazard ratios for death over one year following total hip replacement associated with explanatory variables. Hazard ratios are cause-specific after accounting for the competing risk of death. \*RA codes were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.

RESULTS AFTER EXCLUDING INDIVIDUALS WITH DIAGNOSIS OF BOTH OA AND RA

*Adverse events following TKR and THR*

	OA		RA	
	Number of events	Cumulative incidence (%)	Number of events	Cumulative incidence (%)
<b>TKR</b>				
<i>90 day</i>				
VTE	79	0.86 (0.67 to 1.05)	1	0.17 (0.00 to 0.50)
PJI	17	0.19 (0.10 to 0.27)	0	0.00 (0.00 to 0.00)
MI	24	0.28 (0.17 to 0.39)	4	0.68 (0.01 to 1.34)
Death	43	0.46 (0.33 to 0.60)	2	0.33 (0.00 to 0.78)
<i>10 year</i>				
Revision	248	5.73 (4.63 to 6.82)	13	5.51 (0.80 to 10.00)
<b>THR</b>				
<i>90 day</i>				
VTE	106	1.05 (0.85 to 1.25)	4	0.91 (0.02 to 1.80)
PJI	12	0.12 (0.05 to 0.18)	1	0.23 (0.00 to 0.68)
MI	31	0.32 (0.21 to 0.44)	1	0.24 (0.00 to 0.70)

Death	61	0.60 (0.45 to 0.75)	6	1.33 (0.27 to 2.38)
<i>10 year</i>				
Revision	255	5.55 (4.68 to 6.41)	18	9.13 (3.66 to 14.29)

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Number and cumulative incidence of venous thromboembolism (VTE), prosthetic joint infection (PJI), myocardial infarction (MI) and death following total knee replacement (TKR) and total hip replacement (THR) split by index diagnosis of osteoarthritis (OA) or rheumatoid arthritis (RA).

Association between RA and risk of post-operative adverse events

Estimated effect of RA compared to OA (Hazard ratio (95% CI))

	Unadjusted model	Multivariable model with age, gender, and year of surgery included	Multivariable model with age, gender, year of surgery, and RCS Charlson* included
<b>TKR</b>			
<i>90 day</i>			
VTE	-	-	-
PJI	-	-	-
MI	-	-	-
Death	-	-	-
<i>10 year</i>			
Revision	0.76 (0.44 to 1.33)	0.66 (0.37 to 1.16)	0.66 (0.37 to 1.16)
<b>THR</b>			
<i>90 day</i>			
VTE	-	-	-
PJI	-	-	-
MI	-	-	-

Death	2.23 (0.96 to 5.15)	2.67 (1.15 to 6.21)	2.47 (1.06 to 5.74)
<i>10 year</i>			
Revision	1.72 (1.07 to 2.78)	1.73 (1.07 to 2.79)	1.70 (1.05 to 2.74)

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Hazard ratios associated with diagnosis of RA relative to OA for myocardial infarction (MI), and death following total knee replacement (TKR) and total hip replacement (THR). There were too few venous thromboembolism (VTE), prosthetic joint infection (PJI), and myocardial infarction (MI) following TKR and THR and too few death following TKR for meaningful regression analysis to be undertaken. \*Codes for RA were omitted from the calculation of the Royal College of Surgeons (RCS) Charlson score and the score was dichotomised as 0 and 1+.