

Australian Orthopaedic Association National Joint Replacement Registry

2022 Mortality Following Primary
Hip and Knee Arthroplasty
Supplementary Report



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Registry

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Knee Arthroplasty
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The Registry greatly appreciates the participation of all joint replacement patients throughout Australia. Their contribution allows ongoing improvements in arthroplasty outcomes to be achieved.

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Contents

SUMMARY	6
PRIMARY HIP REPLACEMENT.....	7
PRIMARY KNEE REPLACEMENT.....	12
LIST OF TABLES.....	14
LIST OF FIGURES	14

Summary

Mortality information has been obtained by matching all procedures reported to the Registry up to and including 31 December 2021 with the National Death Index (NDI). The NDI is the national mortality database maintained by the Australian Institute of Health and Welfare (AIHW). The Registry was granted access to this data following a formal ethics application to AIHW.

Adjusted mortality is obtained after direct standardisation of the crude cumulative mortality data by 5 year age intervals and gender to the Estimated Resident Population Status based on the 2001 census.

As the total population has a younger age structure than the population of the Registry, the adjusted mortality is substantially lower than the crude mortality. By minimising the effects of age and gender differences within groups, the adjusted measure may be used to compare the mortality of different procedures and is useful when comparing mortality over time.

The rate per 100 person years has been calculated from the date of the first joint procedure to either the date of death or 31 December 2021. This provides a true rate.

Primary Hip Replacement

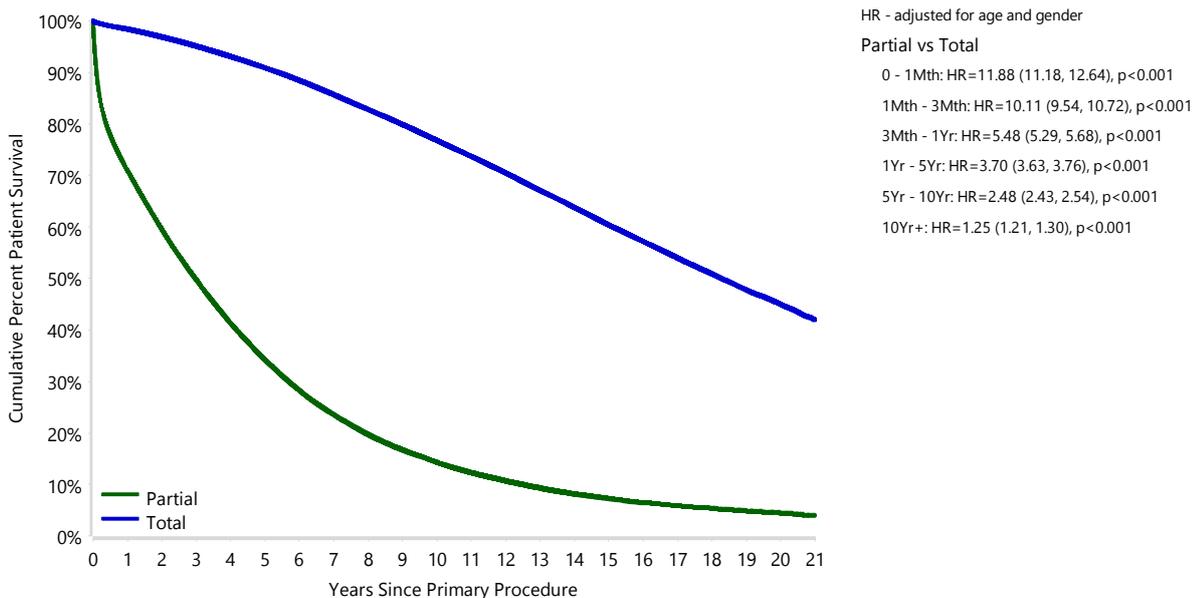
Table M1 Mortality following Primary Hip Replacement by Category

Hip Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	77570	100559	77.1	41.2	355936	21.79 (21.64, 21.95)
Total	98757	436469	22.6	7.6	3445270	2.87 (2.85, 2.88)
TOTAL	176327	537028	32.8	9.2	3801205	4.64 (4.62, 4.66)

Table M2 Yearly Cumulative Percent Survival of Patients with Primary Hip Replacement by Category

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial	70.9 (70.6, 71.2)	49.8 (49.4, 50.1)	34.2 (33.9, 34.5)	14.3 (14.0, 14.6)	7.3 (7.1, 7.5)	4.5 (4.2, 4.7)
Total	98.4 (98.3, 98.4)	95.1 (95.0, 95.2)	90.9 (90.8, 91.0)	76.8 (76.7, 77.0)	60.4 (60.2, 60.6)	45.0 (44.6, 45.3)

Figure M1 Cumulative Percent Survival of Patients with Primary Hip Replacement by Category



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial	100559	67769	42800	26220	7629	2058	220
Total	436469	402266	338510	276239	145460	57120	6351

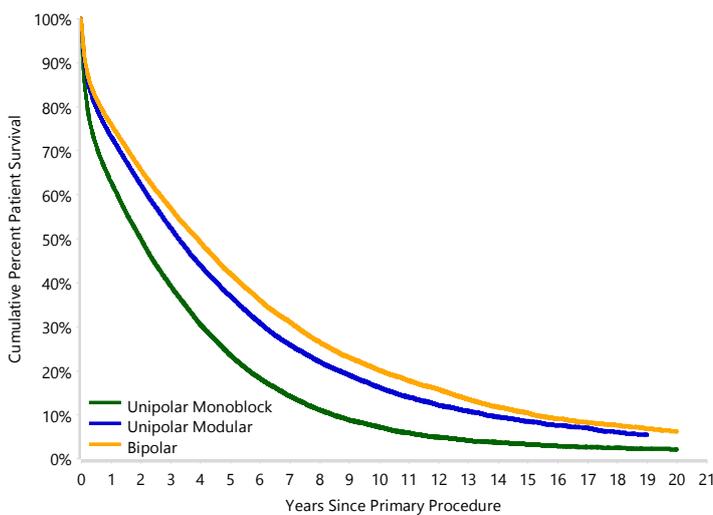
Table M3 Mortality following Primary Partial Hip Replacement by Class (Primary Diagnosis Fractured NOF)

Partial Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Unipolar Monoblock	25064	26338	95.2	34.2	84927	29.51 (29.15, 29.88)
Unipolar Modular	31642	43268	73.1	32.3	155818	20.31 (20.08, 20.53)
Bipolar	17173	26269	65.4	27.9	97060	17.69 (17.43, 17.96)
TOTAL	73879	95875	77.1	31.4	337805	21.87 (21.71, 22.03)

Table M4 Yearly Cumulative Percent Survival of Patients with Primary Partial Hip Replacement by Class (Primary Diagnosis Fractured NOF)

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Unipolar Monoblock	62.8 (62.3, 63.4)	39.3 (38.7, 39.9)	23.6 (23.1, 24.1)	7.2 (6.9, 7.6)	3.3 (3.1, 3.6)	2.2 (1.9, 2.4)
Unipolar Modular	73.2 (72.8, 73.6)	52.5 (52.0, 53.0)	37.0 (36.5, 37.5)	16.3 (15.8, 16.7)	8.5 (8.1, 9.0)	
Bipolar	76.0 (75.5, 76.6)	56.9 (56.3, 57.6)	42.1 (41.5, 42.8)	20.2 (19.5, 20.8)	10.4 (9.8, 11.0)	6.2 (5.6, 6.9)

Figure M2 Cumulative Percent Survival of Patients with Primary Partial Hip Replacement by Class (Primary Diagnosis Fractured NOF)



HR - adjusted for age and gender
Unipolar Monoblock vs Unipolar Modular
 0 - 2Wk: HR=1.41 (1.33, 1.50), p<0.001
 2Wk - 1Mth: HR=1.56 (1.46, 1.67), p<0.001
 1Mth - 1.5Yr: HR=1.40 (1.37, 1.44), p<0.001
 1.5Yr - 3.5Yr: HR=1.33 (1.28, 1.37), p<0.001
 3.5Yr - 4.5Yr: HR=1.37 (1.30, 1.45), p<0.001
 4.5Yr - 5Yr: HR=1.45 (1.34, 1.58), p<0.001
 5Yr - 6.5Yr: HR=1.26 (1.20, 1.34), p<0.001
 6.5Yr - 7Yr: HR=1.45 (1.30, 1.62), p<0.001
 7Yr - 9Yr: HR=1.32 (1.23, 1.41), p<0.001
 9Yr - 10.5Yr: HR=1.18 (1.07, 1.30), p=0.001
 10.5Yr - 11Yr: HR=1.05 (0.85, 1.30), p=0.622
 11Yr - 11.5Yr: HR=1.20 (0.96, 1.50), p=0.101
 11.5Yr - 13Yr: HR=0.91 (0.78, 1.06), p=0.236
 13Yr - 14Yr: HR=0.69 (0.55, 0.87), p=0.001
 14Yr - 14.5Yr: HR=0.86 (0.59, 1.24), p=0.417
 14.5Yr+: HR=0.55 (0.46, 0.66), p<0.001

Bipolar vs Unipolar Modular
 Entire Period: HR=0.92 (0.90, 0.94), p<0.001

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Unipolar Monoblock	26338	16522	10265	6064	1667	530	88
Unipolar Modular	43268	30148	19332	11845	3163	554	34
Bipolar	26269	18045	11155	6980	2293	805	79

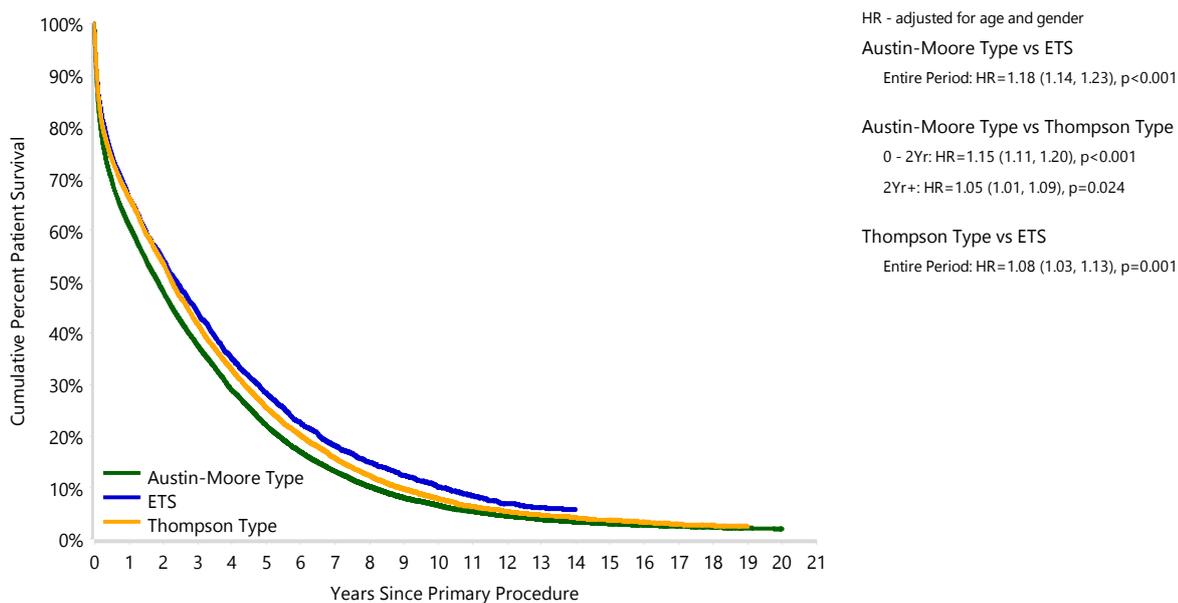
Table M5 Mortality following Primary Unipolar Monoblock Hip Replacement by Type (Primary Diagnosis Fractured NOF)

Monoblock	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Austin-Moore Type	16433	16966	96.9	35.6	53144	30.92 (30.45, 31.40)
ETS	2694	3148	85.6	27.4	10236	26.32 (25.33, 27.33)
Thompson Type	5937	6224	95.4	29.0	21546	27.55 (26.86, 28.26)
TOTAL	25064	26338	95.2	34.2	84927	29.51 (29.15, 29.88)

Table M6 Yearly Cumulative Percent Survival of Patients with Primary Unipolar Monoblock Hip Replacement by Type (Primary Diagnosis Fractured NOF)

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Austin-Moore Type	60.9 (60.2, 61.7)	37.6 (36.8, 38.3)	22.0 (21.4, 22.7)	6.6 (6.2, 6.9)	3.0 (2.7, 3.2)	1.9 (1.7, 2.2)
ETS	66.3 (64.6, 67.9)	44.0 (42.2, 45.7)	28.3 (26.7, 29.9)	10.1 (8.9, 11.3)		
Thompson Type	66.3 (65.1, 67.5)	41.8 (40.5, 43.0)	25.5 (24.4, 26.6)	7.8 (7.2, 8.5)	3.7 (3.2, 4.2)	

Figure M3 Cumulative Percent Survival of Patients with Primary Unipolar Monoblock Hip Replacement by Type (Primary Diagnosis Fractured NOF)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Austin-Moore Type	16966	10336	6366	3719	1047	367	60
ETS	3148	2059	1302	766	186	18	0
Thompson Type	6224	4127	2597	1579	434	145	28

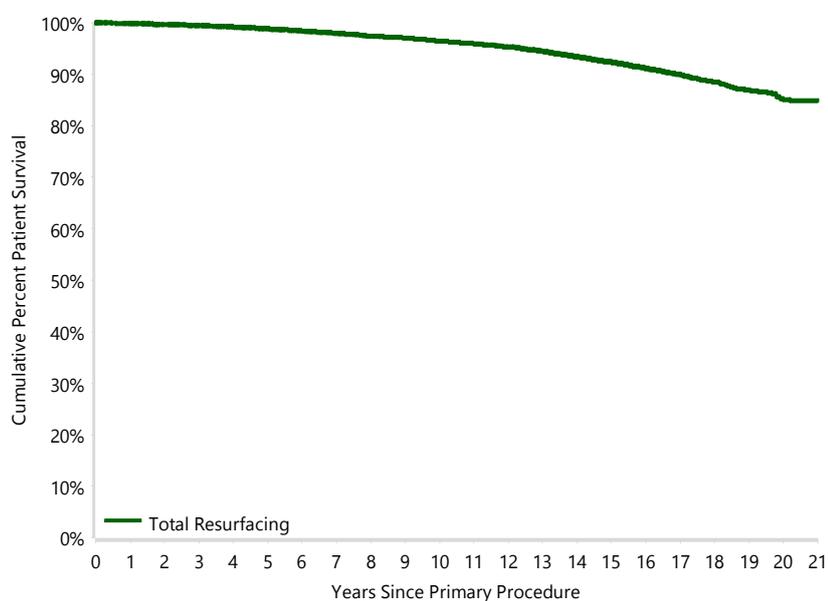
Table M7 Mortality following Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA)

Total Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Resurfacing	1107	14915	7.4	7.6	194753	0.57 (0.54, 0.60)
TOTAL	1107	14915	7.4	7.6	194753	0.57 (0.54, 0.60)

Table M8 Yearly Cumulative Percent Survival of Patients with Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA)

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Total Resurfacing	99.9 (99.8, 99.9)	99.4 (99.3, 99.5)	98.8 (98.6, 99.0)	96.5 (96.1, 96.8)	92.4 (91.8, 92.8)	85.1 (83.9, 86.3)

Figure M4 Cumulative Percent Survival of Patients with Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Total Resurfacing	14915	14473	13635	13026	11319	6705	585



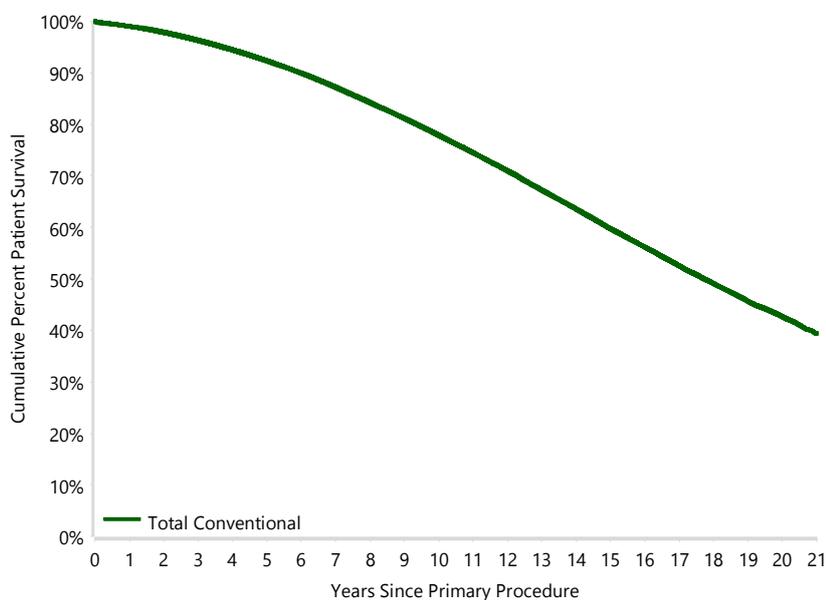
Table M9 Mortality following Primary Total Conventional Hip Replacement (Primary Diagnosis OA)

Total Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Conventional	79698	364746	21.9	6.5	2876436	2.77 (2.75, 2.79)
TOTAL	79698	364746	21.9	6.5	2876436	2.77 (2.75, 2.79)

Table M10 Yearly Cumulative Percent Survival of Patients with Primary Total Conventional Hip Replacement (Primary Diagnosis OA)

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Total Conventional	99.0 (99.0, 99.1)	96.3 (96.2, 96.3)	92.4 (92.3, 92.5)	77.9 (77.7, 78.1)	59.7 (59.5, 60.0)	42.7 (42.2, 43.1)

Figure M5 Cumulative Percent Survival of Patients with Primary Total Conventional Hip Replacement (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Total Conventional	364746	338346	286308	234027	120166	44777	4993

Primary Knee Replacement

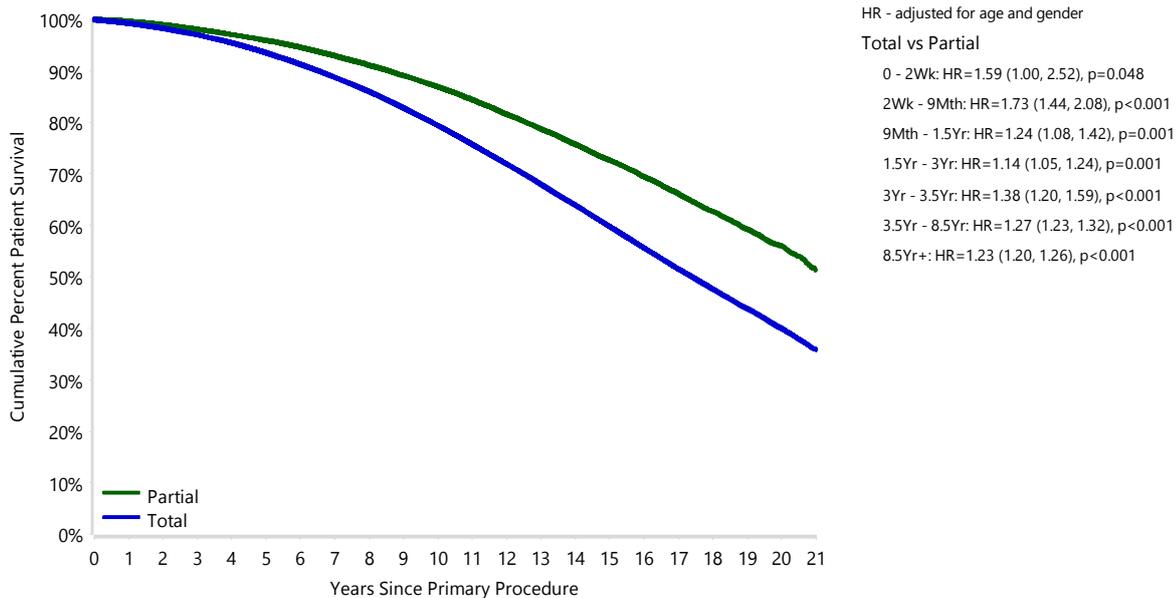
Table M11 Mortality following Primary Knee Replacement by Category

Knee Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	10552	55418	19.0	10.5	542245	1.95 (1.91, 1.98)
Total	113767	559139	20.3	11.6	4335465	2.62 (2.61, 2.64)
TOTAL	124319	614557	20.2	11.4	4877710	2.55 (2.53, 2.56)

Table M12 Yearly Cumulative Percent Survival of Patients with Primary Knee Replacement by Category

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial	99.6 (99.6, 99.7)	98.1 (97.9, 98.2)	95.9 (95.7, 96.0)	86.8 (86.5, 87.2)	72.7 (72.1, 73.2)	56.0 (55.1, 56.9)
Total	99.3 (99.2, 99.3)	97.0 (96.9, 97.0)	93.5 (93.4, 93.5)	79.4 (79.2, 79.5)	59.7 (59.5, 59.9)	40.0 (39.6, 40.4)

Figure M6 Cumulative Percent Survival of Patients with Primary Knee Replacement by Category



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial	55418	52568	46259	39506	27095	13479	1456
Total	559139	518804	440073	358439	179022	60391	5400

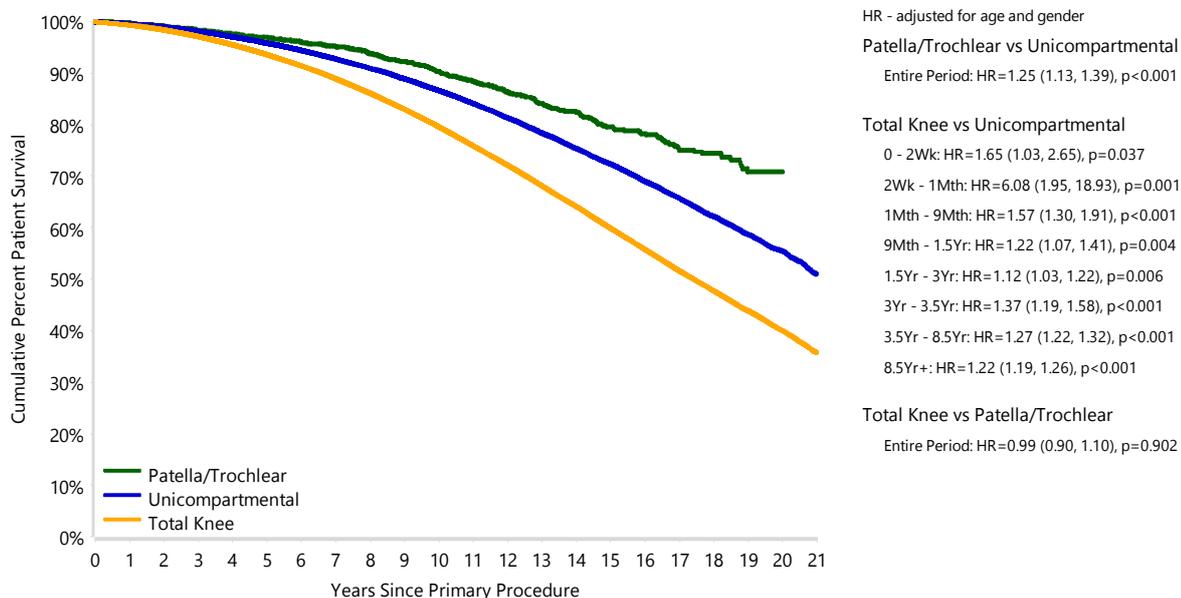
Table M13 Mortality following Primary Knee Replacement by Class (Primary Diagnosis OA)

Knee Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial Resurfacing	13	195	6.7	5.8	2289	0.57 (0.30, 0.97)
Unispacer	6	38	15.8	4.4	652	0.92 (0.34, 2.00)
Patella/Trochlear	361	3461	10.4	5.8	29644	1.22 (1.10, 1.35)
Unicompartmental	9981	50949	19.6	6.4	501717	1.99 (1.95, 2.03)
Bicompartmental	28	120	23.3	6.7	1429	1.96 (1.30, 2.83)
Total Knee	110054	546351	20.1	6.0	4232345	2.60 (2.58, 2.62)
TOTAL	120443	601114	20.0	6.0	4768076	2.53 (2.51, 2.54)

Table M14 Yearly Cumulative Percent Survival of Patients with Primary Knee Replacement by Class (Primary Diagnosis OA)

CPS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Patella/Trochlear	99.7 (99.5, 99.9)	98.3 (97.7, 98.7)	96.9 (96.2, 97.5)	90.3 (88.9, 91.5)	79.5 (77.1, 81.7)	70.8 (66.8, 74.5)
Unicompartmental	99.6 (99.6, 99.7)	98.1 (97.9, 98.2)	95.8 (95.6, 96.0)	86.6 (86.3, 87.0)	72.3 (71.7, 72.8)	55.4 (54.5, 56.3)
Total Knee	99.3 (99.3, 99.3)	97.1 (97.0, 97.1)	93.6 (93.5, 93.7)	79.5 (79.4, 79.7)	59.9 (59.6, 60.1)	40.0 (39.6, 40.4)

Figure M7 Cumulative Percent Survival of Patients with Primary Knee Replacement by Class (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Patella/Trochlear	3461	3248	2810	2338	1368	521	56
Unicompartmental	50949	48355	42548	36342	25129	12722	1373
Total Knee	546351	506985	429993	350177	174654	58626	5175

List of Tables

Primary Hip Replacement	7
Table M1 Mortality following Primary Hip Replacement by Category	7
Table M2 Yearly Cumulative Percent Survival of Patients with Primary Hip Replacement by Category	7
Table M3 Mortality following Primary Partial Hip Replacement by Class (Primary Diagnosis Fractured NOF)	8
Table M4 Yearly Cumulative Percent Survival of Patients with Primary Partial Hip Replacement by Class (Fractured NOF)	8
Table M5 Mortality following Primary Unipolar Monoblock Hip Replacement by Type (Fractured NOF)	9
Table M6 Yearly CPS of Patients with Primary Unipolar Monoblock Hip Replacement by Type (Fractured NOF)	9
Table M7 Mortality following Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA)	10
Table M8 Yearly Cumulative Percent Survival of Patients with Primary Total Resurfacing Hip Replacement (OA)	10
Table M9 Mortality following Primary Total Conventional Hip Replacement (Primary Diagnosis OA)	11
Table M10 Yearly Cumulative Percent Survival of Patients with Primary Total Conventional Hip Replacement (OA)	11
Primary Knee Replacement	12
Table M11 Mortality following Primary Knee Replacement by Category	12
Table M12 Yearly Cumulative Percent Survival of Patients with Primary Knee Replacement by Category	12
Table M13 Mortality following Primary Knee Replacement by Class (Primary Diagnosis OA)	13
Table M14 Yearly Cumulative Percent Survival of Patients with Primary Knee Replacement by Class (Primary Diagnosis OA) ..	13

List of Figures

Primary Hip Replacement	7
Figure M1 Cumulative Percent Survival of Patients with Primary Hip Replacement by Category	7
Figure M2 Cumulative Percent Survival of Patients with Primary Partial Hip Replacement by Class (Fractured NOF)	8
Figure M3 CPS of Patients with Primary Unipolar Monoblock Hip Replacement by Type (Primary Diagnosis Fractured NOF)	9
Figure M4 Cumulative Percent Survival of Patients with Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA) ..	10
Figure M5 Cumulative Percent Survival of Patients with Primary Total Conventional Hip Replacement (OA)	11
Primary Knee Replacement	12
Figure M6 Cumulative Percent Survival of Patients with Primary Knee Replacement by Category	12
Figure M7 Cumulative Percent Survival of Patients with Primary Knee Replacement by Class (Primary Diagnosis OA)	13