

Australian Orthopaedic Association National Joint Replacement Registry

2023 SUPPLEMENTARY REPORT

Mortality of Hip and Knee Arthroplasty



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ASSOCIATION

Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Australian Orthopaedic Association National Joint Replacement Registry

**Mortality Following Primary Hip and Knee
Arthroplasty**

2023 Supplementary Report

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The AOANJRR is funded by the Australian Government Department of Health and Aged Care

Cite this report

Smith PN, Gill DR, McAuliffe MJ, McDougall C, Stoney JD, Vertullo CJ, Wall CJ, Corfield S, Cashman K, Cuthbert AR, Du P, Harries D, Holder C, Lorimer MF, Lewis PL. Mortality Following Primary Hip and Knee Arthroplasty Supplementary Report in *Hip, Knee & Shoulder Arthroplasty: 2023 Annual Report*, Australian Orthopaedic Association National Joint Replacement Registry, AOA, Adelaide; 2023.
<https://doi.org/10.25310/IRJQ4670>

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Acknowledgements

The Registry continues to receive support and invaluable assistance from the Australian Government, state and territory health departments and orthopaedic companies.

The Registry acknowledges the cooperation and support provided by those undertaking the surgery and completing the data forms, in particular, all orthopaedic surgeons, registrars and nursing staff.

The Registry acknowledges the ongoing support of all hospitals, both public and private, that undertake arthroplasty surgery nationally. The support provided by each hospital through their nominated coordinator(s) is appreciated. A complete list of participating hospitals and coordinators is presented at the end of the Hip, Knee and Shoulder Arthroplasty Annual Report.

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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Summary

Mortality information has been obtained by matching all procedures reported to the Registry up to and including 31 December 2022 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 2022. This provides a true rate.

Primary Hip Replacement

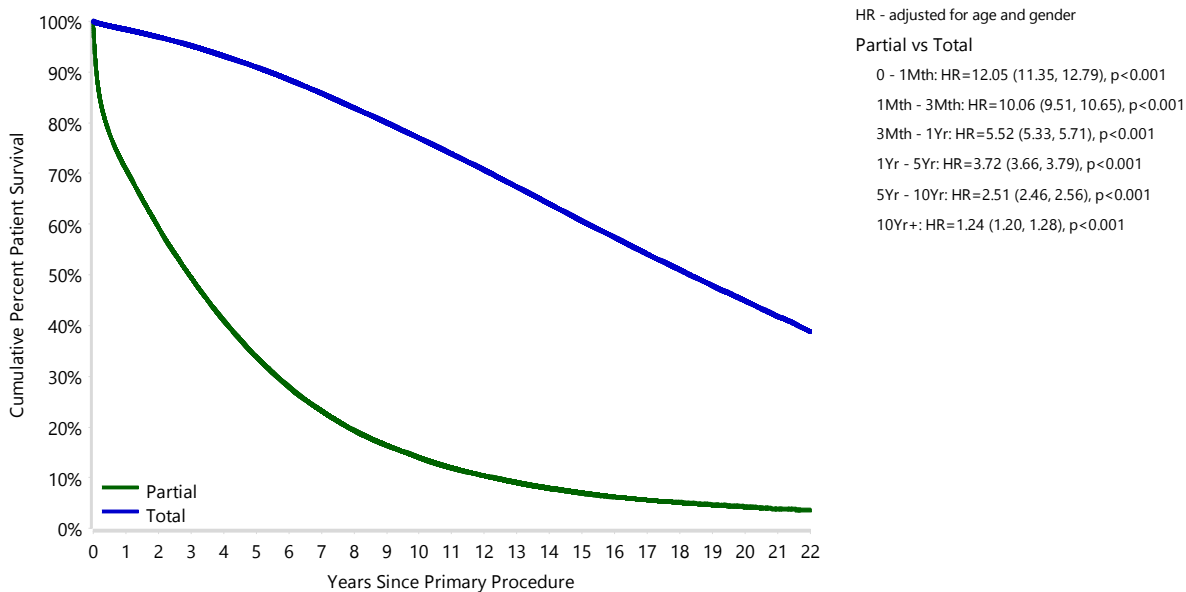
Table M1 Mortality following Primary Hip Replacement by Category

Hip Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	82881	106010	78.2	41.2	377864	21.93 (21.78, 22.08)
Total	110172	464764	23.7	8.0	3789637	2.91 (2.89, 2.92)
TOTAL	193053	570774	33.8	9.6	4167501	4.63 (4.61, 4.65)

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	70.8 (70.6, 71.1)	49.5 (49.2, 49.8)	33.9 (33.6, 34.2)	14.0 (13.7, 14.2)	7.0 (6.8, 7.2)	4.3 (4.0, 4.5)
Total	98.4 (98.4, 98.4)	95.2 (95.1, 95.2)	91.0 (90.9, 91.1)	77.0 (76.8, 77.1)	60.6 (60.4, 60.8)	44.9 (44.6, 45.2)

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	106010	71243	45042	27698	8188	2414	413
Total	464764	429797	364289	299541	161004	67454	12944

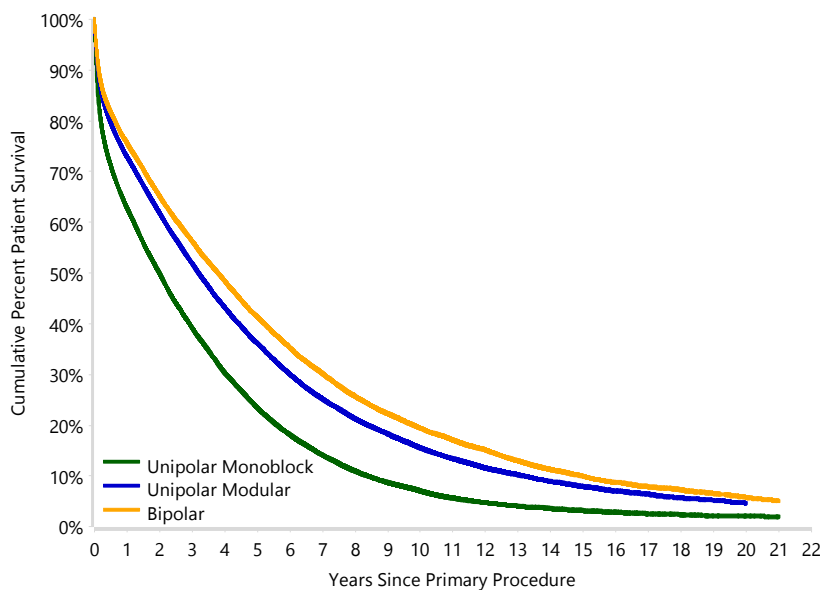
Table M3 Mortality following Primary Partial Hip Replacement by Class (Primary Diagnosis Fractured NOF)

Partial Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Unipolar Monoblock	25325	26392	96.0	34.6	85677	29.56 (29.20, 29.93)
Unipolar Modular	34440	45676	75.4	33.6	166872	20.64 (20.42, 20.86)
Bipolar	19221	29061	66.1	29.5	106260	18.09 (17.83, 18.35)
TOTAL	78986	101129	78.1	32.4	358809	22.01 (21.86, 22.17)

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 (62.2, 63.4)	39.2 (38.6, 39.8)	23.4 (22.9, 23.9)	7.1 (6.7, 7.4)	3.2 (2.9, 3.4)	2.1 (1.9, 2.3)
Unipolar Modular	72.9 (72.5, 73.3)	51.9 (51.4, 52.4)	36.2 (35.7, 36.6)	15.6 (15.2, 16.0)	7.9 (7.5, 8.3)	4.6 (4.1, 5.2)
Bipolar	75.7 (75.1, 76.2)	56.3 (55.6, 56.9)	41.4 (40.7, 42.0)	19.4 (18.8, 20.1)	10.0 (9.4, 10.5)	5.8 (5.3, 6.3)

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=1.55 (1.45, 1.65), p<0.001
- 1Mth - 3Mth: HR=1.41 (1.35, 1.48), p<0.001
- 3Mth - 1.5Yr: HR=1.38 (1.34, 1.43), p<0.001
- 1.5Yr - 3.5Yr: HR=1.31 (1.27, 1.35), p<0.001
- 3.5Yr - 4Yr: HR=1.43 (1.33, 1.53), p<0.001
- 4Yr - 4.5Yr: HR=1.26 (1.16, 1.36), p<0.001
- 4.5Yr - 5.5Yr: HR=1.39 (1.31, 1.48), p<0.001
- 5.5Yr - 6.5Yr: HR=1.22 (1.14, 1.30), p<0.001
- 6.5Yr - 8Yr: HR=1.33 (1.25, 1.42), p<0.001
- 8Yr - 9Yr: HR=1.36 (1.23, 1.50), p<0.001
- 9Yr - 10.5Yr: HR=1.20 (1.09, 1.32), p<0.001
- 10.5Yr - 11.5Yr: HR=1.11 (0.96, 1.29), p=0.154
- 11.5Yr - 12Yr: HR=0.99 (0.78, 1.26), p=0.959
- 12Yr - 13Yr: HR=0.86 (0.71, 1.04), p=0.112
- 13Yr - 13.5Yr: HR=0.65 (0.48, 0.89), p=0.006
- 13.5Yr - 14.5Yr: HR=0.80 (0.63, 1.01), p=0.058
- 14.5Yr - 15Yr: HR=0.59 (0.40, 0.87), p=0.007
- 15Yr - 17: HR=0.66 (0.52, 0.83), p<0.001
- 17 - 19: HR=0.55 (0.39, 0.76), p<0.001
- 19+: HR=0.15 (0.08, 0.27), 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	26392	16540	10279	6094	1699	567	150
Unipolar Modular	45676	31613	20416	12641	3551	749	69
Bipolar	29061	19918	12229	7583	2407	888	164

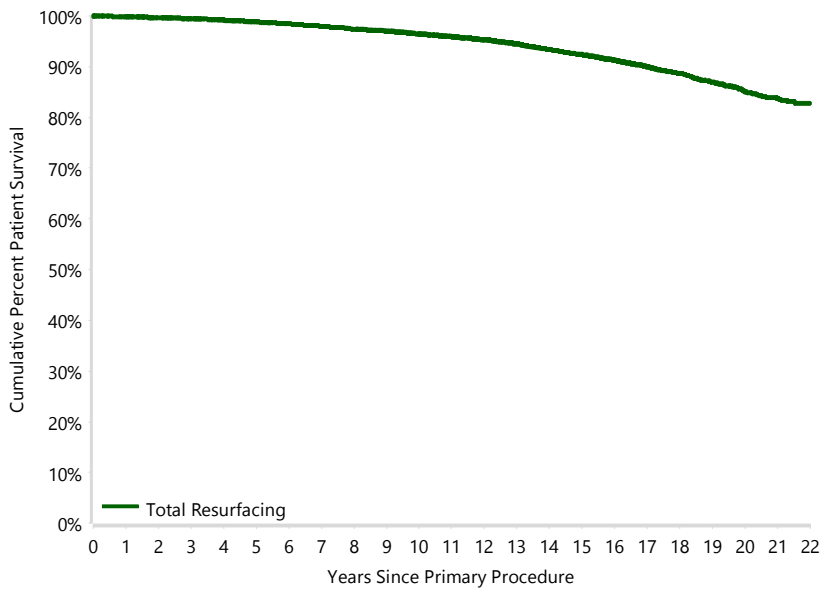
Table M5 Mortality following Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA)

Total Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Resurfacing	1265	15197	8.3	8.5	208589	0.61 (0.57, 0.64)
TOTAL	1265	15197	8.3	8.5	208589	0.61 (0.57, 0.64)

Table M6 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 (91.9, 92.9)	85.1 (84.1, 86.0)

Figure M3 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	15197	14902	14015	13289	11632	7894	1559

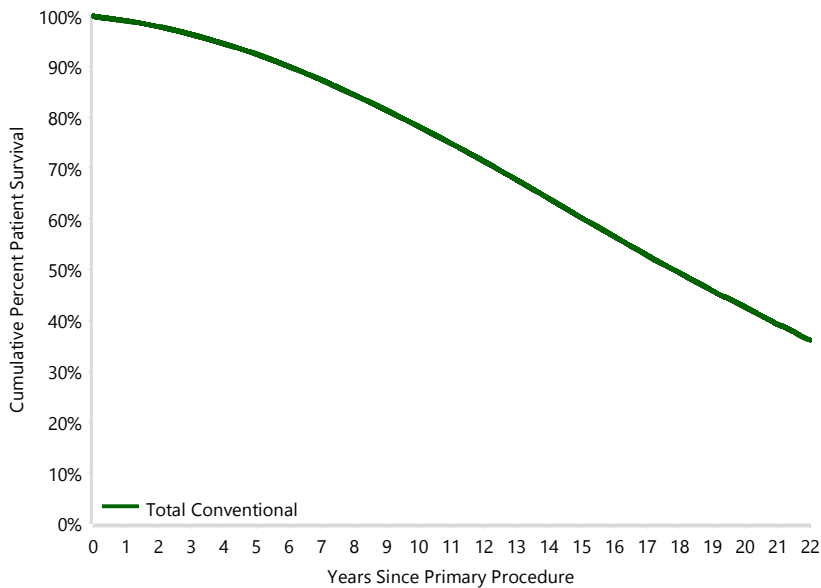
Table M7 Mortality following Primary Total Conventional Hip Replacement (Primary Diagnosis OA)

Total Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Conventional	89086	388362	22.9	6.8	3167231	2.81 (2.79, 2.83)
TOTAL	89086	388362	22.9	6.8	3167231	2.81 (2.79, 2.83)

Table M8 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	99.1 (99.0, 99.1)	96.3 (96.3, 96.4)	92.5 (92.4, 92.6)	78.1 (78.0, 78.3)	60.1 (59.9, 60.4)	42.6 (42.2, 43.0)

Figure M4 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	388362	361576	308235	254077	133879	53003	9884

Primary Knee Replacement

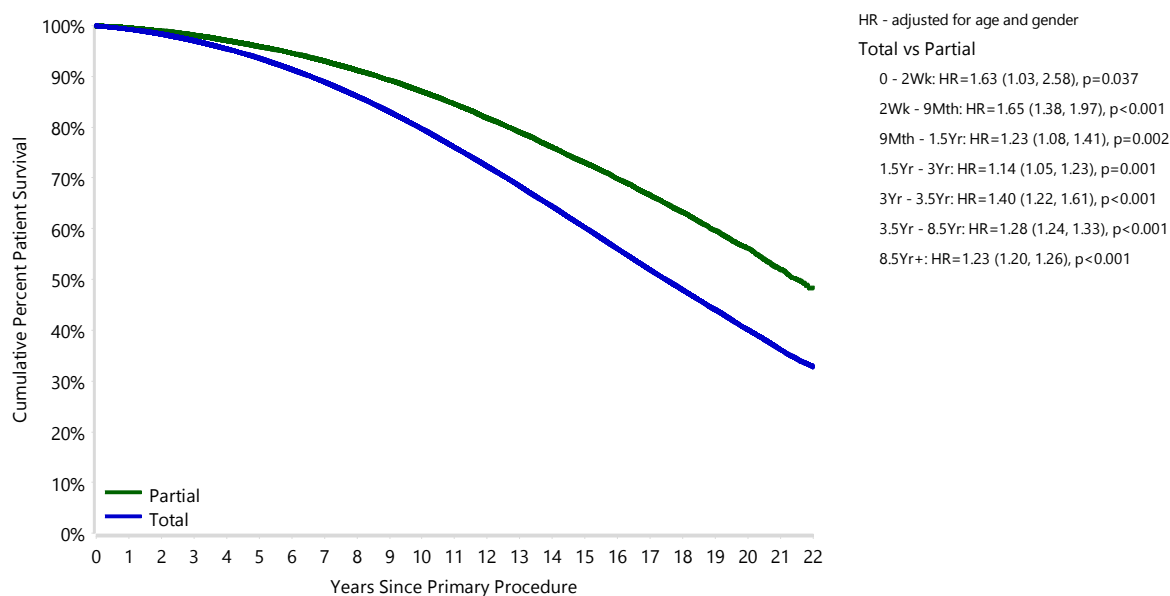
Table M9 Mortality following Primary Knee Replacement by Category

Knee Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	11728	57976	20.2	10.8	587591	2.00 (1.96, 2.03)
Total	128194	594162	21.6	12.0	4788483	2.68 (2.66, 2.69)
TOTAL	139922	652138	21.5	11.7	5376074	2.60 (2.59, 2.62)

Table M10 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 (98.0, 98.2)	95.9 (95.7, 96.1)	87.0 (86.7, 87.3)	73.0 (72.5, 73.5)	56.2 (55.4, 56.9)
Total	99.3 (99.3, 99.3)	97.0 (97.0, 97.1)	93.6 (93.5, 93.6)	79.6 (79.5, 79.8)	60.2 (60.0, 60.4)	40.1 (39.8, 40.4)

Figure M5 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	57976	55240	49103	42353	28649	15618	3222
Total	594162	555373	474328	391192	202018	72984	11389

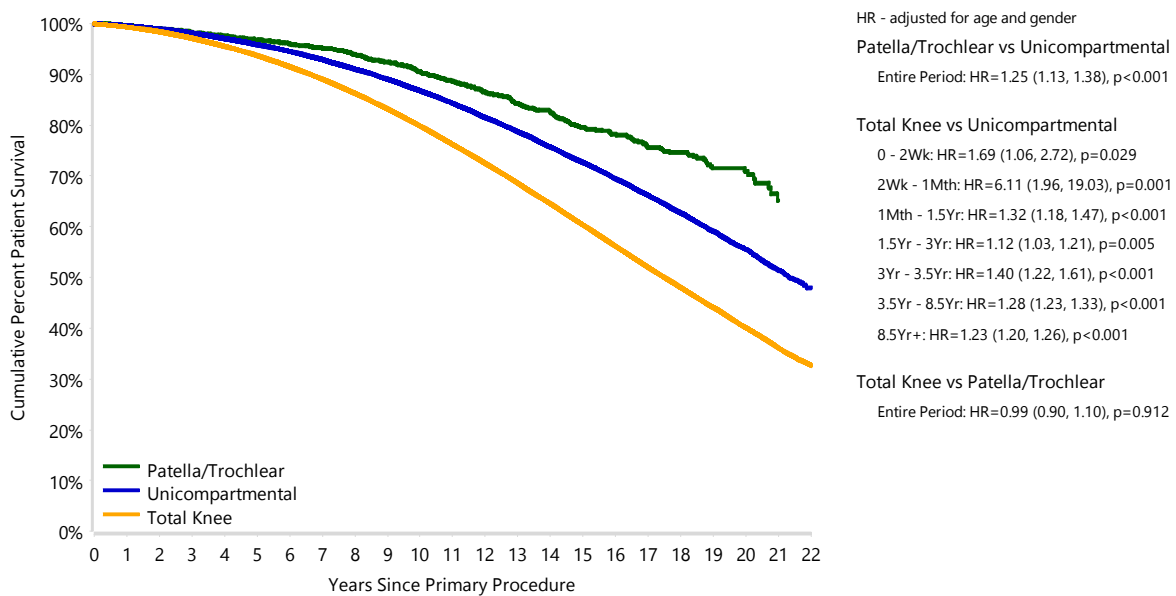
Table M11 Mortality following Primary Knee Replacement by Class (Primary Diagnosis OA)

Knee Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial Resurfacing	16	199	8.0	6.3	2521	0.63 (0.36, 1.03)
Unispacer	7	38	18.4	5.7	683	1.02 (0.41, 2.11)
Patella/Trochlear	407	3662	11.1	6.1	32815	1.24 (1.12, 1.37)
Unicompartmental	11080	53282	20.8	6.8	543177	2.04 (2.00, 2.08)
Bicompartmental	31	120	25.8	7.3	1520	2.04 (1.39, 2.90)
Total Knee	124145	580804	21.4	6.5	4676248	2.65 (2.64, 2.67)
TOTAL	135686	638105	21.3	6.5	5256963	2.58 (2.57, 2.59)

Table M12 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 (99.4, 99.8)	98.2 (97.7, 98.6)	96.9 (96.2, 97.4)	90.6 (89.3, 91.7)	79.6 (77.4, 81.6)	70.9 (67.3, 74.1)
Unicompartmental	99.6 (99.6, 99.7)	98.1 (98.0, 98.2)	95.9 (95.7, 96.0)	86.8 (86.4, 87.1)	72.7 (72.1, 73.2)	55.6 (54.8, 56.4)
Total Knee	99.3 (99.3, 99.3)	97.1 (97.1, 97.2)	93.7 (93.6, 93.8)	79.8 (79.7, 80.0)	60.3 (60.1, 60.6)	40.1 (39.8, 40.4)

Figure M6 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	3662	3455	3007	2544	1521	635	111
Unicompartmental	53282	50792	45178	38964	26506	14684	3064
Total Knee	580804	542901	463603	382340	197196	70908	10948

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