Australian Orthopaedic Association National Joint Replacement Registry

2025 SUPPLEMENTARY REPORT

Mortality Following Primary Hip, Knee and Shoulder Arthroplasty

Australian Orthopaedic Association National Joint Replacement Registry

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Mortality Following Primary Hip, Knee and Shoulder Arthroplasty

2025 Supplementary Report

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Australian Orthopaedic Association
National Joint Replacement Registry

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Summary

Mortality information has been obtained by matching all procedures reported to the Registry up to and including 31 December 2024 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 2024. This provides a true rate.

Primary Hip Replacement

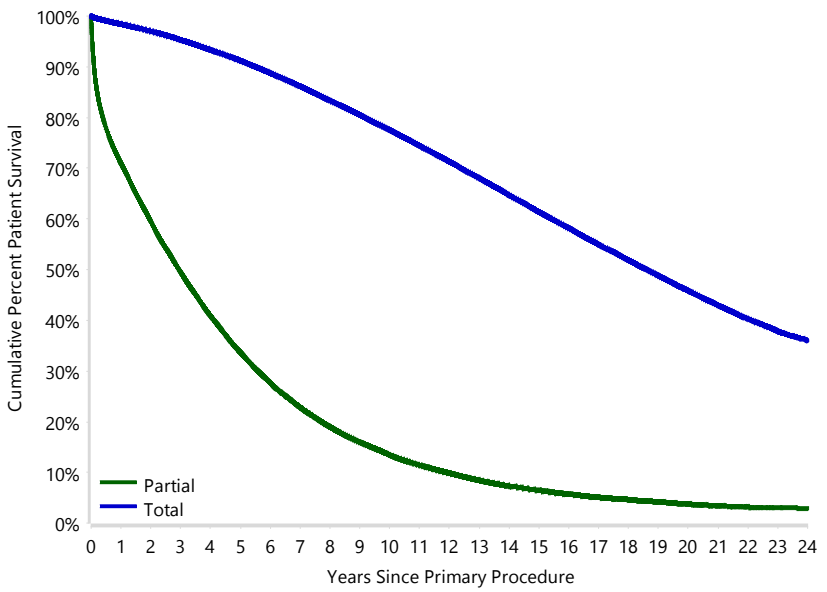
Table M1 Mortality following Primary Hip Replacement by Category

Hip Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	92645	117471	78.9	41.3	419320	22.09 (21.95, 22.24)
Total	132519	528691	25.1	8.5	4532431	2.92 (2.91, 2.94)
TOTAL	**225164**	**646162**	**34.8**	**9.9**	**4951751**	**4.55 (4.53, 4.57)**

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 (70.7, 71.2)	49.5 (49.2, 49.8)	33.7 (33.4, 33.9)	13.5 (13.3, 13.7)	6.5 (6.3, 6.7)	3.8 (3.6, 4.0)
Total	98.5 (98.4, 98.5)	95.3 (95.2, 95.4)	91.2 (91.1, 91.3)	77.5 (77.4, 77.7)	61.4 (61.2, 61.6)	45.9 (45.6, 46.1)

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



HR - adjusted for age and gender

Partial vs Total

0 - 1Mth: HR=12.39 (95% CI 11.70, 13.12), p<0.001

1Mth - 3Mth: HR=10.02 (95% CI 9.49, 10.57), p<0.001

3Mth - 1Yr: HR=5.53 (95% CI 5.35, 5.71), p<0.001

1Yr - 5Yr: HR=3.75 (95% CI 3.69, 3.81), p<0.001

5Yr - 10Yr: HR=2.60 (95% CI 2.55, 2.65), p<0.001

10Yr+: HR=1.28 (95% CI 1.24, 1.32), p<0.001

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial	117471	78784	49412	30367	9005	2891	737
Total	528691	489129	415763	348113	195196	89827	26735

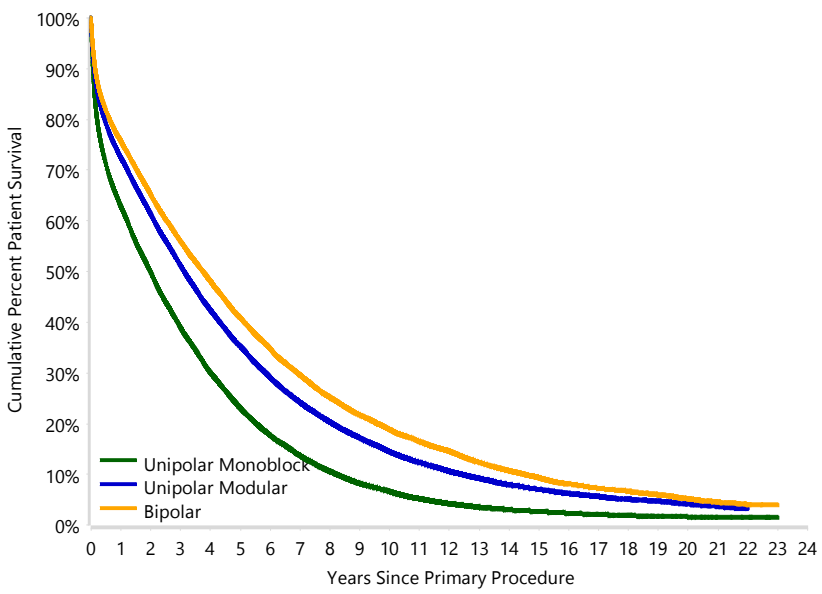
Table M3 Mortality following Primary Partial Hip Replacement by Class (Primary Diagnosis Fractured NOF)

Partial Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Unipolar Monoblock	25763	26520	97.1	35.3	85863	30.00 (29.64, 30.37)
Unipolar Modular	39273	49862	78.8	38.2	186023	21.11 (20.90, 21.32)
Bipolar	23380	35866	65.2	34.6	126780	18.44 (18.21, 18.68)
TOTAL	**88416**	**112248**	**78.8**	**38.1**	**398665**	**22.18 (22.03, 22.32)**

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	62.7 (62.1, 63.3)	39.0 (38.4, 39.5)	23.1 (22.5, 23.6)	6.6 (6.3, 6.9)	2.7 (2.5, 2.9)	1.6 (1.5, 1.8)
Unipolar Modular	72.4 (72.0, 72.7)	51.2 (50.8, 51.7)	35.2 (34.8, 35.7)	14.5 (14.1, 14.9)	7.1 (6.8, 7.4)	4.2 (3.8, 4.5)
Bipolar	75.7 (75.2, 76.1)	56.0 (55.4, 56.5)	40.9 (40.3, 41.5)	18.9 (18.3, 19.4)	9.4 (8.9, 9.9)	5.2 (4.8, 5.7)

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=1.39 (95% CI 1.31, 1.47), p<0.001
- 2Wk - 3Mth: HR=1.44 (95% CI 1.39, 1.49), p<0.001
- 3Mth - 1Yr: HR=1.38 (95% CI 1.33, 1.43), p<0.001
- 1Yr - 5Yr: HR=1.33 (95% CI 1.30, 1.36), p<0.001
- 5Yr - 10.5Yr: HR=1.30 (95% CI 1.25, 1.34), p<0.001
- 10.5Yr - 12Yr: HR=1.15 (95% CI 1.02, 1.29), p=0.024
- 12Yr - 13Yr: HR=0.94 (95% CI 0.79, 1.12), p=0.514
- 13Yr - 17: HR=0.76 (95% CI 0.67, 0.86), p<0.001
- 17 - 19: HR=0.63 (95% CI 0.47, 0.84), p=0.001
- 19 - 20.5: HR=0.17 (95% CI 0.10, 0.31), p<0.001
- 20.5+: HR=0.23 (95% CI 0.12, 0.42), p<0.001

Bipolar vs Unipolar Modular

- Entire Period: HR=0.90 (95% CI 0.89, 0.92), p<0.001

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Unipolar Monoblock	26520	16592	10262	6050	1656	565	212
Unipolar Modular	49862	34542	22259	13975	4116	1085	159
Bipolar	35866	24253	14633	8856	2662	999	303

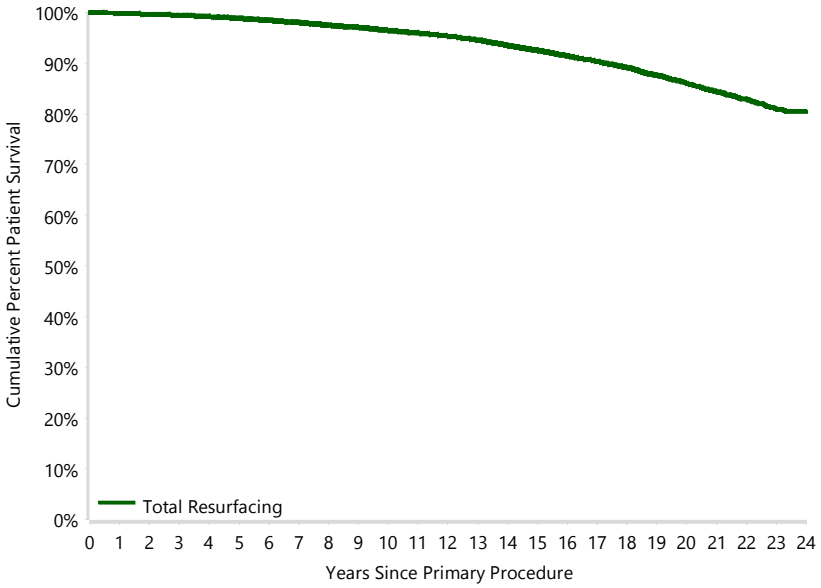
Table M5 Mortality following Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA)

Total Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Resurfacing	1553	16195	9.6	9.1	237133	0.65 (0.62, 0.69)
TOTAL	**1553**	**16195**	**9.6**	**9.1**	**237133**	**0.65 (0.62, 0.69)**

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 (98.7, 99.0)	96.5 (96.2, 96.8)	92.6 (92.1, 93.0)	86.0 (85.3, 86.7)

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	16195	15710	14848	13928	12153	9762	3734

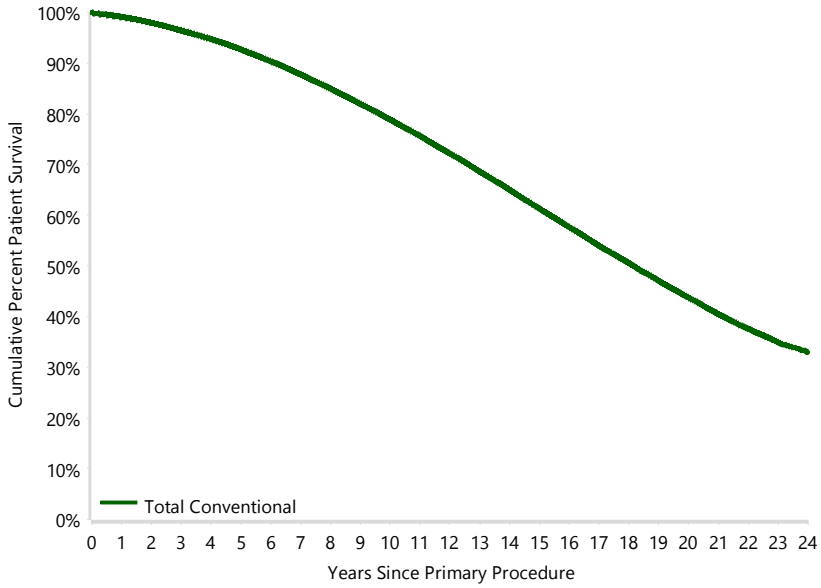
Table M7 Mortality following Primary Total Conventional Hip Replacement (Primary Diagnosis OA)

Total Hip Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Conventional	107475	441613	24.3	7.3	3794438	2.83 (2.82, 2.85)
TOTAL	**107475**	**441613**	**24.3**	**7.3**	**3794438**	**2.83 (2.82, 2.85)**

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 (99.1, 99.1)	96.5 (96.4, 96.5)	92.7 (92.6, 92.8)	78.9 (78.7, 79.0)	61.3 (61.1, 61.5)	43.8 (43.5, 44.1)

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	441613	411415	351765	295855	164248	71448	20067

Primary Knee Replacement

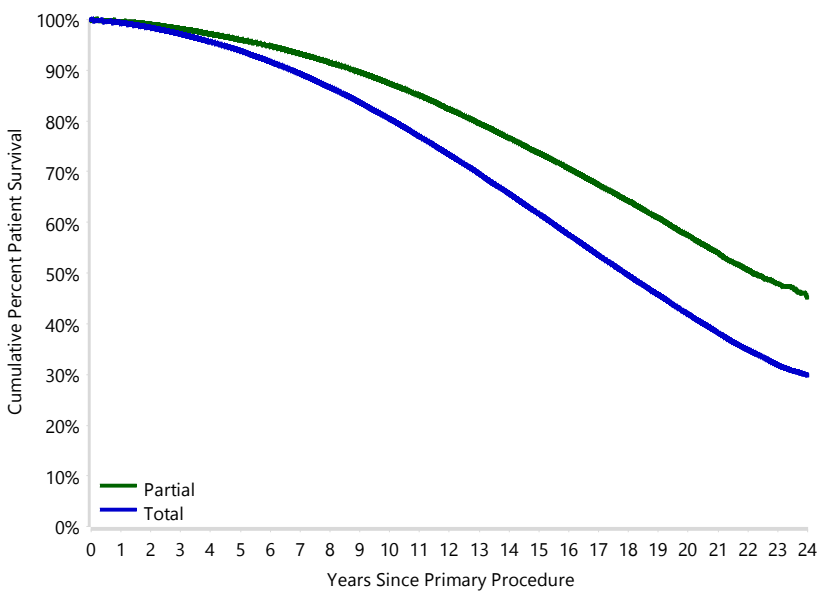
Table M9 Mortality following Primary Knee Replacement by Category

Knee Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	14023	63453	22.1	9.7	682556	2.05 (2.02, 2.09)
Total	156280	679967	23.0	12.6	5769556	2.71 (2.70, 2.72)
TOTAL	**170303**	**743420**	**22.9**	**12.3**	**6452113**	**2.64 (2.63, 2.65)**

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)	98.2 (98.0, 98.3)	96.0 (95.9, 96.2)	87.4 (87.1, 87.7)	73.7 (73.2, 74.1)	57.4 (56.8, 58.1)
Total	99.3 (99.3, 99.3)	97.1 (97.1, 97.2)	93.8 (93.7, 93.9)	80.4 (80.3, 80.5)	61.7 (61.5, 61.8)	41.9 (41.6, 42.1)

Figure M5 Cumulative Percent Survival of Patients with Primary Knee Replacement by Category



HR - adjusted for age and gender

Total vs Partial

- 0 - 2Wk: HR=1.65 (95% CI 1.04, 2.61), p=0.032
- 2Wk - 9Mth: HR=1.58 (95% CI 1.34, 1.87), p<0.001
- 9Mth - 1.5Yr: HR=1.23 (95% CI 1.08, 1.40), p=0.001
- 1.5Yr - 3Yr: HR=1.17 (95% CI 1.08, 1.26), p<0.001
- 3Yr - 3.5Yr: HR=1.38 (95% CI 1.21, 1.58), p<0.001
- 3.5Yr - 8.5Yr: HR=1.28 (95% CI 1.24, 1.33), p<0.001
- 8.5Yr+: HR=1.21 (95% CI 1.19, 1.24), p<0.001

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial	63453	60471	54411	48016	31835	19550	6835
Total	679967	632977	542995	457452	250943	101720	24554

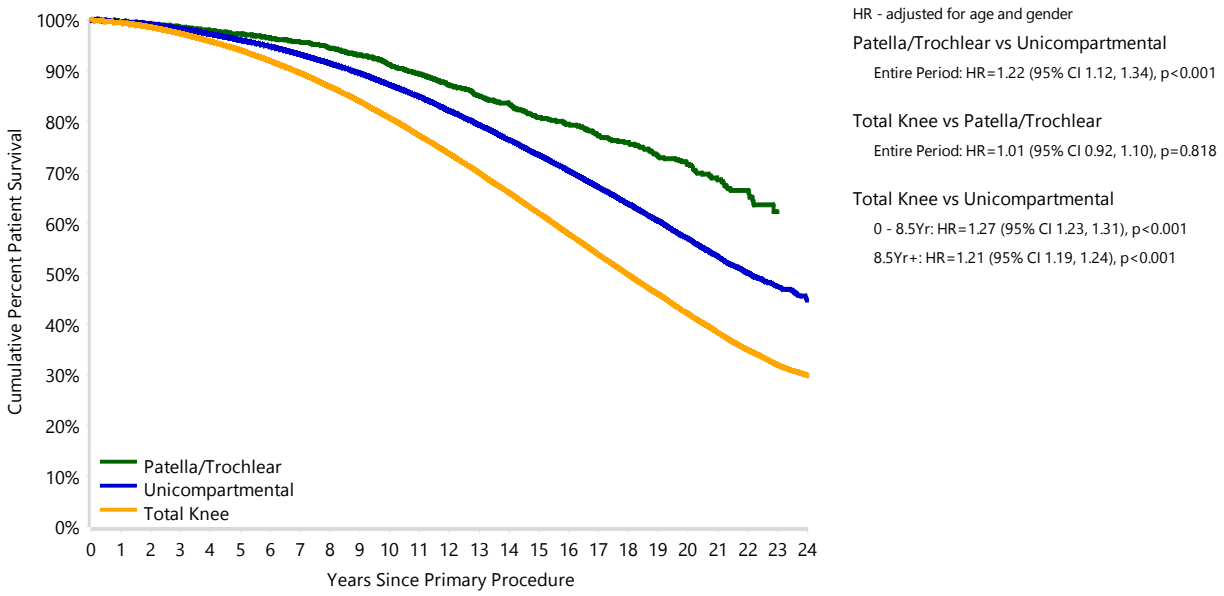
Table M11 Mortality following Primary Knee Replacement by Class (Primary Diagnosis OA)

Knee Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial Resurfacing	19	201	9.5	7.2	2885	0.66 (0.40, 1.03)
Unispacer	9	38	23.7	7.3	743	1.21 (0.55, 2.30)
Patella/Trochlear	494	4095	12.1	6.6	39656	1.25 (1.14, 1.36)
Unicompartmental	13237	58269	22.7	7.4	629697	2.10 (2.07, 2.14)
Bicompartmental	37	121	30.6	9.9	1690	2.19 (1.54, 3.02)
Total Knee	151452	665173	22.8	7.0	5638420	2.69 (2.67, 2.70)
TOTAL	**165248**	**727897**	**22.7**	**7.0**	**6313092**	**2.62 (2.60, 2.63)**

Table M12 Yearly Cumulative Percent Survival of Patients with Primary Knee Replacement by Class (Primary Diagnosis OA)

PS	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Patella/Trochlear	99.7 (99.5, 99.8)	98.4 (98.0, 98.8)	97.2 (96.6, 97.7)	91.2 (90.0, 92.2)	80.8 (78.9, 82.5)	71.4 (68.5, 74.0)
Unicompartmental	99.6 (99.6, 99.7)	98.2 (98.0, 98.3)	96.0 (95.8, 96.1)	87.2 (86.8, 87.5)	73.3 (72.8, 73.8)	56.8 (56.1, 57.4)
Total Knee	99.3 (99.3, 99.4)	97.2 (97.2, 97.3)	93.9 (93.9, 94.0)	80.6 (80.5, 80.7)	61.8 (61.6, 62.0)	41.9 (41.7, 42.2)

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	4095	3865	3411	2967	1829	905	286
Unicompartmental	58269	55550	50023	44150	29313	18210	6445
Total Knee	665173	619211	531078	447309	245237	99078	23731

Primary Shoulder Replacement

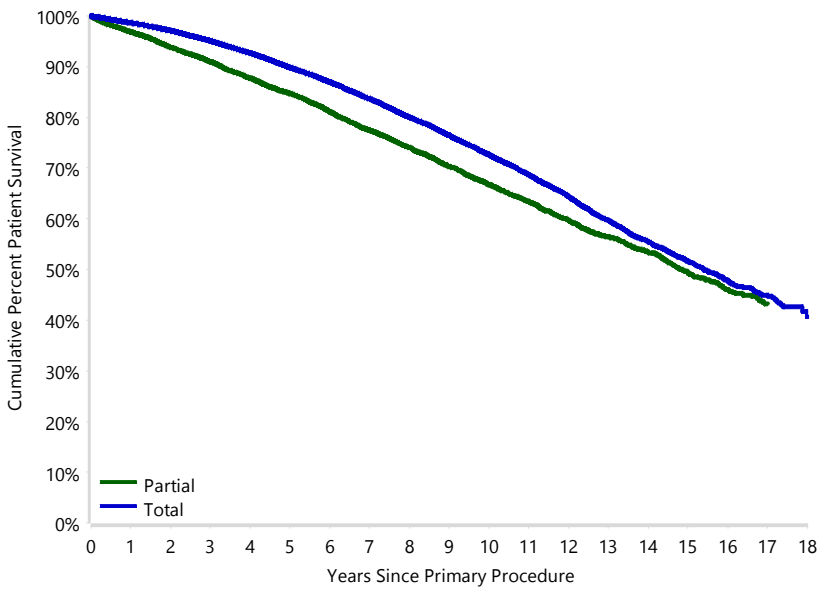
Table M13 Mortality following Primary Shoulder Replacement by Category

Shoulder Category	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Partial	2289	6252	36.6	16.8	54095	4.23 (4.06, 4.41)
Total	7860	47551	16.5	10.5	265823	2.96 (2.89, 3.02)
TOTAL	**10149**	**53803**	**18.9**	**11.9**	**319918**	**3.17 (3.11, 3.23)**

Table M14 Yearly Cumulative Percent Survival of Patients with Primary Shoulder Replacement by Category

CPS	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Partial	96.8 (96.3, 97.2)	91.0 (90.2, 91.7)	84.6 (83.7, 85.5)	77.4 (76.3, 78.5)	66.7 (65.4, 68.0)	53.4 (51.8, 54.9)
Total	98.6 (98.5, 98.8)	95.1 (94.9, 95.3)	89.8 (89.5, 90.1)	83.7 (83.2, 84.1)	72.6 (72.0, 73.2)	55.5 (54.4, 56.5)

Figure M7 Cumulative Percent Survival of Patients with Primary Shoulder Replacement by Category



HR - adjusted for age and gender

Partial vs Total

- 0 - 6Mth: HR=3.48 (95% CI 2.81, 4.30), p<0.001
- 6Mth - 2Yr: HR=2.38 (95% CI 2.07, 2.73), p<0.001
- 2Yr - 4.5Yr: HR=1.82 (95% CI 1.64, 2.02), p<0.001
- 4.5Yr - 5Yr: HR=1.24 (95% CI 0.96, 1.59), p=0.096
- 5Yr - 8Yr: HR=1.52 (95% CI 1.38, 1.68), p<0.001
- 8Yr - 8.5Yr: HR=1.70 (95% CI 1.33, 2.18), p<0.001
- 8.5Yr+: HR=1.24 (95% CI 1.14, 1.35), p<0.001

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Partial	6252	5857	5167	4443	3727	2672	1142
Total	47551	41739	31572	22822	15647	7862	2197

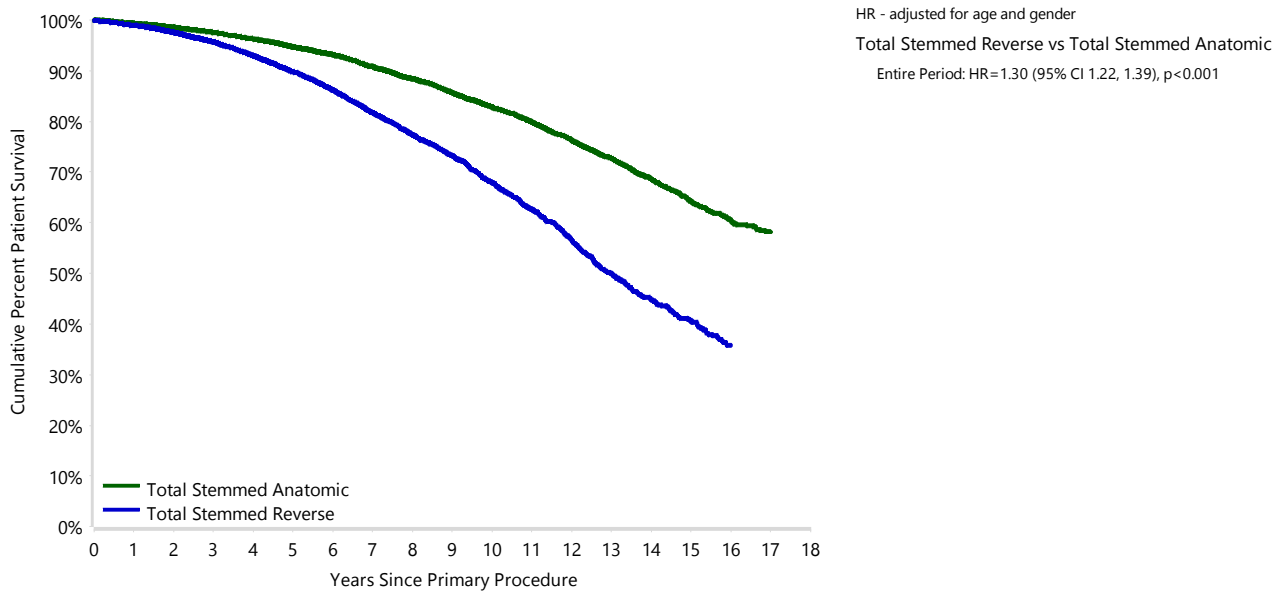
Table M15 Mortality following Primary Total Shoulder Replacement (Primary Diagnosis OA)

Total Shoulder Class	N Death	N Patients	% Deaths	Standardised Mortality	Person Years	Rate per 100 Person Yrs (95% CI)
Total Stemmed Anatomic	1711	8487	20.2	6.4	78600	2.18 (2.07, 2.28)
Total Stemmed Reverse	2168	13218	16.4	3.8	67203	3.23 (3.09, 3.36)
TOTAL	**3879**	**21705**	**17.9**	**4.8**	**145803**	**2.66 (2.58, 2.75)**

Table M16 Yearly Cumulative Percent Survival of Patients with Primary Total Shoulder Replacement (Primary Diagnosis OA)

CPS	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Total Stemmed Anatomic	99.4 (99.2, 99.5)	97.6 (97.2, 97.9)	94.7 (94.2, 95.2)	90.8 (90.1, 91.5)	83.0 (82.0, 83.9)	68.7 (67.2, 70.1)
Total Stemmed Reverse	99.0 (98.9, 99.2)	95.8 (95.4, 96.2)	89.9 (89.2, 90.5)	81.9 (80.9, 82.8)	68.1 (66.6, 69.5)	44.9 (42.5, 47.2)

Figure M8 Cumulative Percent Survival of Patients with Primary Total Shoulder Replacement (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Total Stemmed Anatomic	8487	8269	7637	6825	5831	3856	1384
Total Stemmed Reverse	13218	11418	8479	5866	3696	1597	352

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