

Australian Orthopaedic Association National Joint Replacement Registry

2024 SUPPLEMENTARY REPORT

Metal/Metal Bearing Surface in Total Conventional Hip Arthroplasty



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**Metal/Metal Bearing Surface
in Total Conventional Hip Arthroplasty**

2024 Supplementary Report

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National Joint Replacement Registry**

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Total Conventional Hip 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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Summary

This report provides information on total conventional hip replacement procedures performed with metal/metal bearing surfaces.

All hip replacement procedures recorded by the Registry from the commencement date to 31 December 2023 have been included in this report.

Summary data on the use of metal/metal bearings are provided, along with outcomes (revision rate, reason for revision and type of revision) according to patient and implant characteristics (e.g. head size, age and gender).

The use of metal/metal conventional hip replacements peaked between 2006 and 2008 (when over 3,000 were implanted each year) and then rapidly declined, with no metal/metal THRs implanted since 2016.

The revision rate for metal/metal THRs is higher than for other bearing surfaces, but the high revision rate is mainly restricted to prostheses with head sizes >32mm.

The most common reason for revision of a primary metal/metal hip replacement is metal related pathology, followed by loosening and infection.

Metal/Metal

OUTCOME

Since 2008, the Registry has identified metal/metal bearing surface as having a higher rate of revision compared to metal/polyethylene. In 2010, metal/metal bearing surfaces were identified as having a higher rate of revision compared to all other bearing surfaces. In the same year the Registry first identified the important relationship between head size and revision of metal/metal prostheses.

To further evaluate the effect of head size with metal/metal bearing surface, an analysis was undertaken comparing two head size groups ($\leq 32\text{mm}$ and $>32\text{mm}$). Head sizes $>32\text{mm}$ are associated with an increased rate of revision compared to $\leq 32\text{mm}$ head sizes (Table MM2 and Figure MM2).

DEMOGRAPHICS

Metal/metal bearing surface has been used in 22,107 primary total conventional hip replacements (Table MM1 and Figure MM1).

There have been 4,876 revisions of metal/metal primary total conventional hip replacement; 578 revisions with $\leq 32\text{mm}$ and 4,298 revisions with $>32\text{mm}$ head sizes. The majority of revisions with head sizes $>32\text{mm}$ involve the acetabular component only (57.3%) followed by revision of both the femoral and acetabular components (18.8%). For metal/metal with head sizes $\leq 32\text{mm}$, revision of the femoral component is most common (29.9%) followed by revisions of the acetabular component (25.6%) (Table MM3).

The main reasons for revision of $>32\text{mm}$ head sizes are metal related pathology (47.1%), loosening (17.6%), infection (11.7%) and lysis (7.2%). The main reasons for revision of $\leq 32\text{mm}$ head sizes are loosening (26.6%), prosthesis dislocation/instability (17.5%), fracture (16.1%) and infection (13.8%) (Table MM4 and Figure MM3).

The Registry continues to report a relationship between age and head size. The rate of revision for head sizes $>32\text{mm}$ is higher regardless of age. For head sizes $>32\text{mm}$, patients aged <65 years have a higher rate of revision than patients aged ≥ 65 years after 4 years (Table MM5 and Figure MM4).

For head sizes $>32\text{mm}$, both males and females have a higher rate of revision, with females having the highest rate. When head sizes $\leq 32\text{mm}$ are used, males have a lower rate of revision compared to females (Table MM6 and Figure MM5).

Regardless of head size, metal/metal has a higher rate of revision compared to metal/polyethylene. Metal/metal with $>32\text{mm}$ head sizes have a higher rate of revision compared to metal/metal with head size $\leq 32\text{mm}$ from 1 month onwards. When compared to metal/polyethylene $>32\text{mm}$ head sizes, metal/metal with $>32\text{mm}$ head sizes have a lower rate of revision from 2 weeks to 3 months followed by a higher rate of revision from 3 months onwards. Metal/metal with head size $\leq 32\text{mm}$ have a higher rate of revision compared to metal/polyethylene with head size $\leq 32\text{mm}$ (Table MM7 and Figure MM6).

The differences in the reasons for revision between metal/metal and metal/polyethylene are more evident in metal/metal prostheses with $>32\text{mm}$ head sizes (Figure MM7). Metal related pathology is largely confined to $>32\text{mm}$ head sizes. The cumulative incidence of metal related pathology at 15 years is 12.6% for head sizes $>32\text{mm}$ and 1.0% for head sizes $\leq 32\text{mm}$. The incidence of metal related pathology is potentially higher as it is possible that undiagnosed metal related pathology contributes to the increased rate of loosening and infection reported in metal/metal prostheses with larger head sizes (Figure MM7).

In order to determine if the higher revision rate of metal/metal prostheses with $>32\text{mm}$ head sizes is prosthesis specific, the Registry has analysed all prosthesis head/acetabular combinations that have a head size $>32\text{mm}$ and have >200 procedures. There are 13 combinations that meet these criteria. The cumulative percent revision ranges from 7.4% to 45.3% at 10 years. In comparison, there are 8 head/acetabular combinations that have head sizes $\leq 32\text{mm}$ and >50 procedures. The cumulative percent revision at 10 years ranges from 1.6% to 11.7% (Table MM8 and Table MM9).

Table MM1 Number of Revisions of Metal/Metal Primary Total Conventional Hip Replacement by Head Size and Year of Implant (All Diagnoses)

Year of Implant	≤32mm		>32mm	
	Number Revised	Total Number	Number Revised	Total Number
1999	0	7	6	12
2000	17	141	18	34
2001	58	662	41	113
2002	82	896	21	138
2003	62	653	65	421
2004	61	647	181	952
2005	74	643	465	1915
2006	48	493	806	2828
2007	45	471	908	3220
2008	38	419	991	3282
2009	37	311	559	2078
2010	21	184	192	955
2011	14	94	41	298
2012	10	77	2	34
2013	5	40	2	14
2014	5	51	0	5
2015	1	18	0	1
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
TOTAL	578	5807	4298	16300

Note: The number of revisions refers to the revisions of primaries undertaken in that year

Figure MM1 Metal/Metal Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)

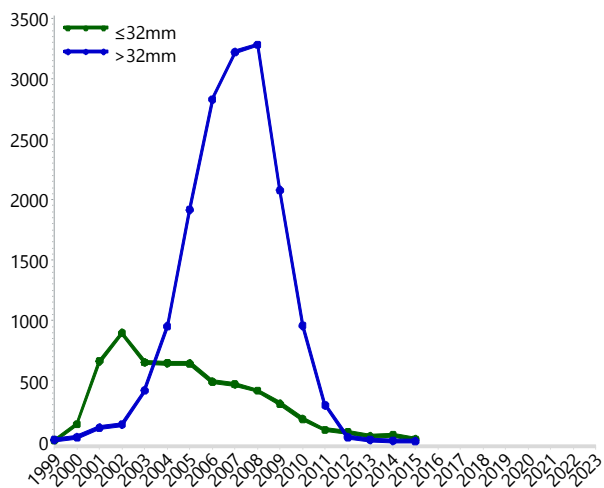
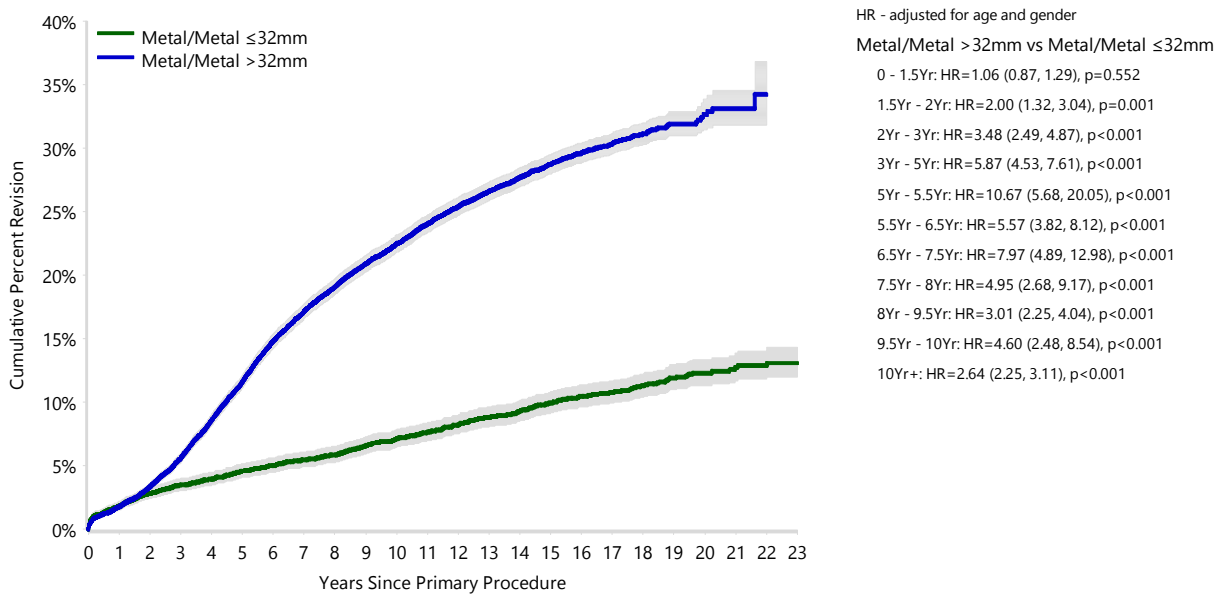


Table MM2 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)

Type	Head Size	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Metal/Metal	≤32mm	578	5807	1.8 (1.5, 2.2)	3.5 (3.1, 4.0)	4.6 (4.1, 5.2)	7.1 (6.5, 7.8)	10.0 (9.2, 10.8)	12.3 (11.3, 13.4)
	>32mm	4298	16300	1.8 (1.6, 2.0)	5.6 (5.3, 6.0)	11.6 (11.1, 12.1)	22.5 (21.8, 23.2)	28.7 (28.0, 29.5)	32.6 (31.5, 33.8)
TOTAL		4876	22107						

Figure MM2 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Metal/Metal ≤32mm	5807	5648	5435	5219	4459	3239	1211
>32mm	16300	15828	14844	13430	10377	6136	308

Table MM3 Type of Revision of Metal/Metal Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)

Type of Revision	Number	≤32mm		>32mm		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Acetabular Component	148	2.5	25.6	2461	15.1	57.3
THR (Femoral/Acetabular)	87	1.5	15.1	809	5.0	18.8
Head/Insert	103	1.8	17.8	378	2.3	8.8
Femoral Component	173	3.0	29.9	329	2.0	7.7
Cement Spacer	22	0.4	3.8	162	1.0	3.8
Head Only	22	0.4	3.8	80	0.5	1.9
Head/Neck/Insert	8	0.1	1.4	37	0.2	0.9
Minor Components	9	0.2	1.6	23	0.1	0.5
Removal of Prostheses	3	0.1	0.5	7	0.0	0.2
Head/Neck	2	0.0	0.3	4	0.0	0.1
Bipolar Head and Femoral				2	0.0	0.0
Insert Only	1	0.0	0.2	2	0.0	0.0
Bipolar Only				1	0.0	0.0
Neck Only				1	0.0	0.0
Reinsertion of Components				1	0.0	0.0
Saddle				1	0.0	0.0
N Revision	578	10.0	100.0	4298	26.4	100.0
N Primary	5807			16300		

Table MM4 Revision Diagnosis of Metal/Metal Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)

Revision Diagnosis	≤32mm			>32mm		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Metal Related Pathology	63	1.1	10.9	2024	12.4	47.1
Loosening	154	2.7	26.6	757	4.6	17.6
Infection	80	1.4	13.8	501	3.1	11.7
Lysis	34	0.6	5.9	311	1.9	7.2
Fracture	93	1.6	16.1	239	1.5	5.6
Prosthesis Dislocation/Instability	101	1.7	17.5	143	0.9	3.3
Pain	13	0.2	2.2	129	0.8	3.0
Implant Breakage Stem	5	0.1	0.9	60	0.4	1.4
Leg Length Discrepancy	7	0.1	1.2	21	0.1	0.5
Wear Acetabulum				19	0.1	0.4
Implant Breakage Acetabular	6	0.1	1.0	16	0.1	0.4
Incorrect Sizing	5	0.1	0.9	12	0.1	0.3
Malposition	4	0.1	0.7	11	0.1	0.3
Tumour				11	0.1	0.3
Wear Acetabular Insert	5	0.1	0.9	2	0.0	0.0
Synovitis	1	0.0	0.2	4	0.0	0.1
Implant Breakage Acetabular Insert	1	0.0	0.2	3	0.0	0.1
Osteonecrosis				3	0.0	0.1
Heterotopic Bone				1	0.0	0.0
Implant Breakage Head				1	0.0	0.0
Other	6	0.1	1.0	30	0.2	0.7
N Revision	578	10.0	100.0	4298	26.4	100.0
N Primary	5807			16300		

Figure MM3 Cumulative Incidence Revision Diagnosis of Metal/Metal Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)

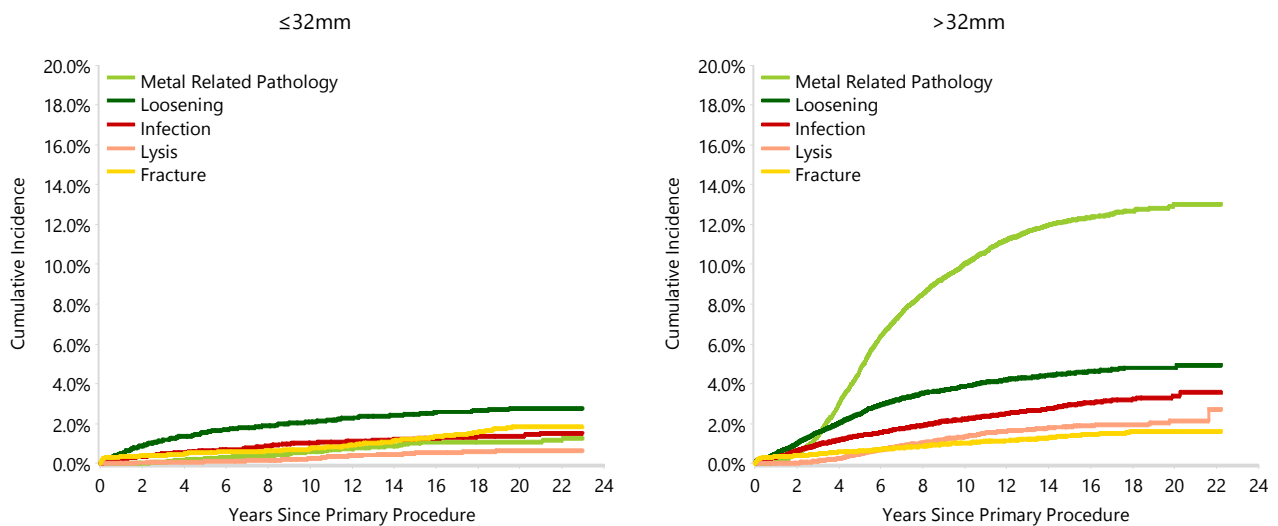
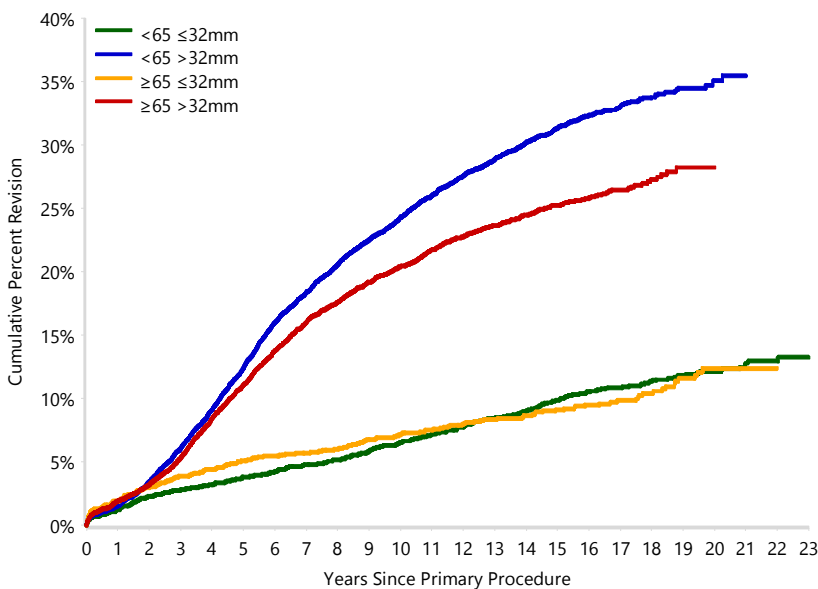


Table MM5 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement by Age and Head Size (Primary Diagnosis OA)

Age	Head Size	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
<65		2666	10348	1.5 (1.2, 1.7)	5.2 (4.8, 5.7)	10.2 (9.6, 10.8)	19.7 (18.9, 20.5)	25.8 (24.9, 26.6)	28.7 (27.7, 29.7)
	≤32mm	290	2698	1.3 (0.9, 1.8)	2.8 (2.3, 3.5)	3.8 (3.2, 4.6)	6.5 (5.6, 7.5)	9.9 (8.8, 11.1)	12.1 (10.8, 13.5)
	>32mm	2376	7650	1.5 (1.3, 1.8)	6.1 (5.5, 6.6)	12.4 (11.7, 13.1)	24.3 (23.3, 25.3)	31.3 (30.3, 32.4)	35.0 (33.6, 36.5)
≥65		1683	9219	1.9 (1.7, 2.2)	4.9 (4.5, 5.4)	9.5 (8.9, 10.1)	16.8 (16.0, 17.7)	20.9 (20.0, 21.8)	24.1 (22.8, 25.5)
	≤32mm	212	2445	1.9 (1.5, 2.6)	3.9 (3.2, 4.7)	5.1 (4.3, 6.0)	7.2 (6.2, 8.3)	9.1 (7.9, 10.4)	12.4 (10.6, 14.5)
	>32mm	1471	6774	1.9 (1.6, 2.3)	5.3 (4.8, 5.9)	11.1 (10.3, 11.8)	20.4 (19.4, 21.4)	25.2 (24.1, 26.4)	28.2 (26.6, 29.9)
TOTAL		4349	19567						

Figure MM4 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement by Age and Head Size (Primary Diagnosis OA)



HR - adjusted for gender

<65 ≤32mm vs <65 >32mm

0 - 2Wk: HR=0.59 (0.25, 1.37), p=0.219
 2Wk - 2Yr: HR=0.64 (0.48, 0.85), p=0.002
 2Yr - 5Yr: HR=0.16 (0.12, 0.22), p<0.001
 5Yr - 5.5Yr: HR=0.05 (0.02, 0.16), p<0.001
 5.5Yr - 6Yr: HR=0.17 (0.08, 0.34), p<0.001
 6Yr - 6.5Yr: HR=0.26 (0.14, 0.50), p<0.001
 6.5Yr - 7.5Yr: HR=0.08 (0.04, 0.19), p<0.001
 7.5Yr - 12Yr: HR=0.28 (0.22, 0.36), p<0.001
 12Yr+: HR=0.43 (0.34, 0.55), p<0.001

<65 ≤32mm vs ≥65 ≤32mm

0 - 5.5Yr: HR=0.72 (0.56, 0.94), p=0.013
 5.5Yr+: HR=1.45 (1.12, 1.88), p=0.004

<65 >32mm vs ≥65 >32mm

0 - 4Yr: HR=1.11 (0.99, 1.24), p=0.065
 4Yr - 5.5Yr: HR=1.35 (1.15, 1.58), p<0.001
 5.5Yr - 7.5Yr: HR=1.22 (1.04, 1.43), p=0.014
 7.5Yr+: HR=1.52 (1.35, 1.71), p<0.001

≥65 ≤32mm vs ≥65 >32mm

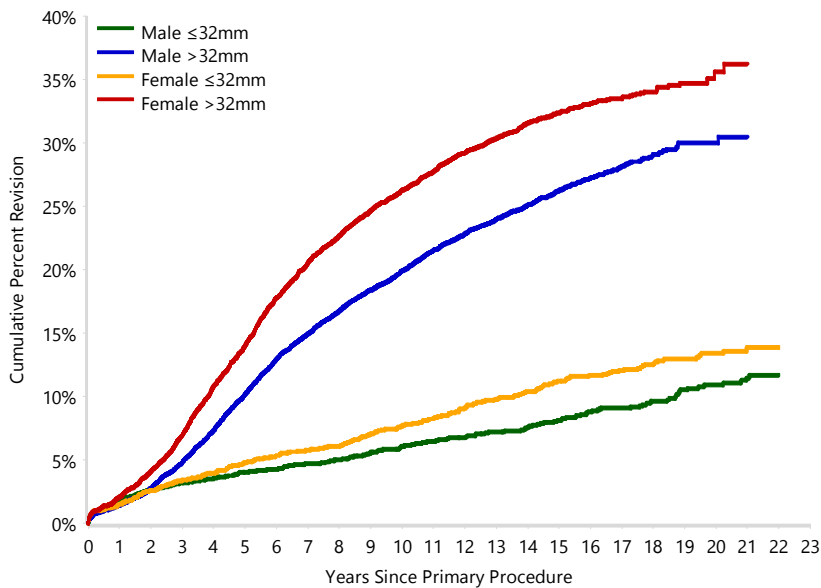
0 - 2Yr: HR=0.95 (0.74, 1.21), p=0.663
 2Yr - 3Yr: HR=0.39 (0.26, 0.57), p<0.001
 3Yr - 4Yr: HR=0.18 (0.12, 0.25), p<0.001
 4Yr - 5.5Yr: HR=0.22 (0.16, 0.30), p<0.001
 5.5Yr - 6Yr: HR=0.10 (0.05, 0.21), p<0.001
 6Yr - 6.5Yr: HR=0.19 (0.11, 0.35), p<0.001
 6.5Yr - 7Yr: HR=0.08 (0.04, 0.19), p<0.001
 7Yr - 7.5Yr: HR=0.15 (0.09, 0.25), p<0.001
 7.5Yr - 9Yr: HR=0.26 (0.18, 0.39), p<0.001
 9Yr+: HR=0.38 (0.30, 0.50), p<0.001

Number at Risk		0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
<65	≤32mm	2698	2656	2579	2521	2309	1848	803
	>32mm	7650	7511	7099	6542	5432	3527	205
≥65	≤32mm	2445	2366	2262	2132	1671	1031	268
	>32mm	6774	6552	6113	5431	3863	1952	62

Table MM6 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement by Gender and Head Size (Primary Diagnosis OA)

Gender	Head Size	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Male		2259	11059	1.5 (1.3, 1.7)	4.4 (4.1, 4.8)	8.7 (8.2, 9.2)	16.6 (15.9, 17.3)	21.9 (21.1, 22.7)	25.3 (24.3, 26.4)
	≤32mm	227	2673	1.7 (1.2, 2.2)	3.2 (2.6, 4.0)	4.0 (3.4, 4.9)	6.1 (5.2, 7.1)	8.1 (7.1, 9.3)	10.9 (9.5, 12.5)
	>32mm	2032	8386	1.4 (1.2, 1.7)	4.8 (4.4, 5.3)	10.2 (9.5, 10.8)	19.9 (19.0, 20.8)	26.2 (25.2, 27.3)	30.0 (28.7, 31.4)
Female		2090	8508	1.9 (1.6, 2.2)	5.9 (5.4, 6.5)	11.3 (10.7, 12.0)	20.8 (19.9, 21.7)	26.1 (25.2, 27.2)	28.6 (27.5, 29.8)
	≤32mm	275	2470	1.5 (1.1, 2.1)	3.4 (2.8, 4.2)	4.8 (4.0, 5.7)	7.7 (6.6, 8.8)	11.2 (9.9, 12.6)	13.4 (11.9, 15.1)
	>32mm	1815	6038	2.1 (1.7, 2.5)	7.0 (6.3, 7.6)	14.0 (13.1, 14.9)	26.3 (25.1, 27.4)	32.4 (31.1, 33.7)	35.6 (33.7, 37.5)
TOTAL		4349	19567						

Figure MM5 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement by Gender and Head Size (Primary Diagnosis OA)



HR - adjusted for age

Male ≤32mm vs Male >32mm

0 - 2Yr: HR=0.97 (0.75, 1.26), p=0.821
 2Yr - 5Yr: HR=0.19 (0.13, 0.26), p<0.001
 5Yr - 6Yr: HR=0.08 (0.03, 0.18), p<0.001
 6Yr - 7.5Yr: HR=0.15 (0.09, 0.27), p<0.001
 7.5Yr - 11.5Yr: HR=0.27 (0.20, 0.37), p<0.001
 11.5Yr - 12Yr: HR=0.06 (0.01, 0.44), p=0.005
 12Yr+: HR=0.41 (0.31, 0.54), p<0.001

Male ≤32mm vs Female ≤32mm

Entire Period: HR=0.76 (0.64, 0.91), p=0.002

Male >32mm vs Female >32mm

0 - 4Yr: HR=0.64 (0.58, 0.72), p<0.001
 4Yr - 4.5Yr: HR=0.91 (0.70, 1.19), p=0.505
 4.5Yr - 6.5Yr: HR=0.72 (0.62, 0.82), p<0.001
 6.5Yr - 7Yr: HR=0.57 (0.42, 0.79), p<0.001
 7Yr - 11Yr: HR=0.80 (0.70, 0.91), p<0.001
 11Yr+: HR=0.98 (0.83, 1.14), p=0.769

Female ≤32mm vs Female >32mm

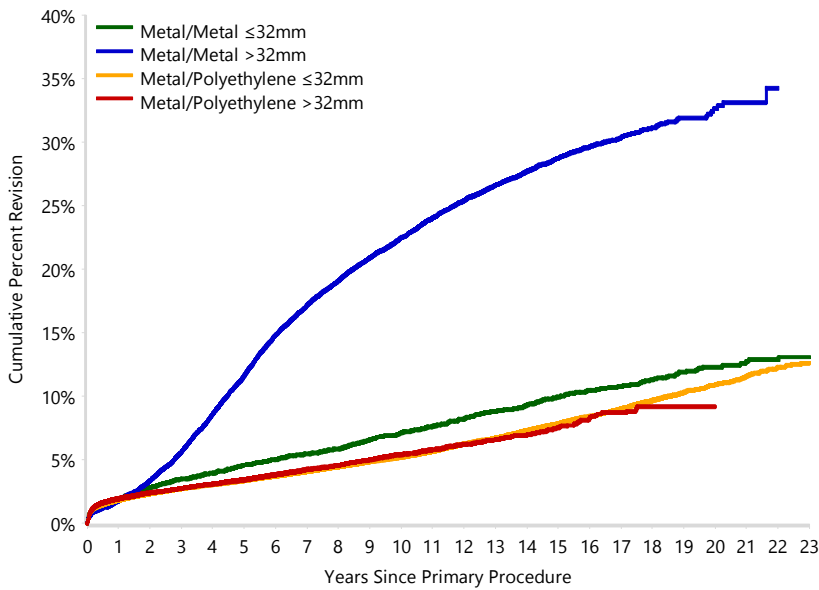
0 - 2Yr: HR=0.71 (0.57, 0.89), p=0.002
 2Yr - 2.5Yr: HR=0.34 (0.22, 0.52), p<0.001
 2.5Yr - 3Yr: HR=0.22 (0.15, 0.34), p<0.001
 3Yr - 6.5Yr: HR=0.15 (0.12, 0.19), p<0.001
 6.5Yr - 7.5Yr: HR=0.08 (0.05, 0.16), p<0.001
 7.5Yr - 8Yr: HR=0.31 (0.21, 0.46), p<0.001
 8Yr - 9.5Yr: HR=0.32 (0.25, 0.42), p<0.001
 9.5Yr - 11.5Yr: HR=0.36 (0.28, 0.45), p<0.001
 11.5Yr - 12.5Yr: HR=0.42 (0.29, 0.60), p<0.001
 12.5Yr - 14Yr: HR=0.34 (0.25, 0.46), p<0.001
 14Yr - 15.5Yr: HR=0.56 (0.38, 0.82), p=0.002
 15.5Yr+: HR=0.62 (0.41, 0.93), p=0.020

Number at Risk		0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Male	≤32mm	2673	2603	2498	2403	2035	1461	592
	>32mm	8386	8189	7734	7067	5590	3240	143
Female	≤32mm	2470	2419	2343	2250	1945	1418	479
	>32mm	6038	5874	5478	4906	3705	2239	124

Table MM7 Cumulative Percent Revision of Metal/Metal and Metal/Polyethylene Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)

Type	Head Size	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Metal/Metal	≤32mm	578	5807	1.8 (1.5, 2.2)	3.5 (3.1, 4.0)	4.6 (4.1, 5.2)	7.1 (6.5, 7.8)	10.0 (9.2, 10.8)	12.3 (11.3, 13.4)
	>32mm	4298	16300	1.8 (1.6, 2.0)	5.6 (5.3, 6.0)	11.6 (11.1, 12.1)	22.5 (21.8, 23.2)	28.7 (28.0, 29.5)	32.6 (31.5, 33.8)
Metal/Polyethylene	≤32mm	10855	212994	1.8 (1.8, 1.9)	2.7 (2.6, 2.8)	3.4 (3.3, 3.5)	5.2 (5.1, 5.3)	7.8 (7.7, 8.0)	10.9 (10.6, 11.2)
	>32mm	3063	77413	1.9 (1.8, 2.0)	2.7 (2.6, 2.9)	3.4 (3.3, 3.6)	5.4 (5.2, 5.6)	7.5 (7.1, 8.0)	9.2 (8.4, 10.1)
TOTAL		18794	312514						

Figure MM6 Cumulative Percent Revision of Metal/Metal and Metal/Polyethylene Primary Total Conventional Hip Replacement by Head Size (All Diagnoses)



HR - adjusted for age and gender

Metal/Metal ≤32mm vs Metal/Metal >32mm

- 0 - 2Wk: HR=1.28 (0.81, 2.04), p=0.295
- 2Wk - 1Mth: HR=1.72 (0.97, 3.05), p=0.061
- 1Mth - 1.5Yr: HR=0.57 (0.46, 0.71), p<0.001
- 1.5Yr - 2Yr: HR=0.42 (0.28, 0.63), p<0.001
- 2Yr - 3Yr: HR=0.31 (0.23, 0.44), p<0.001
- 3Yr - 5Yr: HR=0.20 (0.16, 0.26), p<0.001
- 5Yr+: HR=0.27 (0.24, 0.30), p<0.001

Metal/Metal ≤32mm vs Metal/Polyethylene ≤32mm

Entire Period: HR=1.09 (1.00, 1.19), p=0.038

Metal/Metal >32mm vs Metal/Polyethylene >32mm

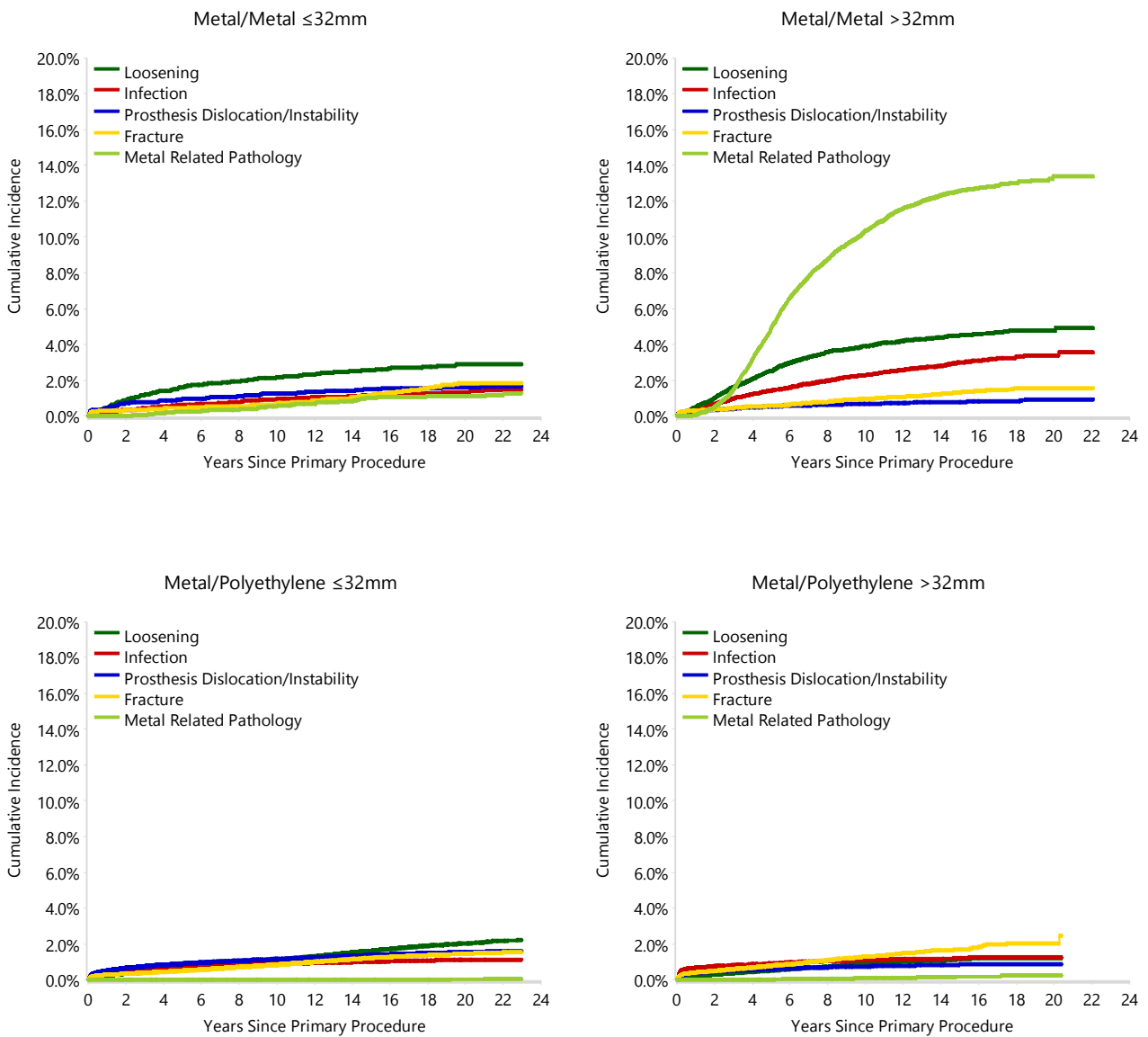
- 0 - 2Wk: HR=1.26 (0.94, 1.70), p=0.120
- 2Wk - 1Mth: HR=0.34 (0.23, 0.49), p<0.001
- 1Mth - 3Mth: HR=0.65 (0.51, 0.82), p<0.001
- 3Mth - 6Mth: HR=1.45 (1.18, 1.77), p<0.001
- 6Mth+: HR=4.93 (4.65, 5.22), p<0.001

Metal/Polyethylene ≤32mm vs Metal/Polyethylene >32mm

Entire Period: HR=0.98 (0.94, 1.02), p=0.308

Number at Risk		0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Metal/Metal	≤32mm	5807	5648	5435	5219	4459	3239	1211
	>32mm	16300	15828	14844	13430	10377	6136	308
Metal/Polyethylene	≤32mm	212994	196164	170530	144419	78419	31760	7687
	>32mm	77413	68032	53828	40954	15440	2466	86

Figure MM7 Cumulative Incidence Revision Diagnosis of Metal/Metal and Metal/Polyethylene Primary Total Conventional Hip Replacement by Head Size (Primary Diagnosis OA)



Note: Metal/Polyethylene includes both non cross-linked and cross-linked polyethylene

Table MM8 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement using Head Size ≤32mm by Head and Acetabular Surface (Primary Diagnosis OA)

Head Surface	Acetabular Surface	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Articul/Eze	PINNACLE	14	105	1.0 (0.1, 6.6)	3.8 (1.5, 9.9)	4.8 (2.0, 11.2)	8.0 (4.1, 15.4)	12.9 (7.5, 21.6)	
Metamys	CBF Cup	9	84	0.0 (0.0, 0.0)	2.4 (0.6, 9.3)	3.6 (1.2, 10.8)	6.1 (2.6, 14.1)	10.5 (5.4, 20.0)	12.2 (6.5, 22.4)
Metasul	Armor	20	312	0.6 (0.2, 2.5)	1.6 (0.7, 3.8)	1.9 (0.9, 4.3)	2.7 (1.3, 5.3)	5.5 (3.3, 9.0)	7.5 (4.8, 11.6)
	Metasul	377	4014	1.6 (1.2, 2.0)	3.3 (2.8, 3.9)	4.5 (3.9, 5.2)	6.9 (6.1, 7.7)	9.5 (8.5, 10.5)	11.9 (10.7, 13.2)
S-Rom	S-Rom	5	129	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	1.6 (0.4, 6.2)	2.5 (0.8, 7.4)	3.4 (1.3, 8.9)
Stanmore	Ringloc	15	90	1.1 (0.2, 7.6)	4.5 (1.7, 11.5)	4.5 (1.7, 11.5)	10.4 (5.6, 19.1)	13.1 (7.4, 22.4)	17.6 (10.8, 28.1)
Taperloc	M2a	4	54	0.0 (0.0, 0.0)	1.9 (0.3, 12.4)	3.7 (0.9, 14.0)	5.7 (1.9, 16.6)	7.8 (3.0, 19.4)	7.8 (3.0, 19.4)
Transcend	Lineage	12	96	5.2 (2.2, 12.1)	6.4 (2.9, 13.6)	7.5 (3.6, 15.1)	8.7 (4.4, 16.6)	14.7 (8.5, 24.7)	14.7 (8.5, 24.7)
Other (31)		46	259	3.5 (1.8, 6.6)	5.8 (3.6, 9.5)	7.0 (4.5, 10.9)	11.7 (8.3, 16.4)	16.4 (12.2, 21.8)	22.0 (16.4, 29.2)
TOTAL		502	5143						

Note: Only prostheses with over 50 procedures have been listed

Table MM9 Cumulative Percent Revision of Metal/Metal Primary Total Conventional Hip Replacement using Head Size >32mm by Head and Acetabular Surface (Primary Diagnosis OA)

Head Surface	Acetabular Surface	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
ASR	ASR	1902	3982	1.8 (1.4, 2.2)	9.8 (8.9, 10.7)	24.9 (23.5, 26.3)	45.3 (43.7, 47.0)	51.9 (50.2, 53.5)	
Articul/Eze	PINNACLE	230	1627	1.9 (1.3, 2.6)	3.0 (2.3, 4.0)	4.9 (3.9, 6.1)	10.6 (9.1, 12.3)	14.9 (13.1, 16.9)	19.5 (16.3, 23.2)
BHR	BHR	443	2223	1.0 (0.7, 1.5)	3.3 (2.6, 4.1)	6.2 (5.2, 7.3)	14.6 (13.1, 16.2)	21.8 (20.0, 23.8)	
	R3	149	535	2.3 (1.3, 3.9)	7.4 (5.5, 10.0)	11.7 (9.2, 14.8)	21.7 (18.4, 25.6)	32.1 (27.9, 36.8)	
BMHR	BHR	44	279	1.8 (0.7, 4.3)	3.9 (2.2, 7.0)	5.7 (3.6, 9.2)	12.4 (9.0, 16.9)	16.8 (12.7, 22.0)	
Bionik	Bionik	99	377	3.7 (2.2, 6.2)	8.1 (5.8, 11.4)	15.3 (11.9, 19.4)	25.2 (21.0, 30.2)	30.1 (25.4, 35.5)	
Icon	Icon	98	341	2.4 (1.2, 4.7)	7.2 (4.9, 10.6)	12.5 (9.4, 16.6)	24.4 (20.0, 29.6)	32.2 (27.1, 38.0)	
M2a	M2a	122	780	1.8 (1.1, 3.0)	4.3 (3.1, 5.9)	6.5 (5.0, 8.5)	11.4 (9.3, 13.9)	15.9 (13.4, 18.8)	18.9 (15.6, 22.7)
M2a Magnum	Recap	106	924	1.5 (0.9, 2.6)	2.5 (1.7, 3.8)	4.3 (3.2, 5.9)	8.5 (6.8, 10.5)	12.2 (10.1, 14.7)	
Metasul	Durom	192	1100	1.2 (0.7, 2.0)	3.9 (2.9, 5.2)	5.6 (4.4, 7.2)	13.3 (11.4, 15.6)	18.3 (16.0, 20.9)	
Mitch TRH	Mitch TRH	159	648	1.7 (0.9, 3.0)	5.1 (3.7, 7.1)	8.5 (6.6, 10.9)	16.2 (13.5, 19.4)	27.4 (23.8, 31.4)	
Optimom	Cormet	135	702	1.4 (0.8, 2.6)	3.6 (2.4, 5.3)	5.1 (3.7, 7.0)	13.1 (10.7, 15.9)	20.8 (17.7, 24.5)	
S-Rom	PINNACLE	28	284	2.1 (1.0, 4.6)	3.5 (1.9, 6.5)	3.9 (2.2, 6.9)	7.4 (4.9, 11.3)	9.6 (6.6, 13.9)	11.6 (8.1, 16.6)
Other (23)		140	622	2.6 (1.6, 4.2)	6.4 (4.7, 8.6)	9.6 (7.5, 12.2)	16.4 (13.6, 19.7)	23.5 (20.1, 27.4)	28.8 (24.3, 34.0)
TOTAL		3847	14424						

Note: Only prostheses with over 200 procedures have been listed

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