Australian Orthopaedic Association National Joint Replacement Registry

Prosthesis Types with No or Minimal Use Supplementary Report

AOA
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Australian Orthopaedic Association
National Joint Replacement Registry

2022 Prosthesis Types with No or Minimal Use Supplementary Report

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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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Table of Contents

Summary

This report provides summary data and outcomes for hip, knee and shoulder prothesis types with no or minimal use in Australia.

There are two classes of hip replacement no longer used: partial resurfacing and thrust plate. These are defined in the following section on hip replacement. These two classes of implant have not been used since 2014 and 2012, respectively.

There are two bearing surfaces used in total conventional hip replacement that are no longer used: procedures performed with ceramic heads on metal bearings and procedures performed with metal heads on ceramic bearings.

The rates of revision, reasons for revision and types of revision for procedures using ceramic head/metal bearings are provided. The numbers of procedures using metal heads/ceramic bearings is very low, so only a summary is provided for this combination.

There is one prosthesis type used in total conventional hip replacement that has minimal use: exchangeble neck prostheses. The proportion of procedures using exchangeable necks continues to decline.

There are three classes of partial knee replacement that are no longer used: unispacer, bicompartmental, and partial resurfacing. These are defined in the second section of this report on knee replacement. These three classes of implant have not been used since 2005, 2012, and 2018, respectively.

There is one class of shoulder replacement no longer used: total resurfacing. This class is defined in the section on shoulder replacement. Total resurfacing shoulder replacement was last used in 2020.

Hip Replacement

Partial Resurfacing

Partial resurfacing is a subcategory of partial hip replacement. It involves the use of one or more button prostheses to replace part of the natural articulating surface on one or both sides of the hip joint.

The Registry has recorded 15 partial resurfacing hip procedures and 9 of these have been revised. The last recorded procedure was in 2014 (Table NU1).

Osteonecrosis was the principal diagnosis (46.7%) (Table NU2). The majority of procedures were undertaken in males (80.0%) (Table NU3).

All but one of these prostheses were used to replace part of the femoral articular surface. The remaining procedure was a partial acetabular surface replacement.

The cumulative percent revision is 6.7% at 1 year and 55.0% at 13 years (Table NU4 and Figure NU1).

Of the 9 revisions, 4 were for osteonecrosis, 2 were for erosion, 1 was for loosening, 1 for lysis and 1 was for progression of disease (Table NU5). All were revised to a total hip replacement (Table NU6).

Table NU1 Number of Revisions of Primary Partial Resurfacing Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2004	1	1
2005	1	2
2006	1	1
2007	2	5
2008	2	3
2009	2	2
2014	0	1
TOTAL	**9**	**15**

Table NU2 Primary Partial Resurfacing Hip Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteonecrosis	7	46.7
Osteoarthritis	5	33.3
Osteochondritis Dissecans	1	6.7
Other	2	13.3
TOTAL	**15**	**100.0**

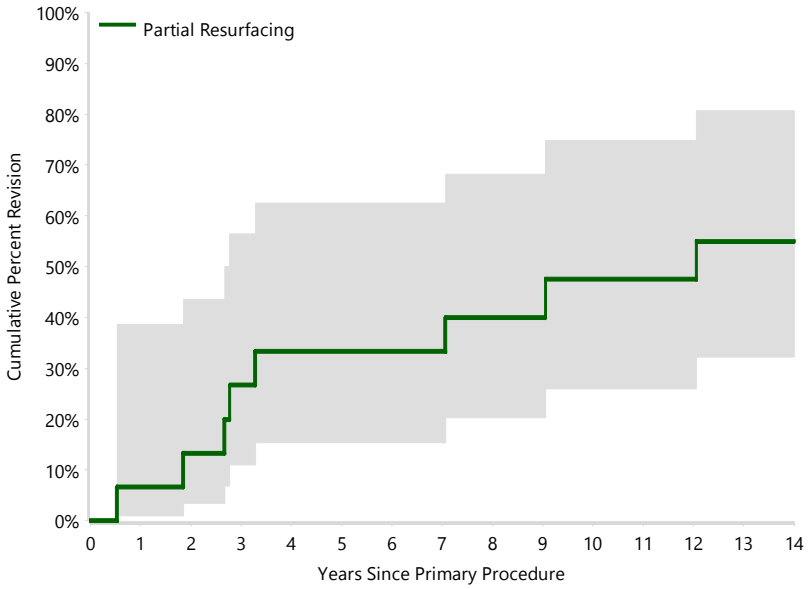
Table NU3 Age and Gender of Primary Partial Resurfacing Hip Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	12	80.0%	18	39	27	26.6	6.6
Female	3	20.0%	17	53	23	31.0	19.3
TOTAL	**15**	**100.0%**	**17**	**53**	**25**	**27.5**	**9.5**

Table NU4 Cumulative Percent Revision of Primary Partial Resurfacing Hip Replacement

Class	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Partial Resurfacing	9	15	6.7 (1.0, 38.7)	13.3 (3.5, 43.6)	26.7 (10.9, 56.4)	33.3 (15.4, 62.5)	40.0 (20.3, 68.2)	55.0 (32.2, 80.6)
TOTAL	**9**	**15**						

Figure NU1 Cumulative Percent Revision of Primary Partial Resurfacing Hip Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Partial Resurfacing	15	14	13	11	10	8	6

Table NU5 Primary Partial Resurfacing Hip Replacement by Reason for Revision

Reason for Revision	Partial Resurfacing	
	N	Col%
Osteonecrosis	4	44.4
Chondrolysis/Acetab. Erosion	2	22.2
Loosening	1	11.1
Lysis	1	11.1
Progression of Disease	1	11.1
TOTAL	**9**	**100.0**

Table NU6 Primary Partial Resurfacing Hip Replacement by Type of Revision

Type of Revision	Partial Resurfacing	
	N	Col%
THR (Femoral/Acetabular)	9	100.0
TOTAL	**9**	**100.0**

Thrust Plate

Thrust plate is a subcategory of total hip replacement. It involves acetabular replacement combined with resection of the femoral head and replacement with a femoral component that has a lateral fixation plate and femoral head prosthesis.

The Registry has recorded 258 thrust plate hip procedures, 28 of which have been revised. The last recorded procedure was in 2012 (Table NU7).

Osteoarthritis was the principal diagnosis (94.2%) (Table NU8). The majority of procedures were undertaken in males (71.3%) (Table NU9). The cumulative percent revision is 12.6% at 18 years (Table NU10 and Figure NU2).

Of the 28 revisions, 39.3% were for loosening (Table NU11). The most common type of revision was of the femoral component (50.0%) (Table NU12).

Table NU7 Number of Revisions of Primary Thrust Plate Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2000	2	15
2001	2	25
2002	4	31
2003	4	20
2004	1	22
2005	2	23
2006	5	14
2007	1	23
2008	2	20
2009	2	26
2010	0	15
2011	3	18
2012	0	6
TOTAL	**28**	**258**

Table NU8 Primary Thrust Plate Hip Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	243	94.2
Rheumatoid Arthritis	6	2.3
Osteonecrosis	5	1.9
Developmental Dysplasia	3	1.2
Other Inflammatory Arthritis	1	0.4
TOTAL	**258**	**100.0**

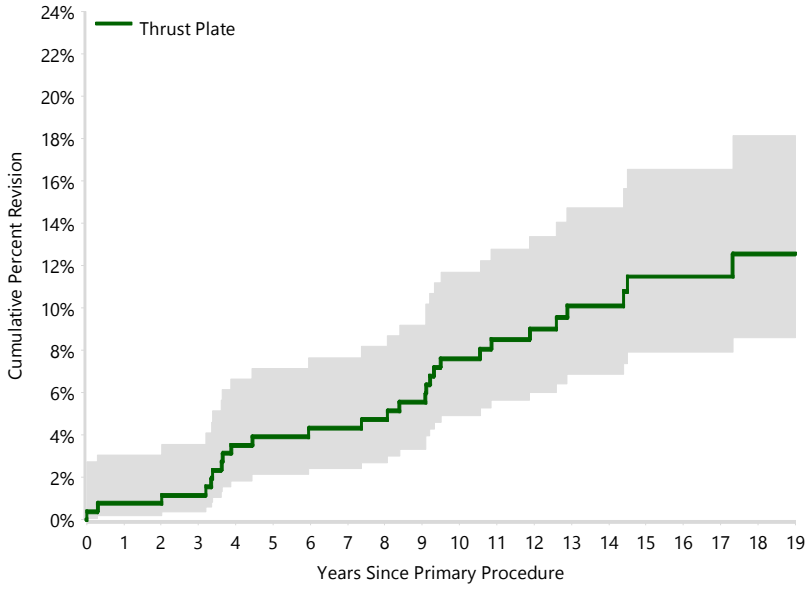
Table NU9 Age and Gender of Primary Thrust Plate Hip Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	184	71.3%	33	75	59	58.5	8.7
Female	74	28.7%	27	71	56	54.5	9.9
TOTAL	**258**	**100.0%**	**27**	**75**	**58**	**57.3**	**9.2**

Table NU10 Cumulative Percent Revision of Primary Thrust Plate Hip Replacement

Class	N Revised	N Total	1 Yr	4 Yrs	9 Yrs	11 Yrs	14 Yrs	18 Yrs
Thrust Plate	28	258	0.8 (0.2, 3.1)	3.5 (1.8, 6.7)	5.5 (3.3, 9.2)	8.5 (5.6, 12.8)	10.1 (6.9, 14.7)	12.6 (8.6, 18.2)
TOTAL	**28**	**258**						

Figure NU2 Cumulative Percent Revision of Primary Thrust Plate Hip Replacement



Number at Risk	0 Yr	1 Yr	4 Yrs	9 Yrs	11 Yrs	14 Yrs	18 Yrs
Thrust Plate	258	255	246	228	197	141	67

Table NU11 Primary Thrust Plate Hip Replacement by Reason for Revision

Reason for Revision	Thrust Plate	
	N	Col%
Loosening	11	39.3
Fracture	4	14.3
Pain	4	14.3
Lysis	3	10.7
Metal Related Pathology	2	7.1
Infection	1	3.6
Wear Acetabular Insert	1	3.6
Prosthesis Dislocation/Instability	1	3.6
Malposition	1	3.6
TOTAL	**28**	**100.0**

Table NU12 Primary Thrust Plate Hip Replacement by Type of Revision

Type of Revision	Thrust Plate	
	N	Col%
Femoral Component	14	50.0
THR (Femoral/Acetabular)	8	28.6
Head/Insert	2	7.1
Acetabular Component	1	3.6
Minor Components	1	3.6
Thrust Plate	1	3.6
Cement Spacer	1	3.6
TOTAL	**28**	**100.0**

Ceramic on Metal Outcomes

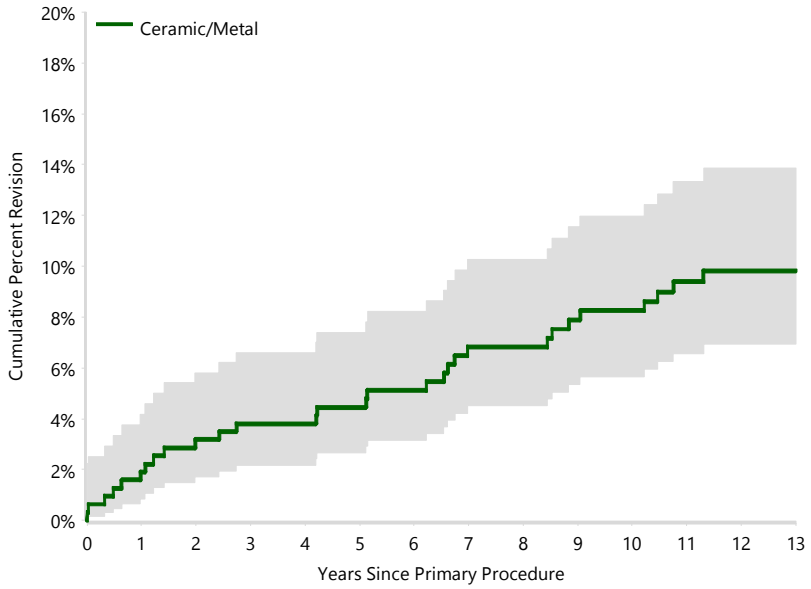
The Registry has information on 316 primary total conventional hip replacement procedures using ceramic head/metal bearings. All have been used with cementless acetabular components and the majority have been used with a head size of 36mm (86.1%).

The cumulative percent revision at 13 years is 9.8% (Table NU13 and Figure NU3).

Table NU13 Cumulative Percent Revision of Ceramic/Metal Primary Total Conventional Hip Replacement (All Diagnoses)

Bearing Surface	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Ceramic/Metal	29	316	1.9 (0.9, 4.2)	3.2 (1.7, 5.8)	3.8 (2.2, 6.6)	5.1 (3.2, 8.2)	7.9 (5.4, 11.5)	9.8 (6.9, 13.9)
TOTAL	**29**	**316**						

Figure NU3 Cumulative Percent Revision of Ceramic/Metal Primary Total Conventional Hip Replacement (All Diagnoses)



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Ceramic/Metal	316	309	305	301	280	256	57

Table NU14 Number of Revisions of Ceramic/Metal Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2007	0	16
2008	7	55
2009	11	124
2010	6	84
2011	5	35
2012	0	2
TOTAL	**29**	**316**

Table NU15 Ceramic/Metal Primary Total Conventional Hip Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	299	94.6
Fractured Neck Of Femur	5	1.6
Osteonecrosis	5	1.6
Other Inflammatory Arthritis	3	0.9
Rheumatoid Arthritis	2	0.6
Developmental Dysplasia	2	0.6
TOTAL	**316**	**100.0**

Table NU16 Ceramic/Metal Primary Total Conventional Hip Replacement by Revision Diagnosis

Revision Diagnosis	Ceramic/Metal		
	Number	% Primaries Revised	% Revisions
Loosening	7	2.2	24.1
Fracture	5	1.6	17.2
Prosthesis Dislocation/Instability	5	1.6	17.2
Infection	4	1.3	13.8
Pain	3	0.9	10.3
Lysis	2	0.6	6.9
Metal Related Pathology	2	0.6	6.9
Malposition	1	0.3	3.4
N Revision	**29**	**9.2**	**100.0**
N Primary	**316**		

Table NU17 Ceramic/Metal Primary Total Conventional Hip Replacement by Type of Revision

Type of Revision	Ceramic/Metal		
	Number	% Primaries Revised	% Revisions
Femoral Component	12	3.8	41.4
Acetabular Component	6	1.9	20.7
Head/Insert	5	1.6	17.2
Cement Spacer	2	0.6	6.9
Minor Components	2	0.6	6.9
THR (Femoral/Acetabular)	2	0.6	6.9
N Revision	**29**	**9.2**	**100.0**
N Primary	**316**		

Metal on Ceramic Outcomes

Metal head/ceramic bearings have only been used in a small number of procedures. The Registry has information on 8 primary total conventional hip replacements using metal head/ceramic bearings. None have been revised. All have been used with cementless acetabular components.

Table NU18 Cumulative Percent Revision of Metal/Ceramic Primary Total Conventional Hip Replacement (Primary Diagnosis OA)

Bearing Surface	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
Metal/Ceramic	0	8	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
TOTAL	**0**	**8**					

Table NU19 Number of Revisions of Metal/Ceramic Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2001	0	1
2003	0	1
2006	0	2
2008	0	1
2011	0	1
2014	0	1
2015	0	1
TOTAL	**0**	**8**

Table NU20 Metal/Ceramic Primary Total Conventional Hip Replacement by Primary Diagnosis

Primary Diagnosis	Total Conventional	
	N	Col%
Osteoarthritis	8	100.0
TOTAL	**8**	**100.0**

Exchangeable Neck Prostheses

A femoral stem with an exchangeable neck has a separate neck that connects proximally to the stem. Femoral stems with exchangeable necks were introduced to enable surgeons to have increased choice with respect to determining femoral neck version, offset and length during primary total conventional hip replacement.

The Registry has recorded 11,485 primary procedures using femoral stems with exchangeable necks (Table NU21). There were 34 procedures reported in 2021 which comprised 0.1% of all primary total conventional hip procedures (Table NU22). The proportion of procedures using exchangeable necks continues to decline and peaked in 2010 at 6.2% of all primary total conventional hip procedures.

The cumulative percent revision at 20 years is 14.9% for stems with exchangeable necks compared to 10.6% for fixed neck stems (Table NU23).
Femoral stems with exchangeable necks have more than 1.7 times the rate of revision compared to fixed neck stems (Figure NU4). The increase in the rate of revision is due to a higher cumulative incidence of loosening (2.7% compared to 2.0%, at 20 years), prosthesis dislocation/instability (2.1% compared to 1.4%) and fracture (2.6% compared to 1.8%) (Figure NU5).

Of the reasons for revision of femoral stems with exchangeable necks, 3.2% are for implant breakage of the femoral component compared to 1.1% for fixed neck stems (Table NU24).

The Registry has information on 12 different exchangeable femoral neck prostheses that been used in >100 procedures. The outcomes of each of these stems are detailed in Table NU25.

Table NU21 Exchangeable Necks Used in Total Conventional Hip Replacement by Primary Diagnosis

Primary Diagnosis	Exchangeable		Fixed	
	N	Col%	N	Col%
Osteoarthritis	10354	90.2	480869	88.0
Fractured Neck Of Femur	396	3.4	27610	5.1
Osteonecrosis	333	2.9	17556	3.2
Developmental Dysplasia	178	1.5	7094	1.3
Rheumatoid Arthritis	83	0.7	4694	0.9
Tumour	17	0.1	3110	0.6
Other Inflammatory Arthritis	78	0.7	2263	0.4
Failed Internal Fixation	35	0.3	2289	0.4
Fracture/Dislocation	4	0.0	705	0.1
Arthrodesis Takedown	6	0.1	127	0.0
Other	1	0.0	120	0.0
TOTAL	**11485**	**100.0**	**546437**	**100.0**

Note: All procedures using metal/metal prostheses have been excluded

Table NU22 Number of Revisions of Exchangeable Necks in Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2000	10	45
2001	26	177
2002	46	395
2003	58	390
2004	56	409
2005	60	424
2006	60	498
2007	64	524
2008	87	711
2009	94	923
2010	168	1515
2011	117	1571
2012	45	959
2013	38	788
2014	34	633
2015	18	508
2016	13	412
2017	15	301
2018	6	174
2019	1	54
2020	1	40
2021	1	34
TOTAL	**1018**	**11485**

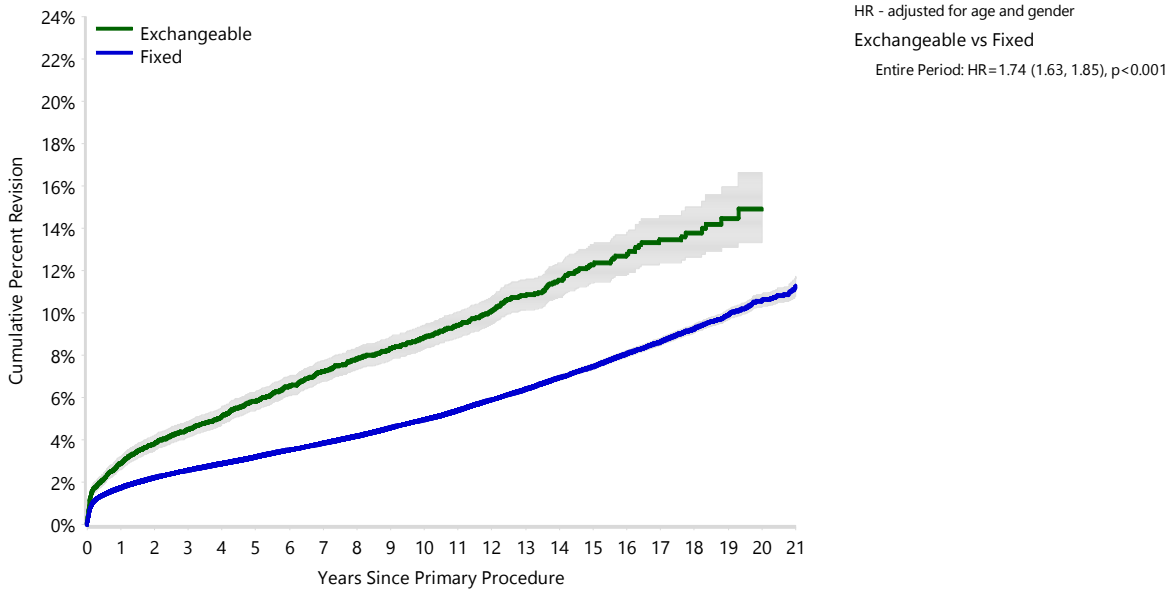
Note: All procedures using metal/metal prostheses have been excluded

Table NU23 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)

Femoral Neck	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Exchangeable	1018	11485	2.9 (2.6, 3.2)	4.5 (4.1, 4.9)	5.8 (5.4, 6.3)	8.8 (8.3, 9.4)	12.3 (11.4, 13.2)	14.9 (13.3, 16.6)
Fixed	22191	546437	1.7 (1.7, 1.8)	2.6 (2.5, 2.6)	3.2 (3.1, 3.3)	5.0 (4.9, 5.0)	7.5 (7.3, 7.6)	10.6 (10.3, 10.9)
TOTAL	**23209**	**557922**						

Note: All procedures using metal/metal prostheses have been excluded.

Figure NU4 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)



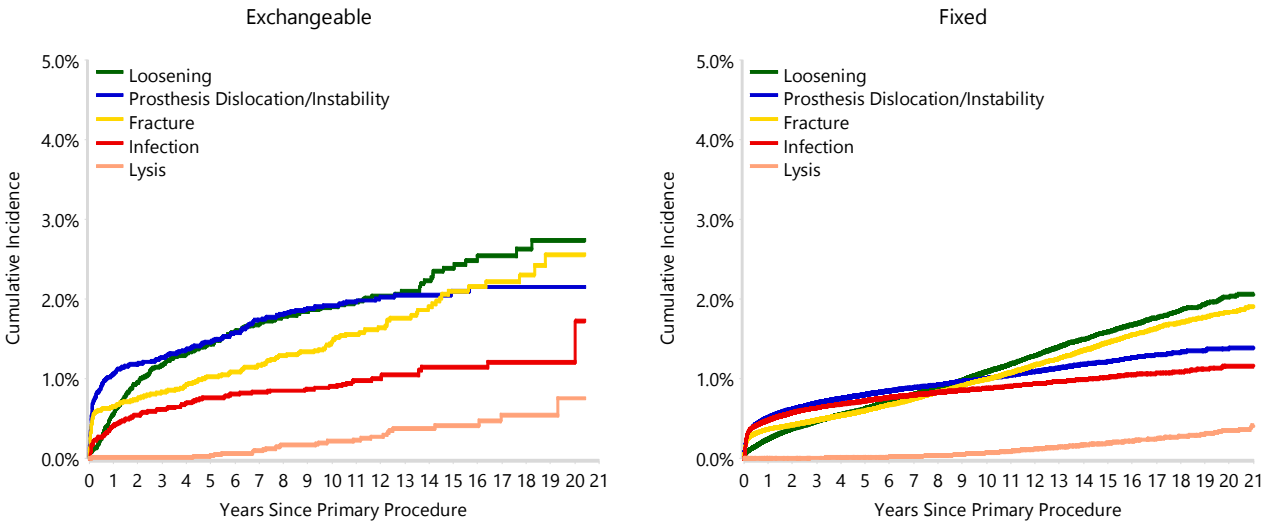
Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Exchangeable	11485	10994	10401	9422	5280	1214	78
Fixed	546437	488595	394505	306517	135810	45537	4545

Table NU24 Reason for Revision of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)

Revision Diagnosis	Exchangeable			Fixed		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Loosening	232	2.0	22.8	5056	0.9	22.8
Prosthesis Dislocation/Instability	221	1.9	21.7	4950	0.9	22.3
Fracture	187	1.6	18.4	4812	0.9	21.7
Infection	113	1.0	11.1	4335	0.8	19.5
Lysis	32	0.3	3.1	442	0.1	2.0
Pain	27	0.2	2.7	399	0.1	1.8
Leg Length Discrepancy	12	0.1	1.2	336	0.1	1.5
Malposition	15	0.1	1.5	312	0.1	1.4
Implant Breakage Stem	33	0.3	3.2	245	0.0	1.1
Wear Acetabular Insert	3	0.0	0.3	201	0.0	0.9
Implant Breakage Acetabular Insert	16	0.1	1.6	181	0.0	0.8
Implant Breakage Acetabular	18	0.2	1.8	135	0.0	0.6
Incorrect Sizing	6	0.1	0.6	126	0.0	0.6
Metal Related Pathology	88	0.8	8.6	107	0.0	0.5
Wear Head	3	0.0	0.3	85	0.0	0.4
Implant Breakage Head	4	0.0	0.4	55	0.0	0.2
Tumour				51	0.0	0.2
Heterotopic Bone	2	0.0	0.2	31	0.0	0.1
Wear Acetabulum				18	0.0	0.1
Progression Of Disease				2	0.0	0.0
Synovitis	1	0.0	0.1	2	0.0	0.0
Osteonecrosis				1	0.0	0.0
Other	5	0.0	0.5	309	0.1	1.4
N Revision	**1018**	**8.9**	**100.0**	**22191**	**4.1**	**100.0**
N Primary	**11485**			**546437**		

Note: All procedures using metal/metal prostheses have been excluded

Figure NU5 Cumulative Incidence Revision Diagnosis of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)



Note: All procedures using metal/metal prostheses have been excluded

Table NU25 Cumulative Percent Revision of Primary Total Conventional Hip Replacement Using an Exchangeable Femoral Neck (All Diagnoses)

Femoral Neck	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
ABGII	99	244	4.5 (2.5, 8.0)	11.2 (7.8, 15.9)	20.7 (16.1, 26.4)	37.5 (31.5, 44.3)		
Adapter	71	428	3.3 (2.0, 5.5)	7.2 (5.1, 10.1)	10.0 (7.5, 13.4)	17.0 (13.5, 21.3)		
Apex	219	2977	2.8 (2.3, 3.5)	4.0 (3.4, 4.8)	5.2 (4.4, 6.0)	7.7 (6.7, 8.8)	10.2 (8.6, 12.0)	
F2L	86	735	3.4 (2.3, 5.0)	5.5 (4.1, 7.4)	6.8 (5.2, 8.9)	8.6 (6.8, 10.9)	12.1 (9.8, 14.9)	14.5 (11.6, 18.2)
Femoral Neck (Amplitude)	27	607	0.8 (0.3, 2.0)	2.0 (1.1, 3.5)	3.5 (2.3, 5.3)	4.2 (2.8, 6.3)		
M-Cor	16	124	0.0 (0.0, 0.0)	2.5 (0.8, 7.5)	4.2 (1.8, 9.7)	9.8 (5.5, 17.0)		
M/L Taper Kinectiv	154	3234	2.3 (1.9, 2.9)	3.2 (2.7, 3.9)	3.8 (3.2, 4.5)	5.2 (4.5, 6.1)		
MBA	83	719	2.4 (1.5, 3.8)	4.1 (2.9, 5.9)	6.3 (4.7, 8.4)	10.7 (8.5, 13.5)	14.8 (11.7, 18.5)	
MSA	25	185	7.1 (4.2, 11.8)	9.3 (5.9, 14.5)	10.4 (6.8, 15.8)	14.4 (9.9, 20.7)		
Margron	115	670	5.6 (4.1, 7.6)	8.3 (6.5, 10.7)	10.2 (8.1, 12.8)	15.4 (12.8, 18.4)	18.0 (15.2, 21.3)	
Profemur	73	969	3.0 (2.1, 4.3)	4.7 (3.6, 6.3)	5.5 (4.2, 7.2)	7.6 (6.1, 9.6)	9.4 (7.0, 12.6)	
R120	10	217	0.9 (0.2, 3.6)	1.9 (0.7, 5.0)	1.9 (0.7, 5.0)	6.3 (3.2, 12.1)		
Other (7)	40	376	5.2 (3.3, 8.0)	7.0 (4.8, 10.2)	8.3 (5.8, 11.7)	11.6 (8.5, 15.7)		
TOTAL	**1018**	**11485**						

Note: All procedures using metal/metal prostheses have been excluded
Only prostheses with >100 procedures have been listed

Knee Replacement

Partial Resurfacing

Partial resurfacing is a subcategory of partial knee replacement. It involves the use of one or more button prostheses to replace part of the natural articulating surface on one or more sides of the joint, in one or more articular compartments of the knee.

The Registry has recorded 245 partial resurfacing knee procedures and 110 of these have been revised (Table NU26). The last recorded procedure was in 2018.

Osteoarthritis was the principal diagnosis (89.8%) (Table NU27). The majority of procedures were undertaken in males (51.0%) (Table NU28).

The cumulative percent revision is 6.1% at 1 year and 43.6% at 11 years (Table NU29 and Figure NU6).

For consistency, could change to "The most common reason for revision is progression of disease (68.2%), followed by loosening (9.1%) and pain (6.4%) (Table NU30). Most (65.5%) were revised to a total knee replacement (Table NU31).

Table NU26 Number of Revisions of Primary Partial Resurfacing Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2004	1	1
2005	9	15
2006	23	42
2007	15	35
2008	17	31
2009	15	25
2010	2	9
2011	5	8
2012	4	11
2013	8	25
2014	7	21
2015	2	10
2016	0	5
2017	1	4
2018	1	3
TOTAL	**110**	**245**

Table NU27 Primary Partial Resurfacing Knee Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	220	89.8
Osteonecrosis	11	4.5
Osteochondritis Dissecans	7	2.9
Other Inflammatory Arthritis	2	0.8
Chondrocalcinosis	1	0.4
Other	4	1.6
TOTAL	**245**	**100.0**

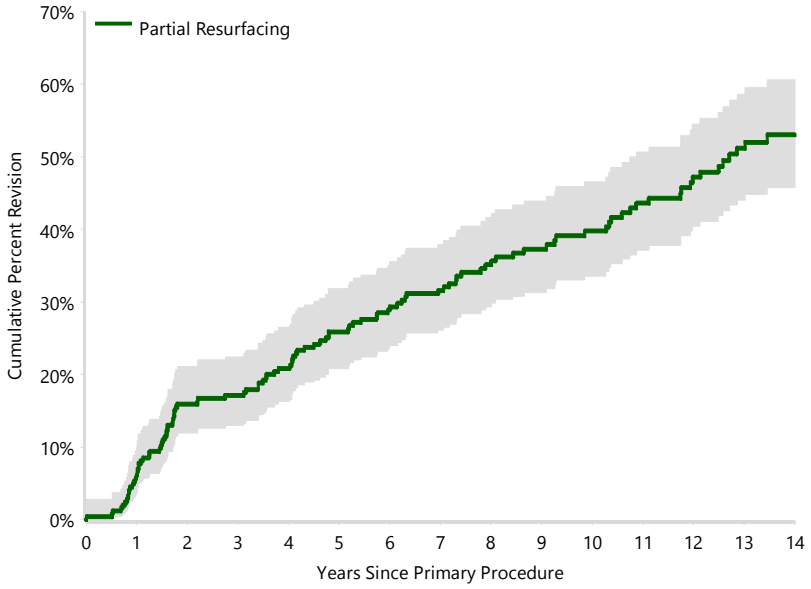
Table NU28 Age and Gender of Primary Partial Resurfacing Knee Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	125	51.0%	17	85	49	48.9	14.4
Female	120	49.0%	30	88	51	51.3	11.7
TOTAL	**245**	**100.0%**	**17**	**88**	**50**	**50.1**	**13.2**

Table NU29 Cumulative Percent Revision of Primary Partial Resurfacing Knee Replacement

Class	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	9 Yrs	11 Yrs	14 Yrs
Partial Resurfacing	110	245	6.1 (3.7, 10.0)	17.1 (13.0, 22.5)	25.9 (20.8, 31.9)	37.3 (31.4, 43.9)	43.6 (37.1, 50.6)	53.0 (45.8, 60.6)
TOTAL	**110**	**245**						

Figure NU6 Cumulative Percent Revision of Primary Partial Resurfacing Knee Replacement



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	9 Yrs	11 Yrs	14 Yrs
Partial Resurfacing	245	230	202	175	107	84	42

Table NU30 Primary Partial Resurfacing Knee Replacement by Reason for Revision

Reason for Revision	Partial Resurfacing	
	N	Col%
Progression Of Disease	75	68.2
Loosening	10	9.1
Pain	7	6.4
Patella Maltracking	3	2.7
Infection	2	1.8
Malalignment	2	1.8
Incorrect Sizing	1	0.9
Implant Breakage Patella	1	0.9
Metal Related Pathology	1	0.9
Wear Tibial	1	0.9
Osteonecrosis	1	0.9
Patellofemoral Pain	1	0.9
Wear Patella	1	0.9
Prosthesis Dislocation	1	0.9
Patella Erosion	1	0.9
Other	2	1.8
TOTAL	**110**	**100.0**

Table NU31 Primary Partial Resurfacing Knee Replacement by Type of Revision

Type of Revision	Partial Resurfacing	
	N	Col%
TKR (Tibial/Femoral)	72	65.5
UKR (Uni Tibial/Uni Femoral)	21	19.1
Patella Only	5	4.5
Patella/Trochlear Resurfacing	4	3.6
Partial Resurfacing	4	3.6
Removal of Prostheses	3	2.7
Cement Spacer	1	0.9
TOTAL	**110**	**100.0**

Unispacer

Unispacer knee replacement involves the use of a medial or lateral femorotibial compartment articular spacer.

There have been 40 unispacer procedures reported to the Registry. The last recorded procedure was in 2005 (Table NU32).

Osteoarthritis was the sole diagnosis reported for all unispacer procedures (Table NU33). The mean age of patients was 54.7 years, with the majority of patients being male (52.5%) (Table NU34).

Two types of unispacer prostheses have been used: UniSpacer (Zimmer) (n=31) and InterCushion (Advance Biosurfaces Inc) (n=9). All InterCushion prostheses were revised within 1.5 years. The 14 year cumulative percent revision of the Zimmer UniSpacer prosthesis is 74.2% (Table NU35 and Figure NU7).

The main reason for revision was progression of disease (22.9%), followed by pain and loosening (Table NU36).

Most unispacer procedures were revised to a unicompartmental knee replacement (57.1%) or a total knee replacement (31.4%). The remainder of the revisions involved a further unispacer replacement (Table NU37).

Table NU32 Number of Revisions of Primary Unispacer Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2003	10	13
2004	24	26
2005	1	1
TOTAL	**35**	**40**

Table NU33 Primary Unispacer Knee Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	40	100.0
TOTAL	**40**	**100.0**

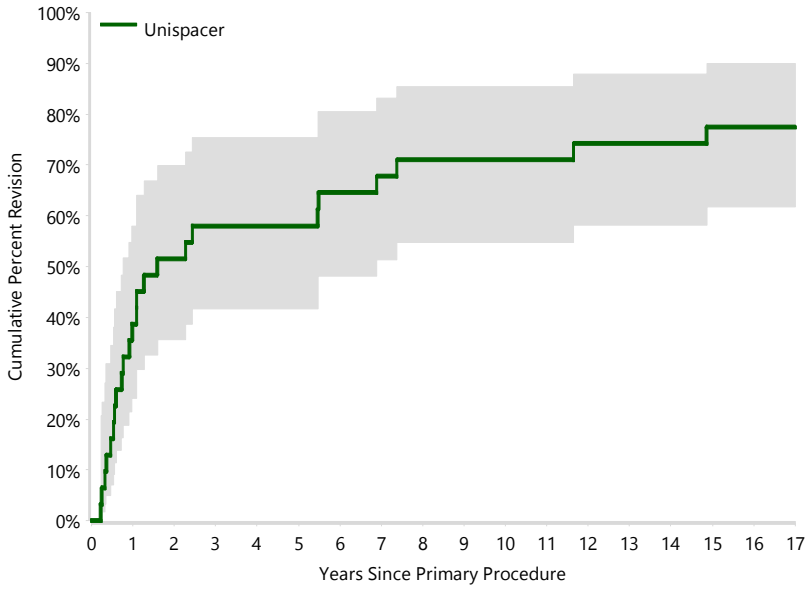
Table NU34 Age and Gender of Primary Unispacer Knee Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	21	52.5%	41	75	55	55.2	9.2
Female	19	47.5%	40	69	56	54.1	8.4
TOTAL	**40**	**100.0%**	**40**	**75**	**55**	**54.7**	**8.7**

Table NU35 Cumulative Percent Revision of Primary Unispacer Knee Replacement by Prosthesis Type

Unispacer	N Revised	N Total	1 Yr	2 Yrs	6 Yrs	11 Yrs	14 Yrs	17 Yrs
InterCushion	9	9	55.6 (28.1, 86.4)					
Unispacer	26	31	38.7 (24.2, 58.0)	51.6 (35.6, 69.8)	64.5 (48.1, 80.6)	71.0 (54.7, 85.5)	74.2 (58.2, 87.8)	77.4 (61.7, 90.0)
TOTAL	**35**	**40**						

Figure NU7 Cumulative Percent Revision of Primary Unispacer Knee Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	6 Yrs	11 Yrs	14 Yrs	17 Yrs
Unispacer	31	19	15	11	9	8	6

Table NU36 Primary Unispacer Knee Replacement by Reason for Revision

Reason for Revision	Unispacer	
	N	Col%
Progression Of Disease	8	22.9
Pain	7	20.0
Loosening	6	17.1
Synovitis	4	11.4
Implant Breakage Tibial	3	8.6
Prosthesis Dislocation	2	5.7
Osteonecrosis	1	2.9
Incorrect Sizing	1	2.9
Infection	1	2.9
Malalignment	1	2.9
Wear Tibial	1	2.9
TOTAL	**35**	**100.0**

Table NU37 Primary Unispacer Knee Replacement by Type of Revision

Type of Revision	Unispacer	
	N	Col%
UKR (Uni Tibial/Uni Femoral)	20	57.1
TKR (Tibial/Femoral)	11	31.4
Unispacer	4	11.4
TOTAL	**35**	**100.0**

Bicompartmental

Bicompartmental knee replacement involves the replacement of the medial femoral and trochlear articular surfaces of the knee with a single femoral prosthesis, as well as the medial tibial articular surface with a unicompartmental tibial prosthesis. It may also include the use of a patellar prosthesis.

The Registry has recorded 165 bicompartmental procedures. There have been no further procedures recorded since July 2012 (Table NU38).

The principal diagnosis for bicompartmental knee replacement was osteoarthritis (97.0%) (Table NU39). It was used more frequently in females (60.6%) and the mean age of patients was 64.3 years (Table NU40).

The bicompartmental knee replacement is a single company product. One femoral component, the Journey Deuce, has been combined with two main tibial components, the Journey Uni All Poly (32.1%) and the Journey Uni (v1) (65.5%). The majority of primary bicompartmental procedures included resurfacing the patella (84.2%).

The cumulative percent revision of bicompartmental knee replacement is 6.1% at 1 year and 19.3% at 13 years (Table NU41 and Figure NU8).

The main reasons for revision were patellofemoral pain and loosening (19.4% and 16.1%, respectively) (Table NU42). Of the 31 revisions, 16 were revised to a total knee replacement and 10 involved the addition of a patellar prosthesis (one was combined with a unicompartmental tibial insert) (Table NU43).

Table NU38 Number of Revisions of Primary Bicompartmental Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2006	2	4
2007	11	38
2008	4	50
2009	6	35
2010	4	24
2011	3	10
2012	1	4
TOTAL	**31**	**165**

Table NU39 Primary Bicompartmental Knee Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	160	97.0
Osteonecrosis	3	1.8
Other Inflammatory Arthritis	1	0.6
Rheumatoid Arthritis	1	0.6
TOTAL	**165**	**100.0**

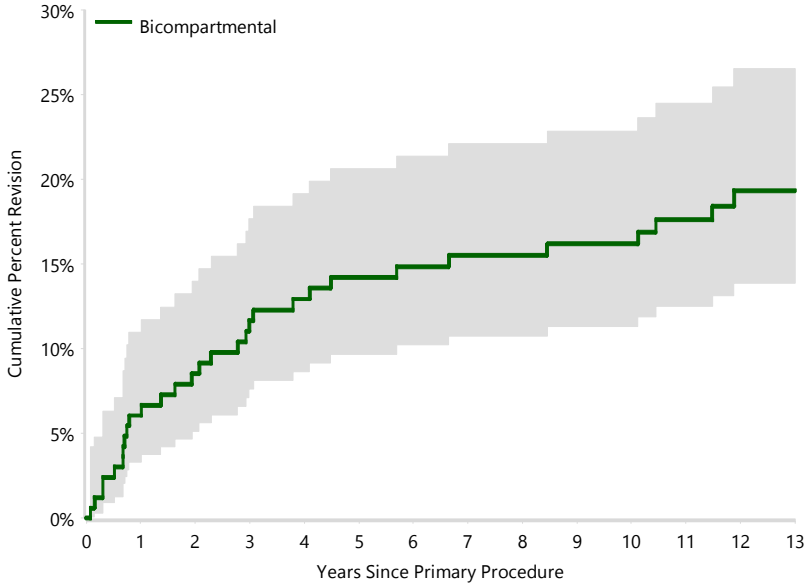
Table NU40 Age and Gender of Primary Bicompartmental Knee Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	65	39.4%	45	86	62	65.1	9.9
Female	100	60.6%	46	84	61	63.8	10.6
TOTAL	**165**	**100.0%**	**45**	**86**	**62**	**64.3**	**10.3**

Table NU41 Cumulative Percent Revision of Primary Bicompartmental Knee Replacement by Prosthesis Combination

Femoral	Tibial	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	13 Yrs
Journey Deuce	Generic Uni Knee Tibial	1	1						
	Journey Uni (v1)	17	108	7.4 (3.8, 14.3)	9.3 (5.1, 16.6)	10.3 (5.8, 17.8)	12.2 (7.3, 20.2)	12.2 (7.3, 20.2)	15.5 (9.8, 24.1)
	Journey Uni (v2)	1	3	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	33.3 (5.5, 94.6)		
	Journey Uni All Poly	12	53	3.8 (1.0, 14.3)	7.5 (2.9, 18.9)	13.3 (6.6, 25.9)	17.2 (9.3, 30.4)	21.1 (12.3, 34.9)	26.1 (14.9, 43.2)
TOTAL		**31**	**165**						

Figure NU8 Cumulative Percent Revision of Primary Bicompartmental Knee Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	13 Yrs
Bicompartmental	165	155	147	140	131	121	55

Table NU42 Primary Bicompartmental Knee Replacement by Reason for Revision

Reason for Revision	Bicompartmental	
	N	Col%
Patellofemoral Pain	6	19.4
Loosening	5	16.1
Pain	5	16.1
Infection	4	12.9
Progression Of Disease	3	9.7
Patella Erosion	2	6.5
Fracture	2	6.5
Implant Breakage Patella	1	3.2
Patella Maltracking	1	3.2
Osteonecrosis	1	3.2
Wear Tibial Insert	1	3.2
TOTAL	**31**	**100.0**

Table NU43 Primary Bicompartmental Knee Replacement by Type of Revision

Type of Revision	Bicompartmental	
	N	Col%
TKR (Tibial/Femoral)	16	51.6
Patella Only	10	32.3
Cement Spacer	2	6.5
Uni Insert Only	1	3.2
Uni Tibial Component	1	3.2
Uni Insert/Patella	1	3.2
TOTAL	**31**	**100.0**

Shoulder Replacement

Total Resurfacing

Total resurfacing is a subcategory of primary total shoulder replacement. It involves glenoid replacement and the use of a humeral prosthesis that replaces the humeral articular surface without resecting the head.

The Registry has recorded 235 total resurfacing shoulder replacements. There have been no further procedures since 2020.

The majority of procedures were undertaken in males and the mean age for males is younger than for females (Table NU46).

Osteoarthritis was the most common primary diagnosis (Table NU45).

The most common reason for revision is loosening (Table NU48). The most common type of revision is to a total shoulder replacement (Table NU49).

Table NU44 Number of Revisions of Primary Total Resurfacing Shoulder Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2005	1	1
2006	2	4
2007	2	8
2008	2	12
2009	1	11
2010	4	15
2011	4	34
2012	1	36
2013	3	36
2014	1	24
2015	1	19
2016	0	11
2017	0	10
2018	0	9
2019	1	4
2020	0	1
TOTAL	**23**	**235**

Table NU45 Primary Total Resurfacing Shoulder Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	226	96.2
Rheumatoid Arthritis	3	1.3
Fracture	2	0.9
Other Inflammatory Arthritis	1	0.4
Instability	1	0.4
Rotator Cuff Arthropathy	1	0.4
Osteonecrosis	1	0.4
TOTAL	**235**	**100.0**

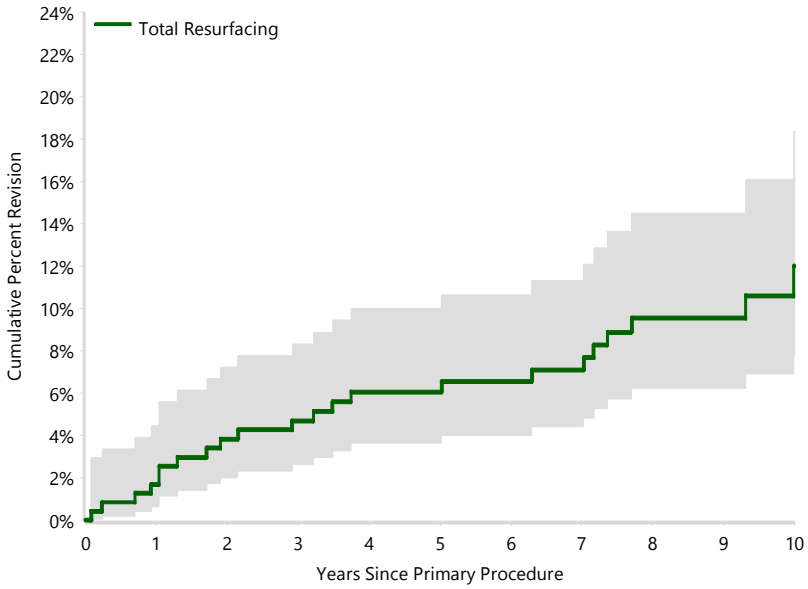
Table NU46 Age and Gender of Primary Total Resurfacing Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	140	59.6%	35	83	63	62.2	9.8
Female	95	40.4%	46	86	67	67.0	6.7
TOTAL	**235**	**100.0%**	**35**	**86**	**65**	**64.1**	**9.0**

Table NU47 Cumulative Percent Revision of Primary Total Resurfacing Shoulder Replacement

Class	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	14 Yrs
Total Resurfacing	23	235	1.7 (0.6, 4.5)	3.8 (2.0, 7.2)	4.7 (2.6, 8.3)	6.5 (4.0, 10.6)	12.0 (7.7, 18.4)	
TOTAL	**23**	**235**						

Figure NU9 Cumulative Percent Revision of Primary Total Resurfacing Shoulder Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	14 Yrs
Total Resurfacing	235	231	225	217	178	63	7

Table NU48 Primary Total Resurfacing Shoulder Replacement by Reason for Revision

Reason for Revision	Number	Percent
Loosening	10	43.5
Instability/Dislocation	3	13.0
Implant Breakage Glenoid Insert	3	13.0
Infection	2	8.7
Rotator Cuff Insufficiency	2	8.7
Fracture	1	4.3
Implant Breakage Glenoid	1	4.3
Wear Glenoid Insert	1	4.3
TOTAL	**23**	**100.0**

Table NU49 Primary Total Resurfacing Shoulder Replacement by Type of Revision

Type of Revision	Number	Percent
Humeral/Glenoid	11	47.8
Humeral Component	7	30.4
Insert Only	2	8.7
Head Only	1	4.3
Cement Spacer	1	4.3
Reoperation	1	4.3
TOTAL	**23**	**100.0**

Note: Humeral heads are replaced when the humeral component is revised

List of Tables

List of Figures