

Australian Orthopaedic Association National Joint Replacement Registry

2022 Primary Partial Shoulder
Arthroplasty Supplementary Report



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Australian
Orthopaedic
Association
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Joint
Replacement
Registry

Director: Professor Stephen Graves
E: admin@aoanjrr.org.au

Manager: Ms Kathy Hill
E: khill@aoanjrr.org.au

AOANJRR
SAHMRI,
North Terrace
ADELAIDE SA 5000
T: +61 8 8128 4280

The AOANJRR is funded by the Australian Government Department of Health

Suggested citation:

Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). Primary Partial Shoulder Replacement: Supplementary Report, in *Hip, Knee & Shoulder Arthroplasty: 2022 Annual Report*, AOA, Adelaide; 2022 1-30. [Accessed from: <https://aoanjrr.sahmri.com/annual-reports-2022/supplementary>]

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**Australian Orthopaedic Association
National Joint Replacement Registry**

**2022 Primary Partial Shoulder Replacement
Supplementary Report**

Acknowledgements

The Registry continues to receive support and invaluable assistance from the Commonwealth 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.

AOA Registry Clinical Director

Professor Stephen Graves

Deputy Clinical Directors

Professor Richard de Steiger
Mr Peter Lewis
Professor Ian Harris

Assistant Deputy Clinical Director

Mr James D Stoney

Clinical Advisors

Professor Richard Page
Mr Peter Stavrou

PROMs Advisor

Professor Ilana Ackerman

AOA Registry Committee

Neil Bergman
Annette Holian
Chris Morrey
Stephen Graves
Richard de Steiger
Peter Lewis
James Stoney
Bill Walter
Richard Page
Peter Stavrou
Rob Kuru
Peter McEwen
Paul Smith
Michael Schuetz
Joshua Petterwood
David Wysoki

Committee Chair
AOA President
AOA Vice President
Director
Deputy Director (Victoria)
Deputy Director (South Australia)
Assistant Deputy Director
Arthroplasty Society of Australia
Shoulder & Elbow Society
Foot & Ankle Society
Spine Society
Knee Society
Australian Capital Territory
Queensland
Tasmania
Western Australia

AOA NATIONAL JOINT REPLACEMENT REGISTRY

Registry Executive Manager

Kathy Hill

Clinical Studies Manager

Durga Bastiras

PROMs Manager

Pablo Flores Figuera

Publications Manager

Sophie Corfield

Administrative Coordinator

Rianne Thompson

Clinical Studies Team

Tania Alland
Libby Poole
Dianne Buranyi-Trevarton
Laura Busk

PROMs Team

Nea Ryan
David Metherell
Marta Jasinska

Data Linkage

Katherine Duszynski
(UNISA)

SOUTH AUSTRALIAN HEALTH AND MEDICAL RESEARCH INSTITUTE (SAHMRI)

Project Manager

Emma Heath

Statisticians

Michelle Lorimer
Alana Cuthbert
Carl Holder
Dylan Harries
Kara Cashman

Data Managers

Janey Barrow
Robert Armitage
Primali De Silva

Data Entry

Georgina Daynes
Kirsty Modystach
Anh Pham
Jacinta Greer
Anna Fergusson
Vivien Do
Jeremy Durward
Michael Crame
Andrew Loakim
Anita Wright
Courtney Cullen
Natalie Morrall

ICT

Andrew Brock
Christian Boyd
Jennifer Coleman
Nazia Dilnaz
Daina Ross
Vincent Talladira
Anu Bakshi
Peter Weston

Contents

INTRODUCTION	6
Classes of Partial Shoulder Replacement	6
Use of Partial Shoulder Replacement	7
Primary Partial Resurfacing Shoulder Replacement	10
Demographics and Outcomes	10
Primary Hemi Resurfacing Shoulder Replacement	11
Demographics	11
Outcome for All Diagnoses	12
Outcome for Osteoarthritis	13
Primary Hemi Mid Head Shoulder Replacement	16
Demographics and Outcome	16
Primary Hemi Stemmed Shoulder Replacement	18
Demographics	18
Outcome for All Diagnoses.....	21
Outcome for Fracture	24
Outcome for Osteoarthritis	30
LIST OF TABLES	32
LIST OF FIGURES	32

Primary Partial Shoulder Replacement

Introduction

This supplementary report provides detailed information on partial shoulder replacement. The Partial Shoulder Arthroplasty Report is one of 15 supplementary reports to complete the AOANJRR Annual Report for 2022 and is available on the AOANJRR website.

CLASSES OF PARTIAL SHOULDER REPLACEMENT

The Registry subcategorises primary partial shoulder replacement into four main classes. These are defined by the type of prostheses used.

Partial resurfacing involves the use of one or more button prostheses to replace part of the natural articulating surface, on one or both sides of the shoulder joint.

Hemi resurfacing involves the use of a humeral prosthesis that replaces the humeral articular surface only, without resecting the head.

Hemi mid head involves resection of part of the humeral head and replacement with a humeral head and an epiphyseal fixation prosthesis.

Hemi stemmed involves the resection of the humeral head and replacement with a humeral head and a humeral stem prosthesis. A humeral stem prosthesis may have metaphyseal or diaphyseal fixation.

Detailed information on demographics of each class of primary partial shoulder replacement is available in the supplementary report 'Demographics of Hip, Knee & Shoulder Arthroplasty' on the AOANJRR website: <https://aoanjrr.sahmri.com/annual-reports-2022>

USE OF PARTIAL SHOULDER REPLACEMENT

There have been 7,623 primary partial shoulder replacements reported to the Registry up to 31 December 2021. This is an additional 277 procedures compared to the number reported last year.

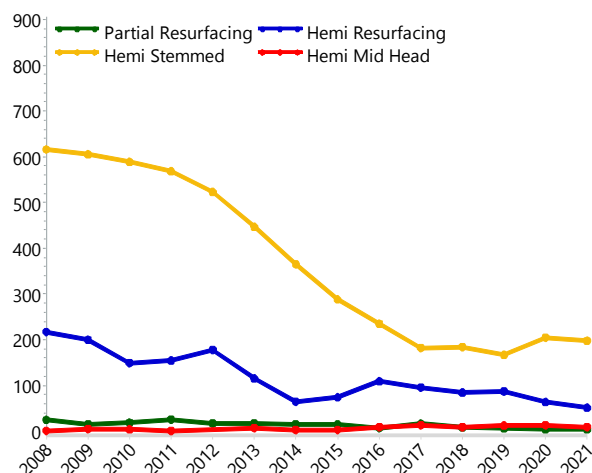
The most common class of primary partial shoulder replacement is hemi stemmed. This accounts for 72.7% of all partial shoulder replacements, followed by hemi resurfacing (23.5%), partial resurfacing (2.6%) and hemi mid head (1.2%) (Table SPS1).

Table SPS1 Primary Partial Shoulder Replacement by Class

Shoulder Class	Number	Percent
Partial Resurfacing	202	2.6
Hemi Resurfacing	1790	23.5
Hemi Stemmed	5542	72.7
Hemi Mid Head	89	1.2
TOTAL	7623	100.0

The use of the two main classes of primary partial shoulder replacement has declined over the last 9 years. The number of hemi resurfacing procedures decreased from 178 in 2012 to 51 in 2021. The number of hemi stemmed procedures decreased from 616 in 2008 to 198 in 2021 (Figure SPS1).

Figure SPS1 Primary Partial Shoulder Replacement by Class



There is gender variation depending on the class of primary partial shoulder replacement. The proportions of primary partial shoulder replacement for females are hemi stemmed (68.5%), hemi mid head (36.0%), hemi resurfacing (40.9%) and partial resurfacing (23.3%) (Table SPS2).

Table SPS2 Primary Partial Shoulder Replacement by Class and Gender

Shoulder Class	Male		Female		TOTAL	
	N	%	N	%	N	%
Partial Resurfacing	155	76.7	47	23.3	202	100.0
Hemi Resurfacing	1058	59.1	732	40.9	1790	100.0
Hemi Stemmed	1744	31.5	3798	68.5	5542	100.0
Hemi Mid Head	57	64.0	32	36.0	89	100.0
TOTAL	3014	39.5	4609	60.5	7623	100.0

The proportion of patients aged ≥65 years also varies depending on the class of primary partial shoulder replacement: hemi stemmed (66.5%), hemi resurfacing (48.4%), hemi mid head (27.0%) and partial resurfacing (18.8%) (Table SPS3).

Overall, males undergoing primary partial shoulder replacement are younger (mean age 60.4 years) compared to females (71.0 years) (Table SPS4).

The most common primary diagnosis for females is fracture (52.0%). For males, the most common primary diagnosis is osteoarthritis (58.1%) (Table SPS5).

The cumulative percent revision varies depending on class. Partial resurfacing and hemi mid head have only been used in small numbers (202 and 89 procedures, respectively). This makes any assessment of comparative performance difficult. However, there is a clear difference in the two more commonly used classes of hemi resurfacing and hemi stemmed. Devices in these classes have a longer follow-up and the cumulative percent revision at 10 years for hemi resurfacing is greater than for hemi stemmed replacement (16.9% compared to 11.8%, respectively) (Table SPS6 and Figure SPS2).

Table SPS3 Primary Partial Shoulder Replacement by Class and Age

Shoulder Class	<55		55-64		65-74		≥75		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Partial Resurfacing	149	73.8	15	7.4	22	10.9	16	7.9	202	100.0
Hemi Resurfacing	429	24.0	494	27.6	535	29.9	332	18.5	1790	100.0
Hemi Stemmed	707	12.8	1147	20.7	1597	28.8	2091	37.7	5542	100.0
Hemi Mid Head	44	49.4	21	23.6	18	20.2	6	6.7	89	100.0
TOTAL	1329	17.4	1677	22.0	2172	28.5	2445	32.1	7623	100.0

Table SPS4 Age and Gender of Primary Partial Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	3014	39.5%	14	94	62	60.4	14.4
Female	4609	60.5%	13	101	72	71.0	11.8
TOTAL	7623	100.0%	13	101	68	66.8	13.9

Table SPS5 Primary Partial Shoulder Replacement by Primary Diagnosis and Gender

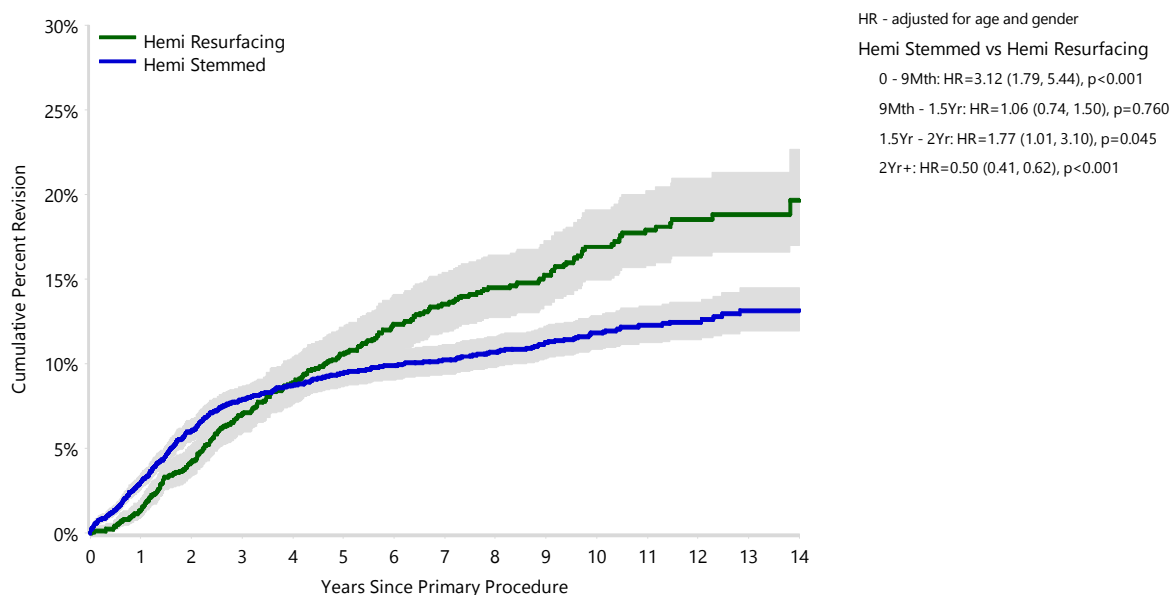
Primary Diagnosis	Male		Female		TOTAL	
	N	Col%	N	Col%	N	Col%
Osteoarthritis	1750	58.1	1564	33.9	3314	43.5
Fracture	734	24.4	2398	52.0	3132	41.1
Rotator Cuff Arthropathy	126	4.2	214	4.6	340	4.5
Osteonecrosis	116	3.8	155	3.4	271	3.6
Instability	144	4.8	71	1.5	215	2.8
Tumour	106	3.5	75	1.6	181	2.4
Rheumatoid Arthritis	23	0.8	105	2.3	128	1.7
Other Inflammatory Arthritis	12	0.4	25	0.5	37	0.5
Osteochondritis Dissecans	2	0.1	.	.	2	0.0
Other	1	0.0	2	0.0	3	0.0
TOTAL	3014	100.0	4609	100.0	7623	100.0

Note: Instability includes instability, dislocation, and Hills-Sachs Defect

Table SPS6 Cumulative Percent Revision of Primary Partial Shoulder Replacement by Class (All Diagnoses)

Shoulder Class	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Partial Resurfacing	13	202	0.5 (0.1, 3.5)	1.5 (0.5, 4.7)	2.7 (1.1, 6.5)	4.7 (2.4, 9.3)	5.6 (2.9, 10.6)	
Hemi Resurfacing	244	1790	1.4 (0.9, 2.0)	7.0 (5.9, 8.3)	10.6 (9.1, 12.2)	13.5 (11.9, 15.4)	16.9 (14.9, 19.1)	19.6 (17.0, 22.7)
Hemi Stemmed	528	5542	3.0 (2.6, 3.5)	7.9 (7.2, 8.7)	9.5 (8.7, 10.3)	10.2 (9.4, 11.1)	11.8 (10.8, 12.9)	13.2 (11.9, 14.5)
Hemi Mid Head	9	89	2.4 (0.6, 9.3)	10.3 (5.0, 20.8)	14.8 (7.8, 27.3)	14.8 (7.8, 27.3)		
TOTAL	794	7623						

Figure SPS2 Cumulative Percent Revision of Primary Partial Shoulder Replacement by Class (All Diagnoses)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Hemi Resurfacing	1790	1707	1435	1166	926	571	88
Hemi Stemmed	5542	4963	4018	3297	2536	1322	135

PRIMARY PARTIAL RESURFACING SHOULDER REPLACEMENT

DEMOGRAPHICS AND OUTCOMES

There have been 202 primary partial resurfacing shoulder replacement procedures reported to the Registry. This is an additional 6 procedures compared to the previous report.

This procedure is undertaken more commonly in males (76.7%). The mean age for males is 38.6 years compared to 55.3 years for females (Table SPS7).

The most common primary diagnosis for males is instability (56.1%), whereas the most common primary diagnosis for females is osteoarthritis (44.7%) (Table SPS8).

The cumulative percent revision at 10 years is 5.6% (Table SPS6). Of the 13 revisions, 9 are for glenoid erosion, 2 are for instability/dislocation, 1 is for rotator cuff insufficiency, and 1 is for loosening. All were revised to a total shoulder replacement (8 of which were total stemmed).

Table SPS7 Age and Gender of Primary Partial Resurfacing Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	155	76.7%	14	87	35	38.6	17.5
Female	47	23.3%	16	88	55	55.3	19.5
TOTAL	202	100.0%	14	88	40	42.5	19.3

Table SPS8 Primary Partial Resurfacing Shoulder Replacement by Primary Diagnosis and Gender

Primary Diagnosis	Male		Female		TOTAL	
	N	Col%	N	Col%	N	Col%
Instability	87	56.1	19	40.4	106	52.5
Osteoarthritis	50	32.3	21	44.7	71	35.1
Fracture	12	7.7	3	6.4	15	7.4
Osteonecrosis	2	1.3	3	6.4	5	2.5
Osteochondritis Dissecans	2	1.3	.	.	2	1.0
Rotator Cuff Arthropathy	2	1.3	.	.	2	1.0
Rheumatoid Arthritis	.	.	1	2.1	1	0.5
TOTAL	155	100.0	47	100.0	202	100.0

PRIMARY HEMI RESURFACING SHOULDER REPLACEMENT

DEMOGRAPHICS

There have been 1,790 primary hemi resurfacing shoulder replacements reported to the Registry. This is an additional 51 procedures compared to the previous report. The use of primary hemi resurfacing has declined by 55.8% since 2008.

This procedure is more common in males (59.1%). The mean age is 59.9 years for males and 67.7 years for females (Table SPS9).

Osteoarthritis is the most common primary diagnosis (88.4%). The range of diagnoses is similar for males and females (Table SPS10).

In 2021, all primary hemi resurfacing procedures reported to the Registry used the PyroTITAN (Table SPS11).

Table SPS9 Age and Gender of Primary Hemi Resurfacing Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	1058	59.1%	19	90	61	59.9	12.1
Female	732	40.9%	27	93	68	67.7	11.3
TOTAL	1790	100.0%	19	93	64	63.1	12.4

Table SPS10 Primary Hemi Resurfacing Shoulder Replacement by Primary Diagnosis and Gender

Primary Diagnosis	Male		Female		TOTAL	
	N	Col%	N	Col%	N	Col%
Osteoarthritis	943	89.1	640	87.4	1583	88.4
Rotator Cuff Arthropathy	50	4.7	35	4.8	85	4.7
Osteonecrosis	19	1.8	18	2.5	37	2.1
Instability	24	2.3	7	1.0	31	1.7
Rheumatoid Arthritis	9	0.9	19	2.6	28	1.6
Fracture	10	0.9	4	0.5	14	0.8
Other Inflammatory Arthritis	3	0.3	9	1.2	12	0.7
TOTAL	1058	100.0	732	100.0	1790	100.0

Note: Instability includes instability and dislocation

Table SPS11 Most Used Humeral Head Prostheses in Primary Hemi Resurfacing Shoulder Replacement

2008		2018		2019		2020		2021	
N	Model	N	Model	N	Model	N	Model	N	Model
124	Copeland	73	PyroTITAN	78	PyroTITAN	59	PyroTITAN	51	PyroTITAN
45	Global CAP	7	Copeland	4	Copeland	3	Copeland		
34	SMR	4	Global CAP	4	Global CAP	2	Global CAP		
11	Aequalis			1	SMR				
2	Epoca RH								
1	Buechel-Pappas								
Most Used									
217	(6) 100.0%	84	(3) 100.0%	87	(4) 100.0%	64	(3) 100.0%	51	(1) 100.0%

OUTCOME FOR ALL DIAGNOSES

Reason for Revision

The main reasons for revision of primary hemi resurfacing shoulder replacement are glenoid erosion (27.5%), pain (20.9%), rotator cuff insufficiency (12.7%), and instability/dislocation (9.4%) (Table SPS12 and Figure SPS3).

Prior to 2021, there had been 12 reported breakages of the PyroTITAN prosthesis. Three of these breakages were reported secondary to loosening.

Type of Revision

The most common type of revision is to a total shoulder replacement (88.9%) (Table SPS13). Of these, 132 (60.8%) were revised to a total reverse shoulder and 77 (35.5%) to a total stemmed shoulder replacement.

Glenoid erosion and pain are the reasons for 48.4% of all hemi resurfacing shoulder revisions.

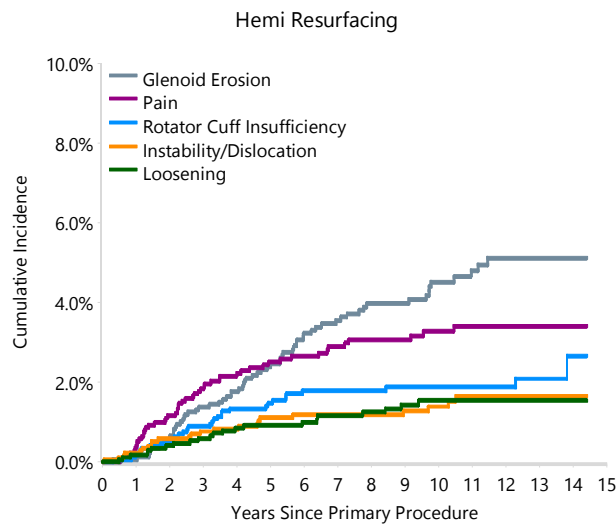
Table SPS12 Primary Hemi Resurfacing Shoulder Replacement by Reason for Revision (All Diagnoses)

Reason for Revision	Number	Percent
Glenoid Erosion	67	27.5
Pain	51	20.9
Rotator Cuff Insufficiency	31	12.7
Instability/Dislocation	23	9.4
Loosening	22	9.0
Implant Breakage Head	12	4.9
Lysis	9	3.7
Infection	8	3.3
Fracture	8	3.3
Malposition	3	1.2
Metal Related Pathology	3	1.2
Arthrofibrosis	2	0.8
Wear Glenoid Insert	2	0.8
Incorrect Sizing	2	0.8
Osteonecrosis	1	0.4
TOTAL	244	100.0

Table SPS13 Primary Hemi Resurfacing Shoulder Replacement by Type of Revision (All Diagnoses)

Type of Revision	Number	Percent
Humeral/Glenoid	217	88.9
Humeral Component	13	5.3
Glenoid Component	6	2.5
Cement Spacer	4	1.6
Removal of Prostheses	2	0.8
Reoperation	1	0.4
Head Only	1	0.4
TOTAL	244	100.0

Figure SPS3 Cumulative Incidence Revision Diagnosis of Primary Hemi Resurfacing Shoulder Replacement (All Diagnoses)





OUTCOME FOR OSTEOARTHRITIS

Age and Gender

Patients aged 65-74 years have a lower rate of revision after 1.5 years compared to patients aged <55 years, whereas patients aged ≥75 years have a lower rate of revision after 2.5 years and after 4 years (Table SPS14 and Figure SPS4).

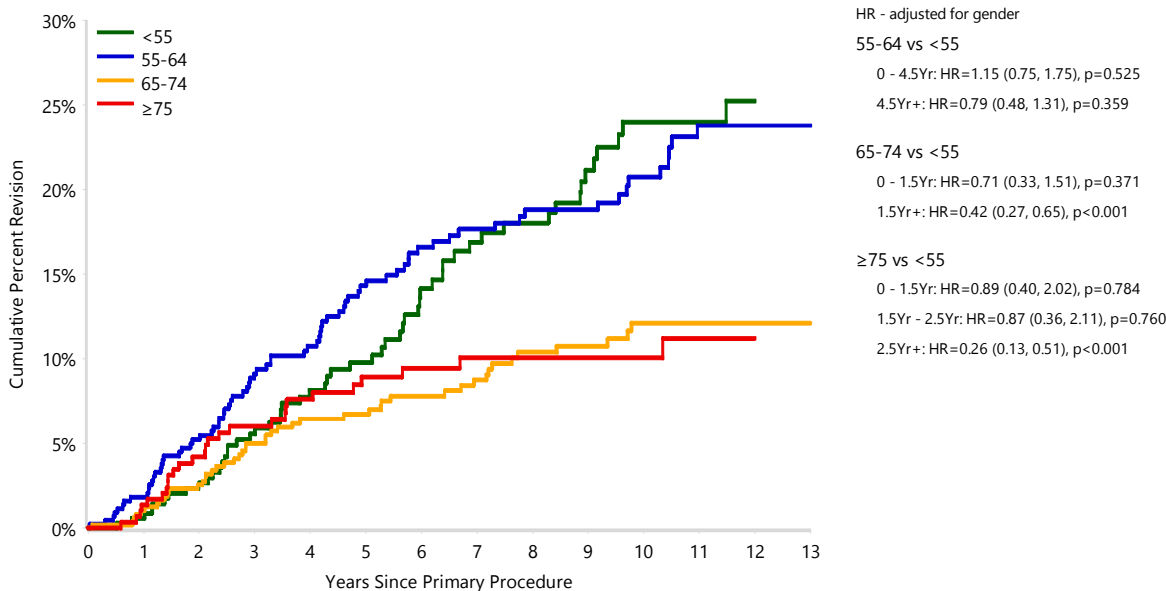
Females have a higher rate of revision than males (Table SPS15 and Figure SPS5).

The outcomes of the most commonly used prostheses are listed in Table SPS16. The PyroTITAN was the only hemi-resurfacing prosthesis remaining in use in 2021. It has a cumulative percent revision of 6.1% (95% CI 4.0, 9.3) at 7 years (Table SPS16 **Error! Reference source not found.**).

Table SPS14 Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Age (Primary Diagnosis OA)

Age	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
<55	56	361	0.6 (0.1, 2.3)	5.6 (3.5, 8.7)	9.8 (6.9, 13.8)	16.9 (12.7, 22.3)	24.0 (18.6, 30.6)	
55-64	78	442	1.9 (0.9, 3.7)	9.1 (6.7, 12.4)	14.3 (11.2, 18.3)	17.7 (14.1, 22.0)	20.7 (16.7, 25.6)	
65-74	46	486	1.0 (0.4, 2.5)	5.0 (3.4, 7.5)	6.7 (4.7, 9.5)	8.7 (6.4, 11.9)	12.1 (9.1, 16.0)	
≥75	27	294	1.4 (0.5, 3.6)	6.0 (3.8, 9.5)	8.9 (6.1, 13.1)	10.1 (6.9, 14.5)	10.1 (6.9, 14.5)	
TOTAL	207	1583						

Figure SPS4 Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Age (Primary Diagnosis OA)

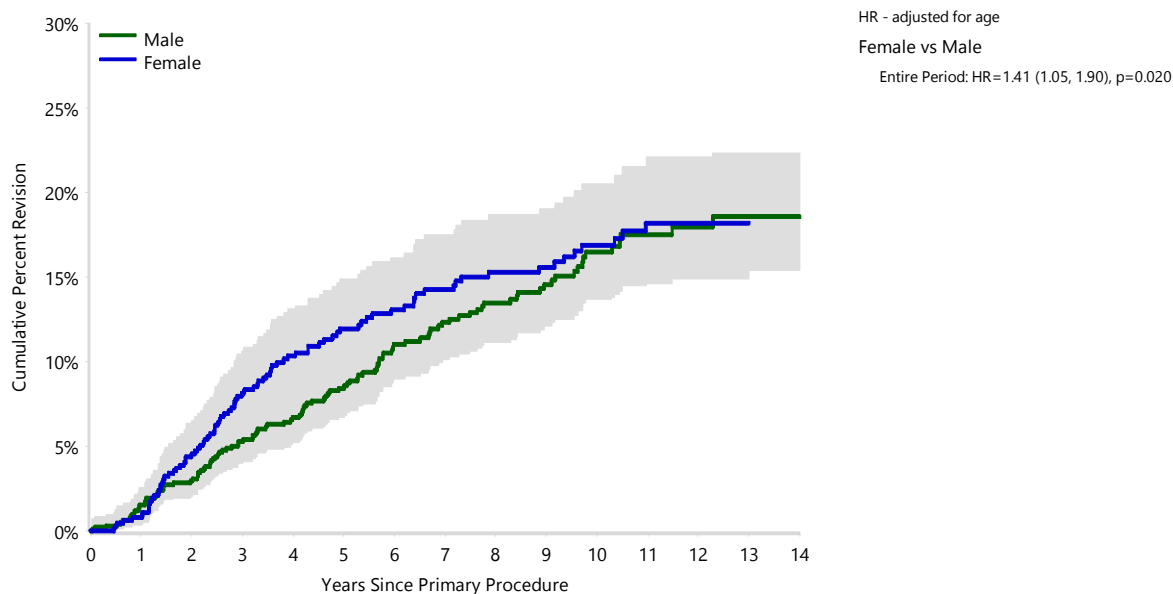


Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
<55	361	341	273	206	149	91	19
55-64	442	411	341	280	227	146	24
65-74	486	472	408	348	286	173	30
≥75	294	286	248	189	145	84	7

Table SPS15 Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Gender (Primary Diagnosis OA)

Gender	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Male	115	943	1.5 (0.9, 2.6)	5.3 (4.0, 7.0)	8.4 (6.7, 10.6)	12.3 (10.1, 15.0)	16.5 (13.7, 19.7)	18.6 (15.4, 22.3)
Female	92	640	0.8 (0.3, 1.9)	8.2 (6.2, 10.7)	12.0 (9.6, 14.9)	14.3 (11.6, 17.5)	16.9 (13.8, 20.5)	
TOTAL	207	1583						

Figure SPS5 Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Gender (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Male	943	893	748	603	467	269	46
Female	640	617	522	420	340	225	34

Table SPS16 Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Humeral Head (Primary Diagnosis OA)

Humeral Head	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Aequalis	18	79	1.3 (0.2, 8.8)	10.3 (5.3, 19.5)	15.7 (9.2, 26.0)	18.8 (11.5, 29.7)	24.0 (15.5, 35.9)	
Copeland	82	556	1.6 (0.8, 3.1)	6.4 (4.7, 8.9)	10.0 (7.7, 12.8)	12.8 (10.2, 16.0)	15.7 (12.8, 19.4)	17.8 (14.4, 21.8)
Global CAP	43	224	0.4 (0.1, 3.1)	9.1 (6.0, 13.7)	12.4 (8.7, 17.6)	16.0 (11.7, 21.8)	20.9 (15.7, 27.5)	
PyroTITAN	26	555	1.3 (0.6, 2.8)	3.7 (2.4, 5.9)	5.2 (3.4, 7.9)	6.1 (4.0, 9.3)		
SMR	32	146	0.0 (0.0, 0.0)	7.0 (3.8, 12.6)	14.3 (9.4, 21.2)	20.9 (14.9, 28.9)	25.0 (18.3, 33.7)	
Other (3)	6	23	4.3 (0.6, 27.1)	17.4 (6.9, 39.9)	17.4 (6.9, 39.9)	22.9 (10.1, 46.9)	22.9 (10.1, 46.9)	
TOTAL	207	1583						

Note: Only prostheses with >50 procedures have been listed

PRIMARY HEMI MID HEAD SHOULDER REPLACEMENT

DEMOGRAPHICS AND OUTCOME

There have been 89 primary hemi mid head shoulder replacement procedures reported to the Registry. This is an additional 10 procedures compared to the previous report.

This procedure is undertaken more commonly in males (64.0%). The mean age is 49.4 years for males and 64.6 years for females (Table SPS17).

Osteoarthritis is the most common primary diagnosis (59.6%) (Table SPS18).

Of the 9 revisions reported, 3 are for glenoid erosion, 2 for rotator cuff insufficiency, and 1 each for fracture, pain, loosening and instability/dislocation (Table SPS19).

The most common type of revision is to a total shoulder replacement (Table SPS20).

The most common humeral head and stem prosthesis combinations are the Affinis and the Eclipse.

Outcomes for the most used prosthesis combinations are presented in Table SPS21.

Table SPS17 Age and Gender of Primary Hemi Mid Head Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	57	64.0%	18	83	48	49.4	12.8
Female	32	36.0%	30	85	66	64.6	11.4
TOTAL	89	100.0%	18	85	55	54.8	14.3

Table SPS18 Primary Hemi Mid Head Shoulder Replacement by Primary Diagnosis and Gender

Primary Diagnosis	Male		Female		TOTAL	
	N	Col%	N	Col%	N	Col%
Osteoarthritis	33	57.9	20	62.5	53	59.6
Osteonecrosis	16	28.1	7	21.9	23	25.8
Fracture	3	5.3	3	9.4	6	6.7
Rotator Cuff Arthropathy	2	3.5	.	.	2	2.2
Instability	1	1.8	1	3.1	2	2.2
Rheumatoid Arthritis	.	.	1	3.1	1	1.1
Other Inflammatory Arthritis	1	1.8	.	.	1	1.1
Other	1	1.8	.	.	1	1.1
TOTAL	57	100.0	32	100.0	89	100.0

Table SPS19 Primary Hemi Mid Head Shoulder Replacement by Reason for Revision

Reason for Revision	Number	Percent
Glenoid Erosion	3	33.3
Rotator Cuff Insufficiency	2	22.2
Fracture	1	11.1
Pain	1	11.1
Loosening	1	11.1
Instability/Dislocation	1	11.1
TOTAL	9	100.0

Table SPS20 Primary Hemi Mid Head Shoulder Replacement by Type of Revision

Type of Revision	Number	Percent
Humeral/Glenoid	4	44.4
Glenoid Component	3	33.3
Humeral Component	1	11.1
Head Only	1	11.1
TOTAL	9	100.0

Note: Fracture includes proximal humerus fracture

Table SPS21 Cumulative Percent Revision of Primary Hemi Mid Head Shoulder Replacement by Prosthesis Combination

Humeral Head	Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Affinis	Affinis	4	58	3.7 (0.9, 14.1)	5.7 (1.9, 16.6)	9.3 (3.4, 24.1)			
Affiniti	Simpliciti	4	7	0.0 (0.0, 0.0)	48.6 (18.7, 88.2)	65.7 (31.5, 95.2)	65.7 (31.5, 95.2)		
Eclipse	Eclipse	1	10	0.0 (0.0, 0.0)	11.1 (1.6, 56.7)	11.1 (1.6, 56.7)	11.1 (1.6, 56.7)	11.1 (1.6, 56.7)	
Other (5)		0	14	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)			
TOTAL		9	89						

Note: Only prostheses with ≥ 7 procedures have been listed

PRIMARY HEMI STEMMED SHOULDER REPLACEMENT

DEMOGRAPHICS

There have been 5,542 primary hemi stemmed shoulder replacement procedures reported to the Registry. This is an additional 210 procedures compared to the previous report.

This procedure is more common in females (68.5%). The mean age is 71.8 years for females and 63.0 years for males (Table SPS22).

The most common primary diagnosis is fracture (55.9%), followed by osteoarthritis (29.0%) (Table SPS23). In 2021, the number of primary hemi stemmed shoulder replacements undertaken for fracture decreased by 87.3% compared to 2008. In 2021, the number of primary hemi stemmed shoulder replacements undertaken for osteoarthritis decreased by 38.2% compared to 2008 (Figure SPS6).

The most common humeral head prostheses used in 2021 are the Ascend Flex, Equinoxe, Comprehensive and Global Unite.

The 10 most used humeral head prostheses account for 97.5% of all primary hemi stemmed procedures in 2021. This has decreased from 98.2% in 2008 (Table SPS24).

The most common humeral stem prostheses used in 2021 are the Ascend Flex, Equinoxe, Comprehensive and Global Unite. The 10 most used humeral stem prostheses account for 98.0% of all primary hemi stemmed procedures in 2021. This has increased from 97.2% in 2008 (Table SPS25).

There has been a major decline in the use of primary hemi stemmed shoulder replacement for the management of osteoarthritis and fracture.

Table SPS22 Age and Gender of Primary Hemi Stemmed Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	1744	31.5%	14	94	64	63.0	13.7
Female	3798	68.5%	13	101	73	71.8	11.5
TOTAL	5542	100.0%	13	101	70	69.0	12.9

Table SPS23 Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis and Gender

Primary Diagnosis	Male		Female		TOTAL	
	N	Col%	N	Col%	N	Col%
Fracture	709	40.7	2388	62.9	3097	55.9
Osteoarthritis	724	41.5	883	23.2	1607	29.0
Rotator Cuff Arthropathy	72	4.1	179	4.7	251	4.5
Osteonecrosis	79	4.5	127	3.3	206	3.7
Tumour	106	6.1	75	2.0	181	3.3
Rheumatoid Arthritis	14	0.8	84	2.2	98	1.8
Instability	32	1.8	44	1.2	76	1.4
Other Inflammatory Arthritis	8	0.5	16	0.4	24	0.4
Other	.	.	2	0.1	2	0.0
TOTAL	1744	100.0	3798	100.0	5542	100.0

Note: Instability includes instability and dislocation



Figure SPS6 Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis

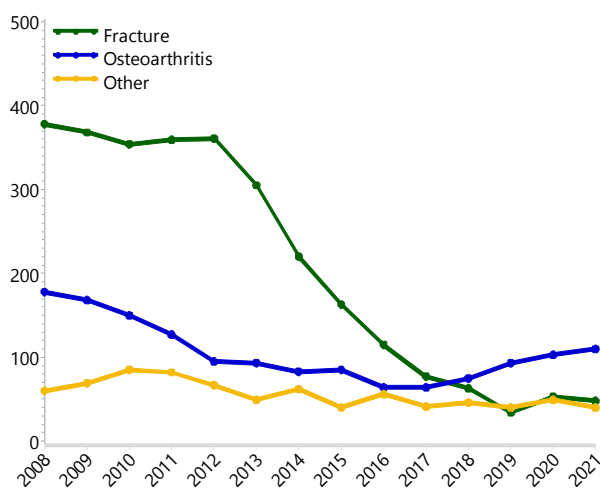


Table SPS24 10 Most Used Humeral Head Prostheses in Primary Hemi Stemmed Shoulder Replacement

2008		2018		2019		2020		2021	
N	Model	N	Model	N	Model	N	Model	N	Model
197	Global Advantage	57	Ascend Flex PyC	81	Ascend Flex PyC	118	Ascend Flex PyC	125	Ascend Flex PyC
177	SMR	20	Global Unite	15	Global Unite	19	Comprehensive	15	Equinox
98	Aequalis	17	Comprehensive	12	Mutars	16	Equinox	14	Comprehensive
38	Bigliani/Flatow	16	SMR	11	SMR CTA	14	Global Unite	7	Global Unite
31	SMR CTA	11	Equinox	10	Comprehensive	6	Aequalis	7	SMR CTA
22	Global Advantage CTA	10	SMR CTA	8	Aequalis	6	Mutars	6	Aequalis
15	Bio-Modular	8	Aequalis	6	Equinox	5	SMR	6	Ascend Flex
13	Solar	7	Affinis	6	SMR	4	Affinis	5	SMR
8	Global AP	7	Ascend Flex	4	Affinis	4	Ascend Flex	4	Mets
6	Univers 3D	6	Delta Xtend	4	Ascend Flex	4	SMR CTA	4	Mutars
10 Most Used									
605	(10) 98.2%	159	(10) 86.4%	157	(10) 94.0%	196	(10) 95.6%	193	(10) 97.5%
Remainder									
11	(4) 1.8%	25	(8) 13.6%	10	(6) 6.0%	9	(6) 4.4%	5	(3) 2.5%
TOTAL									
616	(14) 100.0%	184	(18) 100.0%	167	(16) 100.0%	205	(16) 100.0%	198	(13) 100.0%

Table SPS25 10 Most Used Humeral Stem Prostheses in Primary Hemi Stemmed Shoulder Replacement

2008		2018		2019		2020		2021	
N	Model	N	Model	N	Model	N	Model	N	Model
207	SMR	64	Ascend Flex	85	Ascend Flex	119	Ascend Flex	123	Ascend Flex
138	Global FX	26	SMR	17	SMR	22	Comprehensive	15	Equinox
98	Aequalis	22	Comprehensive	12	Mutars	16	Equinox	14	Comprehensive
81	Global Advantage	12	Global AP	11	Comprehensive	12	Global Unite	12	SMR
26	Bigliani/Flatow TM	12	Global Unite	11	Global Unite	9	SMR	8	Aequalis Flex
13	Solar	11	Equinox	8	Aequalis	6	Aequalis	6	Aequalis
11	Bigliani/Flatow	8	Aequalis	7	Global AP	6	Mutars	5	Global Unite
11	Bio-Modular	7	Affinis	6	Equinox	4	Affinis	4	Mets
8	Global AP	6	Delta Xtend	4	Affinis	3	Aequalis Flex	4	Mutars
6	Univers 3D	5	Mutars	3	Delta Xtend	3	Global AP	3	Affinis
10 Most Used									
599	(10) 97.2%	173	(10) 94.0%	164	(10) 98.2%	200	(10) 97.6%	194	(10) 98.0%
Remainder									
17	(7) 2.8%	11	(5) 6.0%	3	(2) 1.8%	5	(3) 2.4%	4	(2) 2.0%
TOTAL									
616	(17) 100.0%	184	(15) 100.0%	167	(12) 100.0%	205	(13) 100.0%	198	(12) 100.0%

OUTCOME FOR ALL DIAGNOSES

Primary Diagnosis

Primary hemi stemmed shoulder replacement performed for fracture has a higher rate of revision than when performed for osteoarthritis in the first 6 months. After this time there is no difference (Table SPS26 and Figure SPS7).

Reason for Revision

Reasons for revision vary depending on the primary diagnosis. Rotator cuff insufficiency occurs more frequently in hemi stemmed shoulder replacement undertaken for fracture (26.4%), whereas glenoid erosion occurs more frequently in procedures undertaken for osteoarthritis (29.4%) (Table SPS27 and Figure SPS8).

Type of Revision

The most common type of revision is to a total shoulder replacement for both primary diagnoses (72.1% for fracture and 59.6% for osteoarthritis) (Table SPS28). Most were revised to a total reverse shoulder replacement (97.9% when used for fracture and 87.7% for osteoarthritis). Glenoid component only revision occurs more commonly in procedures undertaken for osteoarthritis (25.0% compared to 4.6% for fracture).

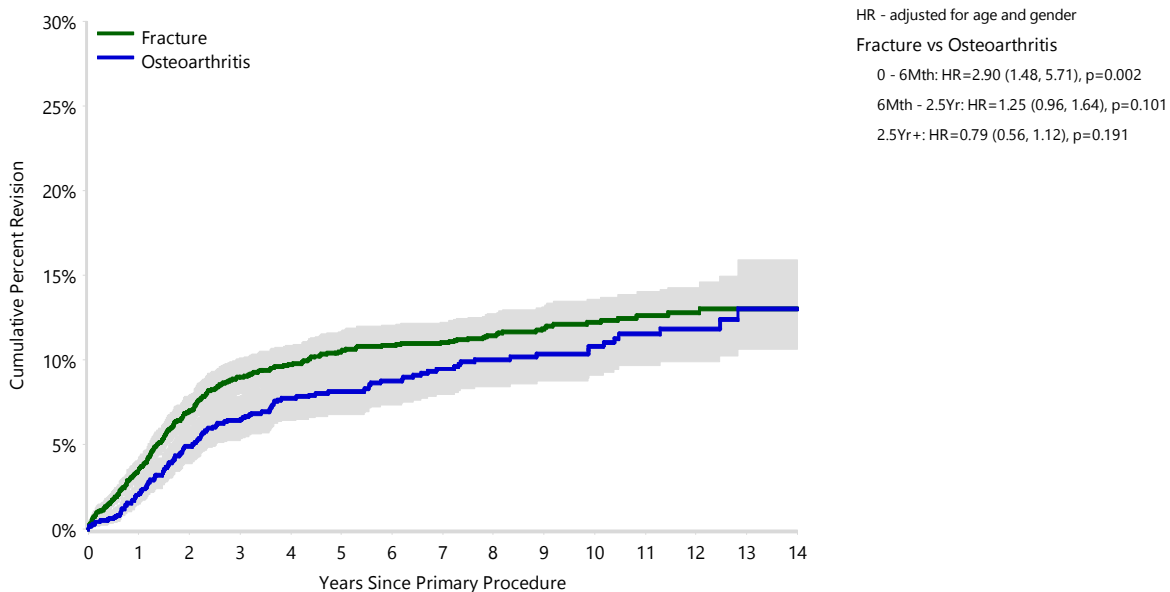
There is no difference in the rate of revision when primary hemi stemmed shoulder replacement is performed for fracture or osteoarthritis after the first 6 months.

Table SPS26 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis

Primary Diagnosis	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Fracture	326	3097	3.6 (2.9, 4.3)	9.0 (8.0, 10.1)	10.5 (9.4, 11.7)	11.0 (9.9, 12.2)	12.2 (11.0, 13.6)	13.0 (11.6,
Osteoarthritis	136	1607	2.1 (1.5, 3.0)	6.4 (5.3, 7.8)	8.1 (6.8, 9.7)	9.5 (8.0, 11.2)	10.8 (9.1, 12.8)	13.0 (10.6,
Rotator Cuff Arthropathy	18	251	2.0 (0.8, 4.8)	5.2 (3.0, 9.0)	6.9 (4.2, 11.2)	6.9 (4.2, 11.2)	10.4 (6.3, 16.9)	
Osteonecrosis	17	206	2.0 (0.8, 5.3)	5.5 (3.0, 10.0)	7.8 (4.6, 13.3)	9.8 (5.9, 16.0)	12.7 (7.7, 20.4)	
Tumour	17	181	5.0 (2.4, 10.2)	11.9 (6.7, 20.8)				
Other (4)	14	200	3.1 (1.4, 6.8)	5.3 (2.9, 9.7)	5.3 (2.9, 9.7)	5.3 (2.9, 9.7)	11.0 (6.2, 19.0)	
TOTAL	528	5542						

Note: Only primary diagnoses with >100 procedures have been listed

Figure SPS7 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Fracture	3097	2821	2356	1956	1522	766	69
Osteoarthritis	1607	1439	1125	920	700	397	46

Note: Only primary diagnoses with >1,000 procedures have been listed

Table SPS27 Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis and Revision Diagnosis

Revision Diagnosis	Number	Fracture		Osteoarthritis		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Rotator Cuff Insufficiency	86	2.8	26.4	22	1.4	16.2
Instability/Dislocation	63	2.0	19.3	27	1.7	19.9
Glenoid Erosion	22	0.7	6.7	40	2.5	29.4
Infection	35	1.1	10.7	12	0.7	8.8
Fracture	29	0.9	8.9	5	0.3	3.7
Loosening	29	0.9	8.9	9	0.6	6.6
Pain	29	0.9	8.9	14	0.9	10.3
Arthrofibrosis	7	0.2	2.1	2	0.1	1.5
Dissociation	7	0.2	2.1	1	0.1	0.7
Malposition	7	0.2	2.1	1	0.1	0.7
Lysis	3	0.1	0.9			
Incorrect Sizing	2	0.1	0.6	1	0.1	0.7
Heterotopic Bone	1	0.0	0.3			
Implant Breakage Glenoid	1	0.0	0.3			
Osteonecrosis				1	0.1	0.7
Other	5	0.2	1.5	1	0.1	0.7
N Revision	326	10.5	100.0	136	8.5	100.0
N Primary	3097			1607		

Figure SPS8 Cumulative Incidence Revision Diagnosis of Primary Hemi Stemmed Shoulder by Primary Diagnosis

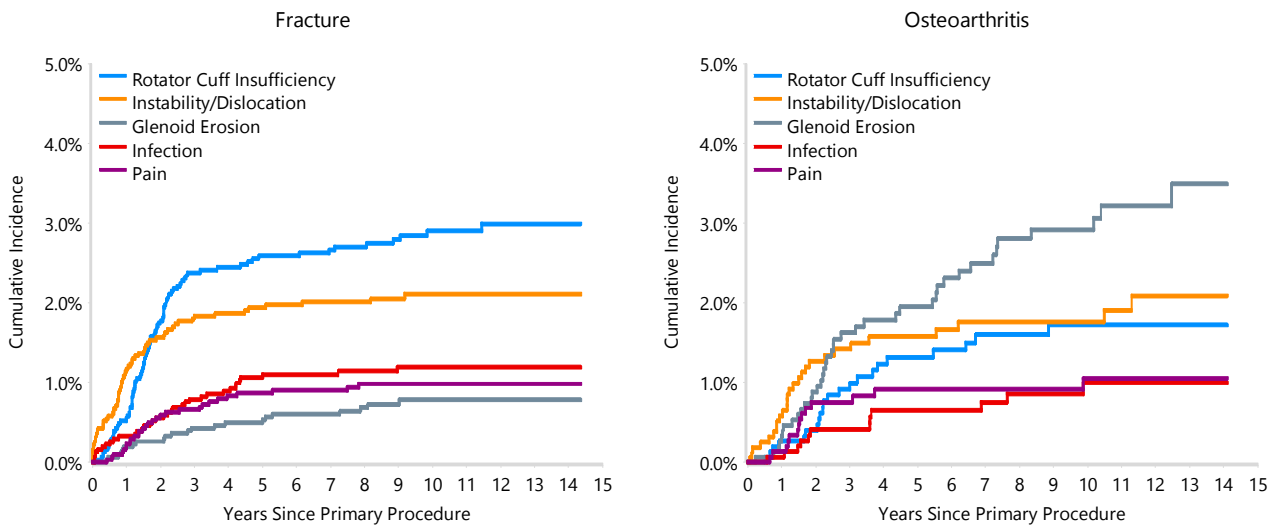


Table SPS28 Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis and Type of Revision

Type of Revision	Number	Fracture		Number	Osteoarthritis	
		% Primaries Revised	% Revisions		% Primaries Revised	% Revisions
Humeral/Glenoid	235	7.6	72.1	81	5.0	59.6
Glenoid Component	15	0.5	4.6	34	2.1	25.0
Humeral Component	29	0.9	8.9	7	0.4	5.1
Cement Spacer	18	0.6	5.5	4	0.2	2.9
Head Only	16	0.5	4.9	3	0.2	2.2
Removal of Prostheses	7	0.2	2.1	1	0.1	0.7
Cement Only	4	0.1	1.2			
Reoperation	2	0.1	0.6	4	0.2	2.9
Head/Insert				1	0.1	0.7
Minor Components				1	0.1	0.7
N Revision	326	10.5	100.0	136	8.5	100.0
N Primary	3097			1607		

OUTCOME FOR FRACTURE

Age and Gender

The rate of revision is lower for patients aged ≥75 years compared to all other age groups (Table SPS29 and Figure SPS9). Females have a higher rate of revision compared to males (Table SPS30 and Figure SPS10).

Cemented stem fixation for fracture has a lower rate of revision than when a cementless non-fracture stem is used.

Humeral Stem

There is no difference in the rate of revision for fracture humeral stems compared to non-

fracture humeral stems (Table SPS31 and Figure SPS11).

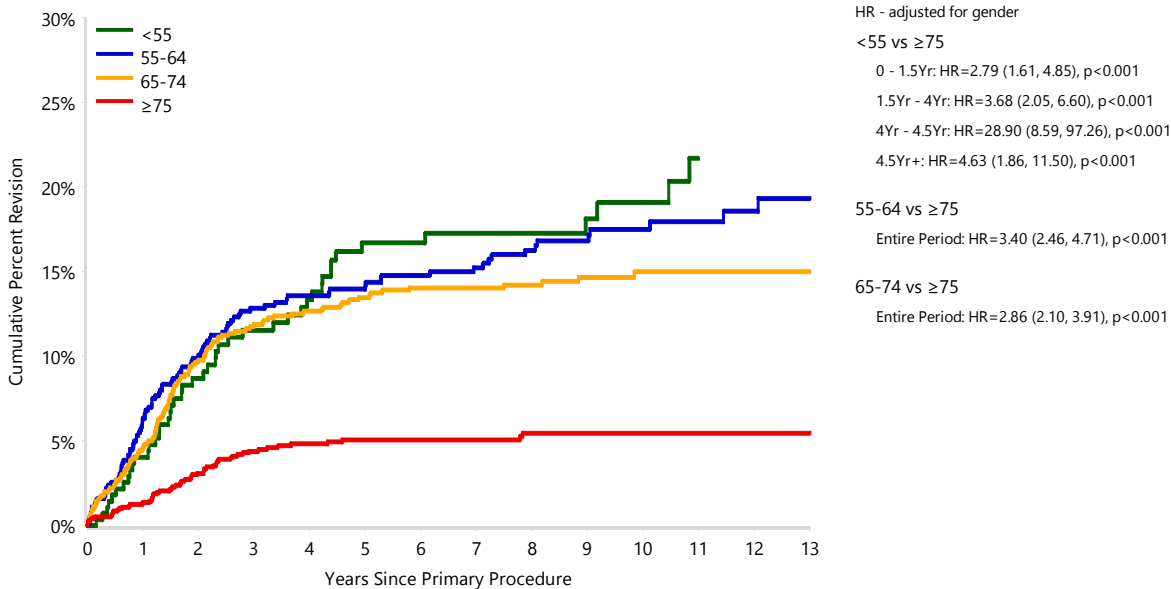
The use of cement for stem fixation in non-fracture hemiarthroplasty has a lower rate of revision than when a cementless non-fracture stem is used (Table SPS32 and Figure SPS12).

The outcomes for the most used prosthesis combinations for the treatment of fracture are listed in Table SPS33. The outcomes for individual fracture stems are presented separately in Table SPS34 and for non-fracture humeral stems in Table SPS35.

Table SPS29 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis Fracture)

Age	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
<55	46	278	4.0 (2.3, 7.2)	11.6 (8.2, 16.1)	16.7 (12.5, 22.0)	17.3 (13.0, 22.7)	19.1 (14.4, 25.1)	
55-64	100	633	6.3 (4.7, 8.6)	12.8 (10.4, 15.8)	14.2 (11.6, 17.3)	15.2 (12.6, 18.5)	17.5 (14.5, 21.0)	
65-74	121	893	4.5 (3.4, 6.1)	11.9 (9.9, 14.3)	13.5 (11.3, 16.0)	14.1 (11.9, 16.6)	15.0 (12.7, 17.7)	
≥75	59	1293	1.4 (0.8, 2.2)	4.4 (3.4, 5.8)	5.1 (3.9, 6.5)	5.1 (3.9, 6.5)	5.5 (4.2, 7.1)	
TOTAL	326	3097						

Figure SPS9 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis Fracture)

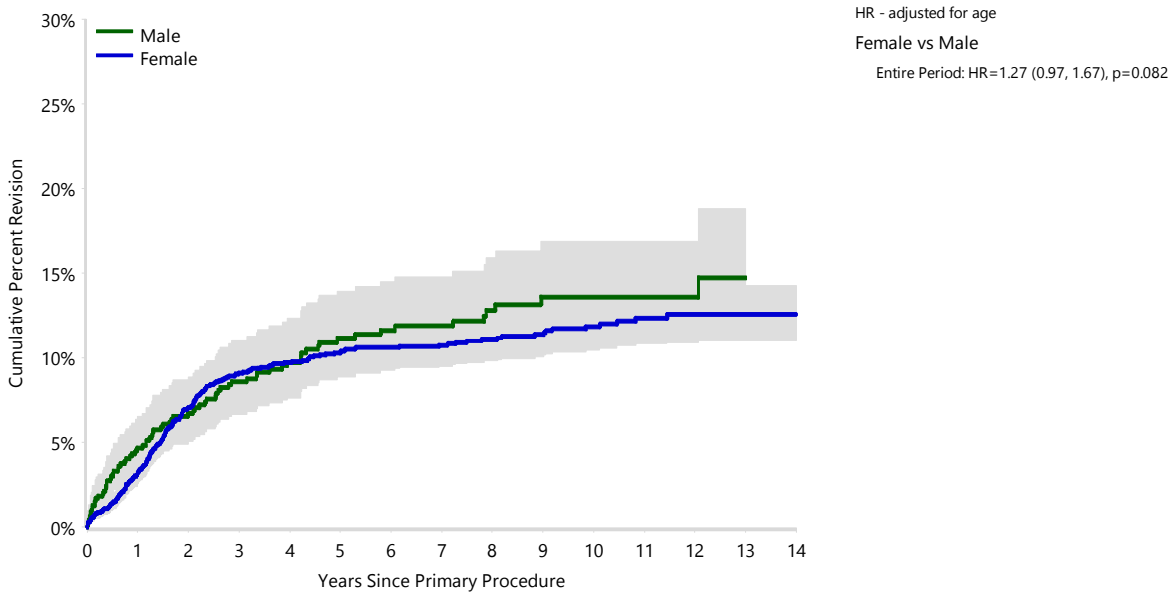


Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
<55	278	255	209	163	131	69	10
55-64	633	563	489	426	345	198	13
65-74	893	821	697	618	497	262	29
≥75	1293	1182	961	749	549	237	17

Table SPS30 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis Fracture)

Gender	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Male	78	709	4.7 (3.3, 6.5)	8.6 (6.7, 11.0)	11.1 (8.9, 13.9)	11.9 (9.5, 14.8)	13.6 (10.9, 16.9)	
Female	248	2388	3.2 (2.6, 4.0)	9.1 (8.0, 10.4)	10.3 (9.1, 11.7)	10.8 (9.5, 12.2)	11.8 (10.5, 13.4)	12.6 (11.0, 14.3)
TOTAL	326	3097						

Figure SPS10 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis Fracture)

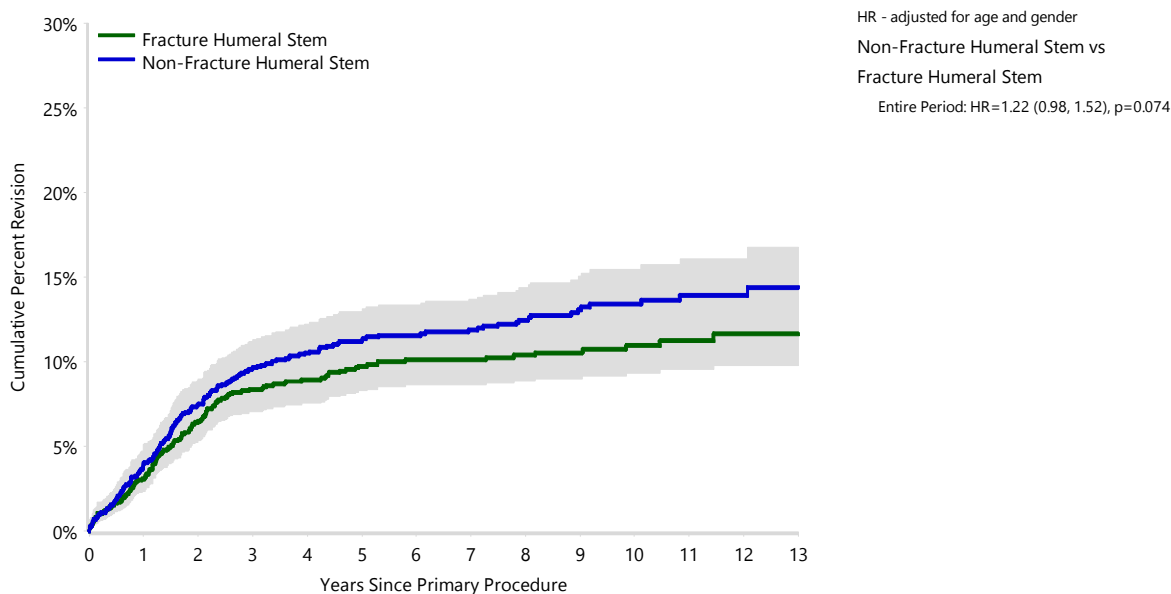


Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Male	709	621	517	411	309	143	16
Female	2388	2200	1839	1545	1213	623	53

Table SPS31 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type (Primary Diagnosis Fracture)

Stem Type	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Fracture Humeral Stem	146	1520	3.1 (2.3, 4.1)	8.4 (7.0, 9.9)	9.7 (8.3, 11.4)	10.1 (8.6, 11.9)	11.0 (9.3, 12.9)	
Non-Fracture Humeral Stem	180	1577	4.0 (3.1, 5.1)	9.6 (8.2, 11.3)	11.3 (9.7, 13.1)	11.9 (10.3, 13.7)	13.4 (11.6, 15.4)	
TOTAL	326	3097						

Figure SPS11 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type (Primary Diagnosis Fracture)

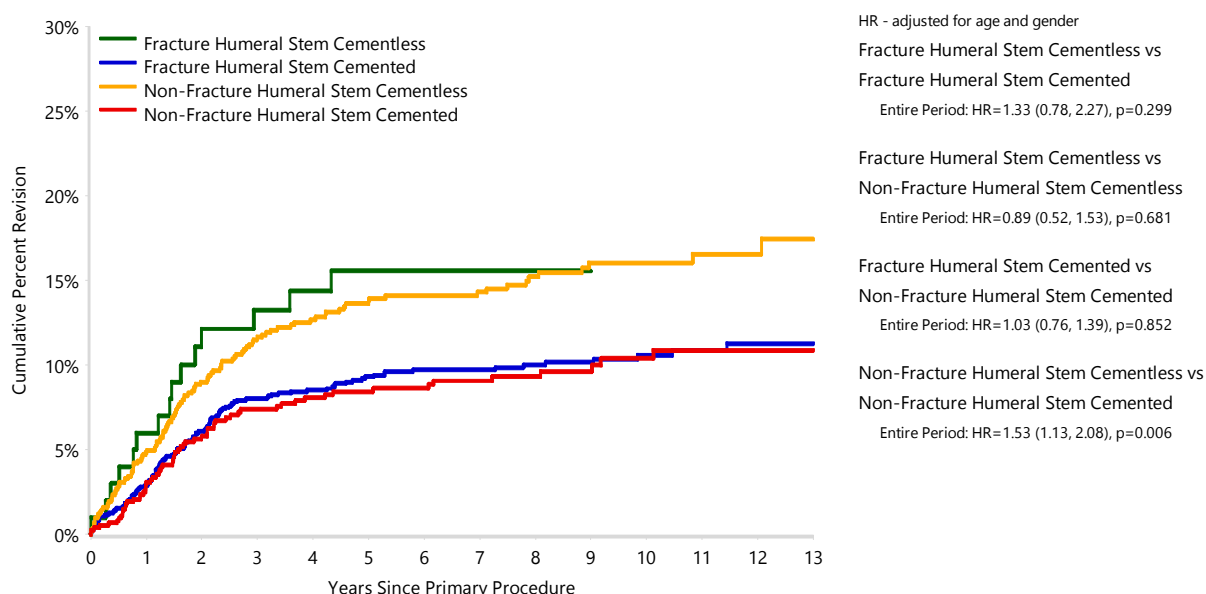


Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Fracture Humeral Stem	1520	1403	1177	964	734	372	36
Non-Fracture Humeral Stem	1577	1418	1179	992	788	394	33

Table SPS32 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type and Humeral Fixation (Primary Diagnosis Fracture)

Stem Type	Humeral Fixation	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Fracture Humeral Stem	Cementless	15	100	6.0 (2.7, 12.9)	13.3 (7.9, 21.7)	15.6 (9.7, 24.5)	15.6 (9.7, 24.5)		
	Cemented	131	1420	2.9 (2.1, 3.9)	8.0 (6.7, 9.6)	9.3 (7.8, 11.0)	9.7 (8.2, 11.5)	10.6 (8.9, 12.5)	
Non-Fracture Humeral Stem	Cementless	116	825	4.8 (3.6, 6.6)	11.6 (9.6, 14.1)	13.8 (11.5, 16.5)	14.3 (12.0, 17.1)	16.0 (13.5, 19.1)	
	Cemented	64	752	3.1 (2.0, 4.6)	7.4 (5.6, 9.6)	8.4 (6.5, 10.8)	9.1 (7.1, 11.6)	10.4 (8.1, 13.2)	
TOTAL		326	3097						

Figure SPS12 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type and Humeral Fixation (Primary Diagnosis Fracture)



Number at Risk		0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Fracture Humeral Stem	Cementless	100	94	78	67	38	7	1
	Cemented	1420	1309	1099	897	696	365	35
Non-Fracture Humeral Stem	Cementless	825	747	615	528	425	211	15
	Cemented	752	671	564	464	363	183	18

Table SPS33 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Humeral Stem (Primary Diagnosis Fracture)

Humeral Head	Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Aequalis	Aequalis	35	466	2.6 (1.5, 4.6)	6.6 (4.6, 9.4)	7.4 (5.3, 10.4)	7.8 (5.6, 10.8)	8.2 (5.9, 11.3)	
Affinis	Affinis	5	45	4.8 (1.2, 17.8)	10.1 (3.9, 24.7)	13.4 (5.7, 29.5)	13.4 (5.7, 29.5)	13.4 (5.7, 29.5)	
Bigliani/Flatow	Bigliani/Flatow TM	12	293	1.4 (0.5, 3.7)	3.6 (2.0, 6.6)	3.6 (2.0, 6.6)	4.1 (2.3, 7.4)	4.8 (2.7, 8.4)	
Bio-Modular	Comprehensive	7	79	2.6 (0.6, 9.9)	7.9 (3.6, 16.7)	9.4 (4.6, 18.8)	9.4 (4.6, 18.8)	9.4 (4.6, 18.8)	
Comprehensive	Comprehensive	5	81	2.5 (0.6, 9.8)	7.7 (3.2, 17.8)	7.7 (3.2, 17.8)	7.7 (3.2, 17.8)		
Equinox	Equinox	3	31	4.3 (0.6, 27.1)	17.4 (5.6, 47.0)				
Global Advantage	Global Advantage	10	53	7.7 (2.9, 19.1)	15.7 (8.1, 28.9)	17.8 (9.7, 31.4)	17.8 (9.7, 31.4)	17.8 (9.7, 31.4)	
	Global FX	58	695	2.2 (1.3, 3.6)	6.3 (4.6, 8.4)	7.9 (6.0, 10.3)	8.5 (6.6, 11.0)	9.7 (7.5, 12.6)	
Global Unite	Global Unite	34	167	8.5 (5.1, 13.9)	20.1 (14.7, 27.3)	21.7 (16.0, 29.1)	21.7 (16.0, 29.1)		
SMR	SMR	122	893	4.2 (3.1, 5.8)	11.0 (9.0, 13.3)	13.0 (10.9, 15.5)	13.8 (11.6, 16.4)	16.0 (13.5, 19.0)	
SMR CTA	SMR	6	42	7.8 (2.6, 22.2)	14.6 (6.3, 32.0)	18.7 (8.7, 37.6)	18.7 (8.7, 37.6)	18.7 (8.7, 37.6)	
Solar	Solar	5	40	7.9 (2.6, 22.5)	10.5 (4.1, 25.7)	13.7 (5.9, 30.0)	13.7 (5.9, 30.0)	13.7 (5.9, 30.0)	
Other (29)		24	212	3.9 (2.0, 7.7)	10.8 (7.1, 16.2)	12.2 (8.1, 18.0)	12.2 (8.1, 18.0)	13.2 (8.9, 19.4)	
TOTAL		326	3097						

Note: Only combinations with >30 procedures have been listed

Table SPS34 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Fracture Stem (Primary Diagnosis Fracture)

Humeral Head	Fracture Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Aequalis	Aequalis	34	449	2.5 (1.4, 4.5)	6.6 (4.6, 9.5)	7.5 (5.3, 10.5)	7.8 (5.6, 10.9)	8.3 (5.9, 11.5)	
Affinis	Affinis	5	43	5.0 (1.3, 18.6)	10.6 (4.1, 25.9)	14.2 (6.1, 31.1)	14.2 (6.1, 31.1)		
Bio-Modular	Comprehensive	7	79	2.6 (0.6, 9.9)	7.9 (3.6, 16.7)	9.4 (4.6, 18.8)	9.4 (4.6, 18.8)	9.4 (4.6, 18.8)	
Comprehensive	Comprehensive	4	45	4.4 (1.1, 16.6)	8.9 (3.5, 22.1)	8.9 (3.5, 22.1)	8.9 (3.5, 22.1)		
Global Advantage	Global FX	58	695	2.2 (1.3, 3.6)	6.3 (4.6, 8.4)	7.9 (6.0, 10.3)	8.5 (6.6, 11.0)	9.7 (7.5, 12.6)	
Global Unite	Global Unite	34	165	8.5 (5.2, 14.0)	20.3 (14.8, 27.5)	21.9 (16.1, 29.3)	21.9 (16.1, 29.3)		
Other (4)		4	44	0.0 (0.0, 0.0)	13.9 (5.4, 33.4)	13.9 (5.4, 33.4)	13.9 (5.4, 33.4)		
TOTAL		146	1520						

Note: Only combinations with >30 procedures have been listed



Table SPS35 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Non-Fracture Stem (Primary Diagnosis Fracture)

Humeral Head	Non Fracture Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Bigliani/Flatow	Bigliani/Flatow TM	12	293	1.4 (0.5, 3.7)	3.6 (2.0, 6.6)	3.6 (2.0, 6.6)	4.1 (2.3, 7.4)	4.8 (2.7, 8.4)	
Comprehensive	Comprehensive	1	36	0.0 (0.0, 0.0)	7.1 (1.0, 40.9)				
Global Advantage	Global Advantage	10	53	7.7 (2.9, 19.1)	15.7 (8.1, 28.9)	17.8 (9.7, 31.4)	17.8 (9.7, 31.4)	17.8 (9.7, 31.4)	
SMR	SMR	122	893	4.2 (3.1, 5.8)	11.0 (9.0, 13.3)	13.0 (10.9, 15.5)	13.8 (11.6, 16.4)	16.0 (13.5, 19.0)	
SMR CTA	SMR	6	42	7.8 (2.6, 22.2)	14.6 (6.3, 32.0)	18.7 (8.7, 37.6)	18.7 (8.7, 37.6)	18.7 (8.7, 37.6)	
Solar	Solar	5	40	7.9 (2.6, 22.5)	10.5 (4.1, 25.7)	13.7 (5.9, 30.0)	13.7 (5.9, 30.0)	13.7 (5.9, 30.0)	
Other (31)		24	220	4.8 (2.6, 8.7)	10.3 (6.7, 15.5)	11.6 (7.8, 17.2)	11.6 (7.8, 17.2)	12.6 (8.5, 18.5)	
TOTAL		180	1577						

Note: Only combinations with >30 procedures have been listed

OUTCOME FOR OSTEOARTHRITIS

Age and Gender

The rate of revision is lower for patients aged ≥ 75 years compared to patients in the <55 years (after 2.5 years) and 55-64 year age groups (Table SPS36 and Figure SPS13).

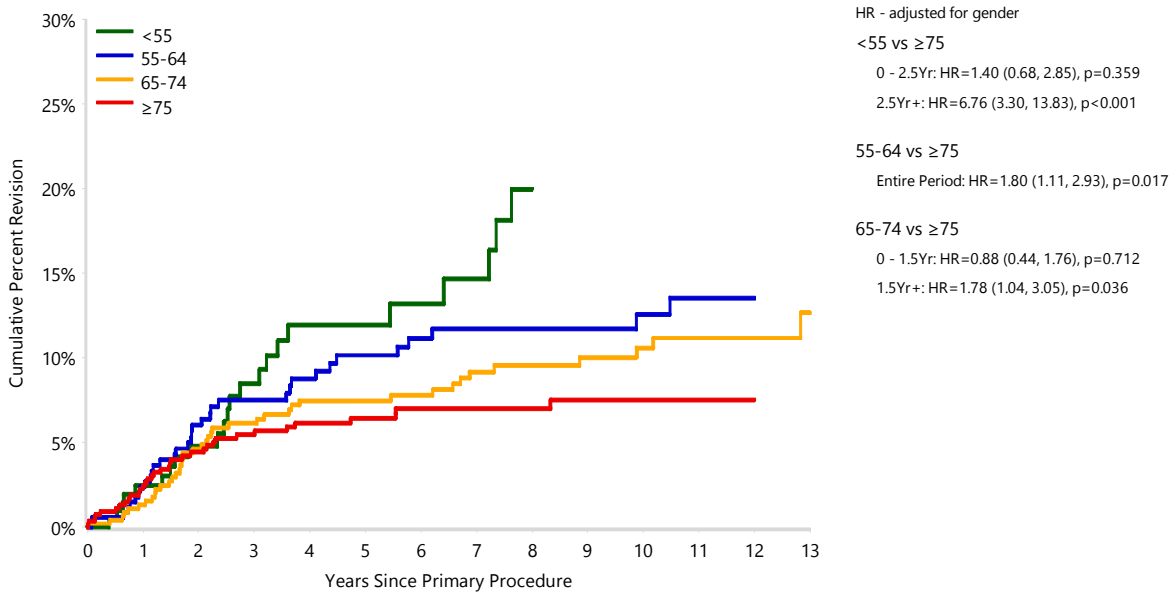
The outcomes of the most used prosthesis combinations for osteoarthritis are listed in Table SPS38.

Gender is not a risk factor for revision (Table SPS37 and Figure SPS14).

Table SPS36 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis OA)

Age	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
<55	25	230	2.5 (1.0, 5.8)	8.5 (5.1, 14.0)	11.9 (7.6, 18.5)	14.7 (9.4, 22.4)		
55-64	35	358	2.4 (1.2, 4.7)	7.5 (5.0, 11.1)	10.2 (7.1, 14.4)	11.7 (8.3, 16.3)	12.6 (8.9, 17.5)	
65-74	41	473	1.3 (0.6, 2.9)	6.1 (4.2, 8.9)	7.5 (5.3, 10.5)	9.2 (6.7, 12.5)	10.6 (7.7, 14.4)	
≥ 75	35	546	2.4 (1.4, 4.2)	5.5 (3.8, 7.8)	6.4 (4.6, 9.0)	7.0 (5.0, 9.7)	7.5 (5.4, 10.5)	
TOTAL	136	1607						

Figure SPS13 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis OA)



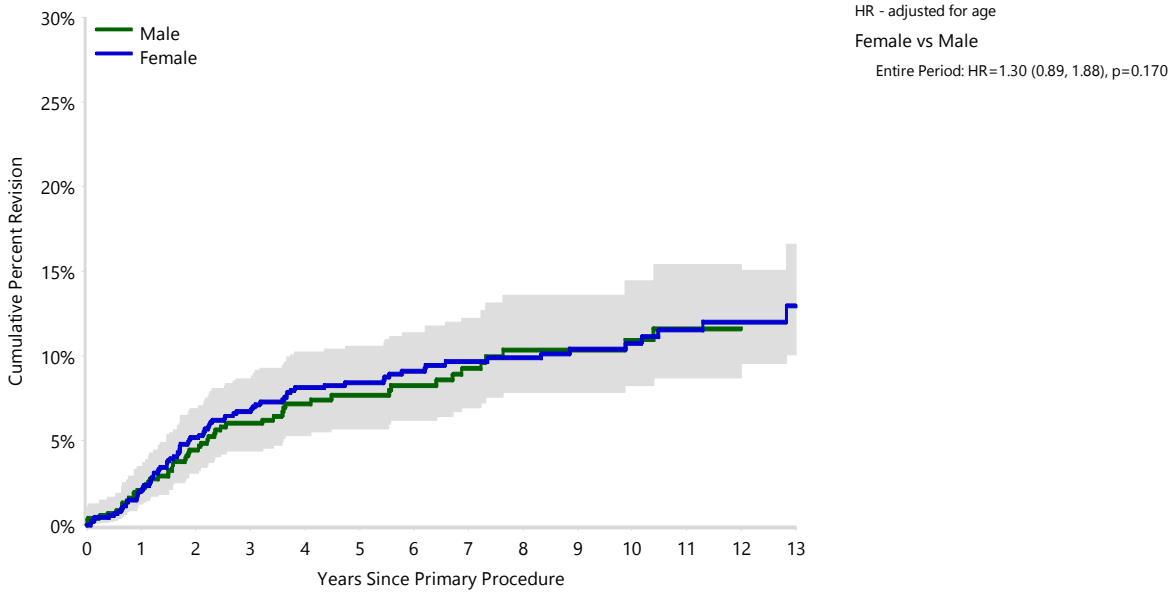
Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
<55	230	185	111	74	56	29	5
55-64	358	316	229	187	147	99	9
65-74	473	434	359	306	250	157	20
≥ 75	546	504	426	353	247	112	12



Table SPS37 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis OA)

Gender	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Male	54	724	2.1 (1.2, 3.5)	6.0 (4.4, 8.3)	7.7 (5.7, 10.3)	9.2 (7.0, 12.2)	10.9 (8.3, 14.4)	
Female	82	883	2.1 (1.3, 3.3)	6.7 (5.2, 8.7)	8.4 (6.7, 10.6)	9.7 (7.7, 12.0)	10.8 (8.6, 13.4)	
TOTAL	136	1607						

Figure SPS14 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Male	724	619	441	331	263	146	15
Female	883	820	684	589	437	251	31

Table SPS38 Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Humeral Stem (Primary Diagnosis OA)

Humeral Head	Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	14 Yrs
Aequalis	Aequalis	11	139	1.4 (0.4, 5.7)	5.2 (2.5, 10.5)	6.0 (3.0, 11.6)	8.8 (5.0, 15.5)	8.8 (5.0, 15.5)	
Ascend Flex	Ascend Flex	8	376	0.6 (0.2, 2.5)	2.8 (1.2, 6.3)	4.7 (2.2, 9.9)			
Bigliani/Flatow	Bigliani/Flatow	5	53	3.8 (1.0, 14.3)	7.5 (2.9, 18.9)	7.5 (2.9, 18.9)	10.2 (4.3, 23.0)	10.2 (4.3, 23.0)	
Comprehensiv	Comprehensiv	2	26	0.0 (0.0, 0.0)	11.5 (3.0, 38.6)	11.5 (3.0, 38.6)	11.5 (3.0, 38.6)		
Delta Xtend	Delta Xtend	3	32	3.1 (0.4, 20.2)	10.2 (3.4, 28.5)	10.2 (3.4, 28.5)	10.2 (3.4, 28.5)		
Global AP	Global AP	11	168	0.6 (0.1, 4.1)	4.2 (2.0, 8.6)	6.1 (3.3, 11.1)	6.9 (3.9, 12.1)	6.9 (3.9, 12.1)	
Global AP CTA	Global AP	5	47	2.1 (0.3, 14.2)	11.1 (4.8, 24.7)	11.1 (4.8, 24.7)	11.1 (4.8, 24.7)	11.1 (4.8, 24.7)	
Global	Global	16	144	0.7 (0.1, 4.8)	5.0 (2.4, 10.2)	7.3 (4.0, 13.1)	8.1 (4.6, 14.1)	11.0 (6.6, 18.0)	
	Global FX	4	31	3.2 (0.5, 20.8)	10.0 (3.3, 28.1)	10.0 (3.3, 28.1)	10.0 (3.3, 28.1)	16.5 (6.1, 40.1)	
Global Advantage	Global Advantage	1	39	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	4.0 (0.6, 25.2)	4.0 (0.6, 25.2)	4.0 (0.6, 25.2)
Global Unite	Global Unite	0	26	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)		
SMR	SMR	46	274	4.1 (2.3, 7.2)	9.7 (6.7, 14.0)	13.4 (9.8, 18.1)	15.6 (11.7, 20.7)	17.3 (13.1, 22.7)	
SMR CTA	SMR	9	99	5.2 (2.2, 12.0)	9.7 (5.2, 17.9)	9.7 (5.2, 17.9)	9.7 (5.2, 17.9)	9.7 (5.2, 17.9)	
Other (26)		15	153	3.4 (1.4, 8.0)	8.6 (4.9, 14.6)	9.6 (5.7, 16.1)	9.6 (5.7, 16.1)		
TOTAL		136	1607						

Note: Only combinations with >20 procedures have been listed

List of Tables

Table SPS1	Primary Partial Shoulder Replacement by Class	7
Table SPS2	Primary Partial Shoulder Replacement by Class and Gender.....	7
Table SPS3	Primary Partial Shoulder Replacement by Class and Age	8
Table SPS4	Age and Gender of Primary Partial Shoulder Replacement	8
Table SPS5	Primary Partial Shoulder Replacement by Primary Diagnosis and Gender	9
Table SPS6	Cumulative Percent Revision of Primary Partial Shoulder Replacement by Class (All Diagnoses).....	9
Table SPS7	Age and Gender of Primary Partial Resurfacing Shoulder Replacement	10
Table SPS8	Primary Partial Resurfacing Shoulder Replacement by Primary Diagnosis and Gender	10
Table SPS9	Age and Gender of Primary Hemi Resurfacing Shoulder Replacement	11
Table SPS10	Primary Hemi Resurfacing Shoulder Replacement by Primary Diagnosis and Gender	11
Table SPS11	Most Used Humeral Head Prostheses in Primary Hemi Resurfacing Shoulder Replacement	11
Table SPS12	Primary Hemi Resurfacing Shoulder Replacement by Reason for Revision (All Diagnoses).....	12
Table SPS13	Primary Hemi Resurfacing Shoulder Replacement by Type of Revision (All Diagnoses).....	12
Table SPS14	Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Age (Primary Diagnosis OA)	13
Table SPS15	Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Gender (Primary Diagnosis OA)	14
Table SPS16	Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Humeral Head (Primary Diagnosis OA)	15
Table SPS17	Age and Gender of Primary Hemi Mid Head Shoulder Replacement	16
Table SPS18	Primary Hemi Mid Head Shoulder Replacement by Primary Diagnosis and Gender	16
Table SPS19	Primary Hemi Mid Head Shoulder Replacement by Reason for Revision	17
Table SPS20	Primary Hemi Mid Head Shoulder Replacement by Type of Revision	17
Table SPS21	Cumulative Percent Revision of Primary Hemi Mid Head Shoulder Replacement by Prosthesis Combination	17
Table SPS22	Age and Gender of Primary Hemi Stemmed Shoulder Replacement	18
Table SPS23	Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis and Gender	18
Table SPS24	10 Most Used Humeral Head Prostheses in Primary Hemi Stemmed Shoulder Replacement	19
Table SPS25	10 Most Used Humeral Stem Prostheses in Primary Hemi Stemmed Shoulder Replacement	20
Table SPS26	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis	21
Table SPS27	Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis and Revision Diagnosis	22
Table SPS28	Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis and Type of Revision.....	23
Table SPS29	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis Fracture)	24
Table SPS30	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis Fracture)	25
Table SPS31	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type (Primary Diagnosis Fracture)	26
Table SPS32	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type and Humeral Fixation (Fracture)	27
Table SPS33	CPR of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Humeral Stem (Fracture)	28
Table SPS34	CPR of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Fracture Stem (Fracture)	28
Table SPS35	CPR of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Non-Fracture Stem (Fracture)	29
Table SPS36	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis OA)	30
Table SPS37	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis OA)	31
Table SPS38	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Humeral Head and Humeral Stem (OA)	31

List of Figures

Figure SPS1	Primary Partial Shoulder Replacement by Class	7
Figure SPS2	Cumulative Percent Revision of Primary Partial Shoulder Replacement by Class (All Diagnoses).....	9
Figure SPS3	Cumulative Incidence Revision Diagnosis of Primary Hemi Resurfacing Shoulder Replacement (All Diagnoses).....	12
Figure SPS4	Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Age (Primary Diagnosis OA)	13
Figure SPS5	Cumulative Percent Revision of Primary Hemi Resurfacing Shoulder Replacement by Gender (Primary Diagnosis OA)	14
Figure SPS6	Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis.....	19
Figure SPS7	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Primary Diagnosis	21
Figure SPS8	Cumulative Incidence Revision Diagnosis of Primary Hemi Stemmed Shoulder by Primary Diagnosis	22
Figure SPS9	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis Fracture)	24
Figure SPS10	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis Fracture)	25
Figure SPS11	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type (Primary Diagnosis Fracture)	26
Figure SPS12	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Stem Type and Humeral Fixation (Fracture)	27
Figure SPS13	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Age (Primary Diagnosis OA)	30
Figure SPS14	Cumulative Percent Revision of Primary Hemi Stemmed Shoulder Replacement by Gender (Primary Diagnosis OA)	31