

Australian Orthopaedic Association National Joint Replacement Registry

2025 SUPPLEMENTARY REPORT

Demographics and Outcome of Elbow and Wrist Arthroplasty



AOA
AUSTRALIAN
ORTHOPAEDIC
ASSOCIATION

Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Australian Orthopaedic Association National Joint Replacement Registry

Demographics and Outcomes of Elbow and Wrist Arthroplasty

2025 Supplementary Report

Clinical Director:
Professor Paul Smith
E: admin@aoanjrr.org.au

Executive Manager:
Sophie Corfield (Acting)
Kathy Hill
Roz Hanson (Feb – August 2025)
E: executivesupport@aoanjrr.org.au

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

**The AOANJRR is funded by the Australian Government Department of
Health, Disability and Ageing**

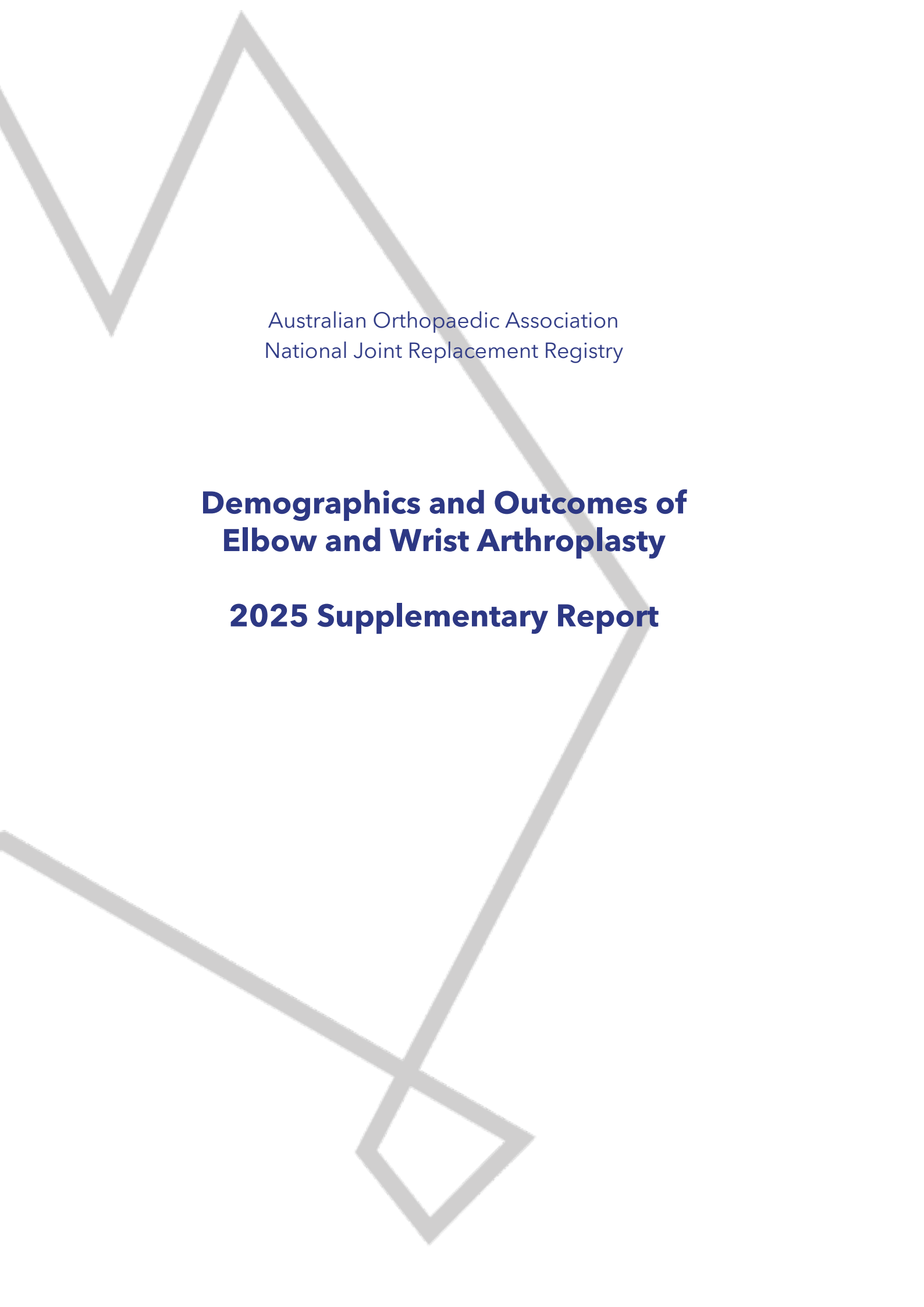
Cite this report

Gill DR, Lewis PL, McAuliffe MJ, Stoney JD, Vertullo CJ, Wall CJ, Corfield S, Esaian R, Moylan S, Du P, Holder C, Edwards S, Xu Q, Oakey H, Lorimer MF, Smith PN. Demographics and Outcomes of Elbow and Wrist Arthroplasty Supplementary Report in *Hip, Knee & Shoulder Arthroplasty: 2025 Annual Report*, Australian Orthopaedic Association National Joint Replacement Registry, AOA, Adelaide; 2025. <https://doi.org/10.25310/PUGU1868>

The use and/or reproduction of AOANJRR data provided in this report requires adherence to the AOANJRR Publications and Authorship Policy available at: <https://aoanjrr.sahmri.com/aoanjrr-data-publication-and-authorship>

www.aoa.org.au

© Australian Orthopaedic Association National Joint Replacement Registry 2025



Australian Orthopaedic Association
National Joint Replacement Registry

**Demographics and Outcomes of
Elbow and Wrist Arthroplasty**

2025 Supplementary Report

Contents

INTRODUCTION	2
ELBOW REPLACEMENT	3
Categories of Elbow Replacement.....	3
Demographics	4
Primary Partial Elbow Replacement	6
Demographics.....	6
Primary Radial Elbow Replacement	7
Primary Uni Humeral Elbow Replacement	8
Primary Uni Humeral with Radial Elbow Replacement.....	9
Primary Humeral Hemiarthroplasty.....	10
Primary Total Elbow Replacement.....	11
Demographics.....	11
Primary Total Elbow without Radial Replacement.....	12
Primary Total Elbow with Radial Replacement.....	15
Revision Elbow Replacement.....	16
Demographics.....	16
WRIST REPLACEMENT	17
Categories of Wrist Replacement	17
Demographics	18
Primary Partial Wrist Replacement	20
Demographics.....	20
Primary Carpal Bone Replacement	21
Primary DRUJ Hemi Replacement.....	22
Total Wrist	23
Demographics.....	23
Primary Total Wrist Replacement	23
Primary DRUJ	24
Revision Wrist Replacement	24
Demographics.....	24

Introduction

The 2025 Demographics and Outcome of Elbow and Wrist Arthroplasty Supplementary Report is based on the analysis of 8,304 elbow and 1,205 wrist procedures recorded by the Registry with a procedure date up to and including 31 December 2024.

The elbow arthroplasty procedures include 4,951 primary partial, 2,035 primary total and 1,354 revisions (Table EG1).

The wrist arthroplasty procedures include 299 primary partial, 730 primary total and 176 revisions (Table WG1).

The Elbow and Wrist Arthroplasty Report is one of 14 supplementary reports to complete the AOANJRR Annual Report for 2025.

The 2025 Annual Report, Supplementary Reports, and investigations of prostheses with higher than anticipated rates of revision are available on the AOANJRR website.

Information on the background, purpose, aims, benefits and governance of the Registry can be found in the Introduction of the 2025 Hip, Knee and Shoulder Arthroplasty Annual Report.

The Registry data quality processes, including data collection, validation and outcomes assessment, are provided in detail in the data quality section of the 2025 Hip, Knee and Shoulder Arthroplasty Annual Report:
<https://aoanjrr.sahmri.com/annual-reports-2025>

Elbow Replacement

CATEGORIES OF ELBOW REPLACEMENT

The Registry groups elbow replacement into three broad categories: primary partial, primary total, and revision elbow replacement.

A primary replacement is the initial replacement procedure undertaken on a joint and involves replacing either part (partial) or all (total) of the articular surface.

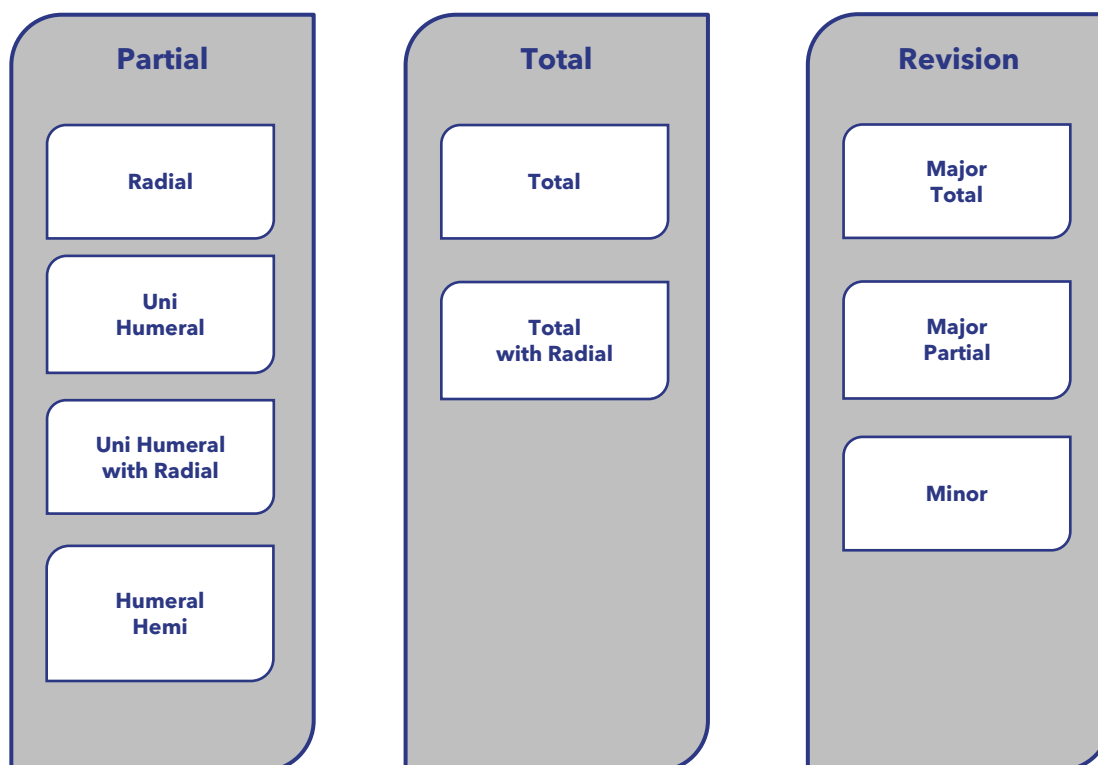
Primary partial and primary total elbow replacement are further subcategorised into classes depending on the type of prostheses used. Partial elbow classes are radial, uni humeral, uni humeral with radial, and humeral hemiarthroplasty elbow replacement. Total elbow classes are total and total with radial

elbow replacement. Definitions for each of these are detailed in the relevant chapters.

Revision procedures are re-operations of previous elbow replacements where one or more of the prosthetic components are replaced, removed, or another component is added. Revisions include re-operations of primary partial, primary total or previous revision procedures.

Elbow revisions are subcategorised into three classes: minor, major partial, and major total revisions. These are defined in the section on revisions.

ELBOW REPLACEMENT



DEMOGRAPHICS

Table EG1 Number of Elbow Replacements by Gender

Elbow Replacement	Female		Male		TOTAL	
	N	%	N	%	N	%
Radial	2589	58.7	1825	41.3	4414	89.8
Uni Humeral	7	70.0	3	30.0	10	0.2
Uni Humeral & Radial	10	40.0	15	60.0	25	0.5
Humeral	396	85.0	70	15.0	466	9.5
Primary Partial	3002	61.1	1913	38.9	4915	100.0
Total Elbow	1483	74.9	496	25.1	1979	97.2
Total Elbow & Radial	35	62.5	21	37.5	56	2.8
Primary Total	1518	74.6	517	25.4	2035	100.0
Revision	806	59.5	548	40.5	1354	100.0
TOTAL	5326	64.1	2978	35.9	8304	100.0

Table EG2 Number of Elbow Replacements by Age

Elbow Replacement	<55		55-64		65-74		75-84		≥85		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Radial	2136	48.4	1125	25.5	809	18.3	298	6.8	46	1.0	4414	89.8
Uni Humeral	9	90.0	1	10.0	.	.	.	.	.	.	10	0.2
Uni Humeral & Radial	10	40.0	9	36.0	5	20.0	1	4.0	.	.	25	0.5
Humeral	52	11.2	111	23.8	138	29.6	115	24.7	50	10.7	466	9.5
Primary Partial	2207	44.9	1246	25.4	952	19.4	414	8.4	96	2.0	4915	100.0
Total Elbow	192	9.7	336	17.0	621	31.4	604	30.5	226	11.4	1979	97.2
Total Elbow & Radial	6	10.7	14	25.0	20	35.7	15	26.8	1	1.8	56	2.8
Primary Total	198	9.7	350	17.2	641	31.5	619	30.4	227	11.2	2035	100.0
Revision	367	27.1	328	24.2	387	28.6	211	15.6	61	4.5	1354	100.0
TOTAL	2772	33.4	1924	23.2	1980	23.8	1244	15.0	384	4.6	8304	100.0

Table EG3 Time between Procedures for Bilateral Primary Elbow Replacement

Bilateral Procedures	Same Day		1day-6months		≥6months		TOTAL	
	N	Total%	N	Total%	N	Total%	N	Total%
Both - Radial	17	11.3	5	3.3	9	6.0	31	20.5
Both - Total Elbow	1	0.7	15	9.9	93	61.6	109	72.2
Humeral Hemiarthroplasty & Total Elbow	.	.	1	0.7	1	0.7	2	1.3
Radial & Humeral Hemiarthroplasty	.	.	1	0.7	1	0.7	2	1.3
Radial & Total Elbow	.	.	1	0.7	3	2.0	4	2.6
Radial & Uni Humeral & Radial	.	.	.	.	1	0.7	1	0.7
Total Elbow & Total Elbow & Radial	.	.	.	.	1	0.7	1	0.7
Uni Humeral & Radial & Total Elbow	.	.	.	.	1	0.7	1	0.7
TOTAL	18	11.9	23	15.2	110	72.8	151	100.0

Figure EG1 All Elbow Replacement by Age and Gender

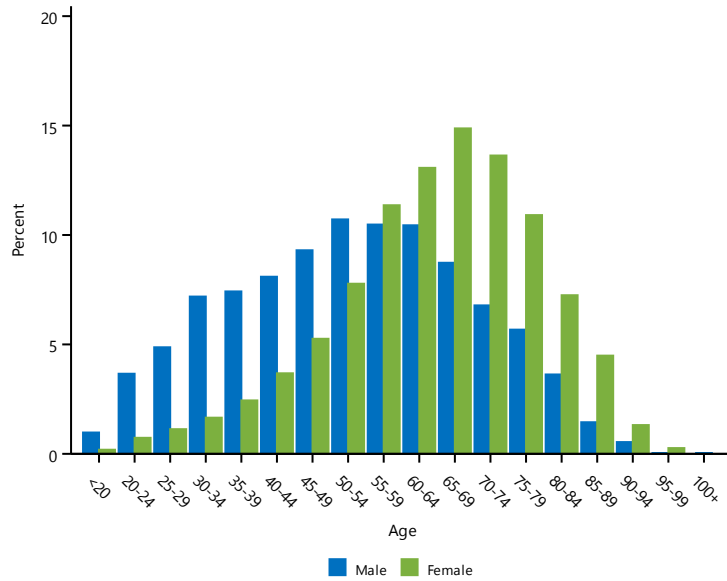


Table EG4 All Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	2978	35.9%	12	102	54	53.0	16.8
Female	5326	64.1%	16	99	65	64.0	14.3
TOTAL	8304	100.0%	12	102	62	60.1	16.2

Table EG5 Cumulative Percent Revision of Primary Elbow Replacement by Elbow Class

Elbow Class	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs
Radial	230	4414	2.9 (2.4, 3.4)	4.7 (4.1, 5.4)	5.4 (4.7, 6.1)	5.8 (5.1, 6.6)	6.3 (5.4, 7.3)
Uni Humeral	1	10	0.0 (0.0, 0.0)	10.0 (1.5, 52.7)	10.0 (1.5, 52.7)	10.0 (1.5, 52.7)	10.0 (1.5, 52.7)
Uni Humeral & Radial	13	25	24.0 (11.6, 45.8)	48.0 (30.8, 68.8)	48.0 (30.8, 68.8)	53.8 (35.3, 74.5)	
Humeral	30	466	4.0 (2.6, 6.3)	5.5 (3.7, 8.2)	6.4 (4.3, 9.4)	10.0 (6.7, 14.8)	
Total Elbow	257	1979	3.4 (2.7, 4.3)	9.0 (7.8, 10.5)	12.1 (10.6, 13.8)	18.4 (16.2, 20.9)	21.9 (18.8, 25.5)
Total Elbow & Radial	14	56	5.5 (1.8, 16.0)	18.8 (10.6, 32.2)	22.9 (13.7, 36.8)	29.8 (18.2, 46.2)	29.8 (18.2, 46.2)
TOTAL	545	6950					

PRIMARY PARTIAL ELBOW REPLACEMENT

DEMOGRAPHICS

The Registry subcategorises primary partial elbow replacement into four classes. These are defined as:

Radial involves resection of the radial head and replacement with a stemmed radial prosthesis.

Uni humeral involves replacement of the capitellum.

Uni humeral with radial involves replacement of the capitellum and radial head.

Humeral hemiarthroplasty involves resection of the distal humerus and replacement with a stemmed humeral prosthesis.

Table EP1 Primary Partial Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	3002	61.1%	16	99	61	60.1	14.1
Male	1913	38.9%	14	102	48	47.3	15.1
TOTAL	4915	100.0%	14	102	57	55.1	15.8

Figure EP1 Primary Partial Elbow Replacement by Age and Gender

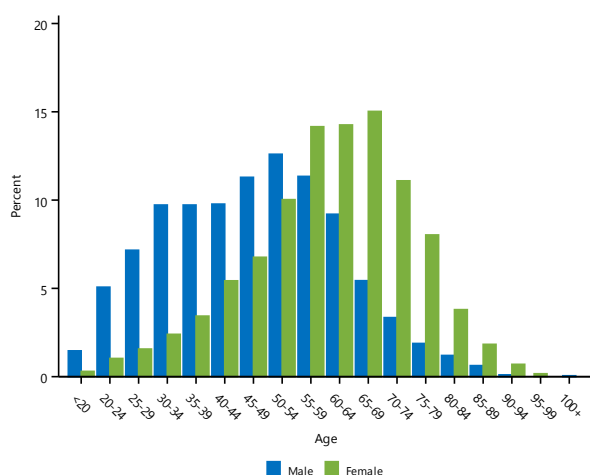


Table EP2 Primary Partial Elbow Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Fracture/Dislocation	4492	91.4
Osteoarthritis	342	7.0
Instability	41	0.8
Rheumatoid Arthritis	14	0.3
Osteonecrosis	13	0.3
Tumour	6	0.1
Other Inflammatory Arthritis	4	0.1
Osteochondritis Dissecans	1	0.0
Other	2	0.0
TOTAL	4915	100.0

PRIMARY RADIAL ELBOW REPLACEMENT

Table EP3 Primary Radial Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	2589	58.7%	16	97	60	58.6	13.7
Male	1825	41.3%	14	102	47	46.6	14.8
TOTAL	4414	100.0%	14	102	55	53.6	15.4

Figure EP2 Primary Radial Elbow Replacement by Age and Gender

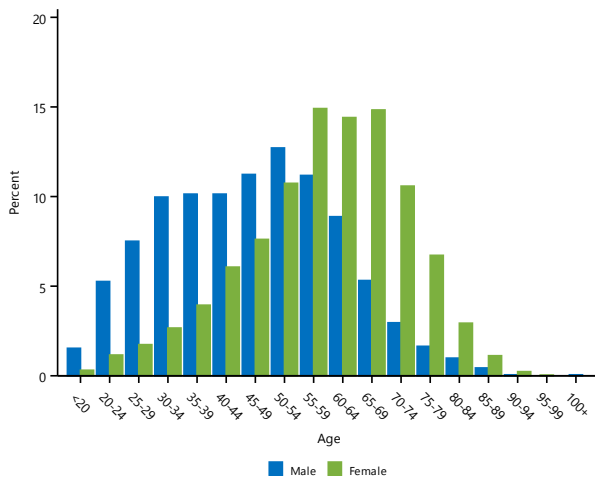


Table EP4 Primary Radial Elbow Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Fracture/Dislocation	4046	91.7
Osteoarthritis	297	6.7
Instability	41	0.9
Rheumatoid Arthritis	11	0.2
Osteonecrosis	10	0.2
Other Inflammatory Arthritis	4	0.1
Tumour	3	0.1
Other	2	0.0
TOTAL	4414	100.0

Table EP5 Most Used Radial Head/Stem Prostheses in Primary Radial Elbow Replacement

2008		2021		2022		2023		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
57	Evolve	165	Radial Stem (Ascension)	143	Radial Stem (Ascension)	69	Radial Stem (Ascension)	97	ALIGN
30	Radial Stem (Ascension)	65	Evolve	59	Evolve	66	Anatomic	65	Anatomic
20	Anatomic	62	Anatomic	50	Anatomic	51	ALIGN	54	MOPYC
15	MOPYC	42	MOPYC	31	MOPYC	49	Evolve	42	Evolve
8	RHS	6	ALIGN	14	ALIGN	40	MOPYC	6	Radial Head Replacement System
6	ExploR	2	ExploR	3	Radial Head Replacement System	6	Radial Head Replacement System	2	Radial Stem (Ascension)
4	Swanson	2	RHS						
4	rHead								
1	Generic Radial Stem								
1	Solar								
10 Most Used									
146 (10)	100.0%	344 (7)	100.0%	300 (6)	100.0%	281 (6)	100.0%	266 (6)	100.0%

PRIMARY UNI HUMERAL ELBOW REPLACEMENT

Table EP6 Primary Uni Humeral Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	7	70.0%	27	56	51	47.0	10.4
Male	3	30.0%	30	52	47	43.0	11.5
TOTAL	10	100.0%	27	56	49	45.8	10.2

Figure EP3 Primary Humeral Elbow Replacement by Age and Gender

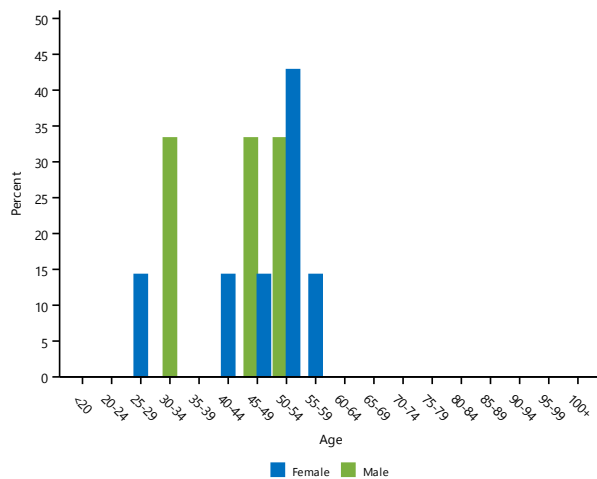


Table EP7 Primary Uni Humeral Elbow Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	5	50.0
Fracture/Dislocation	4	40.0
Osteonecrosis	1	10.0
TOTAL	10	100.0

PRIMARY UNI HUMERAL WITH RADIAL ELBOW REPLACEMENT

Table EP8 Primary Uni Humeral with Radial Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	10	40.0%	22	83	59	57.4	17.0
Male	15	60.0%	31	69	57	55.0	9.3
TOTAL	25	100.0%	22	83	58	56.0	12.6

Figure EP4 Primary Uni Humeral with Radial Elbow Replacement by Age and Gender

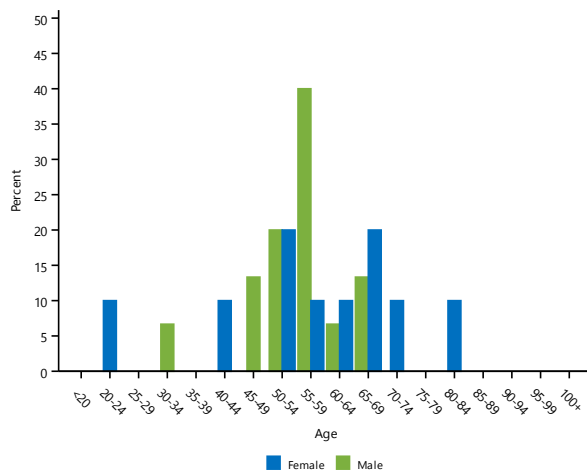


Table EP9 Primary Uni Humeral with Radial Elbow Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	21	84.0
Osteonecrosis	2	8.0
Fracture/Dislocation	2	8.0
TOTAL	25	100.0

PRIMARY HUMERAL HEMIARTHROPLASTY

Table EP10 Primary Humeral Hemiarthroplasty Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	396	85.0%	18	99	70	70.0	12.0
Male	70	15.0%	22	91	63	63.1	14.7
TOTAL	466	100.0%	18	99	70	69.0	12.7

Figure EP5 Primary Humeral Hemiarthroplasty Elbow Replacement by Age and Gender

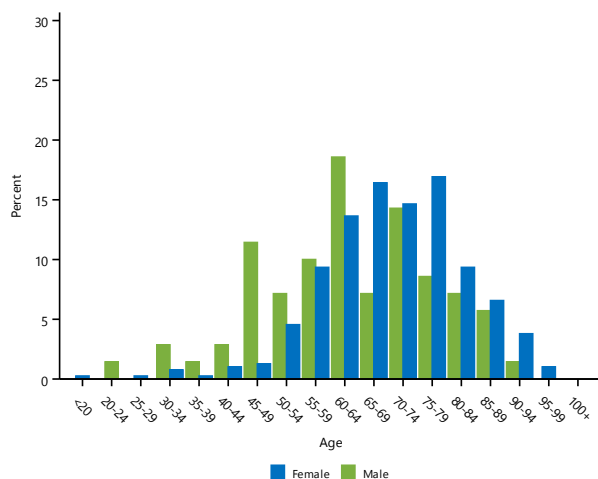


Table EP11 Primary Humeral Hemiarthroplasty Elbow Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Fracture/Dislocation	440	94.4
Osteoarthritis	19	4.1
Rheumatoid Arthritis	3	0.6
Tumour	3	0.6
Osteochondritis Dissecans	1	0.2
TOTAL	466	100.0

Table EP12 Most Used Humeral Prostheses in Primary Humeral Hemiarthroplasty Elbow Replacement

2008		2021		2022		2023		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
13	Latitude	38	Latitude	33	Latitude	58	Latitude	59	Latitude
1	Sorbie-Questor								
Most Used									
14	(2) 100.0%	38	(1) 100.0%	33	(1) 100.0%	58	(1) 100.0%	59	(1) 100.0%

PRIMARY TOTAL ELBOW REPLACEMENT

DEMOGRAPHICS

The Registry subcategorises primary total elbow replacement into two classes. These are defined as:

Total elbow without radial involves resection of the olecranon and distal humerus and replacement with a stemmed ulna and stemmed humeral prosthesis.

Total elbow with radial involves resection of the olecranon and distal humerus and replacement with a stemmed ulna and stemmed humeral prosthesis combined with replacement of the radial head with a radial prosthesis.

Table ET1 Primary Total Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	1518	74.6%	16	96	73	71.5	12.0
Male	517	25.4%	12	94	70	68.4	12.4
TOTAL	2035	100.0%	12	96	72	70.7	12.2

Figure ET1 Primary Total Elbow Replacement by Age and Gender

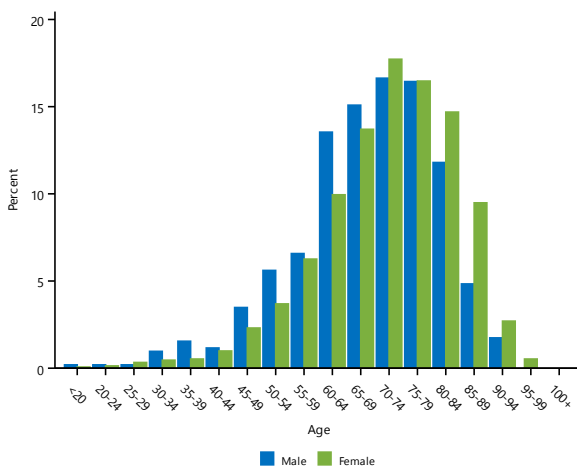


Table ET2 Primary Total Elbow Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Fracture/Dislocation	775	38.1
Osteoarthritis	687	33.8
Rheumatoid Arthritis	473	23.2
Other Inflammatory Arthritis	48	2.4
Tumour	32	1.6
Instability	13	0.6
Osteonecrosis	3	0.1
Other	4	0.2
TOTAL	2035	100.0

PRIMARY TOTAL ELBOW WITHOUT RADIAL REPLACEMENT

Table ET3 Primary Total Elbow without Radial Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	1483	74.9%	16	96	73	71.6	12.0
Male	496	25.1%	12	94	70	68.4	12.5
TOTAL	1979	100.0%	12	96	72	70.8	12.2

Figure ET2 Primary Total Elbow without Radial Replacement by Age and Gender

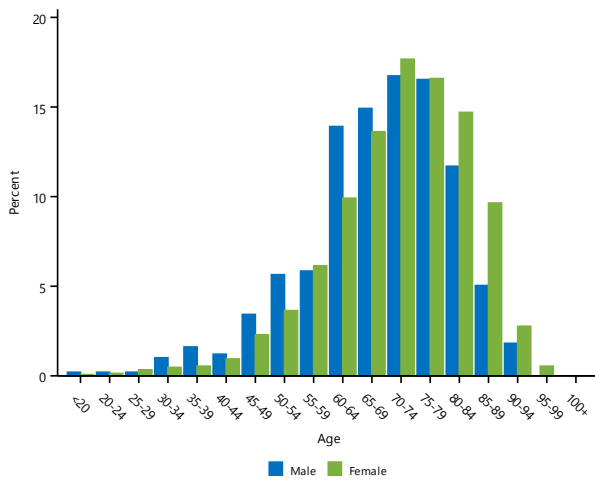


Table ET4 Primary Total Elbow without Radial Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Fracture/Dislocation	764	38.6
Osteoarthritis	657	33.2
Rheumatoid Arthritis	460	23.2
Other Inflammatory Arthritis	47	2.4
Tumour	32	1.6
Instability	12	0.6
Osteonecrosis	3	0.2
Other	4	0.2
TOTAL	1979	100.0

Table ET5 Most Used Humeral Prostheses in Primary Total Elbow without Radial Replacement

2008		2021		2022		2023		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
47	Coonrad/Morrey	65	Latitude	51	Latitude	62	Latitude	73	Latitude
21	Latitude	44	Nexel	38	Nexel	38	Nexel	34	Nexel
10	Discovery	20	Coonrad/Morrey	10	Coonrad/Morrey	23	Coonrad/Morrey	10	Coonrad/Morrey
1	Souter Strathclyde	2	Comprehensive	5	Mutars	2	Mutars	3	Comprehensive
		2	Mutars					1	Mutars
Most Used									
79	(4) 100.0%	133	(5) 100.0%	104	(4) 100.0%	125	(4) 100.0%	121	(5) 100.0%

Table ET6 Cumulative Percent Revision of Primary Total Elbow without Radial Replacement by Humeral Prostheses (Primary Diagnosis Fracture/Dislocation)

Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs
Coonrad/Morrey	31	333	1.9 (0.9, 4.2)	6.3 (4.0, 9.8)	8.9 (6.0, 13.1)	13.3 (9.2, 19.0)	
Discovery	3	26	4.0 (0.6, 25.2)	8.4 (2.2, 29.6)	13.2 (4.4, 35.7)	13.2 (4.4, 35.7)	
Latitude	18	277	2.3 (1.0, 5.0)	6.1 (3.6, 10.2)	6.1 (3.6, 10.2)		
Nexel	10	121	2.6 (0.8, 7.7)	6.8 (3.3, 13.8)			
Other (4)	1	7	16.7 (2.5, 72.7)	16.7 (2.5, 72.7)	16.7 (2.5, 72.7)		
TOTAL	63	764					

Note: Only prostheses with >10 procedures have been listed

Table ET7 Cumulative Percent Revision of Primary Total Elbow without Radial Replacement by Humeral Prostheses (Primary Diagnosis Osteoarthritis)

Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs
Coonrad/Morrey	49	201	4.0 (2.0, 7.9)	15.7 (11.2, 21.7)	21.6 (16.3, 28.4)	28.2 (22.0, 35.7)	
Discovery	15	61	3.3 (0.8, 12.5)	11.7 (5.8, 23.1)	15.3 (8.3, 27.4)	31.8 (19.7, 48.8)	
Latitude	34	239	5.8 (3.4, 9.7)	8.4 (5.4, 13.1)	13.5 (9.2, 19.6)		
Nexel	25	149	5.7 (2.9, 11.0)	16.2 (10.9, 23.9)	19.9 (13.7, 28.6)		
Other (5)	3	7	28.6 (8.0, 74.2)	42.9 (16.3, 82.8)	42.9 (16.3, 82.8)	42.9 (16.3, 82.8)	
TOTAL	126	657					

Note: Only prostheses with >10 procedures have been listed

Table ET8 Cumulative Percent Revision of Primary Total Elbow without Radial Replacement by Humeral Prostheses (Primary Diagnosis Rheumatoid Arthritis)

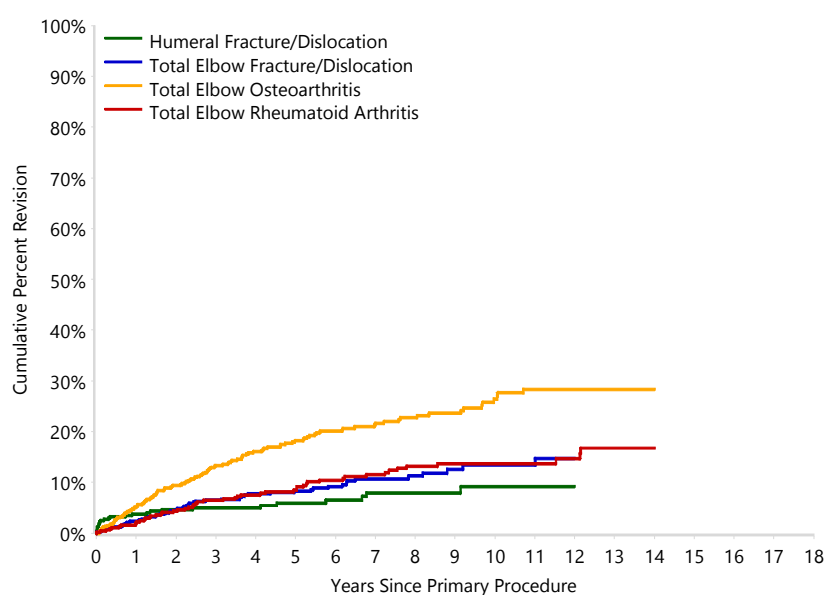
Humeral Stem	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs
Coonrad/Morrey	28	188	2.7 (1.1, 6.3)	7.7 (4.6, 12.7)	11.3 (7.4, 17.0)	16.0 (11.2, 22.5)	
Discovery	6	32	6.3 (1.6, 22.7)	6.3 (1.6, 22.7)	6.3 (1.6, 22.7)	14.2 (5.5, 33.9)	
Latitude	10	149	0.7 (0.1, 4.7)	4.0 (1.7, 9.4)	5.1 (2.3, 11.1)		
Nexel	8	88	1.3 (0.2, 8.6)	8.2 (3.7, 17.3)	8.2 (3.7, 17.3)		
Other (1)	1	3	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	53	460					

Note: Only prostheses with >10 procedures have been listed

Table ET9 Cumulative Percent Revision of Primary Total Elbow without Radial Replacement by Primary Diagnosis and Class

Class	Primary Diagnosis	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	14 Yrs
Humeral Hemi	Fracture/Dislocation	26	440	3.8 (2.3, 6.1)	5.0 (3.2, 7.7)	5.9 (3.9, 9.0)	9.2 (5.9, 14.2)	
Total Elbow	Fracture/Dislocation	63	764	2.3 (1.5, 3.8)	6.5 (4.8, 8.7)	8.3 (6.3, 10.9)	13.4 (10.1, 17.7)	
	Osteoarthritis	126	657	5.2 (3.7, 7.2)	13.4 (10.8, 16.4)	18.2 (15.2, 21.7)	26.4 (22.2, 31.2)	28.4 (23.8, 33.6)
	Rheumatoid Arthritis	53	460	2.0 (1.1, 3.8)	6.5 (4.5, 9.3)	8.5 (6.1, 11.7)	13.8 (10.5, 18.0)	16.8 (12.5, 22.4)
TOTAL		268	2321					

Note: Only prostheses with >10 procedures have been listed.

Figure ET3 Cumulative Percent Revision of Primary Total Elbow without Radial Replacement by Primary Diagnosis and Class

HR - adjusted for age and gender

Total Elbow Fracture/Dislocation vs
Humeral Fracture/Dislocation

0 - 3Mth: HR=0.64 (95% CI 0.26, 1.62), p=0.350

3Mth - 9Mth: HR=1.13 (95% CI 0.43, 2.99), p=0.798

9Mth - 1.5Yr: HR=1.29 (95% CI 0.48, 3.47), p=0.609

1.5Yr+: HR=3.65 (95% CI 1.69, 7.89), p<0.001

Total Elbow Osteoarthritis vs
Humeral Fracture/Dislocation

0 - 1Mth: HR=0.22 (95% CI 0.05, 1.06), p=0.059

1Mth - 6Mth: HR=1.72 (95% CI 0.76, 3.90), p=0.196

6Mth - 1.5Yr: HR=2.62 (95% CI 1.20, 5.73), p=0.015

1.5Yr+: HR=5.40 (95% CI 2.60, 11.21), p<0.001

Total Elbow Rheumatoid Arthritis vs
Humeral Fracture/Dislocation

0 - 6Mth: HR=0.36 (95% CI 0.13, 1.03), p=0.056

6Mth - 1.5Yr: HR=1.24 (95% CI 0.50, 3.08), p=0.647

1.5Yr+: HR=2.82 (95% CI 1.31, 6.05), p=0.007

Number at Risk		0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	14 Yrs
Humeral Hemi	Fracture/Dislocation	440	356	255	188	63	17
Total Elbow	Fracture/Dislocation	764	661	483	330	89	19
	Osteoarthritis	657	581	444	321	121	41
	Rheumatoid Arthritis	460	421	351	283	130	47

Note: Only combinations with > 10 procedures have been listed

PRIMARY TOTAL ELBOW WITH RADIAL REPLACEMENT

Table ET10 Primary Total Elbow with Radial Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	35	62.5%	42	86	68	67.7	10.8
Male	21	37.5%	45	83	67	67.5	10.7
TOTAL	56	100.0%	42	86	68	67.6	10.7

Figure ET4 Primary Total Elbow with Radial Replacement by Age and Gender

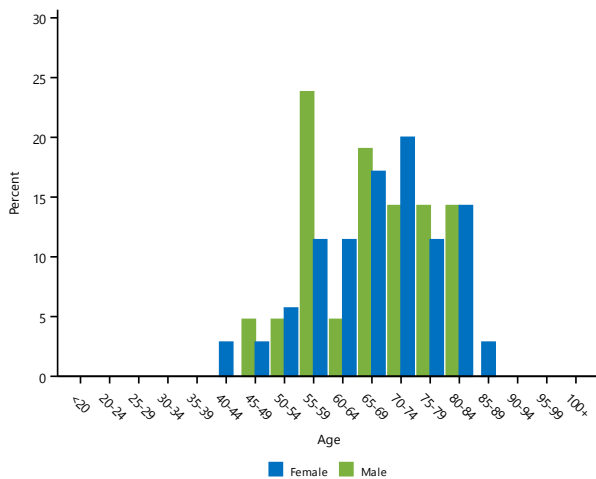


Table ET11 Primary Total Elbow with Radial Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	30	53.6
Rheumatoid Arthritis	13	23.2
Fracture/Dislocation	11	19.6
Other Inflammatory Arthritis	1	1.8
Instability	1	1.8
TOTAL	56	100.0

Table ET12 Most Used Radial Head/Humeral Prostheses in Primary Total Elbow with Radial Replacement

2008		2020		2021		2022		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
10	Latitude	2	Latitude	1	Latitude	1	Latitude		
Most Used									
10	(1) 100.0%	2	(1) 100.0%	1	(1) 100.0%	1	(1) 100.0%	0	(0)

REVISION ELBOW REPLACEMENT

DEMOGRAPHICS

The Registry subcategorises elbow revisions into three classes. These are defined as:

Major total revision involves the insertion, removal and/or replacement of a major component on both the proximal and distal side of the joint.

Major partial revision involves the insertion, removal and/or replacement of a major component on either the proximal or distal side of the joint.

Minor revision involves the insertion, removal and/or replacement of any other prosthesis or implant in elbow replacement.

Major components are prostheses that are fixed to bone. These are the humeral prosthesis and the ulna prosthesis in elbow replacement. The exception to this is the radial prosthesis, which is fixed to bone and is not considered a major prosthesis.

Different types of major partial and minor revisions are identified based on the specific prostheses or implants used in the revision.

Table ER1 All Revision Elbow Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	548	40.5%	20	97	60	58.2	15.2
Female	806	59.5%	21	95	66	64.8	13.5
TOTAL	1354	100.0%	20	97	64	62.1	14.5

Table ER2 Reason for Revision of All Revision Elbow Replacement

Reason for Revision	Number	Percent
Loosening	476	35.2
Infection	308	22.7
Fracture	164	12.1
Instability	78	5.8
Prosthesis Dislocation	31	2.3
Pain	31	2.3
Incorrect Sizing	29	2.1
Wear Bushing	23	1.7
Lysis	20	1.5
Implant Breakage Ulna	15	1.1
Arthrofibrosis	15	1.1
Malposition	10	0.7
Progression Of Disease	10	0.7
Metal Related Pathology	9	0.7
Implant Breakage Humeral	7	0.5
Wear Ulna	5	0.4
Heterotopic Bone	4	0.3
Synovitis	2	0.1
Wear Humeral	1	0.1
Other	116	8.6
TOTAL	1354	100.0

Table ER3 Type of Revision of All Revision Elbow Replacement

Type of Revision	Number	Percent
Humeral/Ulnar	342	25.3
Radial Component	286	21.1
Humeral Component	176	13.0
Ulna Component	130	9.6
Elbow Pin Only	125	9.2
Removal of Prostheses	103	7.6
Cement Spacer	72	5.3
Ulna Cap Only	22	1.6
Radial Head Only	22	1.6
Radial Neck Only	20	1.5
Reoperation	15	1.1
Minor Components	14	1.0
Cement Only	11	0.8
Uni Humeral/Radius	7	0.5
Reinsertion of Components	4	0.3
Radial/Ulnar	3	0.2
Humeral/Radius	1	0.1
Humeral/Radius/Ulnar	1	0.1
TOTAL	1354	100.0

Wrist Replacement

CATEGORIES OF WRIST REPLACEMENT

The Registry groups wrist replacement into three broad categories: primary partial, primary total and revision wrist replacement.

A primary replacement is the initial replacement procedure undertaken on a joint and involves replacing either part (partial) or all (total) of the articular surface.

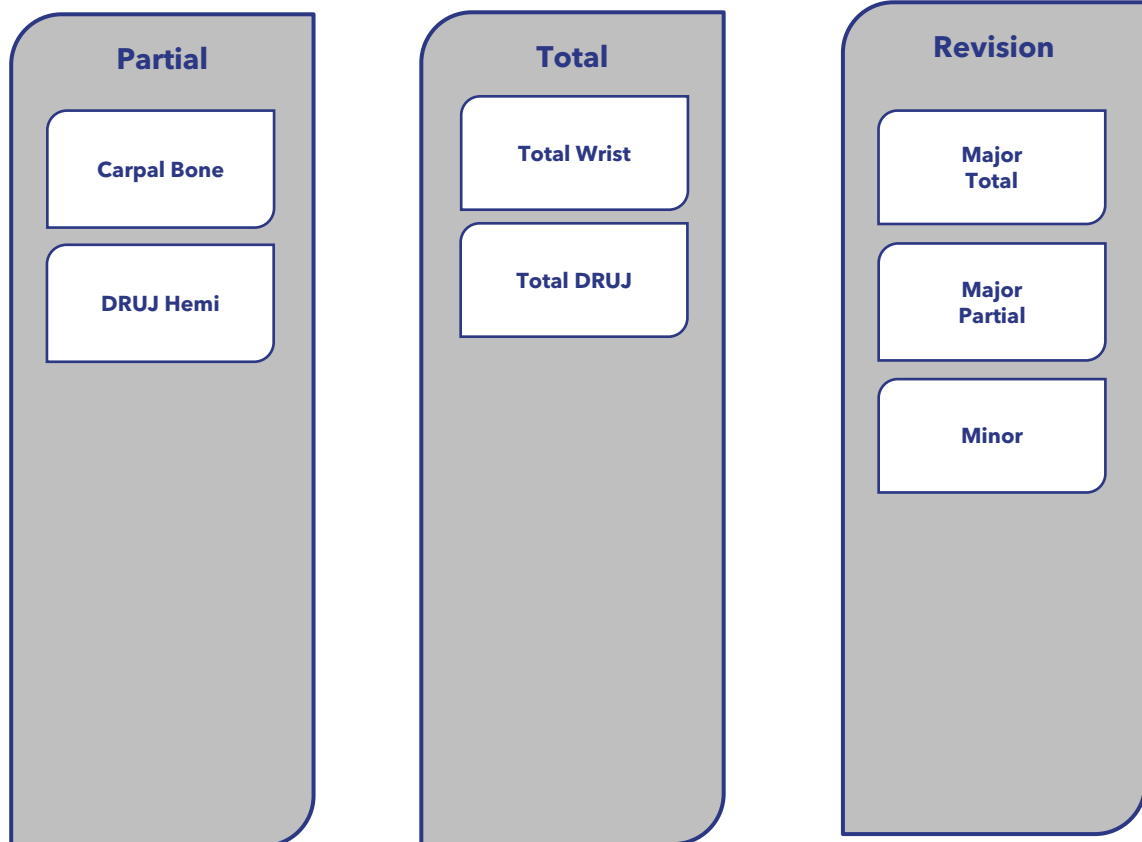
Primary partial wrist replacement is further subcategorised into five classes depending on the type of prosthesis used. Partial wrist classes are lunate, partial ulna, distal radial ulna joint (DRUJ) with ulna only replacement, DRUJ with ulna and radial replacement, and scaphoid interspacer

replacement. Definitions for each of these are detailed in the relevant sections.

Revision procedures are re-operations of previous wrist replacements where one or more of the prosthetic components are replaced, removed, or another component is added. Revisions include re-operations of primary partial, primary total or previous revision procedures.

Wrist revisions are subcategorised into three classes: minor, major partial, and major total revisions. These are defined in the chapter on revisions.

WRIST REPLACEMENT



DEMOGRAPHICS

Table WG1 Number of Wrist Replacements by Gender

Wrist Replacement	Female		Male		TOTAL	
	N	%	N	%	N	%
DRUJ Hemi	110	51.2	105	48.8	215	71.9
Carpal Bone	28	33.3	56	66.7	84	28.1
Primary Partial	138	46.2	161	53.8	299	100.0
Total DRUJ	50	48.5	53	51.5	103	14.1
Total Wrist	277	44.2	350	55.8	627	85.9
Primary Total	327	44.8	403	55.2	730	100.0
Revision	100	56.8	76	43.2	176	100.0
TOTAL	565	46.9	640	53.1	1205	100.0

Table WG2 Number of Wrist Replacements by Age

Wrist Replacement	<55		55-64		65-74		75-84		≥85		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
DRUJ Hemi	46	21.4	55	25.6	65	30.2	42	19.5	7	3.3	215	71.9
Carpal Bone	42	50.0	19	22.6	16	19.0	6	7.1	1	1.2	84	28.1
Primary Partial	88	29.4	74	24.7	81	27.1	48	16.1	8	2.7	299	100.0
Total DRUJ	30	29.1	38	36.9	20	19.4	13	12.6	2	1.9	103	14.1
Total Wrist	114	18.2	172	27.4	207	33.0	121	19.3	13	2.1	627	85.9
Primary Total	144	19.7	210	28.8	227	31.1	134	18.4	15	2.1	730	100.0
Revision	41	23.3	52	29.5	52	29.5	27	15.3	4	2.3	176	100.0
TOTAL	273	22.7	336	27.9	360	29.9	209	17.3	27	2.2	1205	100.0

Table WG3 All Wrist Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	640	53.1%	18	90	64	62.5	13.7
Female	565	46.9%	21	88	65	63.1	13.3
TOTAL	1205	100.0%	18	90	64	62.8	13.5

Figure WG1 All Wrist Replacement by Age and Gender

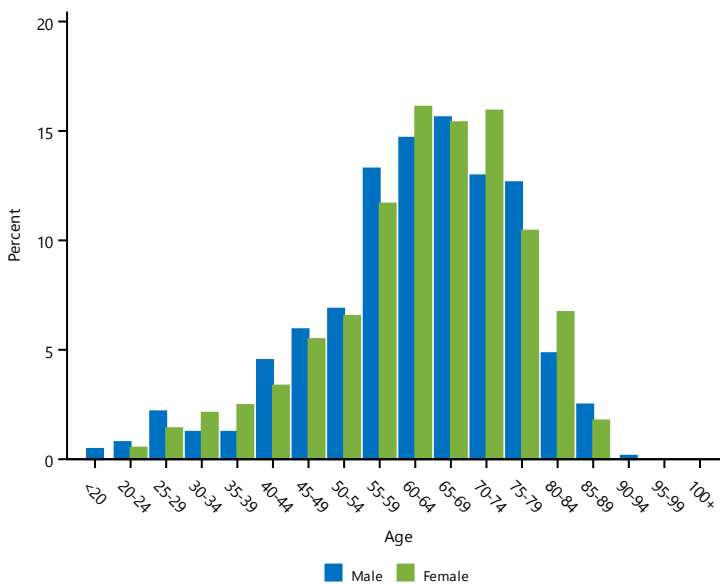


Table WG4 **Cumulative Percent Revision of Primary Wrist Replacement by Class**

Wrist Class	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs
DRUJ Hemi	16	215	3.3 (1.6, 6.8)	6.5 (3.8, 10.9)	7.6 (4.7, 12.4)	8.7 (5.3, 14.2)	
Total DRUJ	8	103	3.1 (1.0, 9.4)	6.8 (3.1, 14.7)	9.7 (4.9, 18.5)		
Carpal Bone	5	84	4.8 (1.8, 12.3)	6.1 (2.6, 14.0)	6.1 (2.6, 14.0)	6.1 (2.6, 14.0)	
Total Wrist	66	627	4.3 (2.9, 6.3)	9.5 (7.3, 12.4)	11.6 (9.0, 14.8)	15.6 (11.8, 20.6)	
TOTAL	95	1029					

PRIMARY PARTIAL WRIST REPLACEMENT

DEMOGRAPHICS

The Registry subcategorises primary partial wrist replacement into two classes. These are defined as:

Carpal Bone: involves replacement of the carpal bone with a prosthesis.

Distal radial ulna joint (DRUJ) Hemi involves the replacement of part of the distal ulna surface with a stemmed ulna prosthesis and resection of the ulna head and replacement with a stemmed ulna prosthesis.

Table WP1 Primary Partial Wrist Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	138	46.2%	21	88	64	62.2	14.7
Male	161	53.8%	18	88	63	58.9	17.3
TOTAL	299	100.0%	18	88	63	60.4	16.2

Figure WP1 Primary Partial Wrist Replacement by Age and Gender

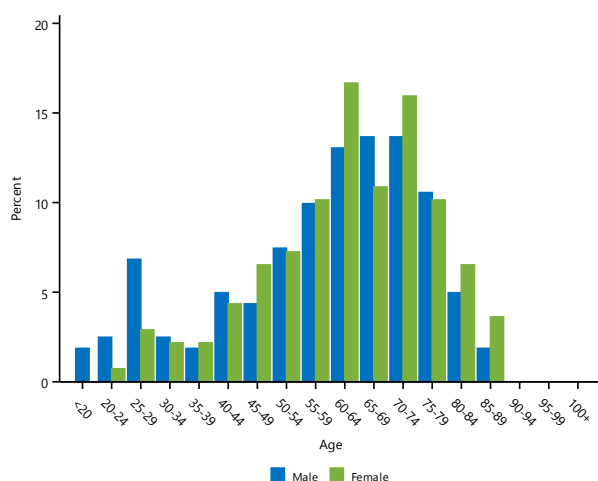


Table WP2 Primary Partial Wrist Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	206	68.9
Fracture/Dislocation	29	9.7
Rheumatoid Arthritis	29	9.7
Osteonecrosis	15	5.0
Other Inflammatory Arthritis	8	2.7
Instability	6	2.0
Tumour	1	0.3
Other	5	1.7
TOTAL	299	100.0

PRIMARY CARPAL BONE REPLACEMENT

Table WP3 Primary Carpal Bone Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	28	33.3%	21	88	62	59.2	17.1
Male	56	66.7%	18	80	50	47.1	17.5
TOTAL	84	100.0%	18	88	55	51.1	18.2

Figure WP2 Primary Carpal Bone Replacement by Age and Gender

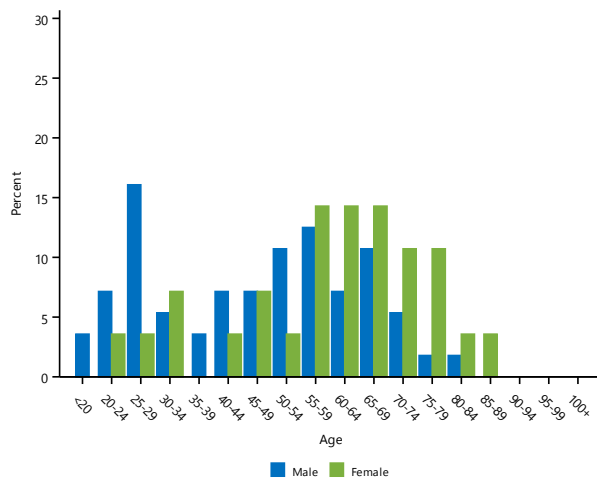


Table WP4 Primary Carpal Bone Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	48	57.1
Osteonecrosis	14	16.7
Fracture/Dislocation	13	15.5
Rheumatoid Arthritis	4	4.8
Other Inflammatory Arthritis	3	3.6
Instability	1	1.2
Other	1	1.2
TOTAL	84	100.0

PRIMARY DRUJ HEMI REPLACEMENT

Table WP5 Primary DRUJ Hemi Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	110	51.2%	26	87	64	62.9	14.0
Male	105	48.8%	19	88	68	65.3	13.4
TOTAL	215	100.0%	19	88	65	64.1	13.8

Figure WP3 Primary DRUJ Hemi Replacement by Age and Gender

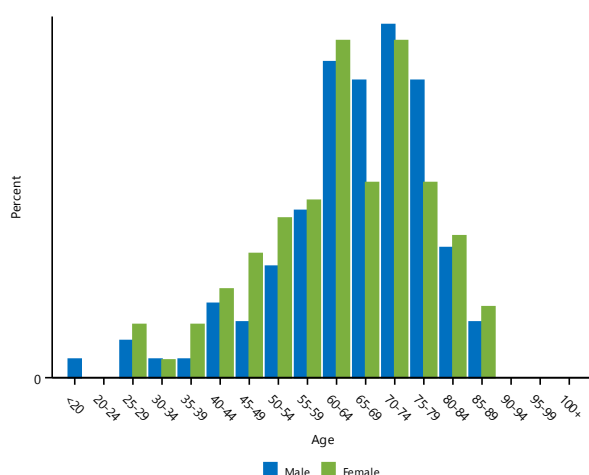


Table WP6 Primary DRUJ Hemi Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	158	73.5
Rheumatoid Arthritis	25	11.6
Fracture/Dislocation	16	7.4
Instability	5	2.3
Other Inflammatory Arthritis	5	2.3
Tumour	1	0.5
Osteonecrosis	1	0.5
Other	4	1.9
TOTAL	215	100.0

Table WP7 Most Used Ulna Prostheses in Primary DRUJ Hemi Replacement

2008		2021		2022		2023		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
1		3		3		4		9	Herbert UHP
5	uHead	5	DRUJ (Ascension)	5	Herbert UHP	15	Herbert UHP		
2	Eclipse	2	Herbert UHP	2	DRUJ (Ascension)				
2	Herbert UHP	1	Eclipse						
1	E-Centrix								
Most Used									
10	(5) 100.0%	8	(4) 100.0%	7	(3) 100.0%	15	(2) 100.0%	9	(1) 100.0%

TOTAL WRIST

DEMOGRAPHICS

Primary total wrist replacement

includes resection of the distal radius and replacement with a radial prosthesis combined with replacement of carpal bones with a carpal prosthesis and carpal spacer.

Total Distal radial ulna joint (DRUJ)

with ulna and radial replacement involves resection of the ulna head and replacement with a stemmed ulna prosthesis and a distal radial notch and plate.

PRIMARY TOTAL WRIST REPLACEMENT

Table WT1 Primary Total Wrist Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	327	44.8%	22	87	65	63.4	12.7
Male	403	55.2%	29	90	65	64.2	11.6
TOTAL	730	100.0%	22	90	65	63.8	12.1

Figure WT1 Primary Total Wrist Replacement by Age and Gender

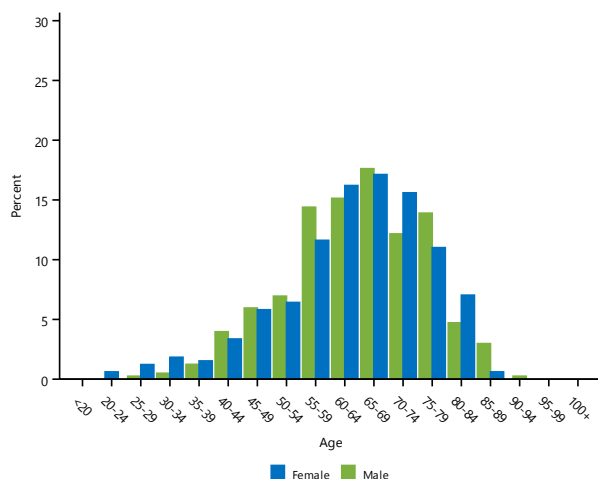


Table WT2 Primary Total Wrist Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	541	74.1
Rheumatoid Arthritis	94	12.9
Instability	25	3.4
Fracture/Dislocation	23	3.2
Osteonecrosis	18	2.5
Other Inflammatory Arthritis	16	2.2
Other	13	1.8
TOTAL	730	100.0

Table WT3 Most Used Carpal/Radial Prostheses in Primary Total Wrist Replacement

2008		2021		2022		2023		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
10	Re-Motion	82	Motec	51	Motec	53	Motec	74	Motec
3	Universal 2	1	Freedom	1	Freedom			1	Re-Motion
		1	Universal 2	1	Re-Motion				
10 Most Used									
13	(2) 100.0	84	(3) 100.0	53	(3) 100.0	53	(1) 100.0	75	(2) 100.0

PRIMARY DRUJ

Table WP8 Primary Total DRUJ Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	50	48.5%	27	81	61	59.4	12.5
Male	53	51.5%	36	87	61	61.6	12.9
TOTAL	103	100.0%	27	87	61	60.5	12.7

Figure WP4 Primary Total DRUJ Replacement by Age and Gender

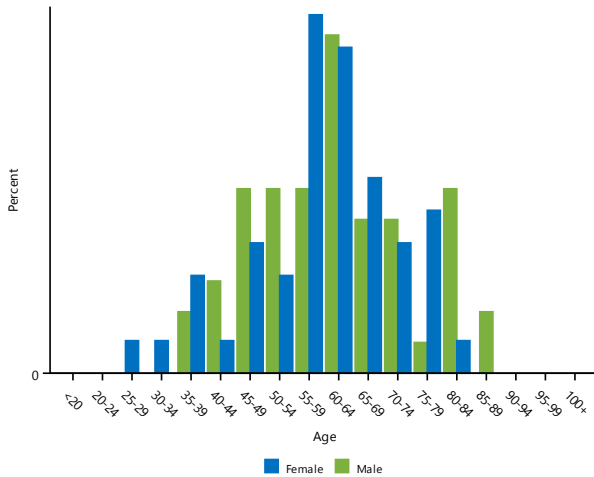


Table WP9 Primary Total DRUJ Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	80	77.7
Instability	10	9.7
Fracture/Dislocation	5	4.9
Rheumatoid Arthritis	4	3.9
Other Inflammatory Arthritis	1	1.0
Other	3	2.9
TOTAL	103	100.0

REVISION WRIST REPLACEMENT

DEMOGRAPHICS

The Registry subcategorises wrist revisions into three classes. These are defined as:

Major total revision involves the insertion, removal and/or replacement of a major component on both the proximal and distal side of the joint.

Major partial revision involves the insertion, removal and/or replacement of a major component on either the proximal or the distal side of the joint.

Minor revision involves the insertion, removal and/or replacement of any other prosthesis or implant in wrist replacement.

Major components are prostheses that are fixed to bone. These are the radial prosthesis and the carpal prosthesis in wrist replacement. The ulna and individual carpal prostheses are not considered major prostheses.

Different types of major, partial and minor revisions are identified based on the specific prostheses or implants used in the revision.

Table WR1 All Revision Wrist Replacement by Age and Gender

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	76	43.2%	22	88	64	60.9	14.2
Female	100	56.8%	32	87	66	63.3	13.2
TOTAL	176	100.0%	22	88	64	62.3	13.6

Table WR2 Reason for Revision of All Revision Wrist Replacement

Reason for Revision	Number	Percent
Loosening	54	30.7
Instability	22	12.5
Pain	21	11.9
Infection	20	11.4
Lysis	9	5.1
Metal Related Pathology	5	2.8
Progression Of Disease	4	2.3
Arthrofibrosis	4	2.3
Prosthesis Dislocation	3	1.7
Implant Breakage Carpal	3	1.7
Incorrect Sizing	2	1.1
Fracture	2	1.1
Contracture	1	0.6
Malposition	1	0.6
Implant Breakage Wrist Plate	1	0.6
Implant Breakage Ulna	1	0.6
Flexion Deformity	1	0.6
Other	22	12.5
TOTAL	176	100.0

Table WR3 Type of Revision of All Revision Wrist Replacement

Type of Revision	Number	Percent
Removal of Prostheses	26	14.8
Carpal Component	21	11.9
Ulna Component	18	10.2
Carpal Head/Radial Cup	18	10.2
Sigmoid Notch	17	9.7
Minor Components	17	9.7
Carpal/Radius	15	8.5
Reoperation Fusion	10	5.7
Ulna Head Only	10	5.7
Radius Component	7	4.0
Carpal Insert	6	3.4
Cement Spacer	5	2.8
Sigmoid Notch/Ulna	2	1.1
Carpal Head	2	1.1
Radial Cup	1	0.6
Reinsertion of Components	1	0.6
TOTAL	176	100.0



AOA
AUSTRALIAN
ORTHOPAEDIC
ASSOCIATION

Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

AOANJRR
SAHMRI Building
North Terrace, Adelaide SA 5000
T: +61 8 8128 4280
aoanjrr.sahmri.com
aoa.org.au

The AOANJRR is funded by the Australian Government Department of Health, Disability and Ageing