

**Australian Orthopaedic Association National Joint Replacement Registry**

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

2025 Supplementary Report

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National Joint Replacement Registry

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Elbow and Wrist Arthroplasty  
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# 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.

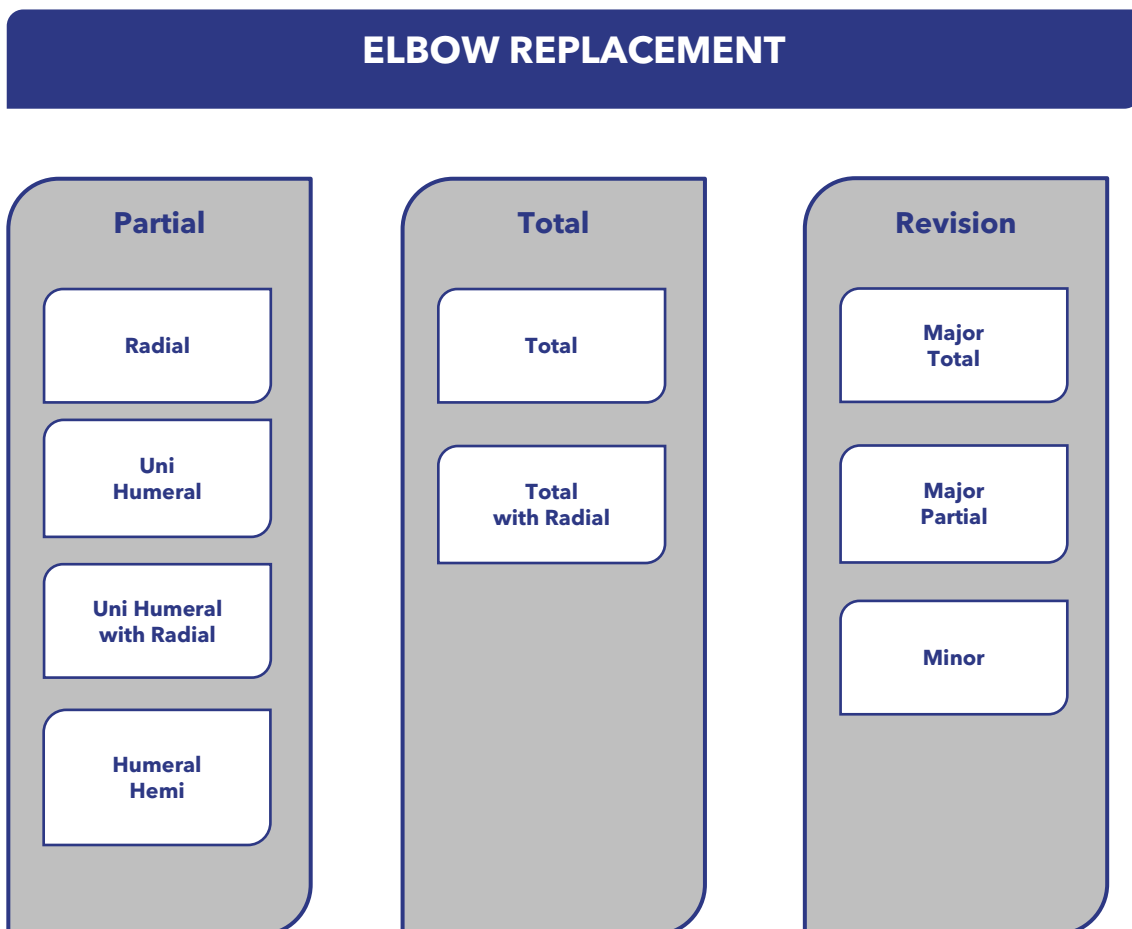
A primary replacement is the initial replacement procedure undertaken on a joint and involves replacing either part (partial) or all (total) of the articular surface.

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.



## 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
<b>Primary Partial</b>	<b>3002</b>	<b>61.1</b>	<b>1913</b>	<b>38.9</b>	<b>4915</b>	<b>100.0</b>
Total Elbow	1483	74.9	496	25.1	1979	97.2
Total Elbow & Radial	35	62.5	21	37.5	56	2.8
<b>Primary Total</b>	<b>1518</b>	<b>74.6</b>	<b>517</b>	<b>25.4</b>	<b>2035</b>	<b>100.0</b>
<b>Revision</b>	<b>806</b>	<b>59.5</b>	<b>548</b>	<b>40.5</b>	<b>1354</b>	<b>100.0</b>
<b>TOTAL</b>	<b>5326</b>	<b>64.1</b>	<b>2978</b>	<b>35.9</b>	<b>8304</b>	<b>100.0</b>

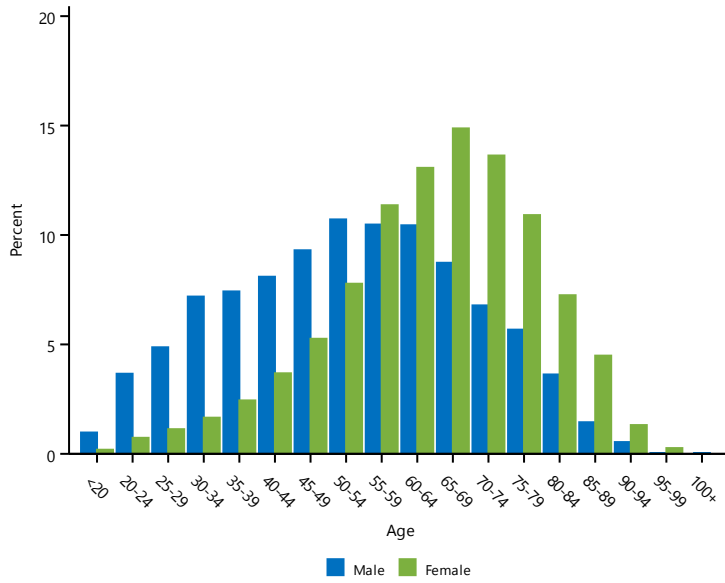
**Table EG2 Number of Elbow Replacements by Age**

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
<b>Primary Partial</b>	<b>2207</b>	<b>44.9</b>	<b>1246</b>	<b>25.4</b>	<b>952</b>	<b>19.4</b>	<b>414</b>	<b>8.4</b>	<b>96</b>	<b>2.0</b>	<b>4915</b>	<b>100.0</b>
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
<b>Primary Total</b>	<b>198</b>	<b>9.7</b>	<b>350</b>	<b>17.2</b>	<b>641</b>	<b>31.5</b>	<b>619</b>	<b>30.4</b>	<b>227</b>	<b>11.2</b>	<b>2035</b>	<b>100.0</b>
<b>Revision</b>	<b>367</b>	<b>27.1</b>	<b>328</b>	<b>24.2</b>	<b>387</b>	<b>28.6</b>	<b>211</b>	<b>15.6</b>	<b>61</b>	<b>4.5</b>	<b>1354</b>	<b>100.0</b>
<b>TOTAL</b>	<b>2772</b>	<b>33.4</b>	<b>1924</b>	<b>23.2</b>	<b>1980</b>	<b>23.8</b>	<b>1244</b>	<b>15.0</b>	<b>384</b>	<b>4.6</b>	<b>8304</b>	<b>100.0</b>

**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
<b>TOTAL</b>	<b>18</b>	<b>11.9</b>	<b>23</b>	<b>15.2</b>	<b>110</b>	<b>72.8</b>	<b>151</b>	<b>100.0</b>

**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
<b>TOTAL</b>	<b>8304</b>	<b>100.0%</b>	<b>12</b>	<b>102</b>	<b>62</b>	<b>60.1</b>	<b>16.2</b>

**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)
<b>TOTAL</b>	<b>545</b>	<b>6950</b>					

# 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.

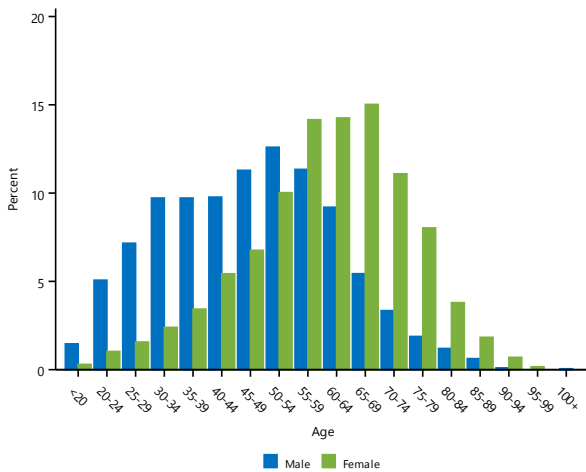
**Uni humeral with radial** involves replacement of the capitellum and radial head.

**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
<b>TOTAL</b>	<b>4915</b>	<b>100.0%</b>	<b>14</b>	<b>102</b>	<b>57</b>	<b>55.1</b>	<b>15.8</b>

**Figure EP1 Primary Partial Elbow Replacement by Age and Gender**



**Table EP2 Primary Partial Elbow Replacement by Primary Diagnosis**

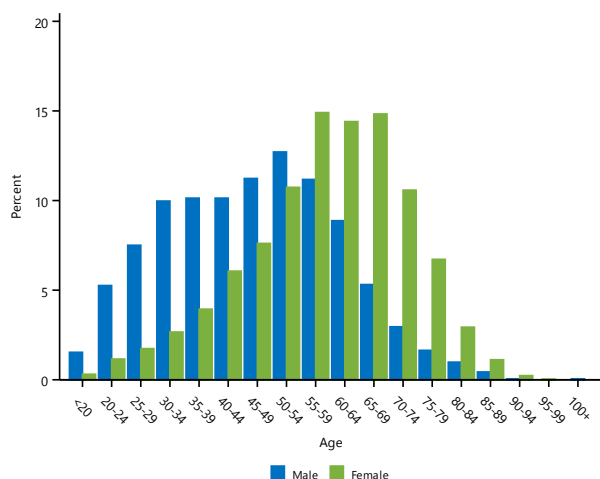
Primary Diagnosis	Number	Percent
Fracture/Dislocation	4492	91.4
Osteoarthritis	342	7.0
Instability	41	0.8
Rheumatoid Arthritis	14	0.3
Osteonecrosis	13	0.3
Tumour	6	0.1
Other Inflammatory Arthritis	4	0.1
Osteochondritis Dissecans	1	0.0
Other	2	0.0
<b>TOTAL</b>	<b>4915</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>4414</b>	<b>100.0%</b>	<b>14</b>	<b>102</b>	<b>55</b>	<b>53.6</b>	<b>15.4</b>

**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
<b>TOTAL</b>	<b>4414</b>	<b>100.0</b>

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

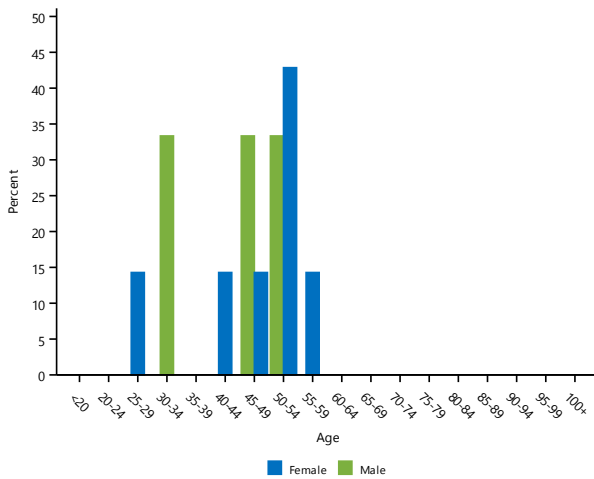
2008		2021		2022		2023		2024	
N	Model	N	Model	N	Model	N	Model	N	Model
57	Evolve	165	Radial Stem (Ascension)	143	Radial Stem (Ascension)	69	Radial Stem (Ascension)	97	ALIGN
30	Radial Stem (Ascension)	65	Evolve	59	Evolve	66	Anatomic	65	Anatomic
20	Anatomic	62	Anatomic	50	Anatomic	51	ALIGN	54	MOPYC
15	MOPYC	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								
<b>10 Most Used</b>									
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
<b>TOTAL</b>	<b>10</b>	<b>100.0%</b>	<b>27</b>	<b>56</b>	<b>49</b>	<b>45.8</b>	<b>10.2</b>

**Figure EP3 Primary Humeral Elbow Replacement by Age and Gender**



**Table EP7 Primary Uni Humeral Elbow Replacement by Primary Diagnosis**

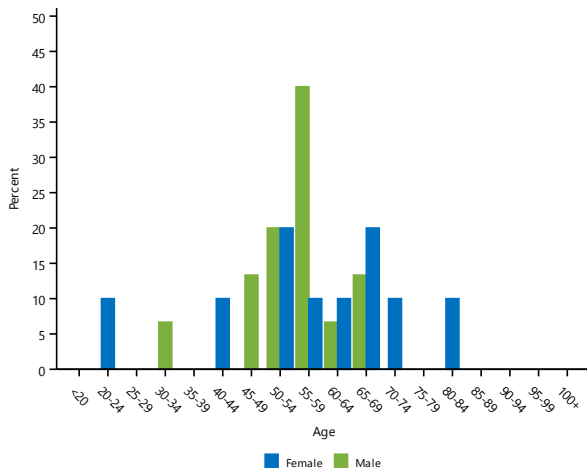
Primary Diagnosis	Number	Percent
Osteoarthritis	5	50.0
Fracture/Dislocation	4	40.0
Osteonecrosis	1	10.0
<b>TOTAL</b>	<b>10</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>25</b>	<b>100.0%</b>	<b>22</b>	<b>83</b>	<b>58</b>	<b>56.0</b>	<b>12.6</b>

**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**

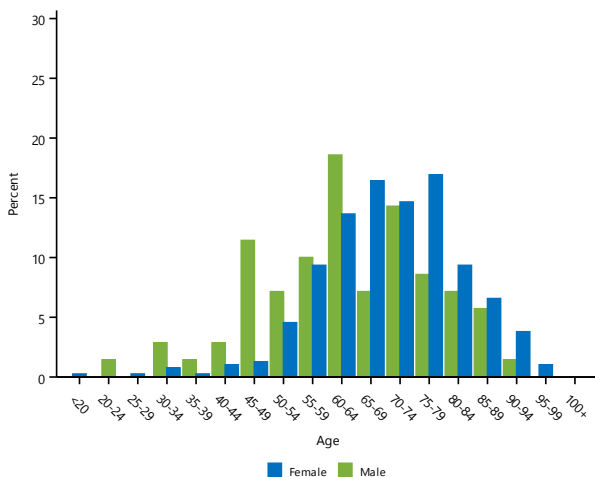
Primary Diagnosis	Number	Percent
Osteoarthritis	21	84.0
Osteonecrosis	2	8.0
Fracture/Dislocation	2	8.0
<b>TOTAL</b>	<b>25</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>466</b>	<b>100.0%</b>	<b>18</b>	<b>99</b>	<b>70</b>	<b>69.0</b>	<b>12.7</b>

**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
<b>TOTAL</b>	<b>466</b>	<b>100.0</b>

**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													
<b>Most Used</b>														
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:

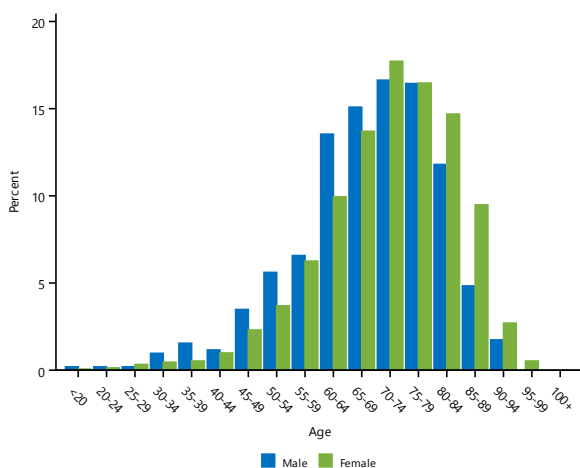
**Total elbow without radial** involves resection of the olecranon and distal humerus and replacement with a stemmed ulna and stemmed humeral prosthesis.

**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
<b>TOTAL</b>	<b>2035</b>	<b>100.0%</b>	<b>12</b>	<b>96</b>	<b>72</b>	<b>70.7</b>	<b>12.2</b>

**Figure ET1 Primary Total Elbow Replacement by Age and Gender**



**Table ET2 Primary Total Elbow Replacement by Primary Diagnosis**

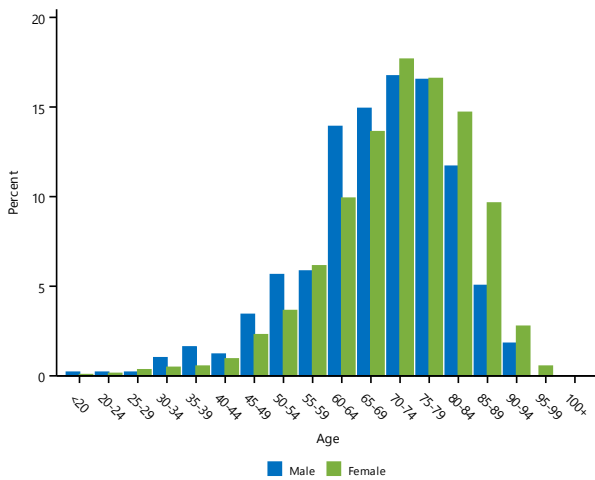
Primary Diagnosis	Number	Percent
Fracture/Dislocation	775	38.1
Osteoarthritis	687	33.8
Rheumatoid Arthritis	473	23.2
Other Inflammatory Arthritis	48	2.4
Tumour	32	1.6
Instability	13	0.6
Osteonecrosis	3	0.1
Other	4	0.2
<b>TOTAL</b>	<b>2035</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>1979</b>	<b>100.0%</b>	<b>12</b>	<b>96</b>	<b>72</b>	<b>70.8</b>	<b>12.2</b>

**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
<b>TOTAL</b>	<b>1979</b>	<b>100.0</b>

**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
<b>Most Used</b>									
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)		
<b>TOTAL</b>	<b>63</b>	<b>764</b>					

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)	
<b>TOTAL</b>	<b>126</b>	<b>657</b>					

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)	
<b>TOTAL</b>	<b>53</b>	<b>460</b>					

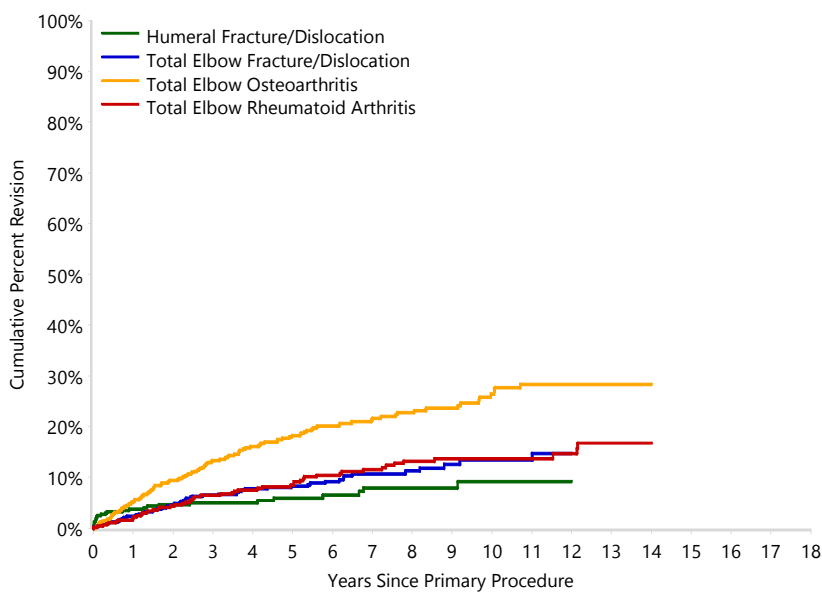
Note: Only prostheses with >10 procedures have been listed

**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)
<b>TOTAL</b>		<b>268</b>	<b>2321</b>					

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

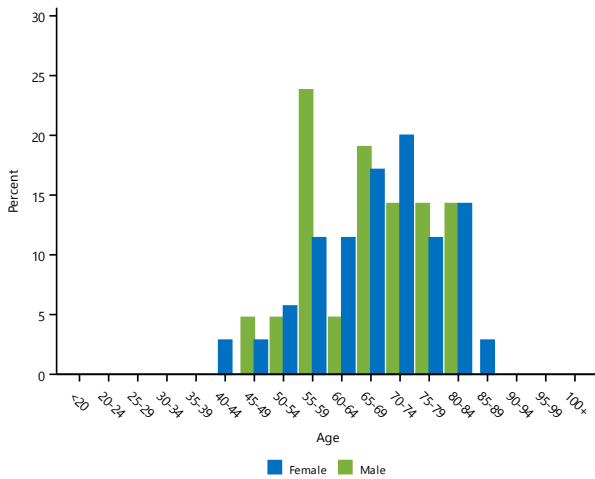
Note: Only combinations with > 10 procedures have been listed

## 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
<b>TOTAL</b>	<b>56</b>	<b>100.0%</b>	<b>42</b>	<b>86</b>	<b>68</b>	<b>67.6</b>	<b>10.7</b>

**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
<b>TOTAL</b>	<b>56</b>	<b>100.0</b>

**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		
<b>Most Used</b>									
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
<b>TOTAL</b>	<b>1354</b>	<b>100.0%</b>	<b>20</b>	<b>97</b>	<b>64</b>	<b>62.1</b>	<b>14.5</b>

**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
<b>TOTAL</b>	<b>1354</b>	<b>100.0</b>

**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
<b>TOTAL</b>	<b>1354</b>	<b>100.0</b>

# Wrist Replacement

## CATEGORIES OF WRIST REPLACEMENT

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

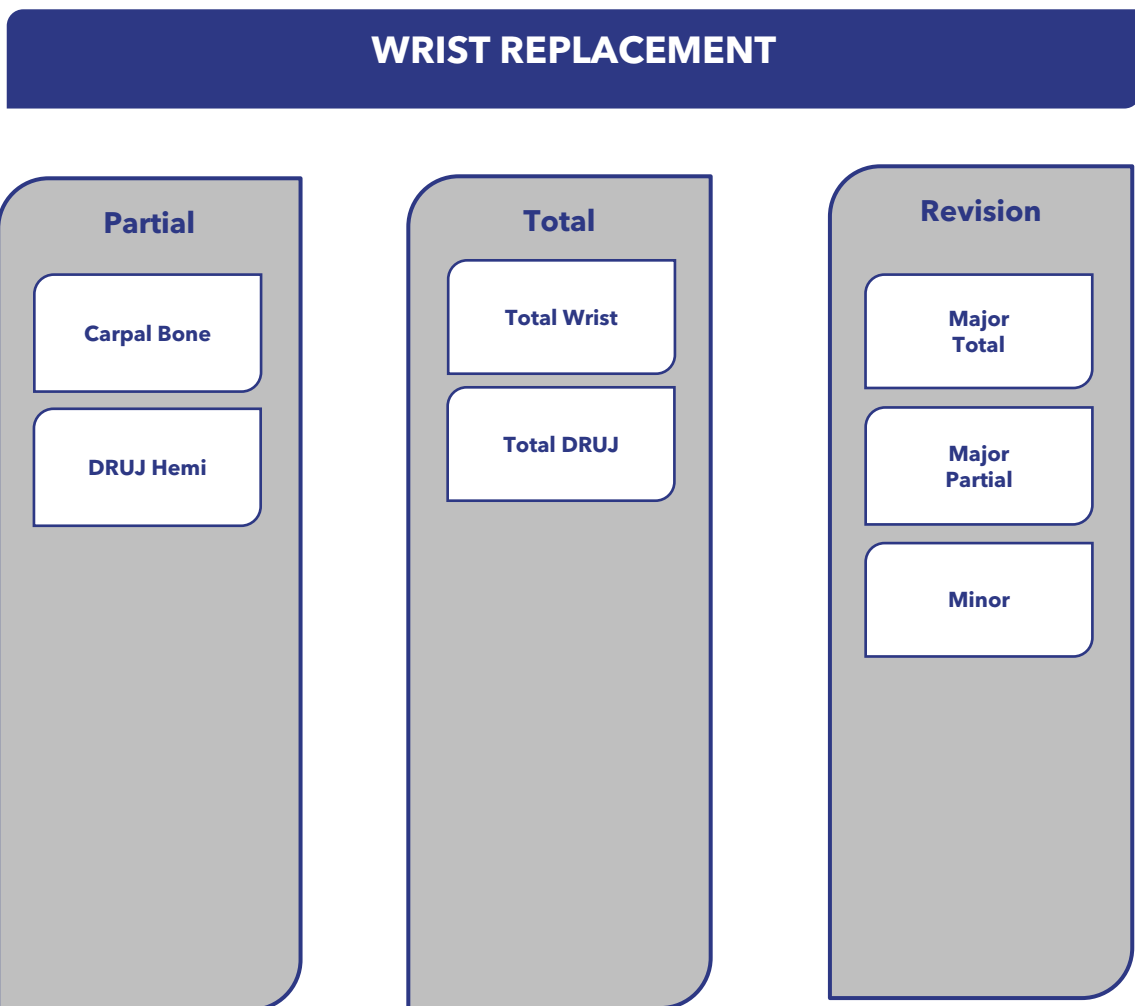
A primary replacement is the initial replacement procedure undertaken on a joint and involves replacing either part (partial) or all (total) of the articular surface.

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.



## 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
<b>Primary Partial</b>	<b>138</b>	<b>46.2</b>	<b>161</b>	<b>53.8</b>	<b>299</b>	<b>100.0</b>
Total DRUJ	50	48.5	53	51.5	103	14.1
Total Wrist	277	44.2	350	55.8	627	85.9
<b>Primary Total</b>	<b>327</b>	<b>44.8</b>	<b>403</b>	<b>55.2</b>	<b>730</b>	<b>100.0</b>
Revision	100	56.8	76	43.2	176	100.0
<b>TOTAL</b>	<b>565</b>	<b>46.9</b>	<b>640</b>	<b>53.1</b>	<b>1205</b>	<b>100.0</b>

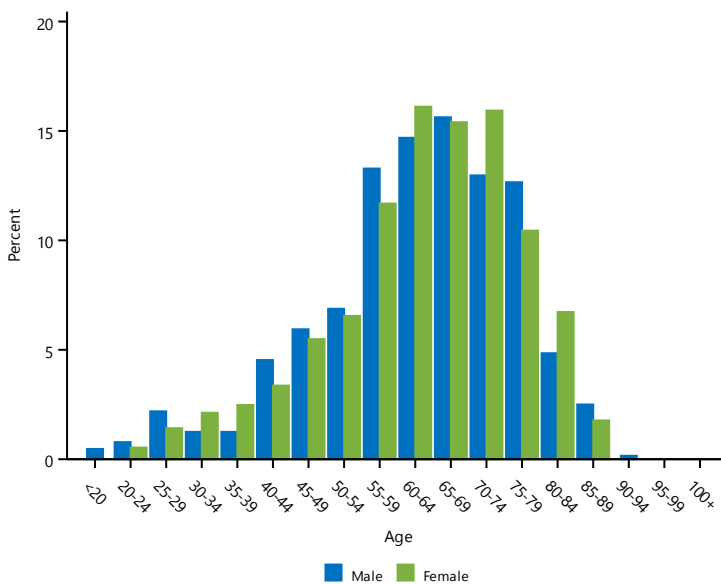
**Table WG2 Number of Wrist Replacements by Age**

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
<b>Primary Partial</b>	<b>88</b>	<b>29.4</b>	<b>74</b>	<b>24.7</b>	<b>81</b>	<b>27.1</b>	<b>48</b>	<b>16.1</b>	<b>8</b>	<b>2.7</b>	<b>299</b>	<b>100.0</b>
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
<b>Primary Total</b>	<b>144</b>	<b>19.7</b>	<b>210</b>	<b>28.8</b>	<b>227</b>	<b>31.1</b>	<b>134</b>	<b>18.4</b>	<b>15</b>	<b>2.1</b>	<b>730</b>	<b>100.0</b>
Revision	41	23.3	52	29.5	52	29.5	27	15.3	4	2.3	176	100.0
<b>TOTAL</b>	<b>273</b>	<b>22.7</b>	<b>336</b>	<b>27.9</b>	<b>360</b>	<b>29.9</b>	<b>209</b>	<b>17.3</b>	<b>27</b>	<b>2.2</b>	<b>1205</b>	<b>100.0</b>

**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
<b>TOTAL</b>	<b>1205</b>	<b>100.0%</b>	<b>18</b>	<b>90</b>	<b>64</b>	<b>62.8</b>	<b>13.5</b>

**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)	
<b>TOTAL</b>	<b>95</b>	<b>1029</b>					

## PRIMARY PARTIAL WRIST REPLACEMENT

### DEMOGRAPHICS

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

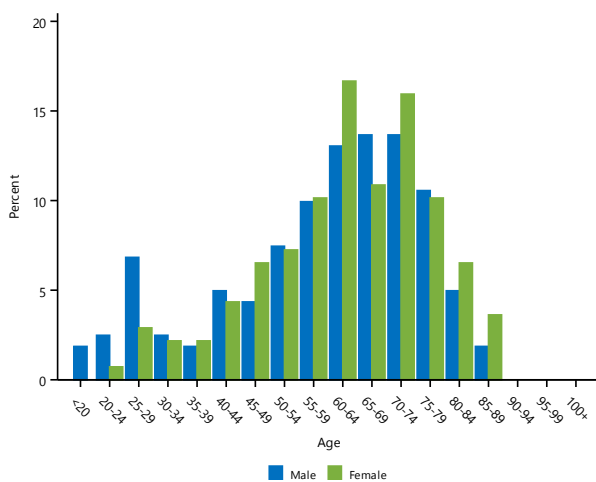
**Carpal Bone:** involves replacement of the carpal bone with a prosthesis.

**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
<b>TOTAL</b>	<b>299</b>	<b>100.0%</b>	<b>18</b>	<b>88</b>	<b>63</b>	<b>60.4</b>	<b>16.2</b>

**Figure WP1 Primary Partial Wrist Replacement by Age and Gender**



**Table WP2 Primary Partial Wrist Replacement by Primary Diagnosis**

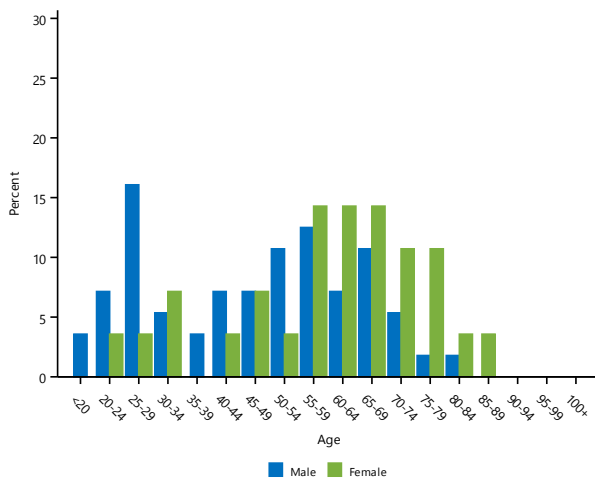
Primary Diagnosis	Number	Percent
Osteoarthritis	206	68.9
Fracture/Dislocation	29	9.7
Rheumatoid Arthritis	29	9.7
Osteonecrosis	15	5.0
Other Inflammatory Arthritis	8	2.7
Instability	6	2.0
Tumour	1	0.3
Other	5	1.7
<b>TOTAL</b>	<b>299</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>84</b>	<b>100.0%</b>	<b>18</b>	<b>88</b>	<b>55</b>	<b>51.1</b>	<b>18.2</b>

**Figure WP2 Primary Carpal Bone Replacement by Age and Gender**



**Table WP4 Primary Carpal Bone Replacement by Primary Diagnosis**

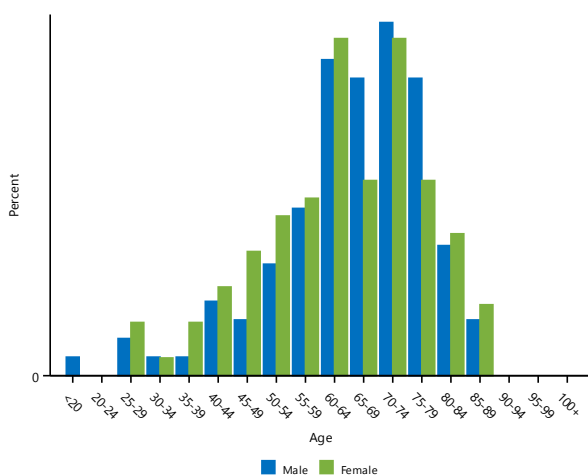
Primary Diagnosis	Number	Percent
Osteoarthritis	48	57.1
Osteonecrosis	14	16.7
Fracture/Dislocation	13	15.5
Rheumatoid Arthritis	4	4.8
Other Inflammatory Arthritis	3	3.6
Instability	1	1.2
Other	1	1.2
<b>TOTAL</b>	<b>84</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>215</b>	<b>100.0%</b>	<b>19</b>	<b>88</b>	<b>65</b>	<b>64.1</b>	<b>13.8</b>

**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
<b>TOTAL</b>	<b>215</b>	<b>100.0</b>

**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								
<b>Most Used</b>		<b>Most Used</b>		<b>Most Used</b>		<b>Most Used</b>		<b>Most Used</b>	
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)

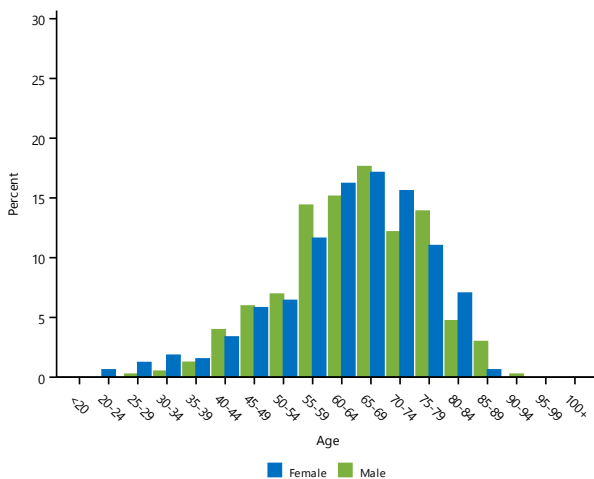
with ulna and radial replacement involves resection of the ulna head and replacement with a stemmed ulna prosthesis and a distal radial notch and plate.

## 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
<b>TOTAL</b>	<b>730</b>	<b>100.0%</b>	<b>22</b>	<b>90</b>	<b>65</b>	<b>63.8</b>	<b>12.1</b>

**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
<b>TOTAL</b>	<b>730</b>	<b>100.0</b>

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

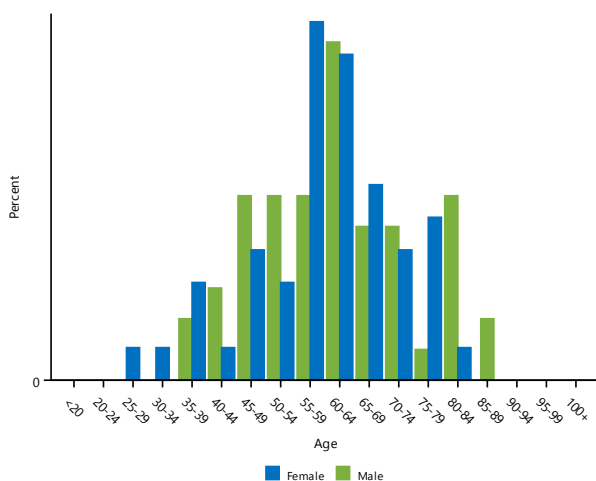
2008		2021		2022		2023		2024						
N	Model	N	Model	N	Model	N	Model	N	Model					
10	Re-Motion	82	Motec	51	Motec	53	Motec	74	Motec					
3	Universal 2	1	Freedom	1	Freedom			1	Re-Motion					
		1	Universal 2	1	Re-Motion									
<b>10 Most Used</b>														
13	(2)	100.0	84	(3)	100.0	53	(3)	100.0	53	(1)	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
<b>TOTAL</b>	<b>103</b>	<b>100.0%</b>	<b>27</b>	<b>87</b>	<b>61</b>	<b>60.5</b>	<b>12.7</b>

**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
<b>TOTAL</b>	<b>103</b>	<b>100.0</b>

## 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
<b>TOTAL</b>	<b>176</b>	<b>100.0%</b>	<b>22</b>	<b>88</b>	<b>64</b>	<b>62.3</b>	<b>13.6</b>

**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
<b>TOTAL</b>	<b>176</b>	<b>100.0</b>

**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
<b>TOTAL</b>	<b>176</b>	<b>100.0</b>