



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 6705 Depuy Synthes Australia Attune CR Total Knee

Report Generated: 31 May 2022

Data Period: 1 September 1999 - 30 May 2022

This report has been prepared by the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). The report provides information on the usage and outcomes of the Attune CR femoral compared to all other total knee replacements, based on data collected by the AOANJRR.

Disclaimer

The AOANJRR has taken every care to ensure that the data supplied are accurate but does not warrant that the data are error free and does not accept any liability for errors or omissions in the data.

098059-220821 DSUS/EMEA

**AOANJRR Automated Industry Report 6705 - Depuy Synthes Australia
Attune CR Total Knee**

Data Period: 1 September 1999 - 30 May 2022

Report Generated: 31 May 2022

Catalogue Numbers of Attune CR Femoral Components included in this analysis

Model	Catalogue Range	Range Description	No. of Primary Procedures
Attune CR	150400101 - 150400210	CR Femoral Component	16086
Attune CR	150400123 - 150400226	CR Narrow Femoral Component	4857

The AOANJRR also reports these catalogue numbers as Attune CR Femoral Components. These are not included in the analysis.

Model	Catalogue Range	Range Description
Attune CR	150401102 - 150401226	CR Femoral Component Porocoat

Table 1: Revision Rates of Attune CR Primary Total Knee Replacement by Femoral Catalogue Number Range (All Diagnoses)

Femoral Range	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
150400101 - 150400210	363	16086	61562	0.59 (0.53, 0.65)
150400123 - 150400226	117	4857	18176	0.64 (0.53, 0.77)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 2: Implant Usage of Attune CR in Primary Total Knee Replacement (All Diagnoses)

	N
Implant Usage	
Date First Used	12 February 2013
Date Last Used	3 May 2022
N Procedures	20943
N Patients	17644
N Hospitals Implanting	181
N Surgeons Implanting*	247
Outcome	
N Revised	480
N Deceased**	753

*503 Attune CR procedures have unknown surgeon

**N Deceased' does not include patient deaths that occurred after the Attune CR implant was revised

Table 3: Follow Up Years of Attune CR in Primary Total Knee Replacement (All Diagnoses)

Model	N	Minimum	Maximum	Median	Mean	Std Dev
Attune CR	20943	0.01	9.29	3.72	3.81	2.08
TOTAL	20943	0.01	9.29	3.72	3.81	2.08

Table 4: Age and Gender of Attune CR Primary Total Knee Replacement (All Diagnoses)

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	9523	45.5%	29	95	68	67.9	8.8
Female	11420	54.5%	18	96	69	68.5	9.1
TOTAL	20943	100.0%	18	96	68	68.2	9.0

Table 5: Primary Total Knee Replacement by Model and Age (All Diagnoses)

Age	Attune CR		Other Total Knee	
	N	Col%	N	Col%
<55	1388	6.6	55366	6.8
55-64	5565	26.6	216488	26.4
65-74	8695	41.5	325347	39.7
≥75	5295	25.3	222465	27.1
TOTAL	20943	100.0	819666	100.0

Table 6: Primary Total Knee Replacement by Model and Gender (All Diagnoses)

Gender	Attune CR		Other Total Knee	
	N	Col%	N	Col%
Male	9523	45.5	360019	43.9
Female	11420	54.5	459647	56.1
TOTAL	20943	100.0	819666	100.0

Table 7: Primary Total Knee Replacement by Model and ASA Grade (All Diagnoses)

ASA Grade	Attune CR		Other Total Knee	
	N	Col%	N	Col%
1	1089	5.2	25747	5.7
2	11484	55.0	245849	54.4
3	8101	38.8	175297	38.8
4	216	1.0	4868	1.1
5	1	0.0	14	0.0
TOTAL	20891	100.0	451775	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 52 Attune CR procedures with no ASA Grade recorded are excluded from this table

Table 8: Primary Total Knee Replacement by Model and BMI (All Diagnoses)

BMI	Attune CR		Other Total Knee	
	N	Col%	N	Col%
Underweight (<18.50)	40	0.2	735	0.2
Normal (18.50-24.99)	1758	9.7	38010	10.6
Pre Obese (25.00-29.99)	5589	30.7	112421	31.2
Obese Class 1 (30.00-34.99)	5810	31.9	110745	30.8
Obese Class 2 (35.00-39.99)	3248	17.9	60678	16.9
Obese Class 3 (\geq 40.00)	1740	9.6	37179	10.3
TOTAL	18185	100.0	359768	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 2758 Attune CR procedures with no BMI recorded are excluded from this table

Table 9: Primary Total Knee Replacement by Model and Primary Diagnosis

Primary Diagnosis	Attune CR		Other Total Knee	
	N	Col%	N	Col%
Osteoarthritis	20687	98.8	801235	97.8
Rheumatoid Arthritis	131	0.6	9787	1.2
Other Inflammatory Arthritis	60	0.3	4184	0.5
Osteonecrosis	52	0.2	2494	0.3
Tumour	1	0.0	1006	0.1
Fracture	7	0.0	692	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	1	0.0	2	0.0
Other	4	0.0	248	0.0
TOTAL	20943	100.0	819666	100.0

Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune CR	480	20943	79739	0.60 (0.55, 0.66)
Other Total Knee	33579	819666	6075783	0.55 (0.55, 0.56)
TOTAL	34059	840609	6155521	0.55 (0.55, 0.56)

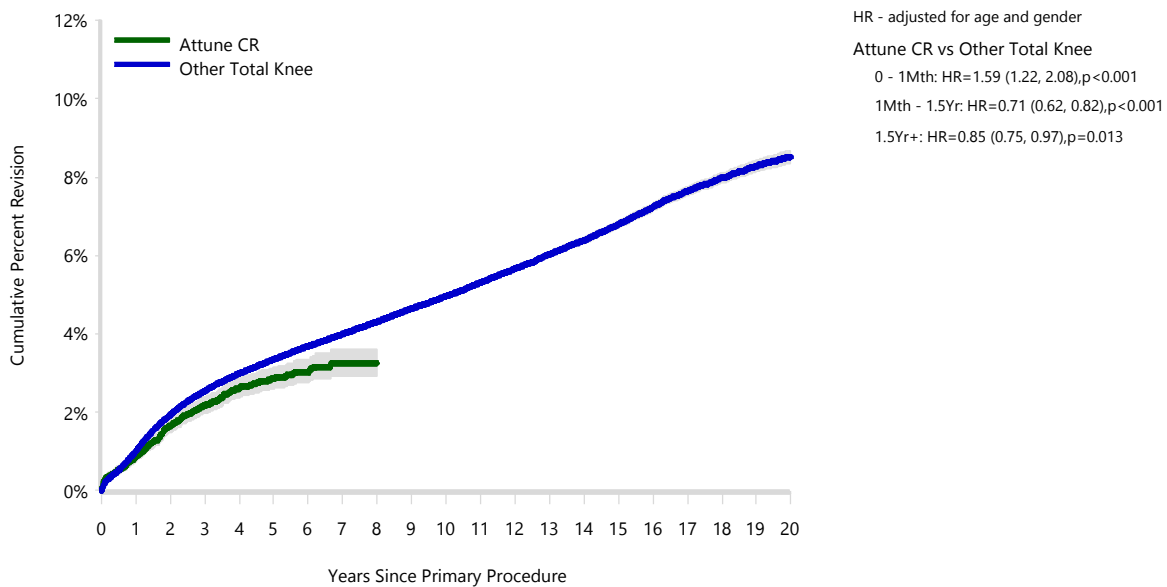
Table 11: Yearly Cumulative Percent Revision of Primary Total Knee Replacement by Model (All Diagnoses)

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs
Attune CR	0.9 (0.8, 1.0)	1.7 (1.5, 1.8)	2.2 (2.0, 2.4)	2.6 (2.4, 2.9)	2.9 (2.6, 3.1)	3.0 (2.8, 3.3)
Other Total Knee	1.0 (1.0, 1.0)	1.9 (1.9, 2.0)	2.5 (2.5, 2.6)	3.0 (2.9, 3.0)	3.3 (3.3, 3.4)	3.7 (3.6, 3.7)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs
Attune CR	3.2 (2.9, 3.6)	3.2 (2.9, 3.6)					
Other Total Knee	4.0 (4.0, 4.0)	4.3 (4.3, 4.4)	4.6 (4.6, 4.7)	5.0 (4.9, 5.0)	5.3 (5.2, 5.4)	5.7 (5.6, 5.7)	6.0 (6.0, 6.1)

CPR	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs
Attune CR							
Other Total Knee	6.4 (6.3, 6.5)	6.8 (6.7, 6.9)	7.2 (7.1, 7.3)	7.6 (7.5, 7.8)	8.0 (7.9, 8.1)	8.3 (8.1, 8.4)	8.5 (8.3, 8.7)

Figure 1: Cumulative Percent Revision of Primary Total Knee Replacement by Model (All Diagnoses)



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs	9 Yrs
Attune CR	20943	19009	15822	12749	9608	6461	3727	1625	186	14
Other Total Knee	819666	763691	691033	631340	568069	506244	446505	389923	336771	286262

Number at Risk	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs
Attune CR	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	240067	197550	160030	127571	99704	75584	55688	39355	26032	15737	7682

TABLE 12

Reasons for Revision

This is reported in two ways: a percentage of primaries revised and as a percentage of all revision procedures.

% Primaries Revised: This shows the proportional contribution of each revision diagnosis as a percentage of the total number of primaries. This percentage can be used to approximate the risk of being revised for that diagnosis. Differing percentages between groups, with the same distribution of follow up time, may identify problems of concern.

% Revisions: The number of revisions for each diagnosis is expressed as a percentage of the total number of revisions. This shows the distribution of reasons for revision within a group but cannot be used as a comparison between groups.

Table 12: Revision Diagnosis of Primary Total Knee Replacement by Model (All Diagnoses) (Follow-up Limited to 9.3 Years)

Revision Diagnosis	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	158	0.8	32.9	7632	0.9	26.0
Loosening	87	0.4	18.1	6855	0.8	23.3
Instability	41	0.2	8.5	2669	0.3	9.1
Patellofemoral Pain	31	0.1	6.5	2556	0.3	8.7
Pain	43	0.2	9.0	2412	0.3	8.2
Patella Erosion	35	0.2	7.3	1701	0.2	5.8
Arthrofibrosis	39	0.2	8.1	1144	0.1	3.9
Fracture	10	0.0	2.1	917	0.1	3.1
Malalignment	6	0.0	1.3	676	0.1	2.3
Lysis	1	0.0	0.2	384	0.0	1.3
Metal Related Pathology	2	0.0	0.4	336	0.0	1.1
Incorrect Sizing	5	0.0	1.0	316	0.0	1.1
Wear Tibial Insert				314	0.0	1.1
Patella Maltracking	3	0.0	0.6	229	0.0	0.8
Bearing Dislocation	2	0.0	0.4	187	0.0	0.6
Implant Breakage Tibial Insert	1	0.0	0.2	151	0.0	0.5
Implant Breakage Patella	1	0.0	0.2	140	0.0	0.5
Synovitis	1	0.0	0.2	96	0.0	0.3
Prosthesis Dislocation				91	0.0	0.3
Osteonecrosis	1	0.0	0.2	63	0.0	0.2
Implant Breakage Tibial				55	0.0	0.2
Implant Breakage Femoral				42	0.0	0.1
Tumour				32	0.0	0.1
Wear Patella				28	0.0	0.1
Heterotopic Bone				14	0.0	0.0
Wear Tibial				10	0.0	0.0
Progression Of Disease				4	0.0	0.0
Wear Femoral				4	0.0	0.0
Incorrect Side				2	0.0	0.0
Patella Dislocation				2	0.0	0.0
Other	13	0.1	2.7	326	0.0	1.1
N Revision	480	2.3	100.0	29388	3.6	100.0
N Primary	20943			819666		

Note: This table is restricted to revisions within 9.3 years for all groups to allow a time-matched comparison of revisions.

Table 13: Yearly Cumulative Incidence Revision Diagnosis of Primary Total Knee Replacement by Model (All Diagnoses)

Model	Event	N Events	1 Yr	2 Yrs	3 Yrs	5 Yrs	10 Yrs	15 Yrs
Attune CR	Infection	158	0.5 (0.4, 0.6)	0.7 (0.6, 0.8)	0.8 (0.6, 0.9)	0.8 (0.7, 1.0)		
	Loosening	87	0.1 (0.0, 0.1)	0.2 (0.2, 0.3)	0.4 (0.3, 0.5)	0.5 (0.4, 0.7)		
	Instability	41	0.1 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.3 (0.2, 0.4)		
	Patellofemoral Pain	31	0.0 (0.0, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)		
	Pain	43	0.0 (0.0, 0.1)	0.2 (0.1, 0.2)	0.2 (0.1, 0.3)	0.3 (0.2, 0.4)		
	Other	120	0.2 (0.1, 0.3)	0.4 (0.3, 0.5)	0.5 (0.4, 0.7)	0.7 (0.6, 0.8)		
	Deceased	753	0.4 (0.3, 0.5)	1.1 (1.0, 1.3)	2.1 (1.9, 2.4)	4.6 (4.2, 5.0)		
	All Revision	480	0.9 (0.8, 1.0)	1.6 (1.5, 1.8)	2.2 (2.0, 2.4)	2.8 (2.6, 3.1)		
Other Total Knee	Infection	8178	0.4 (0.4, 0.5)	0.6 (0.6, 0.6)	0.7 (0.7, 0.8)	0.9 (0.9, 0.9)	1.1 (1.1, 1.1)	1.3 (1.3, 1.3)
	Loosening	8094	0.2 (0.1, 0.2)	0.4 (0.4, 0.4)	0.5 (0.5, 0.5)	0.7 (0.7, 0.8)	1.1 (1.1, 1.2)	1.5 (1.5, 1.6)
	Instability	2975	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.5, 0.5)
	Patellofemoral Pain	2721	0.1 (0.0, 0.1)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.4, 0.5)
	Pain	2644	0.0 (0.0, 0.0)	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.4, 0.5)
	Other	8967	0.2 (0.2, 0.2)	0.4 (0.4, 0.5)	0.6 (0.6, 0.6)	0.8 (0.8, 0.8)	1.2 (1.2, 1.2)	1.7 (1.7, 1.8)
	Deceased	15110 9	0.7 (0.7, 0.7)	1.7 (1.7, 1.7)	3.0 (2.9, 3.0)	6.4 (6.3, 6.4)	19.7 (19.6, 19.8)	37.7 (37.5, 37.8)
	All Revision	33579	1.0 (1.0, 1.0)	1.9 (1.9, 2.0)	2.5 (2.5, 2.6)	3.3 (3.2, 3.3)	4.7 (4.6, 4.7)	6.0 (5.9, 6.0)

Figure 2: Cumulative Incidence Revision Diagnosis of Primary Total Knee Replacement by Model (All Diagnoses)

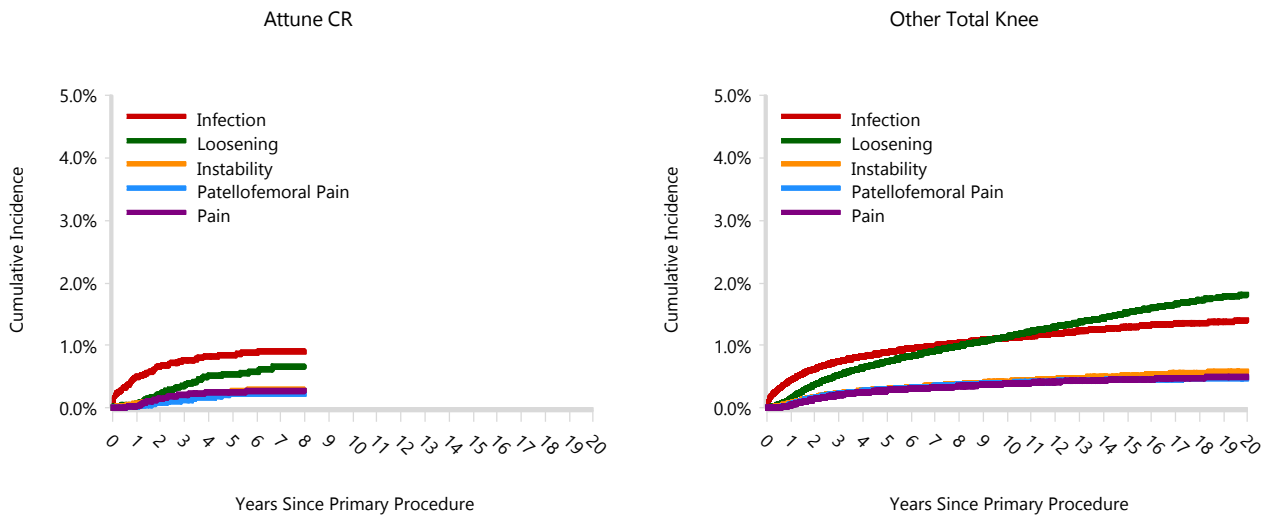


TABLE 14

Type of Revision

This is reported in two ways: a percentage of primary procedures revised and as a percentage of all revision procedures.

% Primaries Revised: This shows the proportional contribution of each type of revision as a percentage of the total number of primary procedures. This percentage can be used to approximate the risk of having that type of revision. Differing percentages between groups, with the same distribution of follow up time, may identify problems of concern.

% Revisions: The number of revisions for each type of revision is expressed as a percentage of the total number of revisions. This shows the distribution of types of revision within a group but cannot be used as a comparison between groups.

Table 14: Type of Revision of Primary Total Knee Replacement by Model (All Diagnoses) (Follow-up Limited to 9.3 Years)

Type of Revision	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	159	0.8	33.1	7619	0.9	25.9
TKR (Tibial/Femoral)	115	0.5	24.0	7259	0.9	24.7
Patella Only	95	0.5	19.8	5703	0.7	19.4
Insert/Patella	34	0.2	7.1	2745	0.3	9.3
Tibial Component	29	0.1	6.0	2502	0.3	8.5
Femoral Component	22	0.1	4.6	1655	0.2	5.6
Cement Spacer	21	0.1	4.4	1606	0.2	5.5
Removal of Prostheses	3	0.0	0.6	179	0.0	0.6
Minor Components	2	0.0	0.4	71	0.0	0.2
Total Femoral				18	0.0	0.1
Cement Only				17	0.0	0.1
Reinsertion of Components				14	0.0	0.0
N Revision	480	2.3	100.0	29388	3.6	100.0
N Primary	20943			819666		

Note: This table is restricted to revisions within 9.3 years for all groups to allow a time-matched comparison of revisions.

Table 15: Revision Rates of Attune CR Primary Total Knee Replacement by Fixation (All Diagnoses)

Fixation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Cemented	480	20867	79688	0.60 (0.55, 0.66)
Hybrid (Tibial Cemented)	0	3	9	0.00 (0.00, 42.01)
Hybrid (Tibial Cementless)	0	73	42	0.00 (0.00, 8.87)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 16: Revision Rates of Attune CR Primary Total Knee Replacement by Polyethylene Type (All Diagnoses)

Polyethylene Type	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
XLPE	0	1	4	0.00 (0.00, 98.78)
XLPE + Antioxidant	480	20940	79728	0.60 (0.55, 0.66)
Unknown	0	2	7	0.00 (0.00, 54.05)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 17: Revision Rates of Attune CR Primary Total Knee Replacement by Bearing Mobility (All Diagnoses)

Bearing Mobility	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Fixed	294	12696	50223	0.59 (0.52, 0.66)
Rotating	186	8245	29509	0.63 (0.54, 0.73)
Unknown	0	2	7	0.00 (0.00, 54.05)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 18: Revision Rates of Attune CR Primary Total Knee Replacement by Stability (All Diagnoses)

Stability	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Minimally Stabilised	479	20935	79719	0.60 (0.55, 0.66)
Posterior Stabilised	1	6	13	7.68 (0.19, 42.80)
Unknown	0	2	7	0.00 (0.00, 54.05)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 19: Revision Rates of Attune CR Primary Total Knee Replacement by Patella Usage (All Diagnoses)

Patella Usage	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Patella Used	276	15284	54829	0.50 (0.45, 0.57)
No Patella	204	5659	24909	0.82 (0.71, 0.94)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 20: Revision Rates of Attune CR Primary Total Knee Replacement by Computer Navigation (All Diagnoses)

Computer Navigation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Computer Navigated	128	6560	21371	0.60 (0.50, 0.71)
Non-Navigated	352	14383	58367	0.60 (0.54, 0.67)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 21: Revision Rates of Attune CR Primary Total Knee Replacement by IDI Usage (All Diagnoses)

IDI Usage	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
IDI Used	23	889	2884	0.80 (0.51, 1.20)
IDI Not Used	457	20054	76855	0.59 (0.54, 0.65)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 22: Revision Rates of Attune CR Primary Total Knee Replacement by Robotic Assistance (All Diagnoses)

Robotic Assistance	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Robotically Assisted	0	16	8	0.00 (0.00, 45.74)
Non-Robotic	480	20927	79731	0.60 (0.55, 0.66)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

Table 23: Number of Revisions of Attune CR Primary Total Knee Replacement by Year of Implant (All Diagnoses)

Year of Implant	Number Revised	Total Number
2013	2	83
2014	38	919
2015	57	2218
2016	76	2489
2017	102	3177
2018	106	3158
2019	59	3283
2020	32	2876
2021	8	2314
2022	0	426
TOTAL	480	20943

Table 24: Revision Rates of Attune CR Primary Total Knee Replacement by Tibial Component (All Diagnoses)

Tibial	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune	480	20940	79722	0.60 (0.55, 0.66)
Custom Made (Depuy)	0	2	13	0.00 (0.00, 28.93)
Other Tibial Components*	0	1	4	0.00 (0.00, 98.78)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

*denotes tibial components distributed by other companies

Table 25: Revision Rates of Attune CR Primary Total Knee Replacement by Femoral Catalogue Number (All Diagnoses)

Femoral Catalogue Number	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
150400101	0	1	7	0.00 (0.00, 55.22)
150400102	0	9	47	0.00 (0.00, 7.92)
150400103	4	139	554	0.72 (0.20, 1.85)
150400104	19	650	2665	0.71 (0.43, 1.11)
150400105	23	1233	4955	0.46 (0.29, 0.70)
150400106	42	1439	5374	0.78 (0.56, 1.06)
150400107	37	2076	7774	0.48 (0.34, 0.66)
150400108	38	1415	5228	0.73 (0.51, 1.00)
150400109	9	450	1700	0.53 (0.24, 1.01)
150400110	2	118	492	0.41 (0.05, 1.47)
150400123	0	31	134	0.00 (0.00, 2.75)
150400124	7	250	924	0.76 (0.30, 1.56)
150400125	31	846	3111	1.00 (0.68, 1.41)
150400126	24	1182	4400	0.55 (0.35, 0.81)
150400201	0	2	8	0.00 (0.00, 46.91)
150400202	0	6	26	0.00 (0.00, 14.21)
150400203	6	167	615	0.98 (0.36, 2.12)
150400204	22	709	2787	0.79 (0.49, 1.20)
150400205	34	1399	5407	0.63 (0.44, 0.88)
150400206	30	1626	6256	0.48 (0.32, 0.68)
150400207	46	2241	8541	0.54 (0.39, 0.72)
150400208	33	1671	6351	0.52 (0.36, 0.73)
150400209	12	582	2238	0.54 (0.28, 0.94)
150400210	6	153	539	1.11 (0.41, 2.42)
150400223	3	38	129	2.33 (0.48, 6.81)
150400224	3	269	1003	0.30 (0.06, 0.87)
150400225	17	959	3583	0.47 (0.28, 0.76)
150400226	32	1282	4892	0.65 (0.45, 0.92)
TOTAL	480	20943	79739	0.60 (0.55, 0.66)

098059-220821 DSUS/EMEA