



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 9079

Depuy Synthes Australia

Attune CR Total Knee

Report Generated: 8 February 2023

Data Period: 1 September 1999 - 7 February 2023

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.

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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	17302
Attune CR	150400123 - 150400226	CR Narrow Femoral Component	5333

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	413	17302	72606	0.57 (0.52, 0.63)
150400123 - 150400226	128	5333	21603	0.59 (0.49, 0.70)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	23 December 2022
N Procedures	22635
N Patients	19019
N Hospitals Implanting	188
N Surgeons Implanting*	256
Outcome	
N Revised	541
N Deceased**	753

*512 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	22635	0.01	9.98	4.07	4.16	2.28
TOTAL	22635	0.01	9.98	4.07	4.16	2.28

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	10230	45.2%	29	95	68	68.1	8.8
Female	12405	54.8%	18	96	69	68.5	9.1
TOTAL	22635	100.0%	18	96	68	68.3	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	1472	6.5	57919	6.7
55-64	5977	26.4	226753	26.4
65-74	9346	41.3	341571	39.7
≥75	5840	25.8	233196	27.1
TOTAL	22635	100.0	859439	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	10230	45.2	378380	44.0
Female	12405	54.8	481059	56.0
TOTAL	22635	100.0	859439	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	1158	5.1	27562	5.6
2	12347	54.7	266082	54.1
3	8844	39.2	192548	39.2
4	234	1.0	5287	1.1
5	.	.	15	0.0
TOTAL	22583	100.0	491494	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)	42	0.2	819	0.2
Normal (18.50-24.99)	1952	9.8	42325	10.6
Pre Obese (25.00-29.99)	6142	30.9	124932	31.3
Obese Class 1 (30.00-34.99)	6325	31.8	122979	30.8
Obese Class 2 (35.00-39.99)	3534	17.8	67187	16.8
Obese Class 3 (\geq 40.00)	1870	9.4	41005	10.3
TOTAL	19865	100.0	399247	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 2770 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	22357	98.8	840360	97.8
Rheumatoid Arthritis	144	0.6	10054	1.2
Other Inflammatory Arthritis	66	0.3	4376	0.5
Osteonecrosis	56	0.2	2590	0.3
Tumour	1	0.0	1052	0.1
Fracture	8	0.0	743	0.1
Chondrocalcinosis	.	.	15	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	3	0.0	247	0.0
TOTAL	22635	100.0	859439	100.0

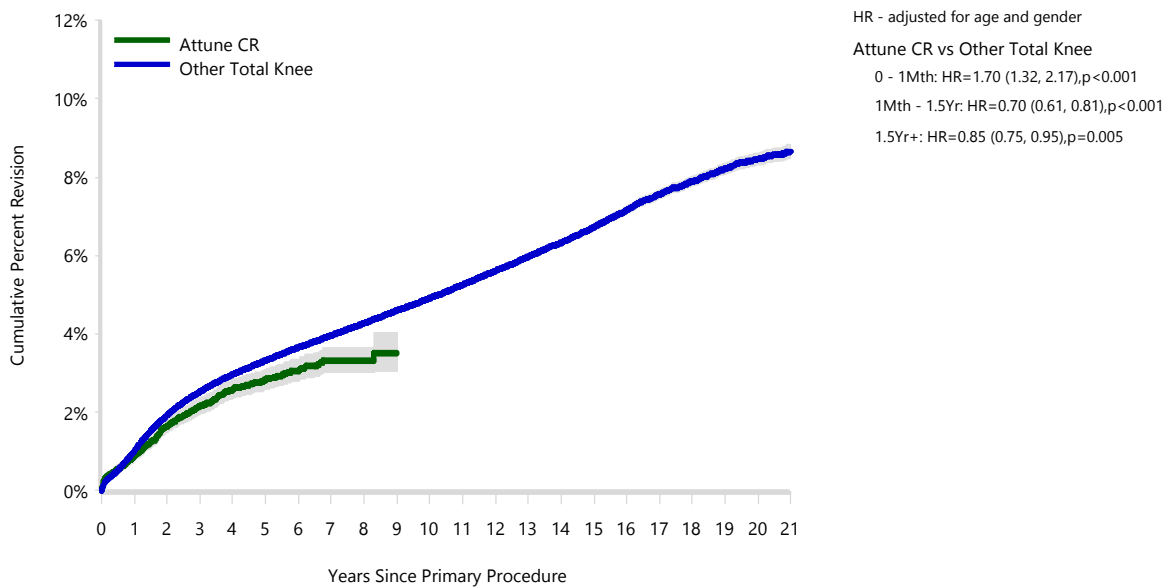
Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune CR	541	22635	94209	0.57 (0.53, 0.62)
Other Total Knee	35492	859439	6534994	0.54 (0.54, 0.55)
TOTAL	36033	882074	6629203	0.54 (0.54, 0.55)

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	7 Yrs
Attune CR	0.9 (0.8, 1.0)	1.6 (1.5, 1.8)	2.1 (2.0, 2.4)	2.6 (2.4, 2.8)	2.8 (2.6, 3.1)	3.1 (2.8, 3.3)	3.3 (3.0, 3.6)
Other Total Knee	1.0 (1.0, 1.0)	1.9 (1.9, 1.9)	2.5 (2.5, 2.6)	3.0 (2.9, 3.0)	3.3 (3.3, 3.4)	3.7 (3.6, 3.7)	4.0 (3.9, 4.0)
CPR	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs
Attune CR	3.3 (3.0, 3.6)	3.5 (3.1, 4.0)					
Other Total Knee	4.3 (4.2, 4.3)	4.6 (4.5, 4.7)	4.9 (4.9, 5.0)	5.3 (5.2, 5.3)	5.6 (5.5, 5.7)	6.0 (5.9, 6.0)	6.3 (6.2, 6.4)
CPR	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
Attune CR							
Other Total Knee	6.7 (6.6, 6.8)	7.2 (7.1, 7.3)	7.6 (7.5, 7.7)	7.9 (7.8, 8.0)	8.2 (8.1, 8.4)	8.5 (8.3, 8.6)	8.7 (8.5, 8.8)

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	10 Yrs
Attune CR	22635	20358	17914	14961	11537	8425	5375	2992	1022	85	0
Other Total Knee	859439	797520	729616	666384	601786	538574	477458	418770	363376	311379	262860
Number at Risk	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
Attune CR	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	218663	178232	143116	113353	87210	65558	47715	32905	21243	12182	5326

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 10 Years)

Revision Diagnosis	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	176	0.8	32.5	8147	0.9	25.9
Loosening	101	0.4	18.7	7324	0.9	23.3
Instability	49	0.2	9.1	2881	0.3	9.2
Patellofemoral Pain	33	0.1	6.1	2639	0.3	8.4
Pain	44	0.2	8.1	2536	0.3	8.1
Patella Erosion	39	0.2	7.2	1865	0.2	5.9
Arthrofibrosis	47	0.2	8.7	1213	0.1	3.9
Fracture	11	0.0	2.0	1029	0.1	3.3
Malalignment	6	0.0	1.1	705	0.1	2.2
Lysis	1	0.0	0.2	436	0.1	1.4
Wear Tibial Insert				362	0.0	1.2
Metal Related Pathology	2	0.0	0.4	356	0.0	1.1
Incorrect Sizing	6	0.0	1.1	324	0.0	1.0
Patella Maltracking	3	0.0	0.6	245	0.0	0.8
Implant Breakage Tibial Insert	1	0.0	0.2	193	0.0	0.6
Bearing Dislocation	3	0.0	0.6	191	0.0	0.6
Implant Breakage Patella	1	0.0	0.2	154	0.0	0.5
Prosthesis Dislocation	1	0.0	0.2	101	0.0	0.3
Synovitis	1	0.0	0.2	99	0.0	0.3
Osteonecrosis	1	0.0	0.2	64	0.0	0.2
Implant Breakage Tibial				60	0.0	0.2
Implant Breakage Femoral				44	0.0	0.1
Wear Patella				41	0.0	0.1
Tumour				35	0.0	0.1
Heterotopic Bone				15	0.0	0.0
Wear Tibial				11	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	15	0.1	2.8	340	0.0	1.1
N Revision	541	2.4	100.0	31422	3.7	100.0
N Primary	22635			859439		

Note: This table is restricted to revisions within 10 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	176	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	101	0.1 (0.0, 0.1)	0.2 (0.2, 0.3)	0.3 (0.3, 0.4)	0.6 (0.4, 0.7)		
	Instability	49	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	33	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	44	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.2 (0.2, 0.3)		
	Other	138	0.2 (0.1, 0.3)	0.4 (0.3, 0.5)	0.5 (0.5, 0.7)	0.7 (0.6, 0.8)		
	Deceased	753	0.4 (0.3, 0.5)	1.0 (0.9, 1.2)	1.9 (1.7, 2.1)	3.9 (3.6, 4.3)		
	All Revision	541	0.9 (0.8, 1.0)	1.6 (1.5, 1.8)	2.1 (1.9, 2.3)	2.8 (2.6, 3.1)		
Other Total Knee	Infection	8687	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, 1.2)	1.3 (1.3, 1.3)
	Loosening	8519	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, 1.5)
	Instability	3172	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	2795	0.1 (0.0, 0.1)	0.2 (0.1, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.4 (0.4, 0.5)
	Pain	2739	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)	0.4 (0.4, 0.5)
	Other	9580	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 7	0.7 (0.7, 0.7)	1.6 (1.6, 1.6)	2.8 (2.8, 2.9)	6.0 (6.0, 6.1)	18.5 (18.4, 18.6)	34.9 (34.8, 35.1)
	All Revision	35492	1.0 (1.0, 1.0)	1.9 (1.9, 1.9)	2.5 (2.5, 2.5)	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)

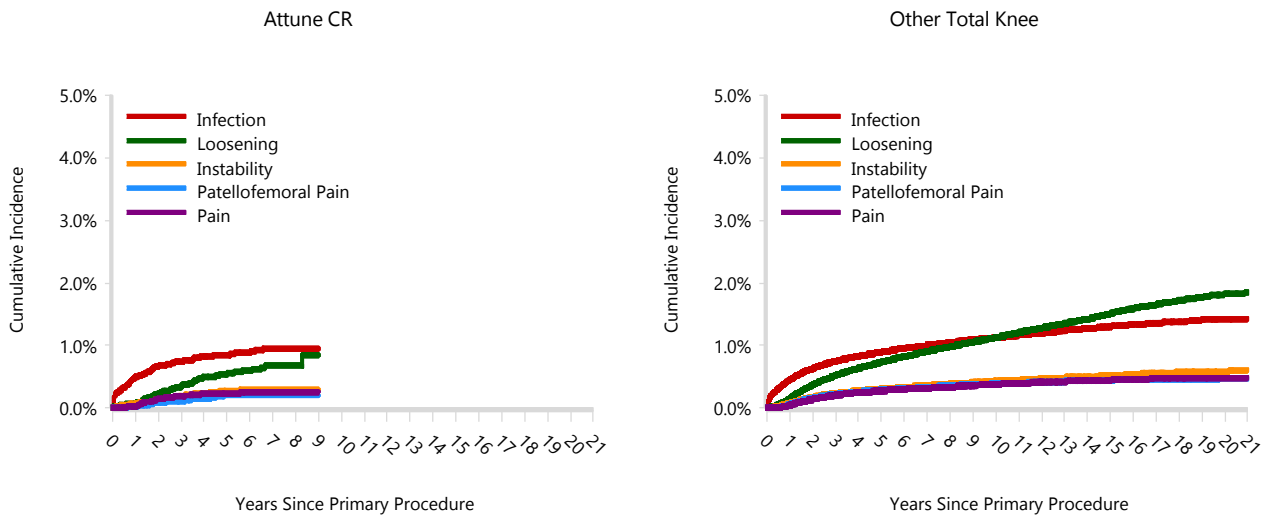


TABLE 14

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 10 Years)

Type of Revision	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	187	0.8	34.6	8177	1.0	26.0
TKR (Tibial/Femoral)	127	0.6	23.5	7889	0.9	25.1
Patella Only	103	0.5	19.0	6014	0.7	19.1
Insert/Patella	36	0.2	6.7	2982	0.3	9.5
Tibial Component	31	0.1	5.7	2635	0.3	8.4
Femoral Component	29	0.1	5.4	1725	0.2	5.5
Cement Spacer	23	0.1	4.3	1679	0.2	5.3
Removal of Prostheses	3	0.0	0.6	185	0.0	0.6
Minor Components	2	0.0	0.4	76	0.0	0.2
Total Femoral				23	0.0	0.1
Cement Only				21	0.0	0.1
Reinsertion of Components				16	0.0	0.1
N Revision	541	2.4	100.0	31422	3.7	100.0
N Primary	22635			859439		

Note: This table is restricted to revisions within 10 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	541	22536	94093	0.57 (0.53, 0.63)
Hybrid (Tibial Cemented)	0	3	10	0.00 (0.00, 35.92)
Hybrid (Tibial Cementless)	0	96	105	0.00 (0.00, 3.51)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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, 83.32)
XLPE + Antioxidant	541	22632	94196	0.57 (0.53, 0.62)
Unknown	0	2	8	0.00 (0.00, 44.93)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	328	13620	58935	0.56 (0.50, 0.62)
Rotating	213	9013	35265	0.60 (0.53, 0.69)
Unknown	0	2	8	0.00 (0.00, 44.93)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	540	22604	94176	0.57 (0.53, 0.62)
Posterior Stabilised	1	6	16	6.07 (0.15, 33.80)
Unknown	0	25	16	0.00 (0.00, 23.34)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	322	16609	65542	0.49 (0.44, 0.55)
No Patella	219	6026	28666	0.76 (0.67, 0.87)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	150	7269	26055	0.58 (0.49, 0.68)
Non-Navigated	391	15366	68153	0.57 (0.52, 0.63)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	24	943	3489	0.69 (0.44, 1.02)
IDI Not Used	517	21692	90720	0.57 (0.52, 0.62)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	98	53	0.00 (0.00, 7.00)
Non-Robotic	541	22537	94156	0.57 (0.53, 0.63)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

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	39	919
2015	60	2218
2016	79	2489
2017	111	3177
2018	113	3158
2019	67	3283
2020	42	2876
2021	15	2321
2022	13	2111
TOTAL	541	22635

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	541	22632	94190	0.57 (0.53, 0.62)
Custom Made (Depuy)	0	2	14	0.00 (0.00, 26.10)
Other Tibial Components*	0	1	4	0.00 (0.00, 83.32)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)

*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, 50.03)
150400102	0	9	52	0.00 (0.00, 7.08)
150400103	5	157	650	0.77 (0.25, 1.80)
150400104	21	692	3105	0.68 (0.42, 1.03)
150400105	29	1335	5807	0.50 (0.33, 0.72)
150400106	45	1550	6364	0.71 (0.52, 0.95)
150400107	42	2228	9199	0.46 (0.33, 0.62)
150400108	44	1516	6191	0.71 (0.52, 0.95)
150400109	9	475	2003	0.45 (0.21, 0.85)
150400110	2	124	574	0.35 (0.04, 1.26)
150400123	0	35	157	0.00 (0.00, 2.36)
150400124	7	283	1104	0.63 (0.25, 1.31)
150400125	32	932	3703	0.86 (0.59, 1.22)
150400126	26	1276	5231	0.50 (0.32, 0.73)
150400201	0	2	9	0.00 (0.00, 39.89)
150400202	0	7	30	0.00 (0.00, 12.13)
150400203	7	195	735	0.95 (0.38, 1.96)
150400204	24	759	3268	0.73 (0.47, 1.09)
150400205	40	1506	6368	0.63 (0.45, 0.86)
150400206	35	1765	7391	0.47 (0.33, 0.66)
150400207	54	2427	10086	0.54 (0.40, 0.70)
150400208	36	1791	7493	0.48 (0.34, 0.67)
150400209	13	606	2635	0.49 (0.26, 0.84)
150400210	7	157	639	1.09 (0.44, 2.26)
150400223	4	40	152	2.63 (0.72, 6.73)
150400224	3	303	1198	0.25 (0.05, 0.73)
150400225	21	1054	4261	0.49 (0.31, 0.75)
150400226	35	1410	5797	0.60 (0.42, 0.84)
TOTAL	541	22635	94209	0.57 (0.53, 0.62)