



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 4155

Depuy Synthes Australia

Attune CR Total Knee

Report Generated: 6 May 2021

Data Period: 1 September 1999 - 4 May 2021

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	14290
Attune CR	150400123 - 150400226	CR Narrow Femoral Component	4244

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	150401103 - 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	305	14290	45885	0.66 (0.59, 0.74)
150400123 - 150400226	94	4244	13401	0.70 (0.57, 0.86)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	22 March 2021
N Procedures	18534
N Patients	15630
N Hospitals Implanting	169
N Surgeons Implanting*	227
Outcome	
N Revised	399
N Deceased**	502

*482 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	18534	0.01	8.22	3.08	3.20	1.83
TOTAL	18534	0.01	8.22	3.08	3.20	1.83

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	8449	45.6%	30	95	68	67.9	8.8
Female	10085	54.4%	18	96	69	68.3	9.1
TOTAL	18534	100.0%	18	96	68	68.1	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	1262	6.8	51285	6.8
55-64	4973	26.8	200610	26.4
65-74	7697	41.5	300409	39.6
≥75	4602	24.8	207077	27.3
TOTAL	18534	100.0	759381	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	8449	45.6	332287	43.8
Female	10085	54.4	427094	56.2
TOTAL	18534	100.0	759381	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	990	5.4	22889	5.8
2	10227	55.3	214308	54.7
3	7069	38.2	150112	38.3
4	197	1.1	4257	1.1
5	.	.	11	0.0
TOTAL	18483	100.0	391577	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 51 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)	36	0.2	617	0.2
Normal (18.50-24.99)	1521	9.6	31601	10.5
Pre Obese (25.00-29.99)	4853	30.7	93558	31.2
Obese Class 1 (30.00-34.99)	5018	31.8	92220	30.7
Obese Class 2 (35.00-39.99)	2837	18.0	50674	16.9
Obese Class 3 (\geq 40.00)	1527	9.7	31306	10.4
TOTAL	15792	100.0	299976	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 2742 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	18314	98.8	742026	97.7
Rheumatoid Arthritis	113	0.6	9358	1.2
Other Inflammatory Arthritis	52	0.3	3840	0.5
Osteonecrosis	47	0.3	2340	0.3
Tumour	.	.	946	0.1
Fracture	4	0.0	624	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	4	0.0	227	0.0
TOTAL	18534	100.0	759381	100.0

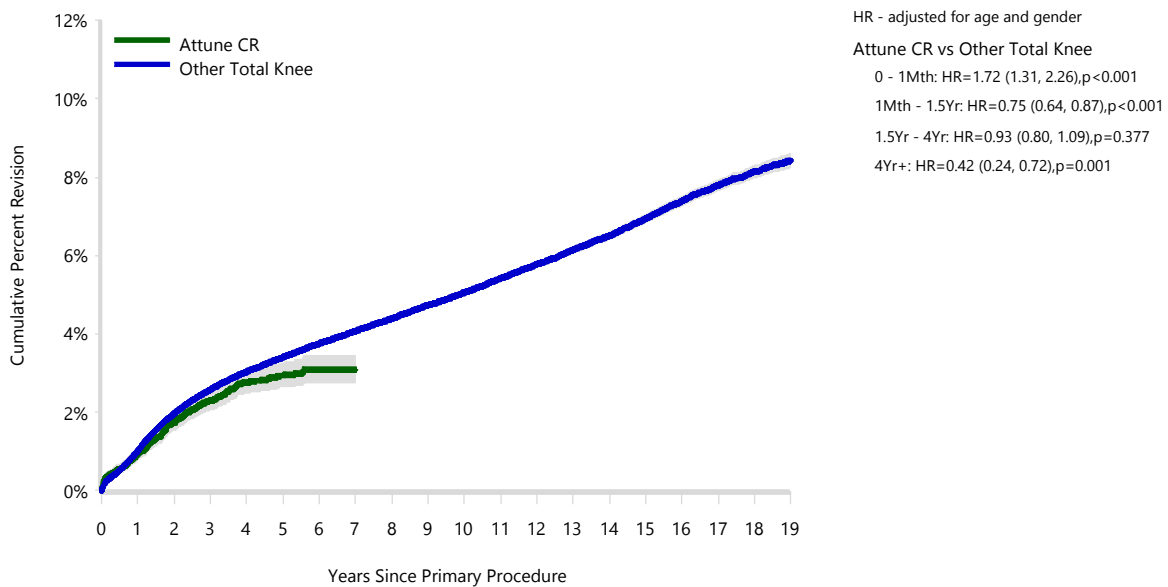
Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune CR	399	18534	59285	0.67 (0.61, 0.74)
Other Total Knee	30822	759381	5410229	0.57 (0.56, 0.58)
TOTAL	31221	777915	5469515	0.57 (0.56, 0.58)

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, 1.1)	1.7 (1.6, 2.0)	2.3 (2.1, 2.6)	2.8 (2.5, 3.1)	2.9 (2.6, 3.3)	3.1 (2.8, 3.4)	
Other Total Knee	1.0 (1.0, 1.0)	2.0 (1.9, 2.0)	2.6 (2.5, 2.6)	3.0 (3.0, 3.1)	3.4 (3.4, 3.4)	3.8 (3.7, 3.8)	
CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	
Attune CR	3.1 (2.8, 3.4)						
Other Total Knee	4.1 (4.0, 4.1)	4.4 (4.3, 4.4)	4.7 (4.7, 4.8)	5.1 (5.0, 5.1)	5.4 (5.3, 5.5)	5.8 (5.7, 5.9)	
CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs
Attune CR							
Other Total Knee	6.1 (6.1, 6.2)	6.5 (6.4, 6.6)	6.9 (6.8, 7.0)	7.4 (7.3, 7.5)	7.8 (7.7, 7.9)	8.1 (8.0, 8.3)	8.4 (8.2, 8.6)

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	18534	15937	12693	9529	6343	3651	1537	162	7	0
Other Total Knee	759381	701950	639879	576907	515144	455852	399362	345779	295627	249109
Number at Risk	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs
Attune CR	0	0	0	0	0	0	0	0	0	0
Other Total Knee	205869	167362	133885	104854	80144	59135	41708	27449	16441	7861

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 8.2 Years)

Revision Diagnosis	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	137	0.7	34.3	6818	0.9	25.9
Loosening	70	0.4	17.5	6201	0.8	23.5
Patellofemoral Pain	25	0.1	6.3	2444	0.3	9.3
Instability	39	0.2	9.8	2352	0.3	8.9
Pain	38	0.2	9.5	2184	0.3	8.3
Patella Erosion	28	0.2	7.0	1446	0.2	5.5
Arthrofibrosis	26	0.1	6.5	1034	0.1	3.9
Fracture	8	0.0	2.0	791	0.1	3.0
Malalignment	5	0.0	1.3	619	0.1	2.3
Metal Related Pathology	2	0.0	0.5	324	0.0	1.2
Lysis	1	0.0	0.3	317	0.0	1.2
Incorrect Sizing	4	0.0	1.0	302	0.0	1.1
Wear Tibial Insert				233	0.0	0.9
Patella Maltracking	3	0.0	0.8	201	0.0	0.8
Bearing Dislocation	1	0.0	0.3	173	0.0	0.7
Implant Breakage Patella				126	0.0	0.5
Implant Breakage Tibial Insert	1	0.0	0.3	117	0.0	0.4
Synovitis	1	0.0	0.3	91	0.0	0.3
Prosthesis Dislocation				77	0.0	0.3
Osteonecrosis				60	0.0	0.2
Implant Breakage Tibial				45	0.0	0.2
Implant Breakage Femoral				36	0.0	0.1
Tumour				29	0.0	0.1
Wear Patella				21	0.0	0.1
Heterotopic Bone				11	0.0	0.0
Wear Tibial				8	0.0	0.0
Wear Femoral				4	0.0	0.0
Progression Of Disease				3	0.0	0.0
Incorrect Side				2	0.0	0.0
Osteoarthritis				1	0.0	0.0
Patella Dislocation				1	0.0	0.0
Post Operative Haematoma				1	0.0	0.0
Other	10	0.1	2.5	289	0.0	1.1
N Revision	399	2.2	100.0	26361	3.5	100.0
N Primary	18534			759381		

Note: This table is restricted to revisions within 8.2 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	Loosening	70	0.1 (0.0, 0.1)	0.2 (0.2, 0.3)	0.4 (0.3, 0.5)	0.6 (0.4, 0.7)		
	Infection	137	0.5 (0.4, 0.6)	0.7 (0.6, 0.8)	0.8 (0.7, 1.0)	0.9 (0.7, 1.0)		
	Instability	39	0.1 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.3 (0.2, 0.5)		
	Patellofemoral Pain	25	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)		
	Pain	38	0.0 (0.0, 0.1)	0.2 (0.1, 0.2)	0.2 (0.2, 0.3)	0.3 (0.2, 0.4)		
	Other	90	0.2 (0.1, 0.3)	0.4 (0.3, 0.5)	0.5 (0.4, 0.7)	0.7 (0.5, 0.8)		
	Deceased	502	0.4 (0.3, 0.5)	1.1 (1.0, 1.3)	2.2 (2.0, 2.5)	4.6 (4.2, 5.1)		
	All Revision	399	0.9 (0.8, 1.1)	1.7 (1.5, 1.9)	2.3 (2.0, 2.5)	2.9 (2.6, 3.2)		
Other Total Knee	Loosening	7540	0.2 (0.1, 0.2)	0.4 (0.4, 0.4)	0.5 (0.5, 0.6)	0.8 (0.7, 0.8)	1.2 (1.1, 1.2)	1.6 (1.6, 1.6)
	Infection	7397	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 (1.2, 1.3)
	Instability	2681	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	2657	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.2 (0.2, 0.3)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.5, 0.5)
	Pain	2443	0.0 (0.0, 0.1)	0.1 (0.1, 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)
	Other	8104	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, 1.3)	1.8 (1.7, 1.8)
	Deceased	13318 9	0.7 (0.7, 0.8)	1.7 (1.7, 1.8)	3.0 (3.0, 3.1)	6.5 (6.4, 6.6)	20.1 (20.0, 20.3)	38.4 (38.2, 38.6)
	All Revision	30822	1.0 (1.0, 1.0)	1.9 (1.9, 2.0)	2.5 (2.5, 2.6)	3.3 (3.3, 3.4)	4.8 (4.7, 4.8)	6.1 (6.0, 6.2)

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

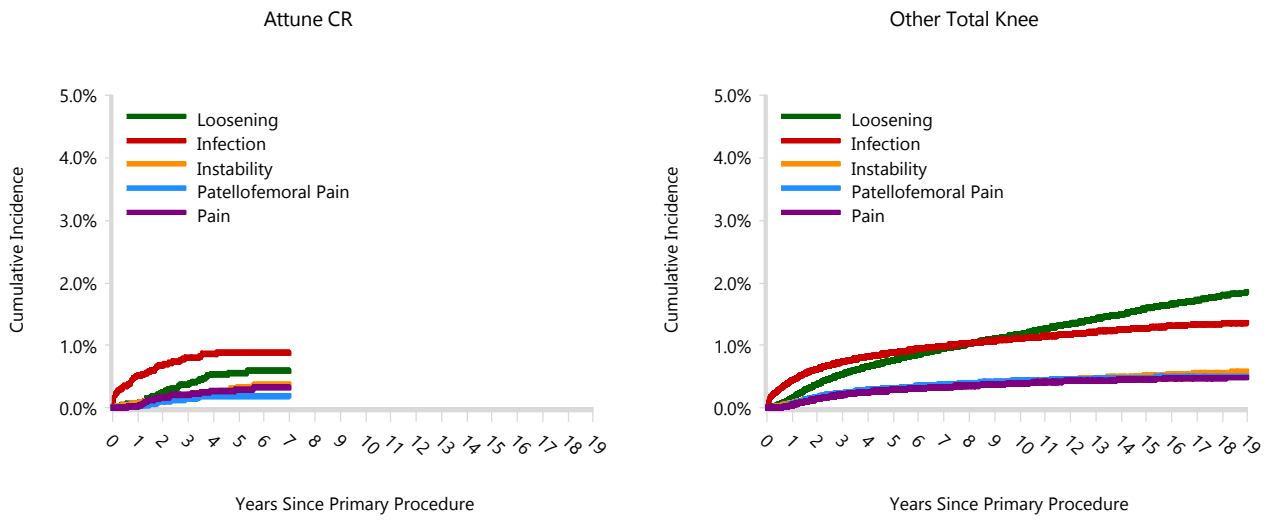


TABLE 14

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 8.2 Years)

Type of Revision	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	141	0.8	35.3	6743	0.9	25.6
TKR (Tibial/Femoral)	89	0.5	22.3	6377	0.8	24.2
Patella Only	75	0.4	18.8	5226	0.7	19.8
Insert/Patella	30	0.2	7.5	2391	0.3	9.1
Tibial Component	26	0.1	6.5	2336	0.3	8.9
Femoral Component	15	0.1	3.8	1539	0.2	5.8
Cement Spacer	18	0.1	4.5	1471	0.2	5.6
Removal of Prostheses	3	0.0	0.8	170	0.0	0.6
Minor Components	2	0.0	0.5	65	0.0	0.2
Cement Only				16	0.0	0.1
Total Femoral				14	0.0	0.1
Reinsertion of Components				13	0.0	0.0
N Revision	399	2.2	100.0	26361	3.5	100.0
N Primary	18534			759381		

Note: This table is restricted to revisions within 8.2 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	399	18529	59278	0.67 (0.61, 0.74)
Hybrid (Tibial Cemented)	0	2	6	0.00 (0.00, 57.14)
Hybrid (Tibial Cementless)	0	3	1	0.00 (0.00, 348.2)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	3	0.00 (0.00, 138.5)
XLPE + Antioxidant	399	18531	59278	0.67 (0.61, 0.74)
Unknown	0	2	5	0.00 (0.00, 78.75)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	246	11290	37824	0.65 (0.57, 0.74)
Rotating	153	7242	21457	0.71 (0.60, 0.84)
Unknown	0	2	5	0.00 (0.00, 78.75)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	399	18529	59273	0.67 (0.61, 0.74)
Posterior Stabilised	0	3	8	0.00 (0.00, 48.29)
Unknown	0	2	5	0.00 (0.00, 78.75)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	223	13283	39809	0.56 (0.49, 0.64)
No Patella	176	5251	19477	0.90 (0.78, 1.05)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	108	5546	14977	0.72 (0.59, 0.87)
Non-Navigated	291	12988	44309	0.66 (0.58, 0.74)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	17	779	1992	0.85 (0.50, 1.37)
IDI Not Used	382	17755	57294	0.67 (0.60, 0.74)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	2	3	0.00 (0.00, 119.4)
Non-Robotic	399	18532	59282	0.67 (0.61, 0.74)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

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	37	919
2015	50	2218
2016	68	2489
2017	87	3175
2018	91	3158
2019	43	3281
2020	20	2861
2021	1	350
TOTAL	399	18534

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	399	18531	59272	0.67 (0.61, 0.74)
Custom Made (Depuy)	0	2	11	0.00 (0.00, 34.77)
Other Tibial Components*	0	1	3	0.00 (0.00, 138.5)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)

*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	6	0.00 (0.00, 65.76)
150400102	0	9	38	0.00 (0.00, 9.65)
150400103	4	124	419	0.96 (0.26, 2.45)
150400104	17	600	2027	0.84 (0.49, 1.34)
150400105	21	1112	3745	0.56 (0.35, 0.86)
150400106	34	1265	3972	0.86 (0.59, 1.20)
150400107	31	1835	5744	0.54 (0.37, 0.77)
150400108	33	1247	3854	0.86 (0.59, 1.20)
150400109	8	410	1259	0.64 (0.27, 1.25)
150400110	2	111	372	0.54 (0.07, 1.94)
150400123	0	28	102	0.00 (0.00, 3.62)
150400124	7	214	679	1.03 (0.41, 2.12)
150400125	21	748	2290	0.92 (0.57, 1.40)
150400126	20	1017	3232	0.62 (0.38, 0.96)
150400201	0	2	6	0.00 (0.00, 64.47)
150400202	0	5	20	0.00 (0.00, 18.46)
150400203	6	150	456	1.32 (0.48, 2.86)
150400204	18	626	2111	0.85 (0.51, 1.35)
150400205	29	1233	4046	0.72 (0.48, 1.03)
150400206	24	1433	4671	0.51 (0.33, 0.76)
150400207	37	1999	6355	0.58 (0.41, 0.80)
150400208	24	1474	4727	0.51 (0.33, 0.76)
150400209	11	517	1664	0.66 (0.33, 1.18)
150400210	6	137	391	1.53 (0.56, 3.34)
150400223	2	34	94	2.13 (0.26, 7.69)
150400224	3	230	739	0.41 (0.08, 1.19)
150400225	15	826	2638	0.57 (0.32, 0.94)
150400226	26	1147	3627	0.72 (0.47, 1.05)
TOTAL	399	18534	59285	0.67 (0.61, 0.74)