



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 5900 Depuy Synthes Australia Attune CR Total Knee

Report Generated: 8 February 2022

Data Period: 1 September 1999 - 4 February 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.

**AOANJRR Automated Industry Report 5900 - Depuy Synthes Australia
Attune CR Total Knee**

Data Period: 1 September 1999 - 4 February 2022

Report Generated: 8 February 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	15626
Attune CR	150400123 - 150400226	CR Narrow Femoral Component	4702

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	354	15626	56815	0.62 (0.56, 0.69)
150400123 - 150400226	113	4702	16721	0.68 (0.56, 0.81)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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 December 2021
N Procedures	20328
N Patients	17107
N Hospitals Implanting	178
N Surgeons Implanting*	241
Outcome	
N Revised	467
N Deceased**	660

*497 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	20328	0.01	8.98	3.52	3.62	2.01
TOTAL	20328	0.01	8.98	3.52	3.62	2.01

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	9251	45.5%	30	95	68	67.9	8.7
Female	11077	54.5%	18	96	69	68.4	9.1
TOTAL	20328	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	1347	6.6	54352	6.7
55-64	5424	26.7	212821	26.4
65-74	8441	41.5	319560	39.7
≥75	5116	25.2	218708	27.2
TOTAL	20328	100.0	805441	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	9251	45.5	353519	43.9
Female	11077	54.5	451922	56.1
TOTAL	20328	100.0	805441	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	1060	5.2	25074	5.7
2	11170	55.1	238312	54.5
3	7835	38.6	169469	38.7
4	211	1.0	4720	1.1
5	.	.	14	0.0
TOTAL	20276	100.0	437589	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)	38	0.2	707	0.2
Normal (18.50-24.99)	1691	9.6	36440	10.5
Pre Obese (25.00-29.99)	5408	30.8	107801	31.2
Obese Class 1 (30.00-34.99)	5613	31.9	106392	30.8
Obese Class 2 (35.00-39.99)	3139	17.9	58413	16.9
Obese Class 3 (\geq 40.00)	1683	9.6	35890	10.4
TOTAL	17572	100.0	345643	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 2756 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	20083	98.8	787257	97.7
Rheumatoid Arthritis	128	0.6	9690	1.2
Other Inflammatory Arthritis	56	0.3	4105	0.5
Osteonecrosis	50	0.2	2456	0.3
Tumour	1	0.0	991	0.1
Fracture	5	0.0	676	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	1	0.0	2	0.0
Other	4	0.0	246	0.0
TOTAL	20328	100.0	805441	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	467	20328	73536	0.64 (0.58, 0.70)
Other Total Knee	33065	805441	5877287	0.56 (0.56, 0.57)
TOTAL	33532	825769	5950823	0.56 (0.56, 0.57)

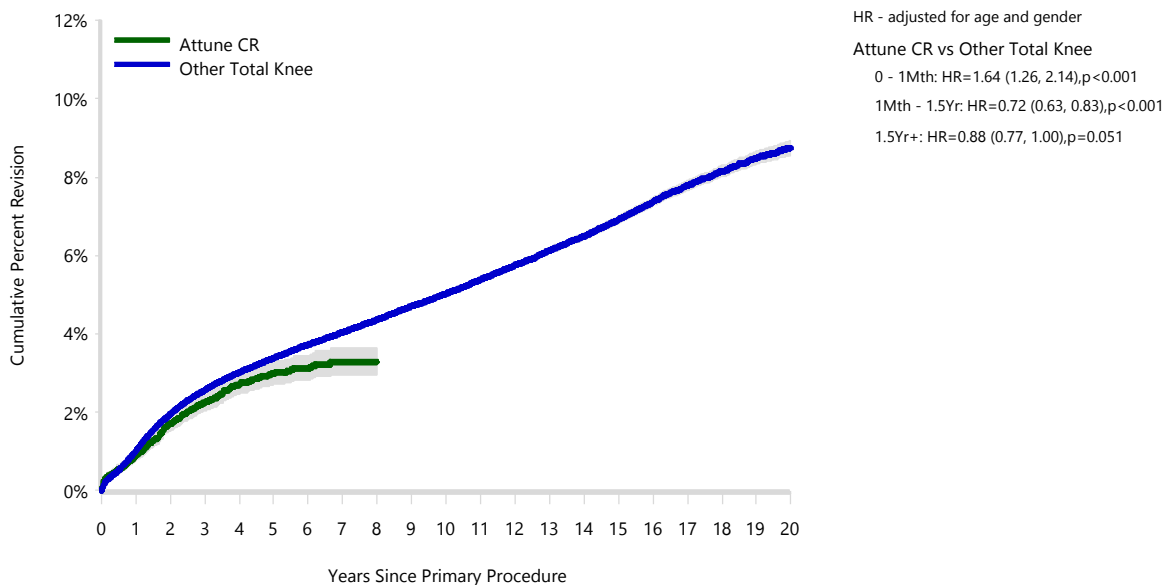
Table 11: Yearly Cumulative Percent Revision of Primary Total Knee Replacement by Model (All Diagnoses)

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, 1.9)	2.3 (2.0, 2.5)	2.7 (2.5, 3.0)	3.0 (2.7, 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 (3.3, 3.4)	3.7 (3.7, 3.8)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs
Attune CR	3.3 (3.0, 3.6)	3.3 (3.0, 3.6)					
Other Total Knee	4.0 (4.0, 4.1)	4.4 (4.3, 4.4)	4.7 (4.7, 4.8)	5.0 (5.0, 5.1)	5.4 (5.3, 5.5)	5.8 (5.7, 5.8)	6.1 (6.1, 6.2)

CPR	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs
Attune CR							
Other Total Knee	6.5 (6.4, 6.6)	6.9 (6.8, 7.0)	7.4 (7.3, 7.5)	7.8 (7.7, 7.9)	8.2 (8.0, 8.3)	8.5 (8.3, 8.7)	8.7 (8.5, 8.9)

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	20328	18168	15154	11692	8540	5452	3043	1024	85	0
Other Total Knee	805441	743430	678869	614081	550927	490288	431801	375824	323334	274209

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	229282	187931	151473	120316	93076	70191	51255	35391	22816	13023	5588

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 Years)

Revision Diagnosis	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	154	0.8	33.0	7424	0.9	25.9
Loosening	83	0.4	17.8	6711	0.8	23.4
Instability	41	0.2	8.8	2607	0.3	9.1
Patellofemoral Pain	31	0.2	6.6	2527	0.3	8.8
Pain	42	0.2	9.0	2367	0.3	8.2
Patella Erosion	35	0.2	7.5	1652	0.2	5.8
Arthrofibrosis	36	0.2	7.7	1125	0.1	3.9
Fracture	10	0.0	2.1	885	0.1	3.1
Malalignment	5	0.0	1.1	664	0.1	2.3
Lysis	1	0.0	0.2	374	0.0	1.3
Metal Related Pathology	2	0.0	0.4	334	0.0	1.2
Incorrect Sizing	5	0.0	1.1	314	0.0	1.1
Wear Tibial Insert				294	0.0	1.0
Patella Maltracking	3	0.0	0.6	226	0.0	0.8
Bearing Dislocation	2	0.0	0.4	183	0.0	0.6
Implant Breakage Tibial Insert	1	0.0	0.2	139	0.0	0.5
Implant Breakage Patella	1	0.0	0.2	137	0.0	0.5
Synovitis	1	0.0	0.2	96	0.0	0.3
Prosthesis Dislocation				89	0.0	0.3
Osteonecrosis	1	0.0	0.2	63	0.0	0.2
Implant Breakage Tibial				52	0.0	0.2
Implant Breakage Femoral				41	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				9	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
Osteoarthritis				1	0.0	0.0
Patella Dislocation				1	0.0	0.0
Post Operative Haematoma				1	0.0	0.0
Other	13	0.1	2.8	318	0.0	1.1
N Revision	467	2.3	100.0	28718	3.6	100.0
N Primary	20328			805441		

Note: This table is restricted to revisions within 9 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	154	0.5 (0.4, 0.6)	0.7 (0.6, 0.8)	0.8 (0.7, 0.9)	0.9 (0.7, 1.0)		
	Loosening	83	0.1 (0.0, 0.1)	0.2 (0.2, 0.3)	0.4 (0.3, 0.5)	0.6 (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 (0.2, 0.3)		
	Pain	42	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	116	0.2 (0.1, 0.3)	0.4 (0.3, 0.5)	0.6 (0.5, 0.7)	0.7 (0.6, 0.9)		
	Deceased	660	0.4 (0.3, 0.5)	1.1 (1.0, 1.3)	2.1 (1.9, 2.4)	4.5 (4.1, 4.9)		
	All Revision	467	0.9 (0.8, 1.0)	1.7 (1.5, 1.9)	2.2 (2.0, 2.5)	3.0 (2.7, 3.2)		
Other Total Knee	Infection	7989	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	8001	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 (1.5, 1.6)
	Instability	2929	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	2713	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 (0.4, 0.5)
	Pain	2607	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	8826	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	14496 5	0.7 (0.7, 0.7)	1.7 (1.7, 1.7)	3.0 (2.9, 3.0)	6.4 (6.3, 6.4)	19.8 (19.6, 19.9)	37.7 (37.5, 37.9)
	All Revision	33065	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, 6.1)

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

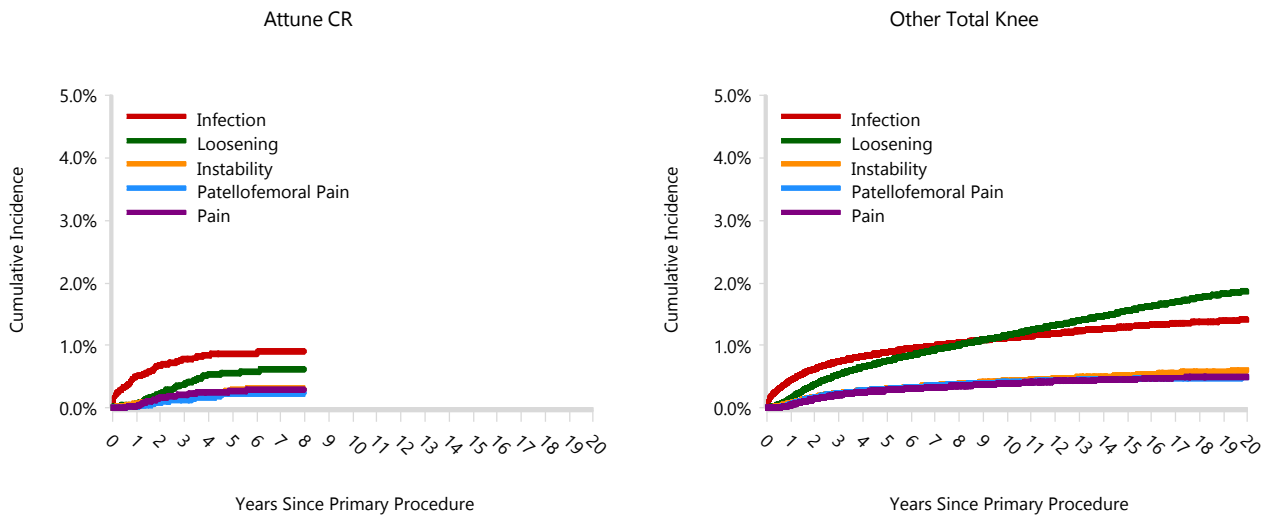


TABLE 14

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 Years)

Type of Revision	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	153	0.8	32.8	7411	0.9	25.8
TKR (Tibial/Femoral)	111	0.5	23.8	7055	0.9	24.6
Patella Only	95	0.5	20.3	5615	0.7	19.6
Insert/Patella	34	0.2	7.3	2659	0.3	9.3
Tibial Component	29	0.1	6.2	2473	0.3	8.6
Femoral Component	19	0.1	4.1	1630	0.2	5.7
Cement Spacer	21	0.1	4.5	1581	0.2	5.5
Removal of Prostheses	3	0.0	0.6	178	0.0	0.6
Minor Components	2	0.0	0.4	70	0.0	0.2
Cement Only				16	0.0	0.1
Total Femoral				16	0.0	0.1
Reinsertion of Components				14	0.0	0.0
N Revision	467	2.3	100.0	28718	3.6	100.0
N Primary	20328			805441		

Note: This table is restricted to revisions within 9 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	467	20288	73510	0.64 (0.58, 0.70)
Hybrid (Tibial Cemented)	0	2	8	0.00 (0.00, 46.30)
Hybrid (Tibial Cementless)	0	38	18	0.00 (0.00, 20.93)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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, 107.9)
XLPE + Antioxidant	467	20325	73526	0.64 (0.58, 0.70)
Unknown	0	2	6	0.00 (0.00, 59.54)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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	285	12352	46473	0.61 (0.54, 0.69)
Rotating	182	7974	27057	0.67 (0.58, 0.78)
Unknown	0	2	6	0.00 (0.00, 59.54)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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	466	20320	73518	0.63 (0.58, 0.69)
Posterior Stabilised	1	6	11	8.74 (0.22, 48.69)
Unknown	0	2	6	0.00 (0.00, 59.54)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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	268	14776	50250	0.53 (0.47, 0.60)
No Patella	199	5552	23286	0.85 (0.74, 0.98)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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	127	6312	19412	0.65 (0.55, 0.78)
Non-Navigated	340	14016	54124	0.63 (0.56, 0.70)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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	21	863	2617	0.80 (0.50, 1.23)
IDI Not Used	446	19465	70919	0.63 (0.57, 0.69)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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, 110.1)
Non-Robotic	467	20326	73533	0.64 (0.58, 0.70)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

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	55	2218
2016	72	2489
2017	102	3177
2018	105	3158
2019	57	3283
2020	29	2873
2021	7	2128
TOTAL	467	20328

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	467	20325	73521	0.64 (0.58, 0.70)
Custom Made (Depuy)	0	2	12	0.00 (0.00, 30.44)
Other Tibial Components*	0	1	3	0.00 (0.00, 107.9)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)

*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, 57.95)
150400102	0	9	44	0.00 (0.00, 8.37)
150400103	4	136	513	0.78 (0.21, 2.00)
150400104	19	634	2472	0.77 (0.46, 1.20)
150400105	23	1198	4591	0.50 (0.32, 0.75)
150400106	41	1399	4946	0.83 (0.59, 1.12)
150400107	35	2023	7160	0.49 (0.34, 0.68)
150400108	37	1375	4811	0.77 (0.54, 1.06)
150400109	9	439	1569	0.57 (0.26, 1.09)
150400110	2	117	456	0.44 (0.05, 1.58)
150400123	0	29	123	0.00 (0.00, 2.99)
150400124	7	246	850	0.82 (0.33, 1.70)
150400125	29	819	2860	1.01 (0.68, 1.46)
150400126	24	1131	4041	0.59 (0.38, 0.88)
150400201	0	2	7	0.00 (0.00, 51.00)
150400202	0	6	24	0.00 (0.00, 15.32)
150400203	6	163	567	1.06 (0.39, 2.30)
150400204	21	684	2581	0.81 (0.50, 1.24)
150400205	33	1363	4995	0.66 (0.45, 0.93)
150400206	30	1563	5773	0.52 (0.35, 0.74)
150400207	44	2185	7883	0.56 (0.41, 0.75)
150400208	33	1618	5861	0.56 (0.39, 0.79)
150400209	11	562	2063	0.53 (0.27, 0.95)
150400210	6	149	494	1.22 (0.45, 2.65)
150400223	3	36	118	2.54 (0.52, 7.41)
150400224	3	260	923	0.33 (0.07, 0.95)
150400225	16	927	3296	0.49 (0.28, 0.79)
150400226	31	1254	4511	0.69 (0.47, 0.98)
TOTAL	467	20328	73536	0.64 (0.58, 0.70)