



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 2505

Depuy Synthes Australia

Attune CR Total Knee

Report Generated: 13 May 2020

Data Period: 1 September 1999 - 12 May 2020

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	12370
Attune CR	150400123 - 150400226	CR Narrow Femoral Component	3636

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	239	12370	33202	0.72 (0.63, 0.82)
150400123 - 150400226	71	3636	9625	0.74 (0.58, 0.93)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

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	27 April 2020
N Procedures	16006
N Patients	13565
N Hospitals Implanting	164
N Surgeons Implanting*	221
Outcome	
N Revised	310
N Deceased**	346

*466 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 Primary Total Knee Replacement (All Diagnoses)

Model	N	Minimum	Maximum	Median	Mean	Std Dev
Attune CR	16006	0.01	7.24	2.55	2.68	1.60
TOTAL	16006	0.01	7.24	2.55	2.68	1.60

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	7251	45.3%	30	95	68	67.8	8.8
Female	8755	54.7%	18	94	69	68.3	9.1
TOTAL	16006	100.0%	18	95	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	1107	6.9	47999	6.7
55-64	4309	26.9	187484	26.3
65-74	6620	41.4	280649	39.4
≥75	3970	24.8	195402	27.5
TOTAL	16006	100.0	711534	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	7251	45.3	309965	43.6
Female	8755	54.7	401569	56.4
TOTAL	16006	100.0	711534	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	880	5.5	20275	5.9
2	8809	55.2	188986	55.0
3	6099	38.2	130743	38.0
4	168	1.1	3791	1.1
5	.	.	11	0.0
TOTAL	15956	100.0	343806	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 50 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)	37	0.3	515	0.2
Normal (18.50-24.99)	1269	9.6	26526	10.5
Pre Obese (25.00-29.99)	4092	30.8	78583	31.1
Obese Class 1 (30.00-34.99)	4149	31.2	77460	30.7
Obese Class 2 (35.00-39.99)	2426	18.3	42755	16.9
Obese Class 3 (\geq 40.00)	1304	9.8	26730	10.6
TOTAL	13277	100.0	252569	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 2729 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	15806	98.8	695020	97.7
Rheumatoid Arthritis	106	0.7	9010	1.3
Other Inflammatory Arthritis	46	0.3	3622	0.5
Osteonecrosis	42	0.3	2217	0.3
Tumour	.	.	883	0.1
Fracture	2	0.0	554	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	4	0.0	208	0.0
TOTAL	16006	100.0	711534	100.0

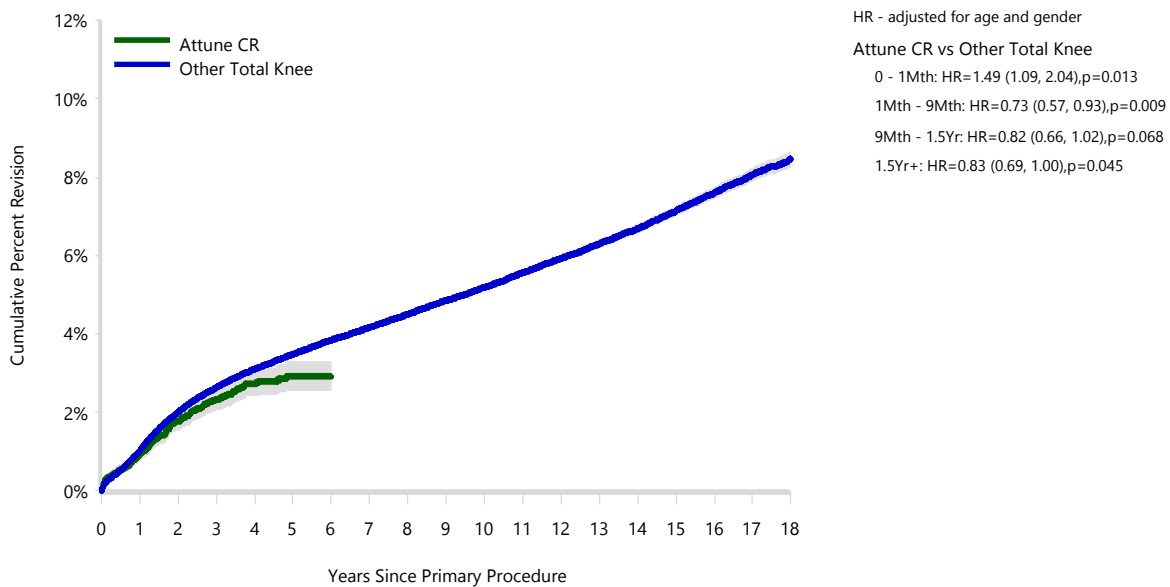
Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune CR	310	16006	42828	0.72 (0.65, 0.81)
Other Total Knee	28648	711534	4841503	0.59 (0.58, 0.60)
TOTAL	28958	727540	4884331	0.59 (0.59, 0.60)

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)	1.8 (1.6, 2.0)	2.3 (2.1, 2.6)	2.7 (2.4, 3.1)	2.9 (2.6, 3.3)	2.9 (2.6, 3.3)
Other Total Knee	1.0 (1.0, 1.0)	2.0 (2.0, 2.0)	2.6 (2.6, 2.7)	3.1 (3.1, 3.1)	3.5 (3.4, 3.5)	3.8 (3.8, 3.9)
CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs
Attune CR						
Other Total Knee	4.2 (4.1, 4.2)	4.5 (4.4, 4.6)	4.9 (4.8, 4.9)	5.2 (5.1, 5.3)	5.6 (5.5, 5.6)	5.9 (5.9, 6.0)
CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
Attune CR						
Other Total Knee	6.3 (6.2, 6.4)	6.7 (6.6, 6.8)	7.1 (7.0, 7.2)	7.6 (7.5, 7.7)	8.1 (7.9, 8.2)	8.5 (8.3, 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	
Attune CR	16006	12957	9770	6546	3772	1617	179	10	0	
Other Total Knee	711534	654143	589871	528310	468722	412283	358596	307543	260794	
Number at Risk	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
Attune CR	0	0	0	0	0	0	0	0	0	0
Other Total Knee	216918	177270	142566	112308	86290	64318	45692	30241	18259	8798

TABLE 12

Reasons for 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 revision diagnosis as a percentage of the total number of primary procedures. 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 7.2 Years)

Revision Diagnosis	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	113	0.7	36.5	6191	0.9	25.9
Loosening	51	0.3	16.5	5613	0.8	23.5
Patellofemoral Pain	20	0.1	6.5	2307	0.3	9.7
Instability	27	0.2	8.7	2091	0.3	8.8
Pain	29	0.2	9.4	2016	0.3	8.4
Patella Erosion	20	0.1	6.5	1251	0.2	5.2
Arthrofibrosis	23	0.1	7.4	954	0.1	4.0
Fracture	5	0.0	1.6	682	0.1	2.9
Malalignment	3	0.0	1.0	566	0.1	2.4
Metal Related Pathology	2	0.0	0.6	307	0.0	1.3
Incorrect Sizing	4	0.0	1.3	289	0.0	1.2
Lysis	1	0.0	0.3	256	0.0	1.1
Wear Tibial Insert				190	0.0	0.8
Patella Maltracking	3	0.0	1.0	185	0.0	0.8
Bearing Dislocation	1	0.0	0.3	170	0.0	0.7
Implant Breakage Patella				113	0.0	0.5
Implant Breakage Tibial Insert	1	0.0	0.3	94	0.0	0.4
Synovitis	1	0.0	0.3	76	0.0	0.3
Prosthesis Dislocation				68	0.0	0.3
Osteonecrosis				55	0.0	0.2
Implant Breakage Tibial				38	0.0	0.2
Implant Breakage Femoral				30	0.0	0.1
Tumour				22	0.0	0.1
Wear Patella				20	0.0	0.1
Heterotopic Bone				8	0.0	0.0
Wear Tibial				7	0.0	0.0
Wear Femoral				3	0.0	0.0
Incorrect Side				2	0.0	0.0
Patella Dislocation				1	0.0	0.0
Post Operative Haematoma				1	0.0	0.0
Progression Of Disease				1	0.0	0.0
Other	6	0.0	1.9	253	0.0	1.1
N Revision	310	1.9	100.0	23860	3.4	100.0
N Primary	16006			711534		

Note: This table is restricted to revisions within 7.2 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	Infection	113	0.5 (0.4, 0.7)	0.7 (0.6, 0.9)	0.8 (0.7, 1.0)	0.9 (0.7, 1.1)		
	Loosening	51	0.0 (0.0, 0.1)	0.3 (0.2, 0.4)	0.4 (0.3, 0.5)	0.6 (0.4, 0.8)		
	Pain	29	0.0 (0.0, 0.1)	0.2 (0.1, 0.3)	0.2 (0.1, 0.3)	0.3 (0.2, 0.5)		
	Instability	27	0.1 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.3 (0.2, 0.4)		
	Arthrofibrosis	23	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.2 (0.1, 0.3)		
	Other	67	0.2 (0.1, 0.3)	0.4 (0.3, 0.5)	0.5 (0.4, 0.6)	0.6 (0.5, 0.8)		
	Deceased	346	0.4 (0.3, 0.5)	1.1 (1.0, 1.3)	2.3 (2.0, 2.6)	4.8 (4.3, 5.5)		
	All Revision	310	0.9 (0.8, 1.1)	1.8 (1.6, 2.0)	2.3 (2.0, 2.6)	2.9 (2.5, 3.2)		
Other Total Knee	Infection	6827	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	7067	0.2 (0.2, 0.2)	0.4 (0.4, 0.4)	0.6 (0.5, 0.6)	0.8 (0.8, 0.8)	1.2 (1.2, 1.3)	1.7 (1.6, 1.7)
	Pain	2301	0.0 (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)	0.5 (0.4, 0.5)
	Instability	2444	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)
	Arthrofibrosis	1000	0.0 (0.0, 0.0)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)
	Other	9009	0.3 (0.2, 0.3)	0.5 (0.5, 0.6)	0.7 (0.7, 0.7)	1.0 (1.0, 1.0)	1.5 (1.5, 1.6)	2.1 (2.1, 2.2)
	Deceased	11819 2	0.8 (0.7, 0.8)	1.8 (1.7, 1.8)	3.1 (3.0, 3.1)	6.6 (6.6, 6.7)	20.6 (20.4, 20.7)	39.0 (38.8, 39.3)
	All Revision	28648	1.0 (1.0, 1.0)	2.0 (1.9, 2.0)	2.6 (2.6, 2.6)	3.4 (3.4, 3.5)	4.9 (4.8, 4.9)	6.2 (6.1, 6.3)

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

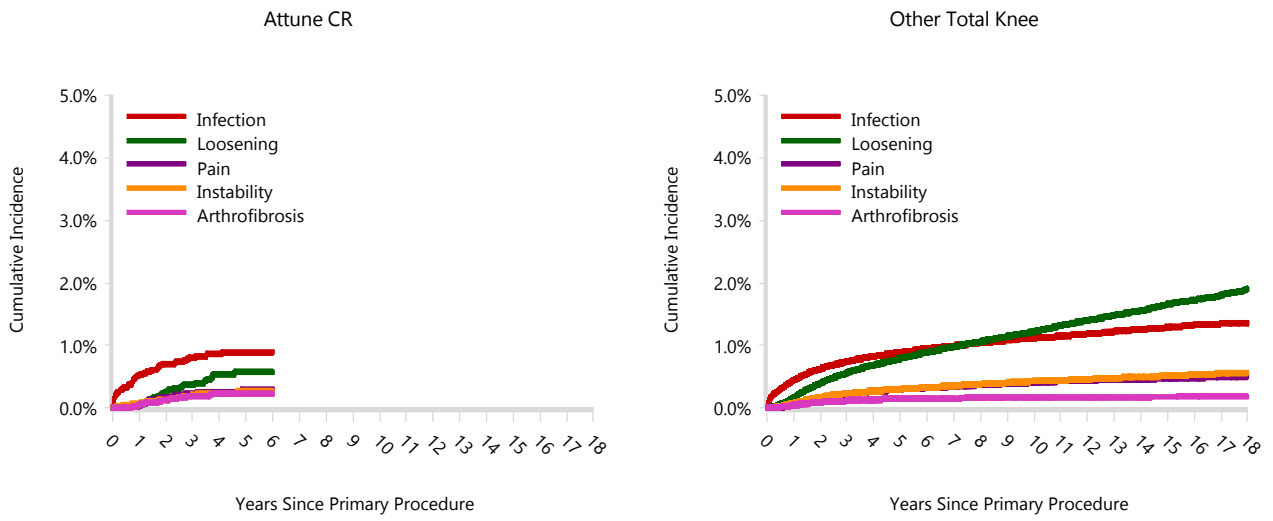


TABLE 14

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 7.2 Years)

Type of Revision	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	112	0.7	36.1	6019	0.8	25.2
TKR (Tibial/Femoral)	60	0.4	19.4	5677	0.8	23.8
Patella Only	62	0.4	20.0	4833	0.7	20.3
Tibial Component	19	0.1	6.1	2186	0.3	9.2
Insert/Patella	22	0.1	7.1	2077	0.3	8.7
Femoral Component	13	0.1	4.2	1447	0.2	6.1
Cement Spacer	17	0.1	5.5	1370	0.2	5.7
Removal of Prostheses	3	0.0	1.0	154	0.0	0.6
Minor Components	2	0.0	0.6	60	0.0	0.3
Cement Only				16	0.0	0.1
Total Femoral				11	0.0	0.0
Reinsertion of Components				10	0.0	0.0
N Revision	310	1.9	100.0	23860	3.4	100.0
N Primary	16006			711534		

Note: This table is restricted to revisions within 7.2 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	310	16004	42823	0.72 (0.65, 0.81)
Hybrid (Tibial Cemented)	0	2	5	0.00 (0.00, 81.96)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

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	2	0.00 (0.00, 218.7)
XLPE + Antioxidant	310	16003	42823	0.72 (0.65, 0.81)
Unknown	0	2	3	0.00 (0.00, 135.1)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

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	196	9857	27814	0.70 (0.61, 0.81)
Rotating	114	6147	15011	0.76 (0.63, 0.91)
Unknown	0	2	3	0.00 (0.00, 135.1)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

Table 18: 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	168	11107	28031	0.60 (0.51, 0.70)
No Patella	142	4899	14797	0.96 (0.81, 1.13)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

Table 19: 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	78	4541	10062	0.78 (0.61, 0.97)
Non-Navigated	232	11465	32766	0.71 (0.62, 0.81)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

Table 20: 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	12	621	1313	0.91 (0.47, 1.60)
IDI Not Used	298	15385	41515	0.72 (0.64, 0.80)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

Table 21: 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	1	1	0.00 (0.00, 520.2)
Non-Robotic	310	16005	42827	0.72 (0.65, 0.81)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

Table 22: 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	36	919
2015	45	2218
2016	61	2488
2017	70	3175
2018	66	3154
2019	30	3270
2020	0	699
TOTAL	310	16006

Table 23: 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	310	16003	42817	0.72 (0.65, 0.81)
Custom Made (Depuy)	0	2	9	0.00 (0.00, 42.62)
Other Tibial Components*	0	1	2	0.00 (0.00, 218.7)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)

*denotes tibial components distributed by other companies

Table 24: 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	5	0.00 (0.00, 79.63)
150400102	0	9	29	0.00 (0.00, 12.54)
150400103	3	102	313	0.96 (0.20, 2.80)
150400104	13	530	1490	0.87 (0.46, 1.49)
150400105	17	971	2751	0.62 (0.36, 0.99)
150400106	28	1102	2850	0.98 (0.65, 1.42)
150400107	27	1556	4130	0.65 (0.43, 0.95)
150400108	29	1066	2762	1.05 (0.70, 1.51)
150400109	6	343	897	0.67 (0.25, 1.46)
150400110	2	99	271	0.74 (0.09, 2.67)
150400123	0	25	77	0.00 (0.00, 4.79)
150400124	4	192	488	0.82 (0.22, 2.10)
150400125	14	633	1628	0.86 (0.47, 1.44)
150400126	16	852	2327	0.69 (0.39, 1.12)
150400201	0	1	4	0.00 (0.00, 91.72)
150400202	0	5	15	0.00 (0.00, 24.44)
150400203	3	137	328	0.92 (0.19, 2.68)
150400204	17	559	1560	1.09 (0.63, 1.74)
150400205	19	1100	2937	0.65 (0.39, 1.01)
150400206	22	1256	3386	0.65 (0.41, 0.98)
150400207	26	1728	4574	0.57 (0.37, 0.83)
150400208	15	1242	3429	0.44 (0.24, 0.72)
150400209	6	448	1199	0.50 (0.18, 1.09)
150400210	6	115	275	2.18 (0.80, 4.75)
150400223	2	24	67	2.98 (0.36, 10.75)
150400224	3	193	538	0.56 (0.11, 1.63)
150400225	13	732	1892	0.69 (0.37, 1.17)
150400226	19	985	2608	0.73 (0.44, 1.14)
TOTAL	310	16006	42828	0.72 (0.65, 0.81)