

ACS (cementless)/ACS Fixed Total Knee Investigation

Note: This analysis compares the ACS (class)/ACS Fixed femoral/tibial combination with all other total knee prostheses.

This combination has been identified as having a significantly higher rate of revision. For a detailed explanation of the process used by the Registry that results in identification of prostheses that have a higher than anticipated rate of revision please refer to the Prostheses with Higher than Anticipated Rates of Revision chapter of the most recent AOANJRR Annual Report, <https://aoanjrr.sahmri.com/annual-reports-2023>.

Note: Procedures using prostheses with no recorded use in 2022 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Knee Replacement

The revision rate of the ACS (class)/ACS Fixed total knee combination is compared to all other total knee prostheses.

Table 1: Revision Rates of Primary Total Knee Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
ACS (class)/ACS Fixed	123	2695	14638	0.84 (0.70, 1.00)
Other Total Knee	26713	755254	5055142	0.53 (0.52, 0.53)
TOTAL	26836	757949	5069780	0.53 (0.52, 0.54)

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the ACS (class)/ACS Fixed total knee combination is compared to all other total knee prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Total Knee Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
ACS (class)/ACS Fixed	1.4 (1.0, 1.9)	3.0 (2.4, 3.8)	3.8 (3.1, 4.6)	4.0 (3.3, 4.8)	4.5 (3.8, 5.5)	4.9 (4.1, 5.9)	5.5 (4.6, 6.7)	5.9 (4.9, 7.1)
Other Total Knee	1.0 (1.0, 1.0)	1.8 (1.8, 1.9)	2.4 (2.4, 2.4)	2.8 (2.8, 2.9)	3.1 (3.1, 3.2)	3.5 (3.4, 3.5)	3.7 (3.7, 3.8)	4.0 (4.0, 4.1)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs
ACS (class)/ACS Fixed	5.9 (4.9, 7.1)	5.9 (4.9, 7.1)					
Other Total Knee	4.3 (4.3, 4.4)	4.6 (4.6, 4.7)	4.9 (4.9, 5.0)	5.2 (5.2, 5.3)	5.5 (5.5, 5.6)	5.9 (5.8, 5.9)	6.2 (6.1, 6.3)

CPR	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs
ACS (class)/ACS Fixed							
Other Total Knee	6.6 (6.5, 6.8)	7.0 (6.9, 7.2)	7.3 (7.2, 7.5)	7.6 (7.4, 7.8)	7.8 (7.6, 8.0)	8.0 (7.7, 8.2)	8.2 (7.9, 8.6)

Note: Prostheses no longer used in 2022 are excluded from the comparator.

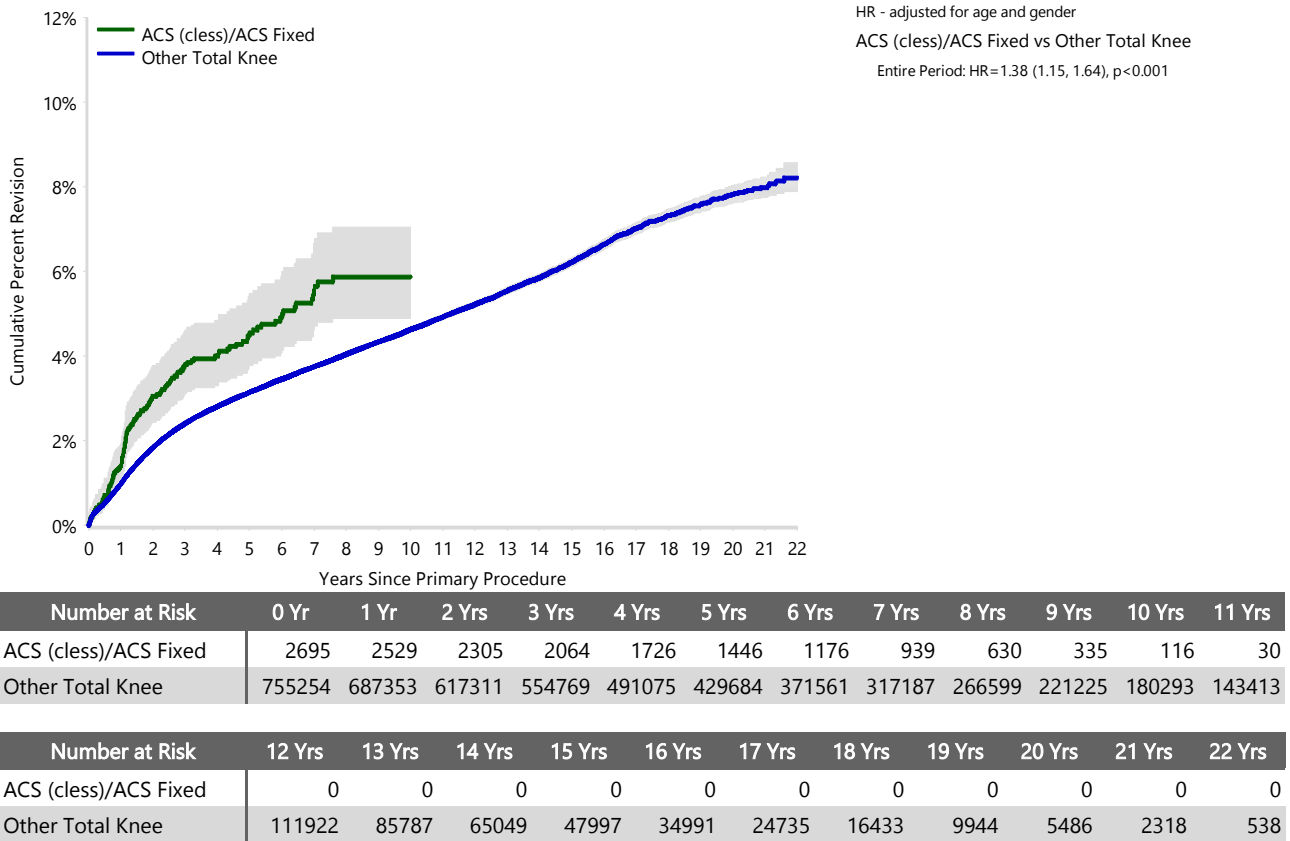
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the ACS (cless)/ACS Fixed total knee combination is compared to all other total knee prostheses. In addition, hazard ratios are reported.

Hazard ratios are reported for specific time periods during which the hazard ratio is constant. This is done to enable more specific and valid comparisons of the risk of revision over time. The pattern of variation in risk has important implications with respect to the underlying reasons for any difference.

Figure 1: Cumulative Percent Revision of Primary Total Knee Replacement



Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 3

Primary Diagnosis for Revised Primary Total Knee Replacement

This table identifies the diagnosis of the primary procedure which was subsequently revised. This information is provided as there is a variation on outcome depending on the primary diagnosis. It is therefore important when considering the reasons for a higher than anticipated rate of revision that there is identification of the primary diagnosis. This information should be compared to the primary diagnosis for the revisions of all other total knee prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Knee Replacement

Primary Diagnosis	ACS (cless)/ACS Fixed		Other Total Knee	
	Number	Percent	Number	Percent
Osteoarthritis	123	100.0	25881	96.9
Rheumatoid Arthritis			342	1.3
Tumour			162	0.6
Other Inflammatory Arthritis			160	0.6
Osteonecrosis			101	0.4
Fracture			48	0.2
Other			18	0.1
Chondrocalcinosis			1	0.0
TOTAL	123	100.0	26713	100.0

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 4

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 4: Primary Total Knee Replacement - Reason for Revision (Follow-up Limited to 11.7 Years)

Revision Diagnosis	ACS (class)/ACS Fixed			Other Total Knee		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	25	0.9	20.3	7124	0.9	28.1
Loosening	34	1.3	27.6	5584	0.7	22.0
Instability	10	0.4	8.1	2498	0.3	9.9
Pain	14	0.5	11.4	1951	0.3	7.7
Patellofemoral Pain	18	0.7	14.6	1854	0.2	7.3
Patella Erosion	4	0.1	3.3	1635	0.2	6.4
Arthrofibrosis	1	0.0	0.8	1022	0.1	4.0
Fracture	1	0.0	0.8	921	0.1	3.6
Malalignment	5	0.2	4.1	585	0.1	2.3
Wear Tibial Insert	1	0.0	0.8	273	0.0	1.1
Lysis	3	0.1	2.4	268	0.0	1.1
Incorrect Sizing	3	0.1	2.4	258	0.0	1.0
Patella Maltracking	1	0.0	0.8	184	0.0	0.7
Bearing Dislocation				149	0.0	0.6
Implant Breakage Tibial Insert				140	0.0	0.6
Implant Breakage Patella				135	0.0	0.5
Metal Related Pathology				99	0.0	0.4
Prosthesis Dislocation	1	0.0	0.8	80	0.0	0.3
Synovitis				69	0.0	0.3
Osteonecrosis				55	0.0	0.2
Implant Breakage Tibial				39	0.0	0.2
Tumour				32	0.0	0.1
Implant Breakage Femoral				30	0.0	0.1
Wear Patella				30	0.0	0.1
Heterotopic Bone				12	0.0	0.0
Wear Tibial				7	0.0	0.0
Progression Of Disease				4	0.0	0.0
Patella Dislocation				2	0.0	0.0
Incorrect Side				1	0.0	0.0
Wear Femoral				1	0.0	0.0
Other	2	0.1	1.6	311	0.0	1.2
N Revision	123	4.6	100.0	25353	3.4	100.0
N Primary	2695			755254		

Note: This table is restricted to revisions within 11.7 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2022 are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total Knee Replacement

This figure details the cumulative incidence of the most common reasons for revision. The five most common reasons for revision are included as long as each of these reasons account for more than 10 procedures or at least 5% of all revisions for the ACS (cless)/ACS Fixed total knee combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total knee prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Knee Replacement

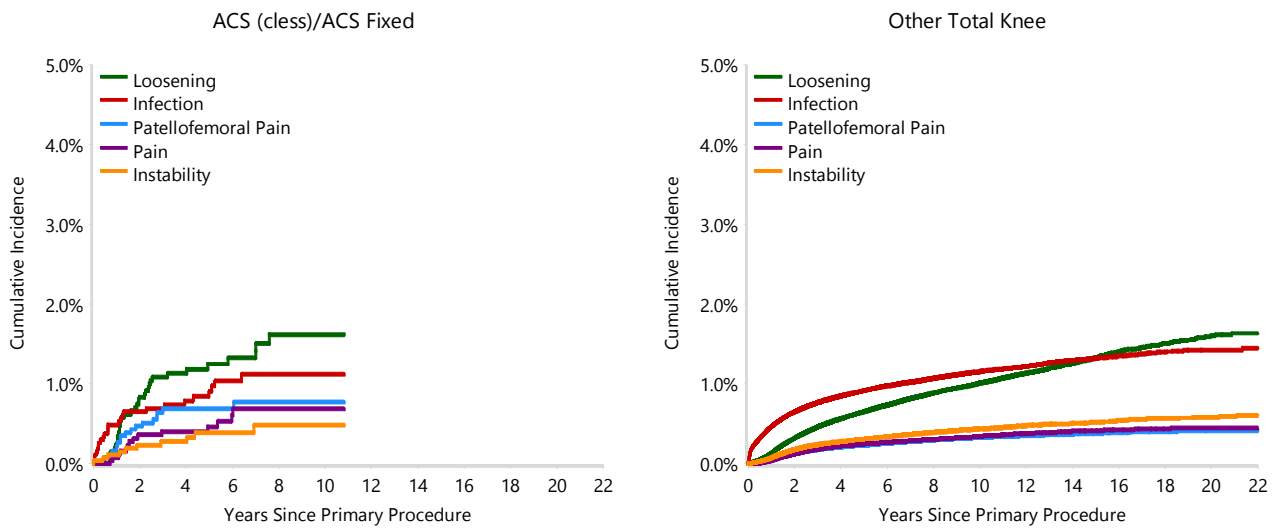


TABLE 5

Type of Revision Performed for Primary Total Knee Replacement

This analysis identifies the components used in the revision of the ACS (cless)/ACS Fixed total knee combination and compares it to the components used in the revision of all other total knee prostheses.

The reason this analysis is undertaken is to identify whether there is one or more components which are being replaced that differ from the components replaced for revisions of all other total knee prostheses i.e. is there a difference in the type of revision undertaken for the ACS (cless)/ACS Fixed total knee combination compared to all other total knee prostheses.

Table 5: Primary Total Knee Replacement - Type of Revision (Follow-up Limited to 11.7 Years)

Type of Revision	ACS (cless)/ACS Fixed		Other Total Knee	
	Number	Percent	Number	Percent
TKR (Tibial/Femoral)	27	22.0	6045	23.8
Tibial Component	20	16.3	2071	8.2
Cement Spacer	3	2.4	1317	5.2
Femoral Component	8	6.5	1295	5.1
Removal of Prostheses			149	0.6
Total Femoral			23	0.1
Reinsertion of Components			13	0.1
N Major	58	47.2	10913	43.0
Insert Only	19	15.4	7321	28.9
Patella Only	33	26.8	4559	18.0
Insert/Patella	13	10.6	2480	9.8
Minor Components			63	0.2
Cement Only			17	0.1
N Minor	65	52.8	14440	57.0
TOTAL	123	100.0	25353	100.0

Note: This table is restricted to revisions within 11.7 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 6**Revision Rates of ACS (class)/ACS Fixed Primary Total Knee Replacement by Fixation**

This analysis is provided as some prostheses have more than one fixation option. Additionally there are prostheses where an alternative to the recommended approach to fixation was used e.g. a cementless prosthesis that has been cemented or vice-versa.

Table 6: Revised Number of ACS (class)/ACS Fixed Primary Total Knee Replacement by Fixation

Fixation	N Revised	N Total
Cemented	0	6
Cementless	55	1170
Hybrid (Tibial Cemented)	68	1518
Hybrid (Tibial Cementless)	0	1
TOTAL	123	2695

TABLE 7**Revision Rates of ACS (class)/ACS Fixed Primary Total Knee Replacement by Bearing Surface**

This analysis is provided as some prostheses are combined with a variety of bearing surfaces. All bearing surfaces used with this combination are listed.

Table 7: Revised Number of ACS (class)/ACS Fixed Primary Total Knee Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Non XLPE	123	2695
TOTAL	123	2695

TABLE 8**Revision Rates of ACS (class)/ACS Fixed Primary Total Knee Replacement by Bearing Mobility**

This analysis is provided as some prostheses are combined with a variety of bearing mobilities. All bearing mobilities used with this combination are listed.

Table 8: Revised Number of ACS (class)/ACS Fixed Primary Total Knee Replacement by Bearing Mobility

Bearing Mobility	N Revised	N Total
Fixed	123	2695
TOTAL	123	2695

TABLE 9**Revision Rates of ACS (class)/ACS Fixed Primary Total Knee Replacement by Stability**

This analysis is provided as some prostheses are combined with a variety of stabilities. All stabilities used with this combination are listed.

Table 9: Revised Number of ACS (class)/ACS Fixed Primary Total Knee Replacement by Stability

Stability	N Revised	N Total
Minimally Stabilised	111	2584
Posterior Stabilised	12	111
TOTAL	123	2695

TABLE 10

Revision Rates of Primary Total Knee Replacement by State

This enables a state by state variation to be identified for the ACS (cless)/ACS Fixed total knee combination and provides the comparative data for each of the states for all other total knee prostheses.

The purpose of this analysis is to determine if the higher than anticipated rate of revision has widespread distribution between states. If there is widespread distribution then the reason for the higher than anticipated rate of revision is unlikely to be surgeon specific. If the prosthesis has been used in only a small number of states it is not possible to distinguish if the higher than anticipated rate of revision is related to the prosthesis, surgeon, technique or patient.

Table 10: Revised Number of Primary Total Knee Replacement by State

Component	State	N Revised	N Total
ACS (cless)/ACS Fixed	NSW	0	1
	VIC	24	961
	QLD	10	135
	WA	56	566
	SA	33	1032
Other Total Knee	NSW	7959	262432
	VIC	5801	152086
	QLD	5756	156873
	WA	3189	80573
	SA	2934	65387
	TAS	437	18133
	ACT/NT	637	19770
TOTAL		26836	757949

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 11**Number of Revisions of ACS (cless)/ACS Fixed Primary Total Knee Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the ACS (cless)/ACS Fixed total knee combination. It also provides the subsequent number of revisions of the primaries reported in that year.

Primary procedures performed in later years have had less follow up time therefore the number revised is expected to be less than the number revised in earlier years. For example, a primary procedure performed in 2022 has a maximum of one year to be revised, whereas a primary procedure performed in 2020 has a maximum of three years to be revised.

Table 11: Number of Revisions of ACS (cless)/ACS Fixed Primary Total Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2011	2	41
2012	8	118
2013	33	284
2014	28	337
2015	16	331
2016	11	238
2017	12	266
2018	6	259
2019	2	319
2020	3	209
2021	1	168
2022	1	125
TOTAL	123	2695

TABLE 12

Revision Rates of ACS (class)/ACS Fixed Primary Total Knee Replacement by Catalogue Number Range

Many prostheses have a number of catalogue ranges. The catalogue range is specific to particular design features; more than one catalogue range usually indicates a minor difference in design in a particular ACS (class)/ACS Fixed prosthesis.

This analysis has been undertaken to determine if the revision rate varies according to the catalogue number range.

Model	Catalogue Range	Catalogue Description	Cement	Coating
Femoral				
ACS	42003102-42003118	FEMORAL COMPONENT POROUS COATED	NO	TIN
ACS	42003202-42005116	FEMORAL COMPONENT CEMENTLESS CPTI/TCP	NO	TIN
ACS	42006602-42006618	PS FEMORAL COMPONENT POROUS COATED	NO	TIN
ACS	42210303-42210316	FEMORAL COMPONENT SLIM POROUS COATED	NO	
Tibial				
ACS Fixed	42010402-42010419	FB TIBIAL COMPONENT POROUS COATED	NO	TIN
ACS Fixed	42010422-42010439	FB TIBIAL COMPONENT CEMENTED	YES	TIN

Table 12: Revised Number of ACS (class)/ACS Fixed Primary Total Knee Replacement by Catalogue Number Range

Femoral Range	Tibial Range	N Revised	N Total
42003102-42003118	42010402-42010419	26	524
	42010422-42010439	35	665
42003202-42005116	42010402-42010419	1	60
	42010422-42010439	0	125
42006602-42006618	42010402-42010419	9	61
	42010422-42010439	3	50
42210303-42210316	42010402-42010419	19	528
	42010422-42010439	30	682
TOTAL		123	2695