Avenir/Fitmore Total Conventional Hip Investigation

Note: This analysis compares the Avenir/Fitmore femoral stem/acetabular combination with all other total conventional hip 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-2025.

Note: Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator. Procedures using prostheses with no recorded use in 2024 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Avenir/Fitmore total conventional hip combination is compared to all other total conventional hip prostheses.

Table 1: Revision Rates of Primary Total Conventional Hip Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Avenir/Fitmore	21	373	1766	1.19 (0.74, 1.82)
Other Total Conventional Hip	19471	551781	3550676	0.55 (0.54, 0.56)
TOTAL	**19492**	**552154**	**3552443**	**0.55 (0.54, 0.56)**

Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Avenir/Fitmore total conventional hip combination is compared to all other total conventional hip prostheses.

Table 2: Yearly Cumulative Percent Revision (95% CI) of Primary Total Conventional Hip Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
Avenir/Fitmore	5.1 (3.3, 7.9)	5.4 (3.5, 8.2)	5.4 (3.5, 8.2)	5.7 (3.8, 8.7)	5.7 (3.8, 8.7)	5.7 (3.8, 8.7)	5.7 (3.8, 8.7)	5.7 (3.8, 8.7)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.2 (2.1, 2.2)	2.5 (2.4, 2.5)	2.8 (2.7, 2.8)	3.0 (3.0, 3.1)	3.3 (3.3, 3.4)	3.6 (3.5, 3.6)	3.9 (3.8, 3.9)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
Avenir/Fitmore								
Other Total Conventional Hip	4.2 (4.1, 4.2)	4.4 (4.4, 4.5)	4.8 (4.7, 4.8)	5.2 (5.1, 5.3)	5.5 (5.4, 5.6)	5.9 (5.8, 6.0)	6.3 (6.2, 6.4)	6.7 (6.6, 6.9)

CPR	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Avenir/Fitmore							
Other Total Conventional Hip	7.1 (6.9, 7.2)	7.4 (7.3, 7.6)	7.9 (7.7, 8.1)	8.3 (8.0, 8.5)	8.8 (8.5, 9.1)	9.3 (9.0, 9.7)	9.9 (9.4, 10.5)

Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

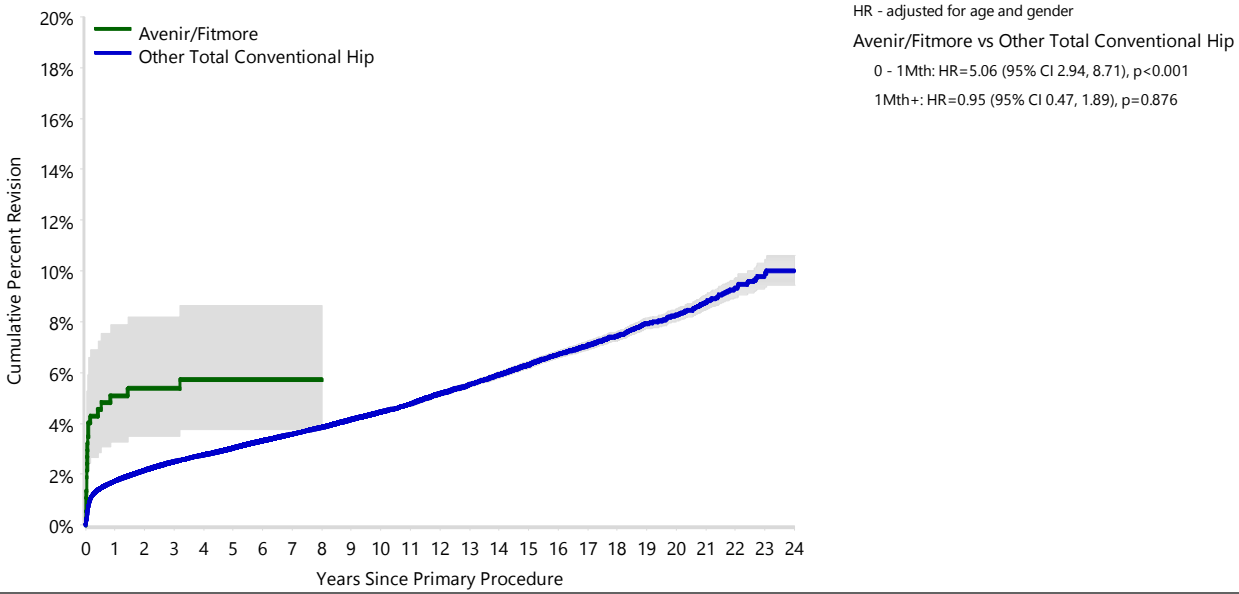
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Avenir/Fitmore total conventional hip combination is compared to all other total conventional hip 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 Conventional Hip Replacement



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	11 Yrs
Avenir/Fitmore	373	352	317	273	217	170	121	82	45	8	5	2
Other Total Conventional Hip	551781	487363	432500	383937	336996	295641	254825	217041	182188	150368	122146	99376

Number at Risk	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Avenir/Fitmore	0	0	0	0	0	0	0	0	0	0	0	0
Other Total Conventional Hip	80223	63999	49890	37936	28064	20581	15102	10871	7426	4536	2346	851

Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 3

Primary Diagnosis for Revised Primary Total Conventional Hip 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 conventional hip prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Conventional Hip Replacement

	Avenir/Fitmore		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	21	100.0	16153	83.0
Fractured Neck Of Femur			1436	7.4
Osteonecrosis			856	4.4
Developmental Dysplasia			313	1.6
Rheumatoid Arthritis			210	1.1
Failed Internal Fixation			157	0.8
Tumour			148	0.8
Other Inflammatory Arthritis			112	0.6
Fracture/Dislocation			53	0.3
Other			19	0.1
Arthrodesis Takedown			14	0.1
TOTAL	**21**	**100.0**	**19471**	**100.0**

Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm 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 Conventional Hip Replacement - Reason for Revision (Follow-up Limited to 11.3 Years)

	Avenir/Fitmore			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	8	2.1	38.1	4622	0.8	25.6
Prosthesis Dislocation/Instability	1	0.3	4.8	4225	0.8	23.4
Fracture	5	1.3	23.8	3936	0.7	21.8
Loosening	4	1.1	19.0	3279	0.6	18.2
Pain	1	0.3	4.8	308	0.1	1.7
Leg Length Discrepancy				296	0.1	1.6
Malposition				264	0.0	1.5
Implant Breakage Stem				162	0.0	0.9
Lysis				131	0.0	0.7
Implant Breakage Acetabular Insert				112	0.0	0.6
Incorrect Sizing				97	0.0	0.5
Metal Related Pathology				65	0.0	0.4
Implant Breakage Acetabular				63	0.0	0.3
Wear Acetabular Insert				57	0.0	0.3
Tumour				39	0.0	0.2
Wear Head				38	0.0	0.2
Heterotopic Bone				27	0.0	0.1
Implant Breakage Head				25	0.0	0.1
Wear Acetabulum				7	0.0	0.0
Osteonecrosis				3	0.0	0.0
Synovitis				1	0.0	0.0
Other	2	0.5	9.5	299	0.1	1.7
N Revision	**21**	**5.6**	**100.0**	**18056**	**3.3**	**100.0**
N Primary	**373**			**551781**		

Note: This table is restricted to revisions within 11.3 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total Conventional Hip 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 Avenir/Fitmore total conventional hip combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total conventional hip prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Conventional Hip Replacement

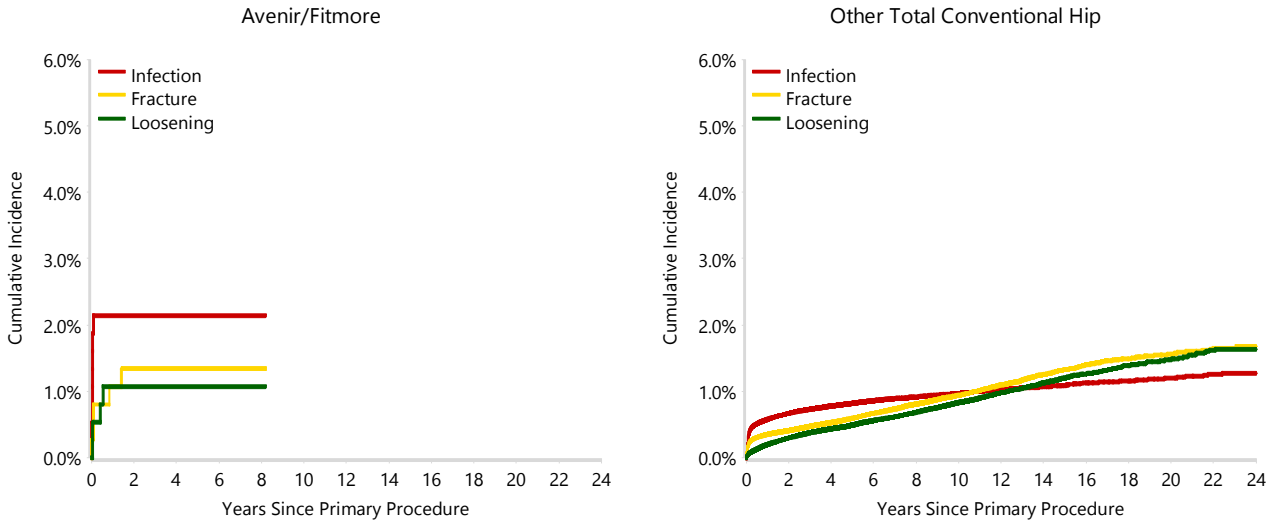


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Avenir/Fitmore total conventional hip combination and compares it to the components used in the revision of all other total conventional hip 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 conventional hip prostheses i.e. is there a difference in the type of revision undertaken for the Avenir/Fitmore total conventional hip combination compared to all other total conventional hip prostheses.

Table 5: Primary Total Conventional Hip Replacement - Type of Revision (Follow-up Limited to 11.3 Years)

	Avenir/Fitmore		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	5	23.8	6010	33.3
Acetabular Component	4	19.0	3095	17.1
THR (Femoral/Acetabular)			1999	11.1
Cement Spacer			577	3.2
Removal of Prostheses			93	0.5
Reinsertion of Components			29	0.2
Total Femoral			11	0.1
Bipolar Head and Femoral			9	0.0
N Major	**9**	**42.9**	**11823**	**65.5**
Head/Insert	12	57.1	4871	27.0
Head Only			900	5.0
Minor Components			284	1.6
Insert Only			175	1.0
Bipolar Only			1	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	**12**	**57.1**	**6233**	**34.5**
TOTAL	**21**	**100.0**	**18056**	**100.0**

Note: This table is restricted to revisions within 11.3 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 6

Revision Rates of Avenir/Fitmore Primary Total Conventional Hip 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 Avenir/Fitmore Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	21	373
TOTAL	**21**	**373**

TABLE 7

Revision Rates of Avenir/Fitmore Primary Total Conventional Hip 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 Avenir/Fitmore Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Metal/XLPE	21	373
TOTAL	**21**	**373**

TABLE 8

Revision Rates of Avenir/Fitmore Primary Total Conventional Hip Replacement by Approach

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

Table 8: Revised Number of Avenir/Fitmore Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	0	27
Lateral	5	114
Posterior	13	218
TOTAL	**18**	**359**

Note: Excludes 14 procedures with no approach recorded

TABLE 9

Revision Rates of Primary Total Conventional Hip Replacement by State

This enables a state by state variation to be identified for the Avenir/Fitmore total conventional hip combination and provides the comparative data for each of the states for all other total conventional hip 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 9: Revised Number of Primary Total Conventional Hip Replacement by State

Component	State	N Revised	N Total
Avenir/Fitmore	NSW	21	373
Other Total Conventional Hip	NSW	5267	159543
	VIC	4851	143812
	QLD	3893	100102
	WA	2492	62236
	SA	1926	51998
	TAS	448	18480
	ACT/NT	594	15610
TOTAL		**19492**	**552154**

Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 10

Number of Revisions of Avenir/Fitmore Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Avenir/Fitmore total conventional hip 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 2024 has a maximum of one year to be revised, whereas a primary procedure performed in 2022 has a maximum of three years to be revised.

Table 10: Number of Revisions of Avenir/Fitmore Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2013	0	2
2014	3	7
2015	1	5
2016	0	46
2017	1	44
2018	4	42
2019	3	56
2020	3	41
2021	2	55
2022	1	41
2023	3	34
TOTAL	**21**	**373**

TABLE 11

Revision Rates of Avenir/Fitmore Primary Total Conventional Hip 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 Avenir/Fitmore 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	Material	Coating
Femoral Stem					
Avenir	0106010001-0106010009	TITANIUM GRIT BLAST HA MULLER STANDARD STEM	NO	METAL	HA COATED
Avenir	0106010101-0106010109	TITANIUM GRIT BLAST HA MULLER LATERAL STEM	NO	METAL	HA COATED
Acetabular					
Fitmore	0100024542-0100024568	TITANIUM SHELL W/SCREW CONES	NO	METAL	

Table 11: Revised Number of Avenir/Fitmore Primary Total Conventional Hip Replacement by Catalogue Number Range

Femoral Stem Range	Acetabular Range	N Revised	N Total
0106010001-0106010009	0100024542-0100024568	17	305
0106010101-0106010109	0100024542-0100024568	4	68
TOTAL		**21**	**373**