HACTIV Total Conventional Hip Investigation

Note: This analysis compares the HACTIV femoral stem prosthesis with all other total conventional hip prostheses.

This prosthesis 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-2024.

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 2023 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the HACTIV total conventional hip prosthesis 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)
HACTIV	113	2827	12352	0.91 (0.75, 1.10)
Other Total Conventional Hip	19137	535744	3442592	0.56 (0.55, 0.56)
TOTAL	**19250**	**538571**	**3454944**	**0.56 (0.55, 0.57)**

Note: Prostheses no longer used in 2023 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 HACTIV total conventional hip prosthesis is compared to all other total conventional hip prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
HACTIV	2.7 (2.2, 3.4)	3.4 (2.8, 4.2)	3.7 (3.0, 4.4)	3.7 (3.1, 4.5)	3.9 (3.2, 4.8)	4.3 (3.6, 5.3)	4.5 (3.7, 5.5)	4.9 (3.9, 6.2)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.2 (2.1, 2.2)	2.5 (2.5, 2.5)	2.8 (2.7, 2.8)	3.1 (3.0, 3.1)	3.3 (3.3, 3.4)	3.6 (3.6, 3.7)	3.9 (3.8, 4.0)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
HACTIV	5.6 (4.3, 7.3)	6.5 (4.6, 9.0)	7.8 (5.0, 11.9)					
Other Total Conventional Hip	4.2 (4.1, 4.3)	4.5 (4.5, 4.6)	4.9 (4.8, 4.9)	5.3 (5.2, 5.4)	5.7 (5.6, 5.8)	6.0 (5.9, 6.2)	6.5 (6.3, 6.6)	6.9 (6.7, 7.0)

CPR	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
HACTIV							
Other Total Conventional Hip	7.3 (7.1, 7.4)	7.6 (7.5, 7.8)	8.2 (8.0, 8.4)	8.5 (8.2, 8.7)	9.0 (8.7, 9.3)	9.6 (9.2, 10.1)	10.3 (9.5, 11.2)

Note: Prostheses no longer used in 2023 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

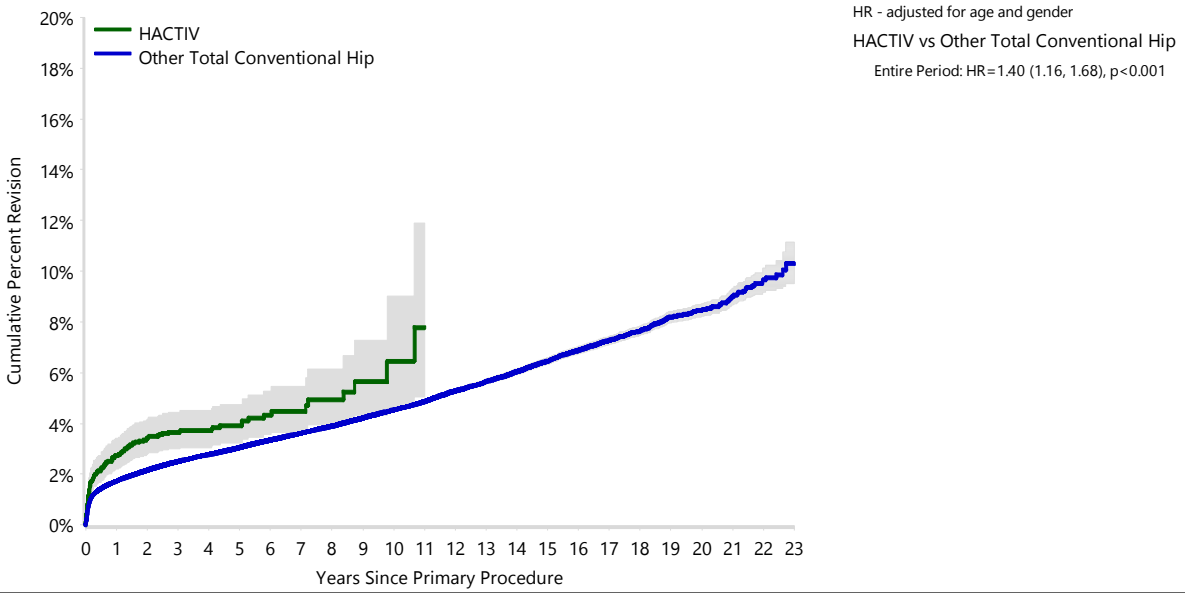
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the HACTIV total conventional hip prosthesis 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
HACTIV	2827	2511	2282	1865	1453	1080	656	432	335	203	107	57
Other Total Conventional Hip	535744	473164	423553	375332	331485	287926	247159	209213	174262	143121	117739	96213

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
HACTIV	13	2	0	0	0	0	0	0	0	0	0	0
Other Total Conventional Hip	77811	61600	47695	35979	26857	20094	14821	10048	6170	3221	1205	203

Note: Prostheses no longer used in 2023 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

	HACTIV		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	106	93.8	15846	82.8
Fractured Neck Of Femur	1	0.9	1419	7.4
Osteonecrosis	2	1.8	857	4.5
Developmental Dysplasia	2	1.8	318	1.7
Rheumatoid Arthritis			208	1.1
Failed Internal Fixation			151	0.8
Tumour			149	0.8
Other Inflammatory Arthritis	1	0.9	105	0.5
Fracture/Dislocation			53	0.3
Other			17	0.1
Arthrodesis Takedown	1	0.9	14	0.1
TOTAL	**113**	**100.0**	**19137**	**100.0**

Note: Prostheses no longer used in 2023 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 13.1 Years)

	HACTIV			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	29	1.0	25.7	4394	0.8	24.0
Prosthesis Dislocation/Instability	28	1.0	24.8	4250	0.8	23.2
Fracture	26	0.9	23.0	4017	0.7	22.0
Loosening	14	0.5	12.4	3544	0.7	19.4
Pain	3	0.1	2.7	323	0.1	1.8
Leg Length Discrepancy	1	0.0	0.9	289	0.1	1.6
Malposition	2	0.1	1.8	263	0.0	1.4
Implant Breakage Stem	1	0.0	0.9	172	0.0	0.9
Lysis	1	0.0	0.9	163	0.0	0.9
Implant Breakage Acetabular Insert	1	0.0	0.9	124	0.0	0.7
Incorrect Sizing	1	0.0	0.9	102	0.0	0.6
Wear Acetabular Insert				75	0.0	0.4
Implant Breakage Acetabular				70	0.0	0.4
Metal Related Pathology	2	0.1	1.8	68	0.0	0.4
Wear Head				45	0.0	0.2
Tumour				42	0.0	0.2
Implant Breakage Head				29	0.0	0.2
Heterotopic Bone				26	0.0	0.1
Wear Acetabulum				9	0.0	0.0
Osteonecrosis				2	0.0	0.0
Progression Of Disease				2	0.0	0.0
Synovitis				1	0.0	0.0
Other	4	0.1	3.5	286	0.1	1.6
N Revision	**113**	**4.0**	**100.0**	**18296**	**3.4**	**100.0**
N Primary	**2827**			**535744**		

Note: This table is restricted to revisions within 13.1 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2023 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 HACTIV total conventional hip prosthesis. 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

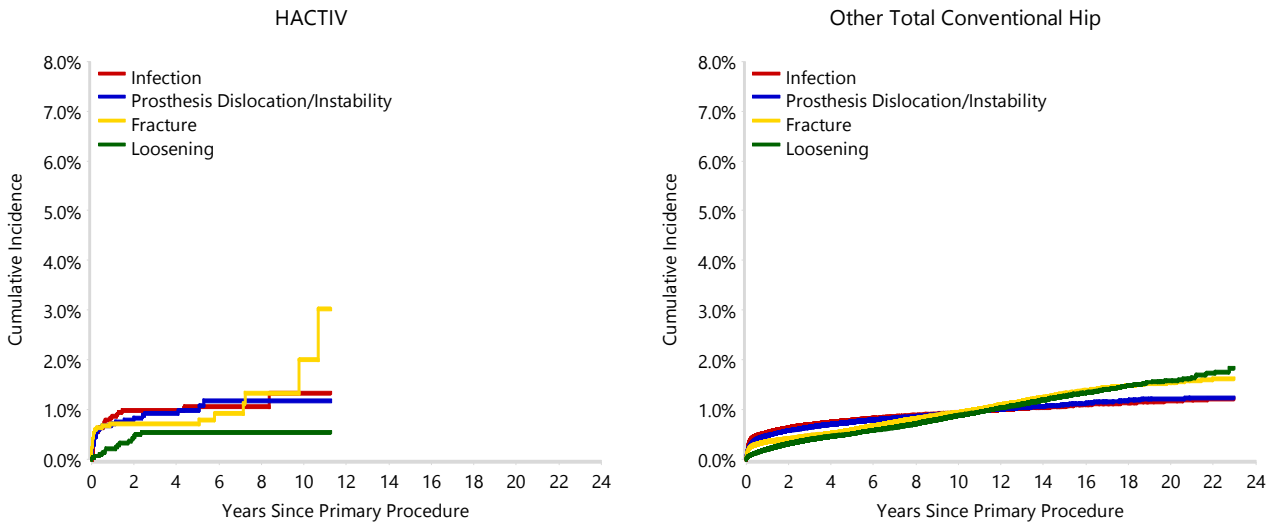


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the HACTIV total conventional hip prosthesis 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 HACTIV total conventional hip prosthesis compared to all other total conventional hip prostheses.

Table 5: Primary Total Conventional Hip Replacement - Type of Revision (Follow-up Limited to 13.1 Years)

	HACTIV		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	29	25.7	6052	33.1
Acetabular Component	40	35.4	3344	18.3
THR (Femoral/Acetabular)	15	13.3	2061	11.3
Cement Spacer	4	3.5	607	3.3
Removal of Prostheses			97	0.5
Reinsertion of Components			28	0.2
Bipolar Head and Femoral			7	0.0
Total Femoral			7	0.0
Saddle			1	0.0
N Major	**88**	**77.9**	**12204**	**66.7**
Head/Insert	22	19.5	4692	25.6
Head Only	3	2.7	911	5.0
Minor Components			301	1.6
Insert Only			184	1.0
Bipolar Only			2	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	**25**	**22.1**	**6092**	**33.3**
TOTAL	**113**	**100.0**	**18296**	**100.0**

Note: This table is restricted to revisions within 13.1 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2023 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 HACTIV 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 HACTIV Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	112	2823
Hybrid (Femur Cemented)	1	3
Reverse Hybrid (Femur Cementless)	0	1
TOTAL	**113**	**2827**

TABLE 7

Revision Rates of HACTIV 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 prosthesis are listed.

Table 7: Revised Number of HACTIV Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	16	347
Ceramic/Non XLPE	15	832
Ceramic/XLPE	67	1295
Ceramic/XLPE + Antioxidant	4	140
Metal/Non XLPE	7	108
Metal/XLPE	4	101
Metal/XLPE + Antioxidant	0	4
TOTAL	**113**	**2827**

TABLE 8

Revision Rates of HACTIV 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 prosthesis are listed.

Table 8: Revised Number of HACTIV Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	16	417
Lateral	11	365
Posterior	67	1757
TOTAL	**94**	**2539**

Note: Excludes 288 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 HACTIV total conventional hip prosthesis 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
HACTIV	NSW	35	674
	VIC	0	4
	QLD	1	14
	WA	59	1830
	SA	17	299
	ACT/NT	1	6
Other Total Conventional Hip	NSW	5172	157054
	VIC	4859	140677
	QLD	3790	94568
	WA	2487	61435
	SA	1809	49107
	TAS	452	18198
	ACT/NT	568	14705
TOTAL		**19250**	**538571**

Note: Prostheses no longer used in 2023 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 HACTIV Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the HACTIV total conventional hip prosthesis. 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 2023 has a maximum of one year to be revised, whereas a primary procedure performed in 2021 has a maximum of three years to be revised.

Table 10: Number of Revisions of HACTIV Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2010	0	2
2011	4	19
2012	1	63
2013	4	61
2014	9	117
2015	3	146
2016	1	96
2017	17	240
2018	20	452
2019	23	388
2020	14	418
2021	10	406
2022	3	194
2023	4	225
TOTAL	**113**	**2827**

TABLE 11

Revision Rates of HACTIV 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 HACTIV 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					
HACTIV	H49007-H49020	HA FEMORAL STEM	NO	METAL	HA COATED
HACTIV	H49C009-H49C020	HACTIV NON CEMENTED HAC COLLARED STEM	NO	METAL	HA COATED
HACTIV	H49L009-H49L020	HA LATERAL FEMORAL STEM	NO	METAL	HA COATED
HACTIV	H49LC009-H49LC020	FEMORAL STEM HIGH OFFSET COLLARED	NO	METAL	HA COATED

Table 11: Revised Number of HACTIV Primary Total Conventional Hip Replacement by Catalogue Number Range

Femoral Stem Range	N Revised	N Total
H49007-H49020	28	769
H49C009-H49C020	34	804
H49L009-H49L020	21	580
H49LC009-H49LC020	30	674
TOTAL	**113**	**2827**

TABLE 12

Revision Rates of HACTIV Primary Total Conventional Hip Replacement by Component

A prosthesis may be combined with multiple components. This analysis has been undertaken to determine if the revision rate varies according to the component with which it is combined.

Table 12: Revised Number of HACTIV Primary Total Conventional Hip Replacement by Acetabular Component

Acetabular Component	N Revised	N Total
Austral	3	62
Cer-Met	1	12
Delta-TT	9	130
FMP	0	13
Fin II	0	41
Furlong	1	18
G7	0	1
Logical G	70	1357
Marathon	0	1
PINNACLE	1	9
R3	0	5
Saturne	22	953
Trabecular Metal (Shell)	0	2
Trident (Shell)	1	1
Trident/Tritanium (Shell)	0	14
Trinity	5	208
TOTAL	**113**	**2827**