Revision Hip Total Conventional Hip Investigation

Note: This analysis compares the Revision Hip 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 Revision Hip 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)
Revision Hip	10	116	598	1.67 (0.80, 3.07)
Other Total Conventional Hip	19242	538451	3454315	0.56 (0.55, 0.56)
TOTAL	**19252**	**538567**	**3454913**	**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 Revision Hip 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
Revision Hip	2.9 (0.9, 8.8)	5.3 (2.2, 12.5)	8.3 (4.0, 16.9)	10.0 (5.0, 19.4)	12.0 (6.3, 22.4)	12.0 (6.3, 22.4)		
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
Revision Hip								
Other Total Conventional Hip	4.2 (4.2, 4.3)	4.5 (4.5, 4.6)	4.9 (4.8, 5.0)	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
Revision Hip							
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)	9.7 (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.

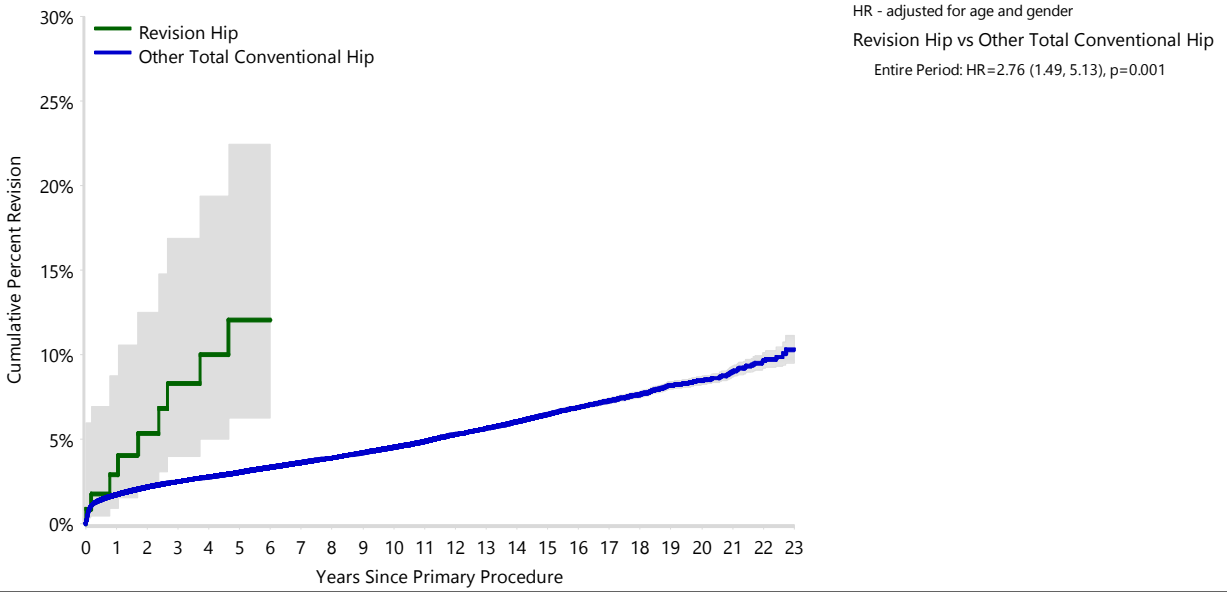
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Revision Hip 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
Revision Hip	116	84	68	60	50	43	40	32	32	27	18	16
Other Total Conventional Hip	538451	475585	425759	377127	332879	288953	247766	209605	174558	143289	117820	96247

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
Revision Hip	12	10	8	8	8	8	6	6	5	2	0	0
Other Total Conventional Hip	77813	61601	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

	Revision Hip		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	4	40.0	15948	82.9
Fractured Neck Of Femur	1	10.0	1420	7.4
Osteonecrosis			859	4.5
Developmental Dysplasia	1	10.0	319	1.7
Rheumatoid Arthritis	1	10.0	208	1.1
Failed Internal Fixation	1	10.0	150	0.8
Tumour	1	10.0	148	0.8
Other Inflammatory Arthritis			106	0.6
Fracture/Dislocation			53	0.3
Other	1	10.0	16	0.1
Arthrodesis Takedown			15	0.1
TOTAL	**10**	**100.0**	**19242**	**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

	Revision Hip			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	1	0.9	10.0	4503	0.8	23.4
Prosthesis Dislocation/Instability	1	0.9	10.0	4380	0.8	22.8
Fracture	3	2.6	30.0	4262	0.8	22.1
Loosening	4	3.4	40.0	3829	0.7	19.9
Pain	1	0.9	10.0	335	0.1	1.7
Leg Length Discrepancy				291	0.1	1.5
Malposition				269	0.0	1.4
Lysis				217	0.0	1.1
Implant Breakage Stem				192	0.0	1.0
Implant Breakage Acetabular Insert				131	0.0	0.7
Wear Acetabular Insert				113	0.0	0.6
Incorrect Sizing				103	0.0	0.5
Metal Related Pathology				84	0.0	0.4
Implant Breakage Acetabular				72	0.0	0.4
Wear Head				48	0.0	0.2
Tumour				44	0.0	0.2
Implant Breakage Head				33	0.0	0.2
Heterotopic Bone				26	0.0	0.1
Wear Acetabulum				11	0.0	0.1
Osteonecrosis				2	0.0	0.0
Progression Of Disease				2	0.0	0.0
Synovitis				1	0.0	0.0
Other				294	0.1	1.5
N Revision	**10**	**8.6**	**100.0**	**19242**	**3.6**	**100.0**
N Primary	**116**			**538451**		

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 Revision Hip 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

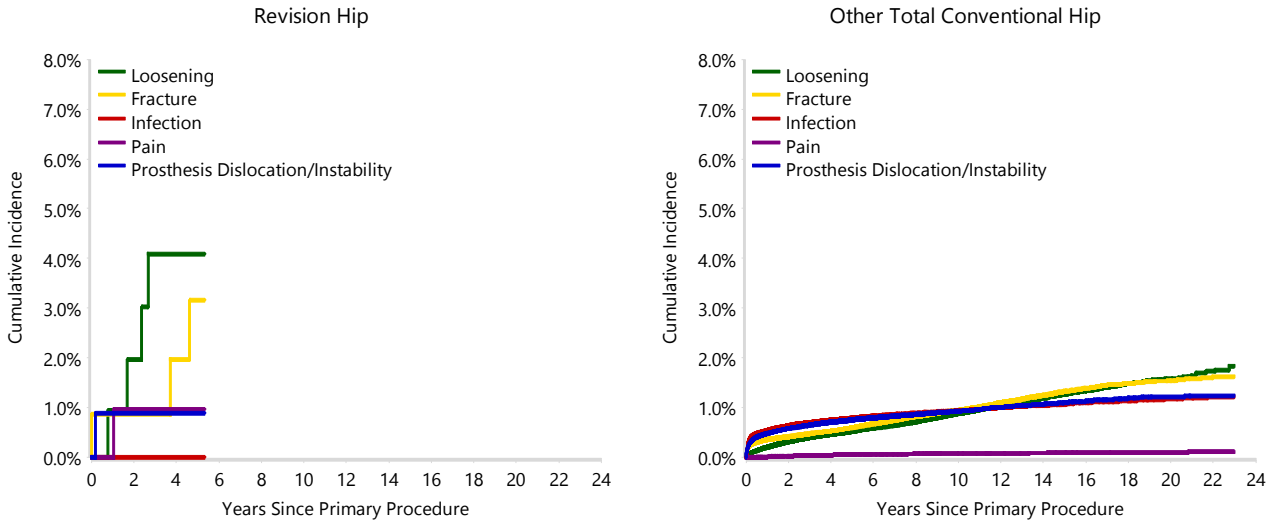


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

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

Table 5: Primary Total Conventional Hip Replacement - Type of Revision

	Revision Hip		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	6	60.0	6344	33.0
Acetabular Component	1	10.0	3608	18.8
THR (Femoral/Acetabular)	2	20.0	2253	11.7
Cement Spacer			620	3.2
Removal of Prostheses			99	0.5
Reinsertion of Components			28	0.1
Total Femoral			9	0.0
Bipolar Head and Femoral			7	0.0
Saddle			1	0.0
N Major	**9**	**90.0**	**12969**	**67.4**
Head/Insert	1	10.0	4844	25.2
Head Only			927	4.8
Minor Components			311	1.6
Insert Only			187	1.0
Bipolar Only			2	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	**1**	**10.0**	**6273**	**32.6**
TOTAL	**10**	**100.0**	**19242**	**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 6

Revision Rates of Revision Hip 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 Revision Hip Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	10	105
Reverse Hybrid (Femur Cementless)	0	11
TOTAL	**10**	**116**

TABLE 7

Revision Rates of Revision Hip 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 Revision Hip Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	1	16
Ceramic/Non XLPE	2	23
Ceramic/XLPE	2	18
Metal/Non XLPE	1	28
Metal/XLPE	4	30
Metal/XLPE + Antioxidant	0	1
TOTAL	**10**	**116**

TABLE 8

Revision Rates of Revision Hip 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 Revision Hip Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	1	1
Lateral	0	9
Posterior	3	43
TOTAL	**4**	**53**

Note: Excludes 63 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 Revision Hip 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
Revision Hip	NSW	2	18
	VIC	5	73
	QLD	2	8
	TAS	0	16
	ACT/NT	1	1
Other Total Conventional Hip	NSW	5206	157698
	VIC	4854	140616
	QLD	3791	94580
	WA	2546	63265
	SA	1825	49398
	TAS	452	18185
	ACT/NT	568	14709
TOTAL		**19252**	**538567**

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 Revision Hip Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Revision Hip 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 Revision Hip Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2002	2	7
2003	0	4
2004	0	3
2005	1	4
2006	0	3
2007	0	2
2008	1	1
2009	0	3
2010	0	3
2011	0	3
2012	0	7
2013	1	6
2014	1	13
2015	0	6
2016	1	5
2017	2	10
2018	1	4
2019	0	5
2020	0	2
2021	0	2
2022	0	11
2023	0	12
TOTAL	**10**	**116**

TABLE 11

Revision Rates of Revision Hip 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 Revision Hip 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
Femoral Stem				
Revision Hip	751515005-751515060	TITANIUM NONHA GRIT BLAST FEMORAL BODY	NO	METAL
Revision Hip	751515105-751515160	TITANIUM NONHA GRIT BLAST FEMORAL BODY	NO	METAL

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

Femoral Stem Range	N Revised	N Total
751515005-751515060	5	66
751515105-751515160	5	50
TOTAL	**10**	**116**

TABLE 12

Revision Rates of Revision Hip 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 Revision Hip Primary Total Conventional Hip Replacement by Acetabular Component

Acetabular Component	N Revised	N Total
ABGII	0	1
Allofit	0	1
Avantage	0	1
BI-MENTUM	0	1
Delta Revision TT	1	9
Delta-One-TT	2	19
Delta-PF	2	9
Delta-TT	2	26
Duraloc	0	2
Duraloc Option	0	1
Marathon	0	2
Mpact	1	2
Mueller	0	3
No Acetabular	0	1
PINNACLE	0	7
Polarcup	0	1
R3	0	1
Reflection (Cup)	0	2
Reflection (Shell)	1	1
SPH-Blind	0	10
SPH-Revision	1	1
Total Hip Replacement (Lima)	0	1
Trabecular Metal (Shell)	0	2
Trident (Shell)	0	3
Trident/Tritanium (Shell)	0	1
Versafitcup CC	0	1
Versafitcup DM	0	7
TOTAL	**10**	**116**