

BHR Total Conventional Hip Investigation

Note: This analysis compares the BHR acetabular 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-2026>.

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 2025 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the BHR 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)
BHR	614	2988	39260	1.56 (1.44, 1.69)
Other Total Conventional Hip	19701	568612	3623071	0.54 (0.54, 0.55)
TOTAL	20315	571600	3662331	0.55 (0.55, 0.56)

Note: Prostheses no longer used in 2025 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 BHR total conventional hip prosthesis 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
BHR	1.1 (0.8, 1.6)	2.3 (1.9, 3.0)	3.2 (2.6, 3.9)	4.3 (3.6, 5.1)	6.1 (5.3, 7.0)	8.0 (7.0, 9.0)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.1 (2.1, 2.2)	2.5 (2.4, 2.5)	2.8 (2.7, 2.8)	3.0 (3.0, 3.1)	3.3 (3.2, 3.3)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs
BHR	9.2 (8.2, 10.4)	11.0 (9.9, 12.2)	12.4 (11.3, 13.7)	14.3 (13.0, 15.7)	16.1 (14.7, 17.5)	17.5 (16.1, 19.0)
Other Total Conventional Hip	3.5 (3.5, 3.6)	3.8 (3.7, 3.9)	4.1 (4.0, 4.2)	4.4 (4.3, 4.5)	4.7 (4.6, 4.8)	5.1 (5.0, 5.2)

CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
BHR	19.0 (17.6, 20.6)	20.1 (18.6, 21.7)	21.2 (19.6, 22.8)	22.6 (21.0, 24.3)	23.7 (22.0, 25.5)	25.0 (23.2, 26.8)
Other Total Conventional Hip	5.4 (5.3, 5.5)	5.8 (5.7, 5.9)	6.2 (6.1, 6.3)	6.6 (6.5, 6.7)	7.0 (6.8, 7.1)	7.3 (7.1, 7.5)

CPR	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs	24 Yrs	25 Yrs
BHR	25.8 (24.0, 27.8)	26.6 (24.6, 28.7)	27.7 (25.2, 30.4)				
Other Total Conventional Hip	7.7 (7.5, 7.9)	8.0 (7.8, 8.2)	8.6 (8.3, 8.9)	9.0 (8.7, 9.4)	9.6 (9.1, 10.0)	9.6 (9.2, 10.1)	10.3 (9.4, 11.2)

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

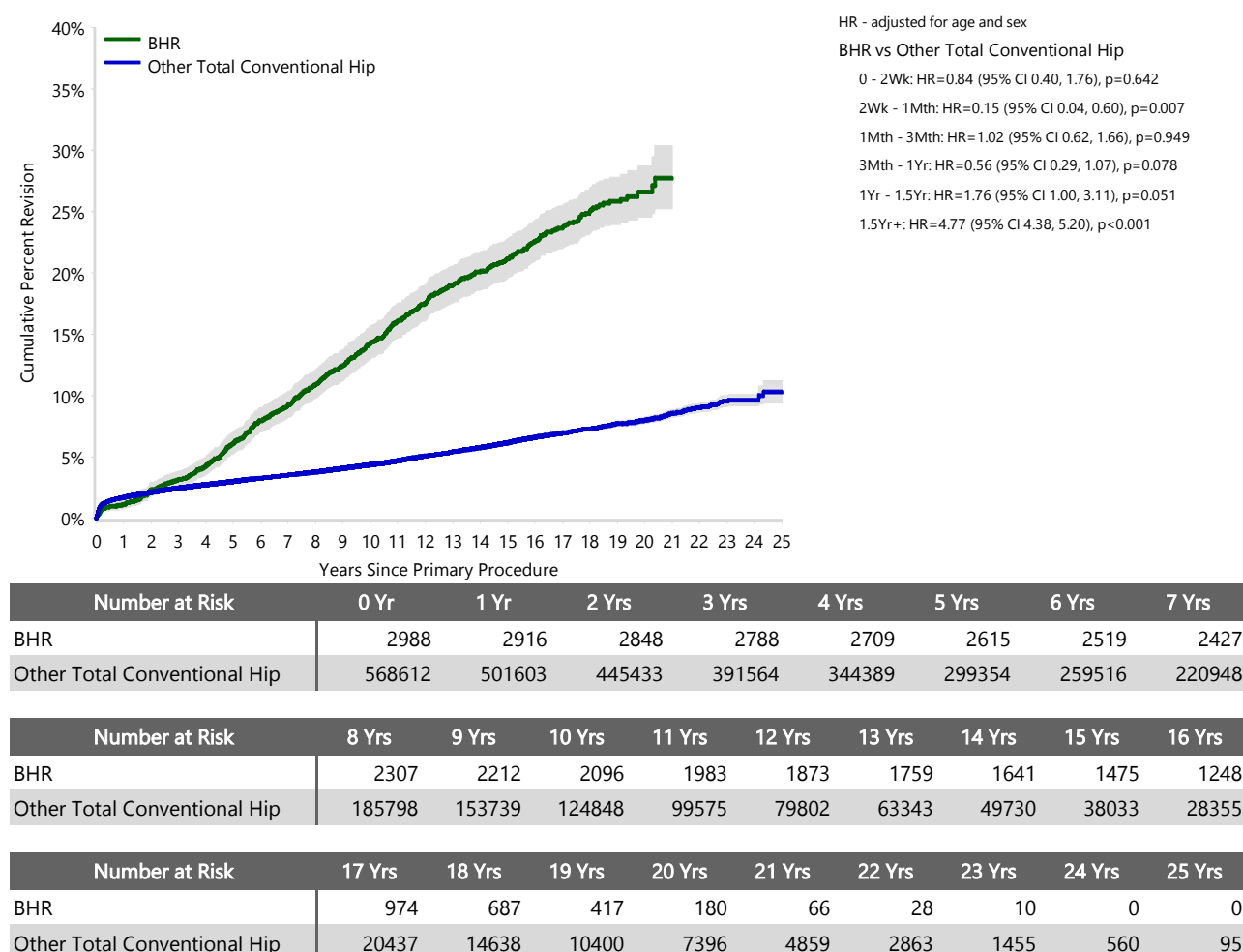
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the BHR 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



Note: Prostheses no longer used in 2025 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

Primary Diagnosis	BHR		Other Total Conventional Hip	
	Number	Percent	Number	Percent
Osteoarthritis	525	85.5	16296	82.7
Fractured Neck Of Femur	15	2.4	1521	7.7
Osteonecrosis	37	6.0	844	4.3
Developmental Dysplasia	17	2.8	321	1.6
Rheumatoid Arthritis	8	1.3	201	1.0
Failed Internal Fixation	1	0.2	165	0.8
Tumour			157	0.8
Other Inflammatory Arthritis	8	1.3	102	0.5
Fracture/Dislocation	1	0.2	60	0.3
Other			21	0.1
Arthrodesis Takedown	2	0.3	13	0.1
TOTAL	614	100.0	19701	100.0

Note: Prostheses no longer used in 2025 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 23.8 Years)

Revision Diagnosis	Number	BHR		Other Total Conventional Hip		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	92	3.1	15.0	5017	0.9	25.5
Prosthesis Dislocation/Instability	20	0.7	3.3	4382	0.8	22.2
Fracture	43	1.4	7.0	4348	0.8	22.1
Loosening	84	2.8	13.7	3627	0.6	18.4
Pain	21	0.7	3.4	340	0.1	1.7
Leg Length Discrepancy	5	0.2	0.8	307	0.1	1.6
Malposition	2	0.1	0.3	282	0.0	1.4
Metal Related Pathology	270	9.0	44.0	93	0.0	0.5
Implant Breakage Stem	8	0.3	1.3	211	0.0	1.1
Lysis	56	1.9	9.1	200	0.0	1.0
Implant Breakage Acetabular Insert				128	0.0	0.6
Wear Acetabular Insert	1	0.0	0.2	112	0.0	0.6
Incorrect Sizing	2	0.1	0.3	96	0.0	0.5
Implant Breakage Acetabular	1	0.0	0.2	73	0.0	0.4
Wear Head	2	0.1	0.3	49	0.0	0.2
Tumour	3	0.1	0.5	46	0.0	0.2
Heterotopic Bone				26	0.0	0.1
Implant Breakage Head	1	0.0	0.2	26	0.0	0.1
Wear Acetabulum	2	0.1	0.3	6	0.0	0.0
Osteonecrosis				4	0.0	0.0
Synovitis				2	0.0	0.0
Progression Of Disease				1	0.0	0.0
Other	1	0.0	0.2	322	0.1	1.6
N Revision	614	20.5	100.0	19698	3.5	100.0
N Primary	2988			568612		

Note: This table is restricted to revisions within 23.8 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2025 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 BHR 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.

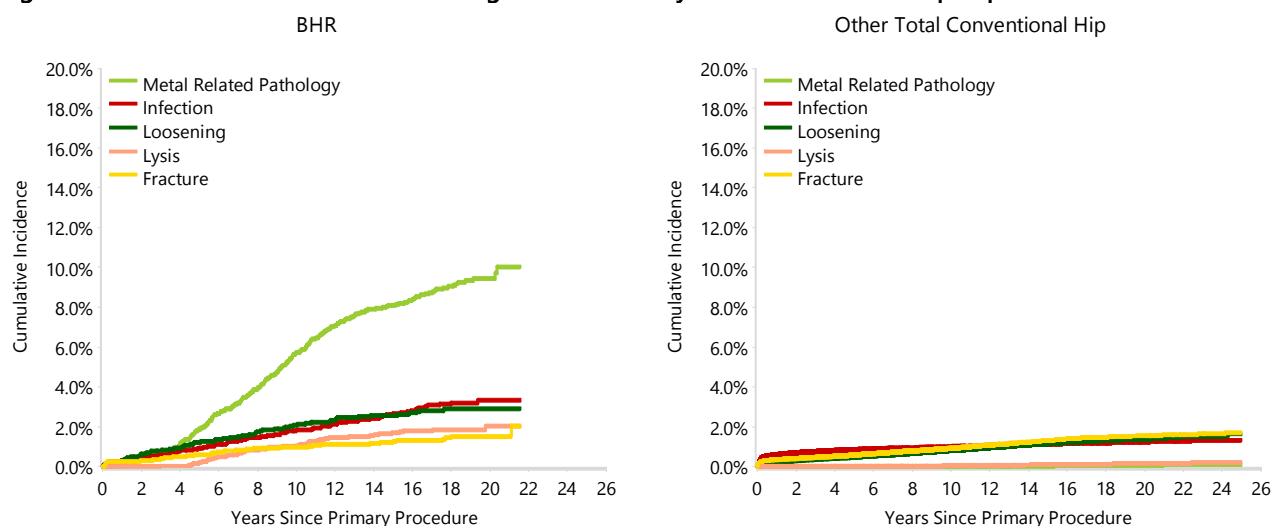
Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Conventional Hip Replacement

TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the BHR 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 BHR 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 23.8 Years)

Type of Revision	BHR		Other Total Conventional Hip	
	Number	Percent	Number	Percent
Femoral Component	58	9.4	6645	33.7
Acetabular Component	276	45.0	3310	16.8
THR (Femoral/Acetabular)	130	21.2	2303	11.7
Cement Spacer	27	4.4	556	2.8
Removal of Prostheses	3	0.5	93	0.5
Reinsertion of Components			27	0.1
Total Femoral			12	0.1
Bipolar Head and Femoral	1	0.2	10	0.1
Saddle	1	0.2		
N Major	496	80.8	12956	65.8
Head/Insert	95	15.5	5372	27.3
Head Only	20	3.3	914	4.6
Minor Components	2	0.3	285	1.4
Insert Only	1	0.2	168	0.9
Bipolar Only			1	0.0
Cement Only			1	0.0
Head/Neck/Insert			1	0.0
N Minor	118	19.2	6742	34.2
TOTAL	614	100.0	19698	100.0

Note: This table is restricted to revisions within 23.8 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2025 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 BHR 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 BHR Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cemented	2	7
Cementless	430	1995
Hybrid (Femur Cemented)	182	985
Reverse Hybrid (Femur Cementless)	0	1
TOTAL	614	2988

TABLE 7**Revision Rates of BHR 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 BHR Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Metal	0	2
Metal/Metal	613	2984
Unknown	1	2
TOTAL	614	2988

TABLE 8**Revision Rates of BHR 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 BHR Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Lateral	0	1
TOTAL	0	1

Note: Excludes 2987 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 BHR 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
BHR	NSW	232	1140
	VIC	56	316
	QLD	295	1442
	WA	2	3
	SA	7	38
	TAS	6	16
	ACT/NT	16	33
Other Total Conventional Hip	NSW	5507	167002
	VIC	4853	146558
	QLD	3968	104359
	WA	2510	64946
	SA	1887	52084
	TAS	439	18269
	ACT/NT	537	15394
TOTAL		20315	571600

Note: Prostheses no longer used in 2025 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 BHR Primary Total Conventional Hip Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the BHR 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 2025 has a maximum of one year to be revised, whereas a primary procedure performed in 2023 has a maximum of three years to be revised.

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

Year of Implant	Number Revised	Total Number
2001	0	1
2002	3	38
2003	10	66
2004	26	127
2005	58	288
2006	120	550
2007	123	581
2008	92	477
2009	95	404
2010	57	276
2011	25	134
2012	3	27
2013	2	13
2014	0	5
2015	0	1
TOTAL	614	2988

TABLE 11

Revision Rates of BHR 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 BHR 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	Fixation
Acetabular						
BHR	120144-120154	ACETABULAR CUP POROCAST HAP COATED <56MM	NO	METAL	HA COATED	POROUS
BHR	120156-120166	ACETABULAR CUP POROCAST HAP COATED	NO	METAL	HA COATED	POROUS
BHR	120246-120254	BIRMINGHAM DYSPLASIA CUP <56MM	NO	METAL	HA COATED	POROUS
BHR	120258-120266	BIRMINGHAM DYSPLASIA CUP	NO	METAL	HA COATED	POROUS
BHR	74120144-74122154	ACETABULAR CUP W/ IMPACTOR HAP COCR <56MM	NO	METAL	HA COATED	
BHR	74120156-74122168	ACETABULAR CUP W/ IMPACTOR HAP COCR	NO	METAL	HA COATED	
BHR	74120246-74122252	DYSPLASIA CUP W/ IMPACTOR HAP COCR <56MM	NO	METAL		
BHR	74120258-74122264	DYSPLASIA CUP W/ IMPACTOR HAP COCR	NO	METAL	HA COATED	
BHR	CMD0171-CMD0171	BHR DYSPLASIA CUP POROCAST HAP COCR	NO	METAL		

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

Acetabular Range	N Revised	N Total
120144-120154	46	204
120156-120166	37	227
120246-120254	10	35
120258-120266	4	15
74120144-74122154	238	1113
74120156-74122168	258	1274
74120246-74122252	14	88
74120258-74122264	7	31
CMD0171-CMD0171	0	1
TOTAL	614	2988

TABLE 12

Revision Rates of BHR 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 BHR Primary Total Conventional Hip Replacement by Femoral Stem Component

Femoral Stem Component	N Revised	N Total
ABGII	1	6
Accolade I	39	91
AcuMatch M-Series	1	1
Alloclassic	18	102
Anthology	92	387
BMHR	19	110
BMHR VST	45	256
Basis	0	1
Bi-Metric	10	61
C.F.P.	0	2
CLS	0	6
CORAIL	2	7
CPCS	62	289
Custom Made (MSA)	0	1
Echelon	1	14
Emperion	9	30
Epoch	1	4
Exeter V40	7	67
F2L	0	6
Generic Stem	1	1
Image	2	4
MS 30	2	10
MiniHip	0	1
Natural Hip	0	17
Omnifit	0	1
Platform	19	82
Polarstem	8	26
Reef	0	2
Restoration	1	3
SL-Plus	10	22
SLR-Plus	1	2
Secur-Fit	0	2
Secur-Fit Plus HA	0	5
Securus	0	1
Spectron EF	102	537
Synergy	159	826
UniSyn	0	3
Wagner	1	1
ZMR	1	1
TOTAL	614	2988