

Ortho Update

ABS Group

4-Nov-11

Australian National Joint Registry Results 2011

The latest Australian National Joint Replacement Registry annual report (ANJRR) contains data from September 1999 to 31st December 2010 and is among the most compliant registries in the world. The 2011 ANJRR is based on the analysis of 628,093 primary and revision hip and knee procedures and highlights the continued exceptional clinical success of the BIRMINGHAM HIP[®] Resurfacing (BHR[®]) device.

1. Excellent BHR Survivorship – exceeding ANJRR's 10 year survivorship guidelines

Table HT78: Yearly Cumulative Percent Revision of Primary Total Resurfacing Hip Replacement

Head Component	Acetabular Component	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
ASR	ASR	3.3 (2.5, 4.5)	5.9 (4.7, 7.5)	10.5 (8.6, 12.7)	13.0 (9.3, 17.9)	
Adept	Adept	1.2 (0.5, 2.9)	1.9 (0.9, 3.9)			
BHR	BHR	1.5 (1.2, 1.7)	2.5 (2.2, 2.8)	3.5 (3.1, 3.9)	5.0 (4.4, 5.5)	6.3 (5.3, 7.4)
Bionik	Bionik	3.8 (1.8, 7.7)	10.0 (6.1, 16.4)			
Cormet	Cormet	2.0 (0.9, 4.1)	4.5 (2.7, 7.5)	6.2 (3.8, 9.9)	11.1 (7.3, 16.7)	
Cormet 2000 HAP Bi-Coated	Cormet	2.5 (1.1, 5.5)	4.8 (2.7, 8.6)	7.4 (4.4, 12.1)		
Durom	Durom	3.1 (2.2, 4.6)	5.4 (4.0, 7.2)	7.3 (5.6, 9.5)	9.6 (6.7, 13.7)	
Icon	Icon	0.9 (0.1, 6.2)	1.9 (0.5, 7.3)			
Mitch TRH	Mitch TRH	1.3 (0.7, 2.3)	2.2 (1.3, 3.6)			
Recap	Recap	4.3 (2.2, 8.4)	6.0 (3.4, 10.7)			
Other (6)		5.6 (3.1, 10.2)	8.0 (4.8, 13.1)	10.4 (6.7, 16.1)	12.7 (8.4, 18.9)	

Note: Only prostheses with over 100 procedures have been listed.

- Conserve Plus not featured probably due to low implantations
- Recap has been newly identified as having higher than anticipated revision rates
- Bionik and Durom are still being used although identified with higher than anticipated revision rates.

Resurfacing demographics

- With a 6.3% revision rate at 10 years the BHR conforms to the ANJRR 10 year guidelines of a revision rate no greater than 7.5%. This exceeds the UK's NICE guidelines which state that prostheses should demonstrate a revision rate of 10% or less at 10 years.
- 6.8% of all primary hip replacement in 2010
- ≤55 year old patients are increasing
- 91.0% of patients were male
- BHR has the longest reported clinical results for resurfacing in the registry and provides far superior results then reported competitor devices.

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2. BHR[®] vs. THR – BHR survivorship outperforms THR

- BHR revision rate for all diagnoses at 10 years is **6.3%**

Table HT14: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Primary Diagnosis

CPR	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
Osteoarthritis	1.5 (1.4, 1.5)	2.6 (2.5, 2.7)	3.4 (3.3, 3.5)	4.4 (4.2, 4.5)	6.2 (5.9, 6.5)
Osteonecrosis	2.1 (1.8, 2.5)	3.4 (3.0, 3.9)	4.6 (4.0, 5.2)	5.6 (5.0, 6.4)	7.2 (6.2, 8.5)
Fractured Neck Of Femur	3.0 (2.6, 3.4)	4.5 (4.0, 5.1)	5.5 (4.9, 6.3)	6.5 (5.6, 7.4)	
Rheumatoid Arthritis	2.0 (1.6, 2.7)	3.9 (3.1, 4.8)	4.4 (3.6, 5.3)	5.4 (4.5, 6.6)	7.5 (5.8, 9.6)
Developmental Dysplasia	2.2 (1.7, 2.8)	3.3 (2.7, 4.1)	4.4 (3.5, 5.4)	5.4 (4.4, 6.6)	6.4 (5.0, 8.1)
Other (6)	2.8 (2.3, 3.5)	4.4 (3.7, 5.3)	5.2 (4.3, 6.2)	6.0 (5.0, 7.3)	7.6 (5.7, 10.1)

This is supported when revision rate is expressed as number of revisions per 100 observed years.

- BHR revision rate per 100 observed years is **0.72%** outperforming THR for all diagnoses

Table HT13: Revision Rates of Primary Total Conventional Hip Replacement by Primary Diagnosis

Primary Diagnosis	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Osteoarthritis	5353	173591	725009	0.74 (0.72, 0.76)
Osteonecrosis	296	7180	30945	0.96 (0.85, 1.07)
Fractured Neck Of Femur	316	7353	22147	1.43 (1.27, 1.59)
Rheumatoid Arthritis	113	2519	12019	0.94 (0.77, 1.13)
Developmental Dysplasia	105	2570	11794	0.89 (0.73, 1.08)
Other (6)	138	3369	10803	1.28 (1.07, 1.51)
TOTAL	6321	196582	812718	0.78 (0.76, 0.80)

Note: Only prostheses with over 1000 procedures have been listed.

Table HT77: Revision Rates of Primary Total Resurfacing Hip Replacement

Head Component	Acetabular Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
ASR	ASR	103	1167	4932	2.09 (1.70, 2.53)
Adept	Adept	8	415	1223	0.65 (0.28, 1.29)
BHR	BHR	373	9678	51745	0.72 (0.65, 0.80)
Bionik	Bionik	18	192	495	3.64 (2.16, 5.75)
Cormet	Cormet	27	363	1539	1.75 (1.16, 2.55)
Cormet 2000 HAP Bi-Coated	Cormet	18	245	930	1.94 (1.15, 3.06)
Durom	Durom	58	837	3723	1.56 (1.18, 2.01)
Icon	Icon	3	113	401	0.75 (0.15, 2.19)
Mitch TRH	Mitch TRH	17	918	2065	0.82 (0.48, 1.32)
Recap	Recap	13	192	577	2.25 (1.20, 3.85)
Other (6)		22	178	1046	2.10 (1.32, 3.19)
TOTAL		660	14298	68673	0.96 (0.89, 1.04)

Note: Only prostheses with over 100 procedures have been listed.

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BHR outperforms THR in patients under 64 years of age

BHR survivorship at 10 years (6.3%) for all ages and diagnoses is superior to THR survivorship for OA in patients under 64 years for both genders

Table HT24: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Fixation and Age (Primary Diagnosis OA)

Age	Fixation	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
<55	Cemented	1.3 (0.6, 2.6)	2.6 (1.6, 4.2)	4.1 (2.7, 6.2)	5.6 (3.8, 8.2)	
	Cementless	1.4 (1.3, 1.7)	3.3 (3.0, 3.6)	4.3 (3.9, 4.7)	5.0 (4.6, 5.5)	6.8 (5.8, 8.0)
	Hybrid	1.1 (0.8, 1.6)	1.8 (1.4, 2.5)	3.1 (2.4, 3.9)	5.2 (4.1, 6.6)	9.1 (6.6, 12.4)
55-64	Cemented	1.5 (1.0, 2.1)	3.0 (2.3, 3.9)	4.1 (3.3, 5.2)	5.4 (4.3, 6.7)	10.6 (8.0, 13.9)
	Cementless	1.5 (1.4, 1.6)	2.9 (2.7, 3.1)	3.8 (3.6, 4.1)	4.8 (4.5, 5.2)	7.5 (6.5, 8.6)
	Hybrid	1.0 (0.9, 1.3)	2.0 (1.7, 2.3)	2.9 (2.5, 3.3)	4.2 (3.7, 4.9)	6.2 (5.3, 7.3)
65-74	Cemented	1.0 (0.8, 1.3)	2.2 (1.8, 2.6)	3.2 (2.7, 3.7)	4.6 (4.0, 5.3)	6.3 (5.4, 7.5)
	Cementless	1.5 (1.4, 1.7)	2.6 (2.5, 2.8)	3.5 (3.3, 3.7)	4.2 (4.0, 4.5)	5.9 (5.0, 6.9)
	Hybrid	1.2 (1.1, 1.4)	2.2 (2.0, 2.4)	3.0 (2.7, 3.2)	3.8 (3.5, 4.1)	5.0 (4.5, 5.6)
≥75	Cemented	1.0 (0.8, 1.3)	1.8 (1.5, 2.1)	2.6 (2.2, 3.0)	3.0 (2.6, 3.5)	4.4 (3.4, 5.6)
	Cementless	2.3 (2.1, 2.5)	3.4 (3.2, 3.7)	4.2 (3.9, 4.5)	5.2 (4.8, 5.7)	7.2 (5.6, 9.2)
	Hybrid	1.2 (1.1, 1.4)	2.1 (1.9, 2.3)	2.7 (2.5, 3.0)	3.4 (3.1, 3.7)	4.3 (3.7, 5.0)

This is supported when revision rate is expressed as number of revisions per 100 observed years.

- BHR revision/100 observed years is **0.72%**
- Male and Female under 64 years of age have a higher revision rate than 0.72%

Table HT19: Revision Rates of Primary Total Conventional Hip Replacement by Age and Gender (Primary Diagnosis OA)

Gender	Age	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Male	<55	320	9657	41311	0.77 (0.69, 0.86)
	55-64	695	20270	86611	0.80 (0.74, 0.86)
	65-74	869	28996	124220	0.70 (0.65, 0.75)
	≥75	663	20654	78257	0.85 (0.78, 0.91)
Female	<55	320	8262	34728	0.92 (0.82, 1.03)
	55-64	668	20799	86317	0.77 (0.72, 0.83)
	65-74	953	32069	138647	0.69 (0.64, 0.73)
	≥75	865	32884	134919	0.64 (0.60, 0.69)
TOTAL		5353	173591	725009	0.74 (0.72, 0.76)

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BHR provides superior results compared to THR in patients ≤ 64 regardless of the fixation

- BHR revision rate of 6.3% at 10 years outperforms THR revision rates for males and females <64 years.

Table HT20: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Age and Gender (Primary Diagnosis OA)

Gender	Age	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
Male	<55	1.2 (1.0, 1.5)	2.7 (2.4, 3.1)	3.7 (3.3, 4.2)	4.6 (4.1, 5.2)	7.5 (6.1, 9.2)
	55-64	1.5 (1.3, 1.6)	2.8 (2.5, 3.0)	3.6 (3.3, 3.9)	4.9 (4.5, 5.3)	8.0 (6.9, 9.3)
	65-74	1.3 (1.2, 1.4)	2.4 (2.2, 2.6)	3.3 (3.1, 3.5)	4.4 (4.1, 4.7)	5.8 (5.1, 6.5)
	≥75	1.8 (1.6, 2.0)	2.9 (2.7, 3.2)	3.8 (3.5, 4.2)	4.6 (4.2, 5.0)	6.4 (5.4, 7.7)
Female	<55	1.6 (1.3, 1.9)	3.4 (3.0, 3.8)	4.5 (4.0, 5.1)	5.7 (5.0, 6.4)	7.0 (6.0, 8.2)
	55-64	1.3 (1.2, 1.5)	2.6 (2.4, 2.9)	3.6 (3.3, 3.9)	4.6 (4.2, 5.0)	6.9 (6.0, 7.9)
	65-74	1.4 (1.3, 1.6)	2.5 (2.3, 2.7)	3.3 (3.0, 3.5)	4.0 (3.7, 4.3)	5.4 (4.9, 6.1)
	≥75	1.5 (1.4, 1.6)	2.3 (2.1, 2.5)	3.0 (2.7, 3.2)	3.7 (3.4, 3.9)	4.6 (4.0, 5.3)

This is supported when revision rate is expressed as number of revisions per 100 observed years.

- BHR revision/100 observed years is 0.72%

Table HT23: Revision Rates of Primary Total Conventional Hip Replacement by Fixation and Age (Primary Diagnosis OA)

Age	Fixation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
<55	Cemented	29	641	3597	0.81 (0.54, 1.16)
	Cementless	519	14608	60160	0.86 (0.79, 0.94)
	Hybrid	92	2670	12281	0.75 (0.60, 0.92)
55-64	Cemented	107	2068	11429	0.94 (0.77, 1.13)
	Cementless	990	29853	120871	0.82 (0.77, 0.87)
	Hybrid	266	9148	40629	0.65 (0.58, 0.74)
65-74	Cemented	217	5742	31869	0.68 (0.59, 0.78)
	Cementless	1028	34601	137306	0.75 (0.70, 0.80)
	Hybrid	577	20722	93692	0.62 (0.57, 0.67)
≥75	Cemented	195	8225	39736	0.49 (0.42, 0.56)
	Cementless	761	21197	76331	1.00 (0.93, 1.07)
	Hybrid	572	24116	97108	0.59 (0.54, 0.64)
TOTAL		5353	173591	725009	0.74 (0.72, 0.76)

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3. Outcome of first revision

Re-revision rates for resurfacing **are lower** than re-revision for THR.

Revisions in the resurfacing group have a high proportion of badly performing devices such as ASR™ or Durom®.

Table R3: Re-revision Rates of Known Primary Total Conventional Hip Replacement (Primary Diagnosis OA, excluding first revision for Infection)

Revision of Primary	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Minor	188	1167	3768	4.99 (4.30, 5.76)
Major Partial	323	2806	8292	3.90 (3.48, 4.34)
Major Total	40	445	1052	3.80 (2.72, 5.18)
All Revision	551	4418	13112	4.20 (3.86, 4.57)

Note: Excluding revisions where no minor or major femoral/acetabular components have been inserted.

Table R7: Re-revision Rates of Known Primary Total Resurfacing Hip Replacement (Primary Diagnosis OA, excluding first revision for Infection)

Revision of Primary	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Acetabular Component	6	37	160	3.75 (1.38, 8.16)
Femoral Component	27	287	1150	2.35 (1.55, 3.42)
THR (Femoral/Acetabular)	21	222	472	4.45 (2.76, 6.80)
All Revision	54	546	1782	3.03 (2.28, 3.95)

Note: Excluding revisions where no major femoral/acetabular components have been inserted.

- Minor revisions account for 15.3% of all THR revisions, the most common is head or insert exchange and this type of revision accounts for 10.6% of all revisions.
- When revising a failed BHR®, conversion to a primary is relatively straightforward¹.
- Total hip replacement after a failed BHR has comparable clinical and functional outcomes to primary total hip replacement².

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4. Large Diameter MoM THR: BHR[®] combined with Smith & Nephew stems perform at a comparable rate to other bearings

- BHR & SYNERGY[®] combination failure rate at 5 years is 3.2 (2.0 5.0) – outperforming other bearings with large heads

Table HT34: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Bearing Surface and Head Size (Primary Diagnosis OA)

Bearing Surface	Head Size	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
Ceramic/Ceramic	≤32mm	1.6 (1.4, 1.7)	2.7 (2.4, 2.9)	3.4 (3.2, 3.7)	4.3 (4.0, 4.6)	5.6 (4.9, 6.3)
	>32mm	1.4 (1.2, 1.6)	2.4 (2.1, 2.8)	3.4 (2.9, 3.9)	3.9 (3.3, 4.6)	
Ceramic/Polyethylene	≤32mm	1.5 (1.2, 1.9)	2.4 (2.0, 2.9)	3.1 (2.6, 3.7)	4.1 (3.5, 4.9)	8.1 (6.5, 10.2)
	>32mm	3.6 (1.7, 7.6)				
Ceramic/Modified Polyethylene	≤32mm	1.4 (1.2, 1.7)	2.4 (2.1, 2.8)	2.9 (2.5, 3.3)	3.7 (3.2, 4.3)	6.2 (4.8, 8.1)
	>32mm	1.2 (0.9, 1.7)	2.6 (2.0, 3.4)	3.5 (2.4, 5.0)		
Metal/Metal	≤32mm	1.5 (1.2, 1.9)	3.0 (2.6, 3.6)	3.9 (3.3, 4.5)	4.5 (3.9, 5.2)	5.2 (4.4, 6.1)
	>32mm	1.7 (1.5, 1.9)	4.6 (4.2, 5.0)	7.1 (6.6, 7.7)	9.4 (8.5, 10.4)	
Metal/Polyethylene	≤32mm	1.4 (1.3, 1.6)	2.5 (2.3, 2.7)	3.6 (3.3, 3.8)	4.8 (4.5, 5.2)	7.1 (6.5, 7.8)
	>32mm	1.7 (0.7, 3.7)	4.2 (1.9, 9.2)			
Metal/Modified Polyethylene	≤32mm	1.4 (1.3, 1.5)	2.3 (2.1, 2.4)	2.9 (2.7, 3.0)	3.6 (3.4, 3.8)	4.7 (4.3, 5.1)
	>32mm	1.5 (1.3, 1.7)	2.3 (2.0, 2.7)	3.2 (2.7, 3.8)	3.8 (3.0, 4.8)	
Ceramicised Metal/Modified Polyethylene	≤32mm	1.0 (0.8, 1.4)	1.5 (1.1, 1.9)	1.8 (1.4, 2.3)	2.2 (1.6, 2.9)	
	>32mm	1.4 (1.0, 2.0)	1.9 (1.4, 2.7)	2.1 (1.5, 2.9)		
Other (5)	≤32mm	1.9 (0.9, 4.0)	3.6 (2.0, 6.3)	4.0 (2.3, 6.8)	7.2 (4.1, 12.5)	
	>32mm	2.3 (1.4, 3.9)				

- BHR & SYNERGY[®] combination has comparable results to popular bearing choices

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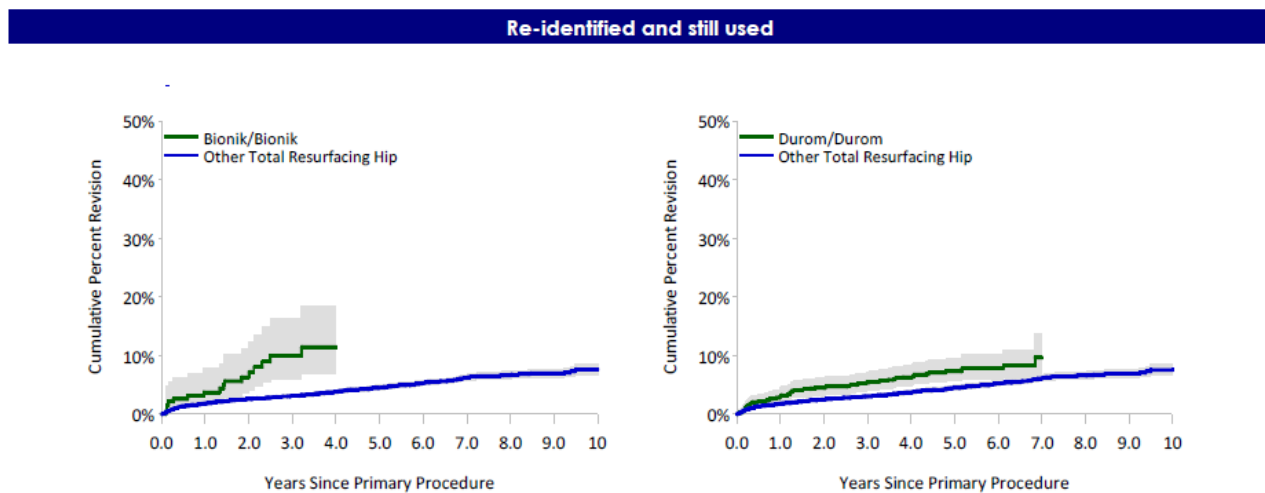
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5. Higher than anticipated revision rates

Table IP11: Yearly Cumulative Percent Revision of Individual Total Resurfacing Hip identified as having a Higher than Anticipated Revision Rate

CPR	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
Identified and no longer used					
ASR/ASR	3.3 (2.5, 4.5)	5.9 (4.7, 7.5)	10.5 (8.6, 12.7)	13.0 (9.3, 17.9)	
*Cormet 2000 HAP	6.3 (2.9, 13.5)	8.4 (4.3, 16.1)	9.5 (5.0, 17.4)	12.6 (7.4, 21.2)	
Re-Identified and still used					
Bionik/Bionik	3.8 (1.8, 7.7)	10.0 (6.1, 16.4)			
Durom/Durom	3.1 (2.2, 4.6)	5.4 (4.0, 7.2)	7.3 (5.6, 9.5)	9.6 (6.7, 13.7)	
Newly Identified					
Recap/Recap	4.3 (2.2, 8.4)	6.0 (3.4, 10.7)			

Figure IP5: Cumulative Percent Revision of Individual Total Resurfacing Hip re-identified and still used



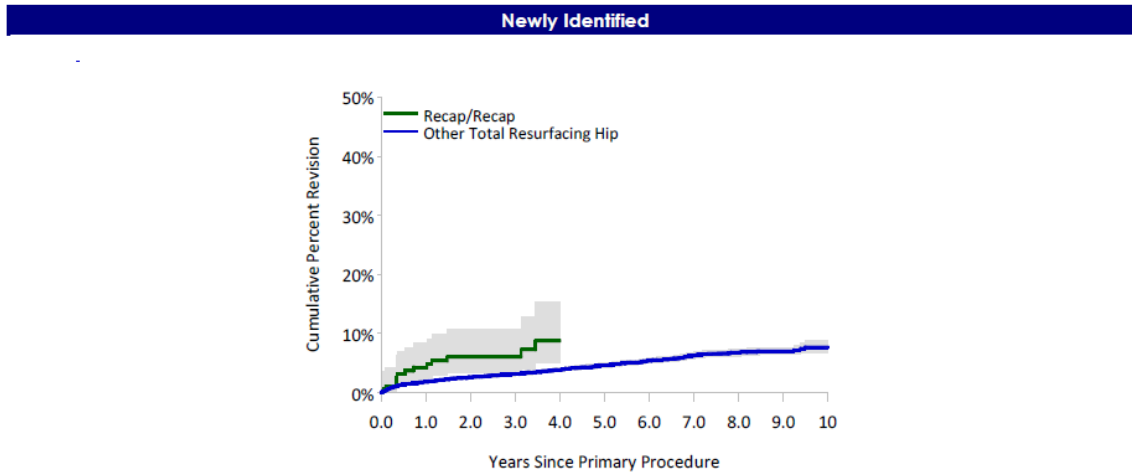
- Only 15 Bionik resurfacing prosthesis were implanted in 2010
- Durom has never been used in great numbers and has gradually been declining. 24 prosthesis were implanted in 2010.

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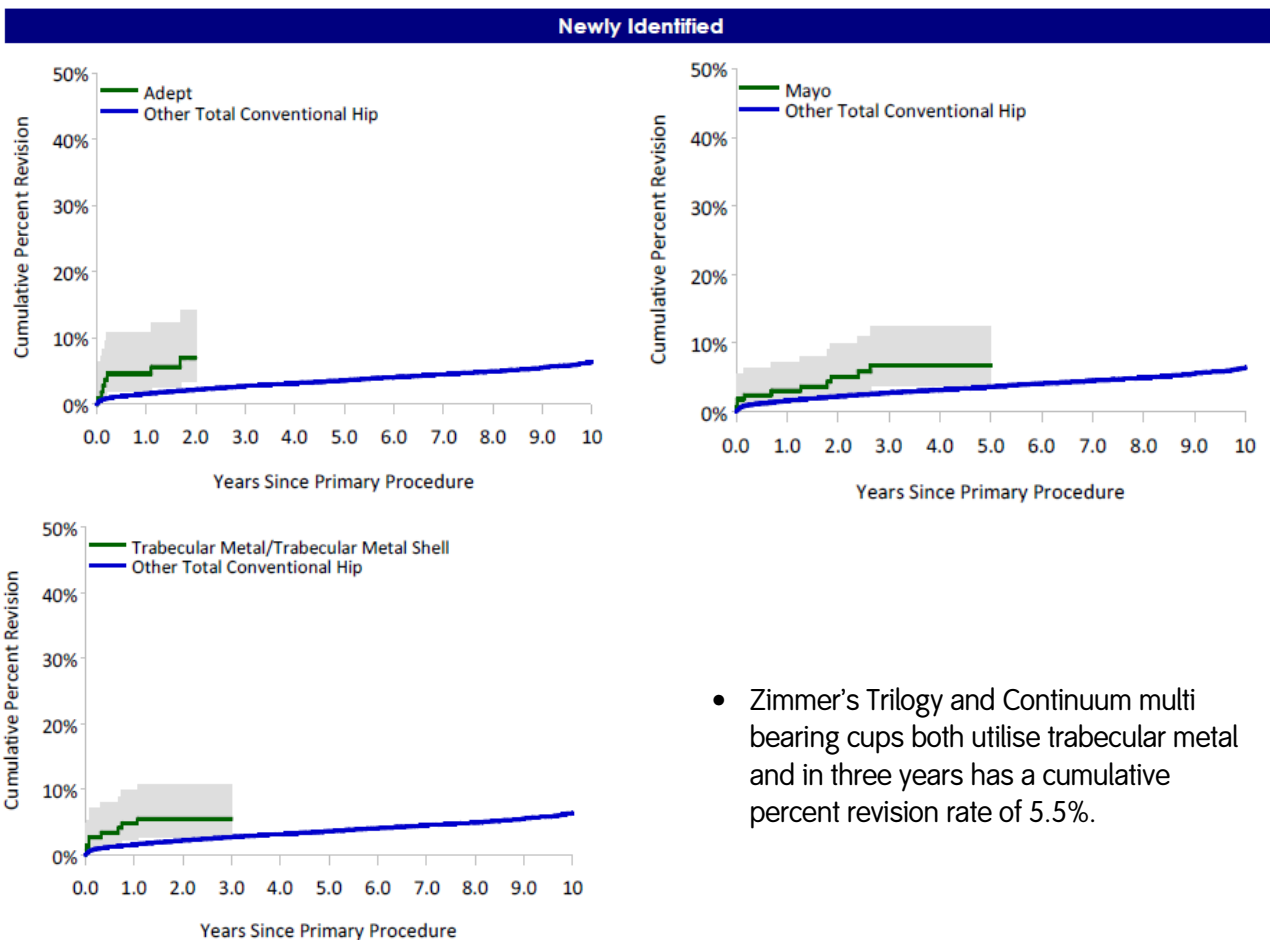
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Figure IP6: Cumulative Percent Revision of Individual Total Resurfacing Hip newly identified



- The Recap resurfacing device has been newly identified this year, although it was identified prior to 2010 it is regarded as a newly identified prosthesis as it was not identified last year.

Figure IP4: Cumulative Percent Revision of Individual Total Conventional Hip newly identified



- Zimmer's Trilogy and Continuum multi bearing cups both utilise trabecular metal and in three years has a cumulative percent revision rate of 5.5%.

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6. Conclusion

Why would you do a primary hip stem in the young active patient when you can do a BHR?

- BHR is a successful option for young active patients with survivorship rates superior or equivalent to primary THR.
- BHR provides young active patients a more **conservative** solution with **superior functional** and proprioceptive outcomes than an equivalent primary hip.
- If BHR fails, **conversion to a primary hip** is a relatively **straightforward** procedure¹.
- If a **primary hip fails** either due to a major or minor revision, the risk of **re-revision** is **increased**.
- Total hip replacement after a failed BHR has comparable clinical and functional outcomes to primary THR¹.
- The Registry demonstrates that a revised THR has higher a re-revision rate than a failed resurfacing.
- Conversion of a failed BHR to a Modular head with a Smith & Nephew stem produces good clinical outcomes

References

1. Latham *et al.* Femoral revision in hip resurfacing compared with large-bearing metal-on-metal hip arthroplasty. *The Journal of Arthroplasty* Vol. 00 No. 0 2011 (article in press)



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