

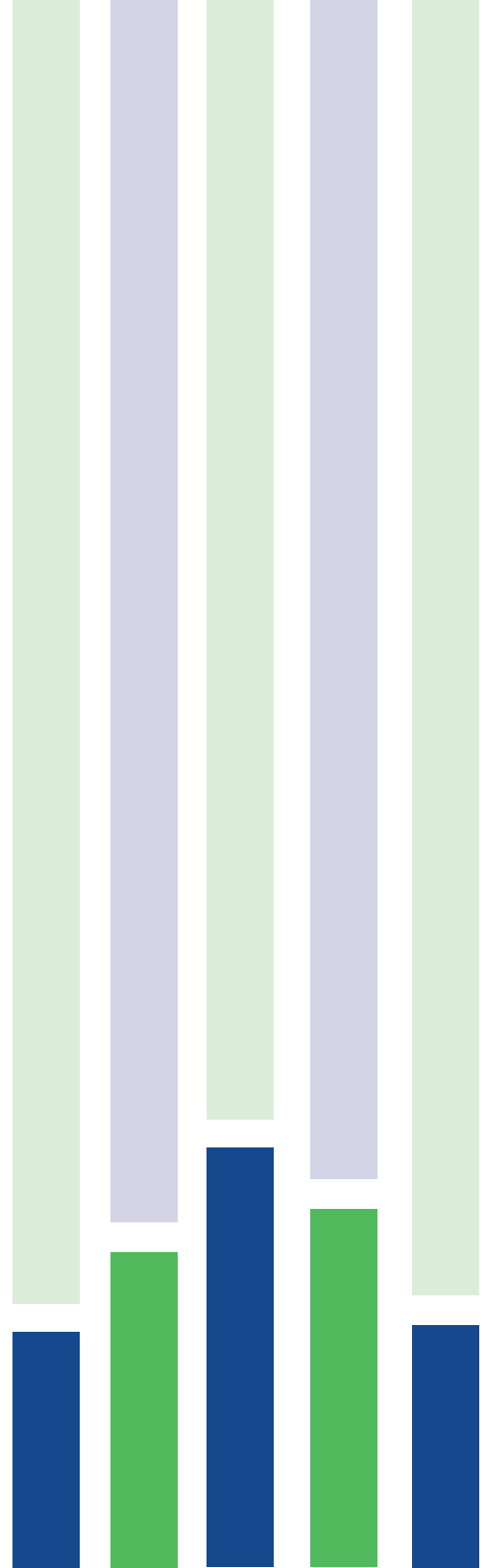


National Joint Registry

[www.njrcentre.org.uk](http://www.njrcentre.org.uk)



Surgical data to 31st December 2010



**National Joint Registry  
for England and Wales**

8<sup>th</sup> Annual Report

2011

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## Glossary

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# Part 2: Clinical activity 2010

Part 2 of the NJR 8th Annual Report summarises the data and findings for hip and knee procedures carried out in England and Wales between 1st January 2010 and 31st December 2010. For the first time the NJR Annual Report also shows the findings of ankle procedures which started being submitted on 1st April 2010. To be included in the report, all procedures must have been entered into the NJR by the 28th February 2011.

During 2010, 413 orthopaedic units were open, including NHS hospitals in England and Wales, independent hospitals, NHS treatment centres and ISTCs. Of these, 399 (97%) submitted at least one hip, knee or ankle procedure to the NJR. The compliance rate for the calendar year 2010 was 92.4%.

On average 196 hip replacements and 213 knee replacements were submitted per orthopaedic unit. These numbers are higher than the submissions in 2009. However, the number of procedures entered by units varied widely; the maximum number of hip submissions being 1,270 and the maximum number of knee submissions being 1,278.

## Hip replacement procedures

In 2010, there were 76,759 hip replacement procedures recorded on the NJR, representing a 6% increase compared with the same reporting period last year<sup>1</sup>. Of these, 68,907 were primary procedures and 7,852 were revision surgeries, representing a revision 'burden' of 11.4%.

Of the 68,907 primary hip procedures undertaken in 2010, 36% were cemented total hip replacements (THR), 43% were cementless THRs and 16% were hybrids<sup>2</sup> or reverse hybrid THRs. The remaining were

large head metal-on-metal replacements<sup>3</sup>, comprising 3% resurfacing and 2% large head metal-on-metal total hip replacements (LHMoM THRs).

In the 7th Annual Report (2009 data) it was noted that, despite the expected superior short-term results for cemented total hip replacements, there was an increasing trend away from fixation with cement towards cementless fixation, and 2009 was the first year that cementless fixation overtook cemented fixation as the preferred fixation modality. Although the percentage usage of cementless hip replacements has continued to increase in 2010, this has been accompanied by a sharp decline in the use of metal-on-metal resurfacing devices following the voluntary withdrawal from the market of the ASR device marketed by DePuy. The percentage usage of cemented devices has remained the same as in 2009.

Patient demographics in terms of age and gender distribution have not changed substantially since 2003. In 2010, 31% of patients were 75 years of age and above, 35% between the ages of 65 and 74, 23% between the ages of 55 and 64 and 12% below the age of 55.

This year, the ASA distribution is comparable to last year with 16% being regarded as fit and healthy prior to surgery (17% in 2009). However, there continues to be a decrease in the number of patients regarded as being fit and healthy prior to surgery (ASA grade 1)<sup>4</sup>.

The average body mass index (BMI)<sup>5</sup> has increased to 28.5, compared with 27.3 in 2004.

It would appear that NHS hospitals are dealing with less fit patients, with 20% being ASA grade 3 or 4, compared with 7% in independent hospitals, 14% in

<sup>1</sup> 72,432 hip procedures were recorded in 2009. This number has now increased to 77,967 as a result of 2009 activity being registered in 2010. For the purposes of comparative analysis, 2009 figures reported in 7th Annual Report have been used.

<sup>2</sup> Of the hybrids, 86% were conventional hybrids (cemented stem and cementless socket) and 14% were reverse hybrids (cementless stem and cemented socket).

<sup>3</sup> Large head metal-on-metal replacements consist of a large diameter metal-on-metal head combined with a resurfacing cup.

<sup>4</sup> American Society of Anaesthesiology system for grading the overall physical condition of the patient as follows: P1 – fit and healthy; P2 – mild disease, not incapacitating; P3 – incapacitating systemic disease; P4 – life threatening disease; P5 – expected to die within 24 hrs with or without an operation.

<sup>5</sup> BMI: 20-24 normal; 25-29 overweight; 30-39 obese; 40+ morbidly obese.

NHS treatment centres and 6% in ISTCs. These data suggest that the average recipient of a hip prosthesis has become less fit and more overweight during the eight years that the NJR has been recording data.

Patients' age and gender significantly influenced the fixation type and type of replacement operation carried out. For example, in male patients under 55 years of age 22% of procedures were resurfacing and 11% cemented replacements, compared with male patients over 75 years of age where less than 1% were resurfacings and 48% were cemented. In female patients less than 55 years of age, 6% were resurfacing and 15% cemented replacements, compared with female patients over 75 years of age where less than 1% of procedures were resurfacings and 56% were cemented.

The indications for surgery were recorded as osteoarthritis (93%), avascular necrosis (2%), fractured neck of femur (2%), congenital dislocation (1%) and inflammatory arthropathy (1%).

In terms of surgical technique, the lateral position was used in 91% of cases and the posterior approach was used in 57%. Minimally invasive surgery was described as being used in 5% of cases and image-guided surgery in less than 1%. Antibiotic loaded bone cement was used in 93% of cases when cement was used.

The most frequently prescribed chemical method of thromboprophylaxis for total hip replacement was low molecular weight heparin (LMWH) (67% - a decrease of 4% on 2009) and the most used mechanical method was thrombo embolus deterrent (TED) stockings (65%).

In 2010, 146 different brands of femoral stem were used, 123 different brands of acetabular components and 13 different brands of resurfacing cups. This indicates a small decline for both femoral stems and acetabular components. It is difficult to ascertain the reason for this but it is thought that the CE (Conformité Européenne) reclassification of joint replacement products from class 2B to class 3 and the increased ODEP requirement for post-market surveillance data,

may have slightly raised the barriers to entry for new products, and hastened the removal from the market of less successful brands.

The Orthopaedic Data Evaluation Panel (ODEP)<sup>6</sup> ratings for prostheses were again studied. The full 10A benchmark rating was achieved in 84% of cemented stems, 74% of cementless stems, 42% of cemented cups, 5% of cementless cups and 51% of resurfacing cups.

When cemented hip stems were used, the Exeter V40 remained the market leader with 63% of the market share. The Contemporary cup is the market leader with a market share of just under 35%.

With cementless brands, the Corail stem remains the market leader at 47% and the Pinnacle socket with a market share of approximately 34%.

Hip resurfacing has steadily declined from a peak of 6,484 reported procedures in 2006 to 5,707 in 2008, to 2,512 in 2010 amid ongoing concerns following the voluntary withdrawal from the market of the ASR device manufactured by DePuy. The Birmingham Hip Resurfacing (BHR) remains the market leader.

There is an increasing trend to use larger head devices in total hip replacements (excluding resurfacing). In 2010, 28% were 36mm or above, compared with 20% in 2008 and only 1% in 2003.

This represents a significant change in orthopaedic practice during the life of the NJR and will be the subject of a detailed analysis over the coming months.

A total of 7,852 hip revision procedures were reported in 2010, which is an increase of 649 compared with 2009. Of these, 86% were single stage revision procedures, 6% were stage one of a two stage procedure, 7% were stage two of a two stage procedure and 1% were excision arthroplasty procedures. This denotes a 3% increase in single stage revision procedures compared with 2009.

<sup>6</sup> Orthopaedic Data Evaluation Panel of NHS Supply Chain.

Indications for revision in single stage revision were aseptic loosening (50%), dislocation (17%) and infection (3%). When the indication was stage one of a two stage revision, aseptic loosening was recorded in 14% of cases and infection in 79%.

Both components were revised in 44% of single stage revisions, compared with 80% in stage one of a two stage revision.

During a single stage revision, 51% were cementless hip procedures, 28% were cemented and 19% were a hybrid reconstruction.

## Knee replacement procedures

The number of knee replacement procedures recorded on the NJR during 2010 was 81,979, which represents an increase of 5.7% compared with 2009.

There were 5,109 revision procedures. The revision 'burden' for knee replacement procedures has increased from 5.9% in 2009 to 6.2% in 2010.

Unlike hip replacements, the type and fixation of knee replacements has remained largely unchanged over the lifespan of the NJR; though there has been a 2% increase in cemented total knee replacements (TKRs) since 2006. In 2010, 85% were cemented primary total knee replacements (TKRs), 5% were uncemented TKRs, and less than 1% were hybrid TKRs, 8% were unicondylar knee replacements and 1% were patello-femoral replacements.

For bicondylar primary knee replacements 73% were cruciate-retaining, 24% posterior-stabilised, 3% constrained condylar and less than 1% were hinged or linked knee replacements. Since 2005 there has been a 2% increase in cruciate-retaining and a decrease of 3% in posterior-stabilised designs. This trend towards less constrained knees has been despite the fact that patients would appear to have been becoming sicker and more obese since the inception of the NJR.

The ASA grades indicate that less fit patients were treated in NHS hospitals with approximately 19% being ASA grade 3 or 4, compared with 8% in independent hospitals, 13% in NHS treatment centres and 8% in ISTCs.

BMI has increased to 30.6 in 2010 from 29.3 in 2004. Patient BMI is higher in knee procedures compared with hip procedures. This indicates that the average recipient of a knee replacement would be classified as clinically obese.

Age and gender influence the choice of type of replacement. Male patients and younger patients (under 55 years of age) have a higher proportion of unicondylar and patello-femoral replacements, compared with elderly patients who have a higher proportion of bicondylar knees and of TKRs using cement.

In terms of surgical techniques, a medial parapatellar incision was used in 93% of cases. The patella was resurfaced in approximately one third of primary knee replacement procedures. Minimally invasive surgery was used in 7% of cases and image-guided surgery in 2%.

The most frequently prescribed chemical method of thromboprophylaxis for knee replacement was LMWH (65%). This is a decrease of 4% compared with last year and replicated the trend shown in hip procedures. TED stockings were the most commonly used mechanical method (69%).

The PFC Sigma Knee was the market leader for total condylar knee replacements, being used in approximately 36% of cases. The Oxford Knee was the market leader for unicondylar knee replacements, used in 69% of procedures. The Avon was the brand leader in patello-femoral joints, used in approximately 38% of cases, although its market share has fallen proportionally with an increase in the use of other brands.

Of the 5,082 knee revision procedures, 76% were single stage operations, 11% were stage one of a two stage procedure, and 12% were stage two of a two stage revision.

# Part 3: Outcomes after joint replacement, 2003 to 2010

Part 3 of the 8th Annual Report describes the survivorship of hip and knee replacements in England and Wales up to almost eight years after primary surgery. This includes an analysis of revision rates and mortality after primary joint replacement. Differences according to implant characteristics (such as implant brand, and prosthesis, fixation, and bearing types) are explored and results for different patient groups are contrasted.

As in previous years, NHS data (HES and PEDW) has been matched to NJR data to identify revisions linked to a primary operation. From this, additional revisions are identified which increases revision rates above those calculated from NJR data alone. However, there is a concern that HES/PEDW data is over-counting revisions because of the inclusion of some re-operations as revisions (see Section 3.2). This approach is now under review and so for the first time, some analysis has been undertaken on the NJR data alone. Revision rates from the two data sources are compared in Sections 3.3.2 and 3.4.2.

The NJR-HES/PEDW data consists of 300,374 primary hip procedures linked to 6,971 first revisions (4,968 from NJR data with another 2,003 from HES/PEDW data) and 342,120 primary knee procedures linked to 8,017 first revisions (5,663 from NJR with another 2,354 from HES/PEDW data). The full NJR data consists of 384,760 primary hip procedures (linked to 5,794 first revisions) and 417,222 primary knee procedures (linked to 6,460 first revisions).

## Hip replacement procedures

Overall revision rates were low: only 1.1% of primary hip replacements had been revised by one year after primary surgery rising to 2.3% by year three, 3.5% by year five, and 4.7% by year seven. However, there was substantial variation in revision rates according to prosthesis type. The lowest rates were associated

with cemented prostheses (3% at seven years) although rates for the hybrid (3.8% at seven years) and uncemented (4.6% at seven years) groups were not exceptionally different. Much higher rates were associated with resurfacing procedures (11.8% at seven years) and stemmed metal-on-metal bearing surfaces (13.6% at seven years). There appears to be a sharp increase in the risk of revision at around six years after primary surgery for the metal-on-metal group although more data is needed to confirm this finding.

There was also variation in revision rates according to the characteristics of patients. Multi-variable analysis indicates that for patients aged under 60, there was little difference in revision rates between the cemented, uncemented and hybrid groups. However, for patients aged 70 or over, cemented prostheses were associated with the lowest revision rates. Adjusted revision rates for the resurfacing and stemmed metal-on-metal groups remained significantly above those of other groups indicating that the higher revision rates cannot simply be explained by the patients being younger on average and more typically male. Revision rates tended to be slightly lower for women than for men in the cemented, uncemented and hybrid groups but were significantly higher for women in the resurfacing and metal-on-metal groups.

Brand analysis was undertaken on NJR data only this year. Some variation in revision rates according to brand is apparent although differences are mainly small once 95% confidence intervals and fixation type are taken into account. In addition, analysis is unadjusted for other factors (such as different bearing surfaces and patient characteristics) that could influence revision rates. NJR revision rates for all cemented hips were 1.4% at five years while the lowest revision rate in this group was for the Exeter V40 stem with the Elite Plus Cemented Cup (0.7% at five years). NJR revision rates for uncemented hip prostheses were 3% at five years while the most

commonly used uncemented combination (the Corail stem with a Pinnacle cup) had a revision rate of 2.3% at five years. The NJR revision rate for resurfacing procedures was 4.9% at five years but here there was greater variation between brands. The market leader, the BHR, had the lowest revision rates in the group (3.4% at five years).

Around 20% of the linked first revisions considered here were due to infection. This is likely to be a higher proportion than among all revisions because infection is more likely to occur in the early period after primary surgery and the registry is still at a relatively early stage. Therefore, revision rates excluding infection have been produced and contrasted with all-cause revision rates.

The risk of death in the first 30 days (0.3%) and 90 days (0.6%) after surgery was similar to the overall risk of revision in these periods. Altogether, 16.8% of patients had died within seven years of their hip replacement (although death rates for these patients were lower than death rates among people in the general population of a comparable age and gender). Death can be considered a competing event to the risk of revision (as patients are no longer at risk of revision once they have died). Adjusting for the competing risk of death was found to be important as unadjusted analysis over-estimates revision rates (the seven-year overall revision rate falls from 4.7% to 4.3% once analysis is adjusted).

## Knee replacement procedures

Overall, revision rates were low: only 0.7% of primary knee replacements had been revised by one year after primary surgery rising to 2.7% by year three, 3.9% by year five, and 4.9% by year seven. However, there was substantial variation in revision rates according to prosthesis type with the lowest rates associated with cemented prostheses (3.8% at seven years). There was no significant difference between the uncemented and hybrid groups and revision rates for these prostheses were only slightly higher than for cemented prostheses (4.8% at seven years). In contrast, revision rates for patello-femoral and unicondylar procedures were considerably higher at 20.4% and 16.6% respectively by seven years after primary surgery.

For total knee replacements, posterior cruciate-retaining implants had lower revision rates than posterior cruciate-stabilised implants (3.7% compared with 4.3% at seven years). These revision rates were lower again for posterior cruciate-retaining implants with fixed bearings compared with posterior cruciate-retaining implants with mobile bearings (3.4% versus 5.0% at seven years). Overall, the lowest revision rates for knee replacements were associated with a posterior cruciate-retaining, fixed bearing cemented prosthesis (3.4% at seven years).

In terms of patient characteristics, there were no significant differences between men and women in terms of the risk of revision. However, revision rates for those aged under 60 were much higher than for older age groups for all prosthesis types (for example, the seven-year revision rate for those aged under 60 with a cemented knee replacement was 7.5% compared with 2.6% of those aged 70 or over). Unicondylar revision rates remained much higher than for other prosthesis types regardless of age group with the highest revision rates for those aged under 60 (22.9% had been revised by seven years).

Brand analysis was undertaken on NJR data only. Some variation in revision rates according to brand was apparent although, as indicated by the overlapping 95% confidence intervals, not all results were statistically significant. In addition, this analysis is unadjusted for other factors (such as varying implant constraint, fixation method, and patient characteristics) that could influence revision rates. The most commonly used brands were not necessarily those with the lowest revision rates. Compared to an overall five-year revision rate of 2% for total knee replacements, the PFC Sigma, the market leader, had a five-year revision rate of 1.7% while a less commonly used brand, the MRK, had the lowest five-year revision rate of 1%. For unicondylar knee replacements, the MG Uni had the lowest revision rate (4.7% at five years compared with an overall group revision rate of 6.7%).

Around 26% of the linked first revisions considered here were due to infection. Therefore, as with hip replacements, revision rates excluding infection have been produced and contrasted with all-cause revision rates.

# Part 2

## 2.2 Hip replacement procedures, 2010



The total number of hip procedures entered into the NJR during 2010 was 76,759, an increase of 6% over 2009. Of these, 68,907 were primary and 7,852 were revision (and re-operation) procedures. The revision 'burden' has increased to 11% from 10% in the previous year.

Table 2.3 shows that 93% of patients at independent hospitals and ISTCs were graded as fit and healthy or with mild disease according to the ASA system, compared with 80% at NHS units.

Nearly all procedures (94%) undertaken at ISTCs were primary procedures. The percentage of primary hip resurfacings undertaken in independent hospitals (5%) is nearly double that of NHS hospitals (3%), as shown in Figure 2.2. At NHS treatment centres, 66% of primary procedure activity relates to cementless hip primary procedures – a greater proportion than at any other type of provider.

At NHS hospitals, revision procedures account for a higher percentage of total procedures (13%) than at any other type of provider (10% overall). NHS hospitals perform 84% of all hip revision procedures.



**Table 2.3** Patient characteristics and procedure details, according to type of provider for hip procedures in 2010.

	NHS hospitals		Independent hospitals		NHS treatment centres		ISTCs		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Total</b>	<b>51,071</b>	<b>67%</b>	<b>19,669</b>	<b>26%</b>	<b>2,221</b>	<b>3%</b>	<b>3,798</b>	<b>5%</b>	<b>76,759</b>	
<b>Patient physical status</b>										
P1 - fit and healthy	6,454	13%	4,484	23%	435	20%	453	12%	11,826	15%
P2 - mild disease not incapacitating	34,197	67%	13,739	70%	1,469	66%	3,102	82%	52,507	68%
P3 - incapacitating systemic disease	9,962	20%	1,429	7%	314	14%	240	6%	11,945	16%
P4 - life threatening disease	446	<1%	16	<1%	3	<1%	3	<1%	468	<1%
P5 - expected to die within 24 hrs with or without an operation	12	<1%	1	<1%	0	0%	0	0%	13	<1%
<b>Procedure type</b>										
<b>Primary procedures</b>	<b>44,504</b>	<b>65%</b>	<b>18,656</b>	<b>27%</b>	<b>2,075</b>	<b>3%</b>	<b>3,672</b>	<b>5%</b>	<b>68,907</b>	<b>90%</b>
Primary total prosthetic replacement using cement	16,979	38%	5,784	31%	525	25%	1,316	36%	24,604	36%
Primary total prosthetic replacement not using cement	18,621	42%	9,012	48%	1,373	66%	1,821	50%	30,827	45%
Primary total prosthetic replacement not classified elsewhere (e.g. hybrid)	7,540	17%	2,866	15%	92	4%	466	13%	10,964	16%
Primary resurfacing arthroplasty of joint	1,364	3%	994	5%	85	4%	69	2%	2,512	4%
<b>Revision procedures</b>	<b>6,567</b>	<b>84%</b>	<b>1,013</b>	<b>13%</b>	<b>146</b>	<b>2%</b>	<b>126</b>	<b>2%</b>	<b>7,852</b>	<b>10%</b>
Hip single stage revision	5,542	84%	931	92%	132	90%	112	89%	6,717	86%
Hip stage one of two stage revision	441	7%	33	3%	5	3%	7	6%	486	6%
Hip stage two of two stage revision	511	8%	43	4%	9	6%	7	6%	570	7%
Hip excision arthroplasty	54	<1%	6	<1%	0	0%	0	0%	60	<1%
Hip re-operation other than revision <sup>12</sup>	19	<1%	0	0%	0	0%	0	0%	19	<1%
<b>Bilateral or unilateral<sup>13</sup></b>										
Bilateral	216	<1%	148	<1%	22	<1%	40	<1%	426	<1%
Unilateral	50,855	100%	19,521	100%	2,199	100%	3,758	100%	76,333	100%
<b>Funding</b>										
Independent	760	1%	9,996	51%	2	<1%	17	<1%	10,775	14%
NHS	50,310	99%	9,673	49%	2,219	100%	3,781	100%	65,983	86%
Not selected	1	<1%	0	0%	0	0%	0	0%	1	<1%

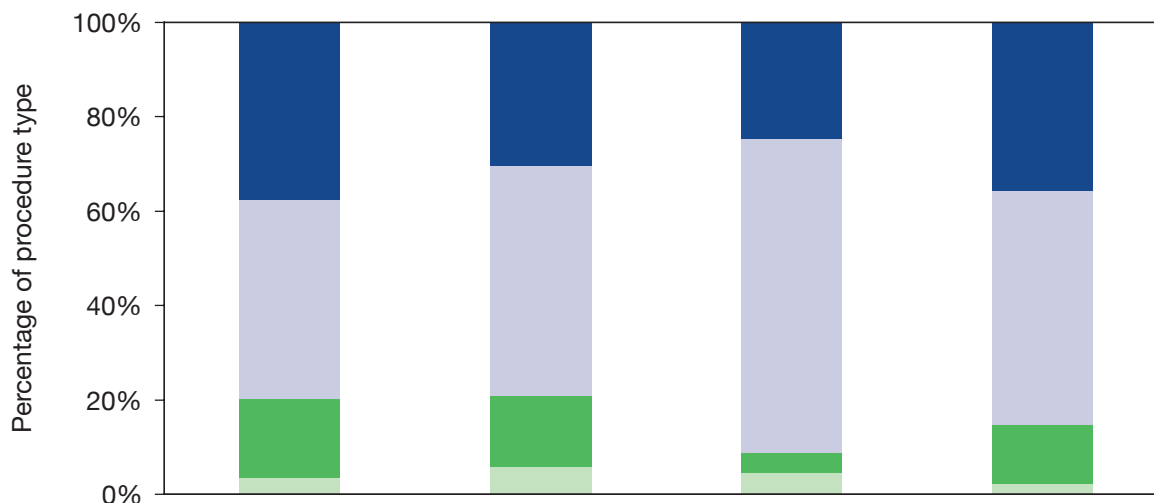
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<sup>12</sup> Hip re-operations other than revision are recorded because some units continue to use MDSv2 where these procedures were included. MDSv3 no longer records re-operations. Therefore, the re-operation procedure totals will not reflect the actual number performed.

<sup>13</sup> Bilaterals will only be counted as a bilateral if they are entered under the same operation during data entry. If the two procedures are recorded under two different operations they will be counted as two unilateral procedures. Therefore, the count of bilaterals is likely to be an underestimate.

**Figure 2.2**

Primary hip procedures by type of provider, 2010.



Type of provider	NHS hospitals	Independent hospitals	NHS treatment centres	ISTCs
Cemented	38%	31%	25%	36%
Cementless	42%	48%	66%	50%
Hybrid	17%	15%	4%	13%
Resurfacing	3%	5%	4%	2%
Number of procedures	44,504	18,656	2,075	3,672

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### 2.2.1 Primary hip replacement procedures, 2010

Of the 68,907 primary hip replacement procedures undertaken in 2010, 36% were cemented THRs, 43% were cementless, 3% were hip resurfacing procedures and 2% were LHMOM THRs (Figure 2.3). Figure 2.3 shows an apparent decrease in the volume of hip procedures between 2009 and 2010. However, not all procedures performed in 2010 were entered into the database before the 28th February 2011 deadline and will be entered after this date whereas volumes for other years have also had until 28th February 2011 to be submitted.

Compared with the previous year, there has been a 4% increase in cementless procedures and a reduction in the number of resurfacing procedures.

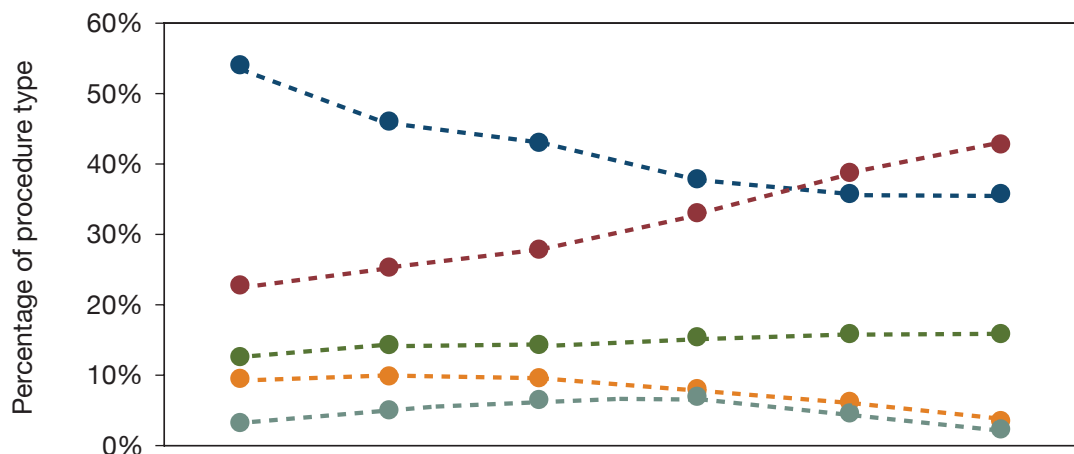
The percentage of cemented procedures did not change between 2009 and 2010 after being in steady decline since 2005.

Over the last year there has also been a significant decrease in the percentage of resurfacing procedures and in procedures where a large head is used with a resurfacing cup. This decline is thought to have resulted from the well-publicised voluntary withdrawal from the market of one brand of resurfacing device (ASR – DePuy), following the identification by the NJR of higher than expected revision rates for this product.

In 2010, 14% of hybrid procedures were reverse hybrid (cementless stem, cemented socket) and 86% were standard hybrid (cemented stem, cementless socket).

**Figure 2.3**

Type of primary hip replacement procedures undertaken between 2005 and 2010.



Year	2005	2006	2007	2008	2009	2010
-●- Cemented	54%	46%	43%	38%	36%	36%
-●- Cementless	22%	25%	28%	33%	39%	43%
-●- Hybrid	12%	14%	14%	15%	16%	16%
-●- Resurfacing	9%	10%	9%	8%	6%	3%
-●- Large head with resurfacing cup	3%	5%	6%	7%	4%	2%
Number of procedures	56,350	59,715	66,615	69,839	69,936	68,907

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### 2.2.1.1 Patient characteristics

Age and gender were included for those patients who gave consent for their personal identifiers to be entered into the NJR and where consent was 'Not recorded' (a total of 94% which is the same as reported in 2009). The average age was 67.2 years, 0.5 years older than last year. Approximately 59% of the patients were female (Table 2.4) which is 3% higher than 2009. On average, female patients were older than male patients at the time of their primary hip replacement (68.8 years and 66.3 years respectively, Table 2.5). Patients undergoing a resurfacing procedure were the youngest, at an average age of 54.8 years (Table 2.4). Four times as many males have a resurfacing procedure compared with females. These reported figures show good adherence by the orthopaedic community to guidelines issued by the British Orthopaedic Association during 2009/10, on patient selection criteria for metal-on-metal resurfacing prostheses.

According to the ASA system, 16% of patients undergoing a primary hip replacement in 2010 were graded as fit and healthy prior to surgery, compared with 37% in 2003. Figure 2.5 shows the changes in ASA grade over eight years. Patient BMI<sup>14</sup> has increased over the past eight years from 27.4 to 28.5, as shown in Figure 2.6(a). Females undergoing THR have a consistently lower mean BMI than males; the converse is the case for TKR (Figure 2.18(a)). Figure 2.6(b) shows that there has been an increase in the number of patients with a BMI of between 30 and 39 and a decrease in the number of patients with BMI between 18.5 and 24. The single largest indication recorded for surgery was osteoarthritis, recorded in 93% of procedures (Table 2.4). Figure 2.4(b) shows that the percentage of patients within the age group bands has not changed significantly since 2003, suggesting that the increase in BMI and reduction in fitness of patients is not due to an ageing patient cohort.

<sup>14</sup> BMI: 20-24 normal, 25-29 overweight, 30-39 obese, 40+ morbidly obese.

**Table 2.4** Patient characteristics for primary hip replacement procedures in 2010, according to procedure type.

	Primary total prosthetic replacement using cement		Primary total prosthetic replacement not using cement		Primary total prosthetic replacement not classified elsewhere (e.g. hybrid)		Primary resurfacing arthroplasty of joint		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Total hip primaries</b>	<b>24,604</b>	<b>36%</b>	<b>30,827</b>	<b>45%</b>	<b>10,964</b>	<b>16%</b>	<b>2,512</b>	<b>4%</b>	<b>68,907</b>	
<b>Total hip primaries with patient data</b>	<b>23,418</b>	<b>95%</b>	<b>29,082</b>	<b>94%</b>	<b>10,320</b>	<b>94%</b>	<b>2,293</b>	<b>91%</b>	<b>65,113</b>	<b>94%</b>
Average age	73.00		65.57		69.81		54.84		67.2	
SD	9.55		11.23		10.82		9.53		13.27	
Interquartile range	67.4 - 79.7		59.0 - 73.5		63.7 - 77.3		48.9 - 61.2		62.0 - 76.6	
<b>Gender</b>										
Female	15,395	66%	16,399	56%	6,512	63%	424	18%	38,730	59%
Male	8,023	34%	12,683	44%	3,808	37%	1,869	82%	26,383	41%
<b>Patient physical status</b>										
P1 – fit and healthy	2,635	11%	5,831	19%	1,462	13%	1,129	45%	11,057	16%
P2 – mild disease not incapacitating	17,274	70%	21,359	69%	7,621	70%	1,316	52%	47,570	69%
P3 – incapacitating systemic disease	4,522	18%	3,518	11%	1,805	16%	67	3%	9,912	14%
P4 – life threatening disease	167	<1%	115	<1%	74	<1%	0	0%	356	<1%
P5 – expected to die within 24 hours with or without an operation	6	<1%	4	<1%	2	<1%	0	0%	12	<1%
<b>BMI</b>										
Number with BMI data	15,426	63%	18,218	59%	6,610	60%	1,507	60%	41,761	61%
Average	28.21		28.82		28.42		28.32		28.51	
SD	5.1		5.3		5.2		4.4		5.2	
<b>Indications for surgery</b>										
Osteoarthritis	22,956	93%	28,822	93%	9,874	90%	2,377	95%	64,029	93%
Avascular necrosis	447	2%	810	3%	328	3%	50	2%	1,635	2%
Fractured neck of femur	549	2%	438	1%	377	3%	4	<1%	1,368	2%
Congenital dislocation	132	<1%	603	2%	219	2%	68	3%	1,022	1%
Inflammatory arthropathy	347	1%	399	1%	225	2%	20	<1%	991	1%
Failed hemiarthroplasty	91	<1%	60	<1%	49	<1%	1	<1%	201	<1%
Trauma – chronic	280	1%	297	<1%	186	2%	18	<1%	781	1%
Previous surgery, non-trauma related	24	<1%	113	<1%	47	<1%	9	<1%	193	<1%
Previous arthrodesis	13	<1%	12	<1%	5	<1%	0	0%	30	<1%
Previous infection	25	<1%	19	<1%	23	<1%	0	0%	67	<1%
Other	396	2%	443	1%	205	2%	75	3%	1,119	2%
<b>Side</b>										
Bilateral	65	<1%	283	<1%	61	<1%	12	<1%	421	<1%
Left, unilateral	10,900	44%	13,880	45%	4,915	45%	1,226	49%	30,921	45%
Right, unilateral	13,639	55%	16,664	54%	5,988	55%	1,274	51%	37,565	55%

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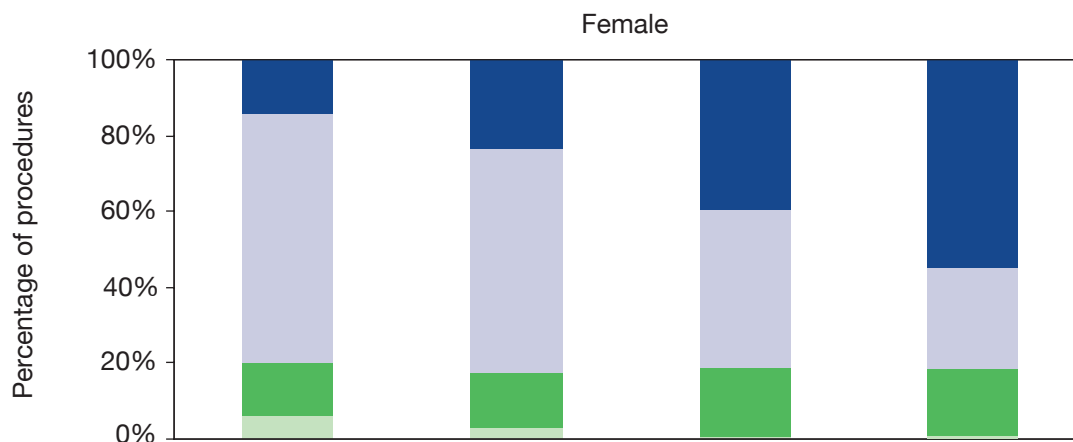
**Table 2.5** Age and gender for primary hip replacement patients in 2010.

	Primary total prosthetic replacement using cement		Primary total prosthetic replacement not using cement		Primary total prosthetic replacement not classified elsewhere (e.g. hybrid)		Primary resurfacing arthroplasty of joint		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Average age by gender</b>										
<b>Female</b>	15,395	40%	16,399	42%	6,512	17%	424	1%	38,730	59%
Average	73.63		66.10		70.31		54.20		68.85	
SD	9.37		11.19		10.74		10.29		12.35	
Interquartile range	68.0 - 80.3		59.5 - 73.9		64.1 - 77.9		47.9 - 61.4		63.1 - 77.6	
<b>Male</b>	8,023	30%	12,683	48%	3,808	14%	1,869	7%	26,383	41%
Average	71.77		64.87		68.95		54.98		66.32	
SD	9.76		11.24		10.89		9.35		12.44	
Interquartile range	66.3 - 78.5		58.5 - 72.8		63.1 - 76.2		49.1 - 61.6		60.2 - 75.1	
<b>Age group by gender</b>										
<b>Female</b>										
<45 years	116	<1%	639	4%	135	2%	70	17%	960	2%
45 - 54 years	457	3%	1,875	11%	420	6%	144	34%	2,896	7%
55 - 64 years	2,021	13%	4,675	29%	1,228	19%	157	37%	8,081	21%
65 - 74 years	5,468	36%	5,689	35%	2,389	37%	47	11%	13,593	35%
75 - 84 years	5,886	38%	2,995	18%	1,966	30%	5	1%	10,852	28%
>85 years	1,447	9%	526	3%	374	6%	1	<1%	2,348	6%
<b>Male</b>										
<45 years	127	2%	650	5%	126	3%	272	15%	1,175	4%
45 - 54 years	319	4%	1,584	12%	267	7%	613	33%	2,783	11%
55 - 64 years	1,276	16%	3,856	30%	789	21%	756	40%	6,677	25%
65 - 74 years	3,064	38%	4,270	34%	1,498	39%	210	11%	9,042	34%
75 - 84 years	2,774	35%	2,108	17%	960	25%	17	<1%	5,859	22%
>85 years	463	6%	215	2%	168	4%	1	<1%	847	3%

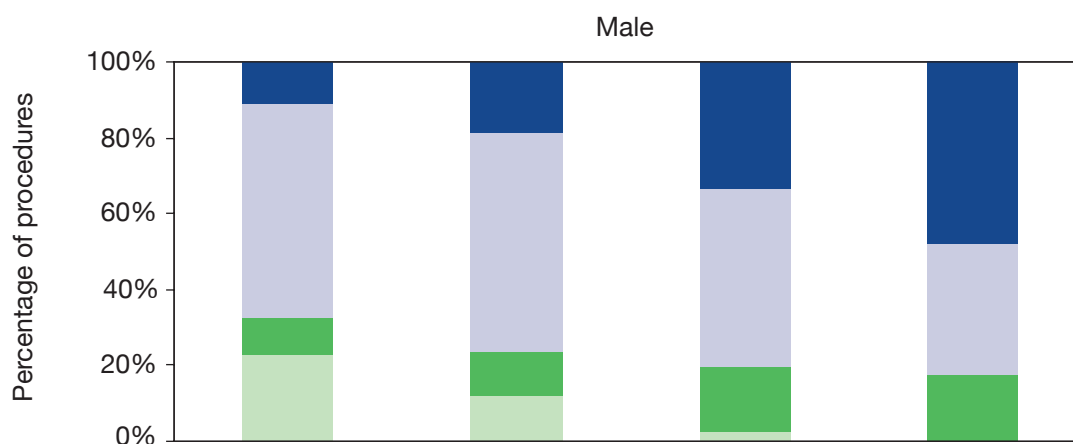
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**Figure 2.4(a)**

Age and gender for primary hip replacement patients in 2010.



Age group	<55	55 - 64	65 - 74	75+
Cemented	15%	25%	40%	56%
Cementless	65%	58%	42%	27%
Hybrid	14%	15%	18%	18%
Resurfacing	6%	2%	<1%	<1%
Number of patients	3,856	8,081	13,593	13,200

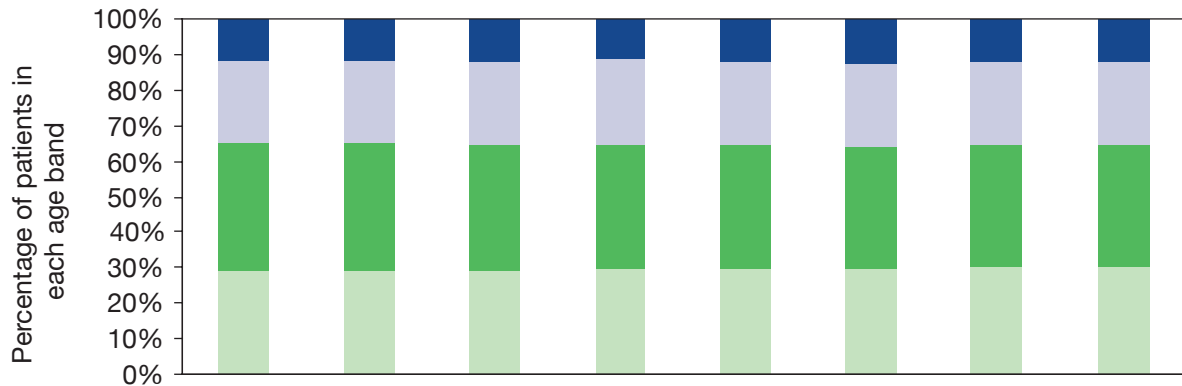


Age group	<55	55 - 64	65 - 74	75+
Cemented	11%	19%	34%	48%
Cementless	56%	58%	47%	35%
Hybrid	10%	12%	17%	17%
Resurfacing	22%	11%	2%	<1%
Number of patients	3,958	6,677	9,042	6,706

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**Figure 2.4(b)**

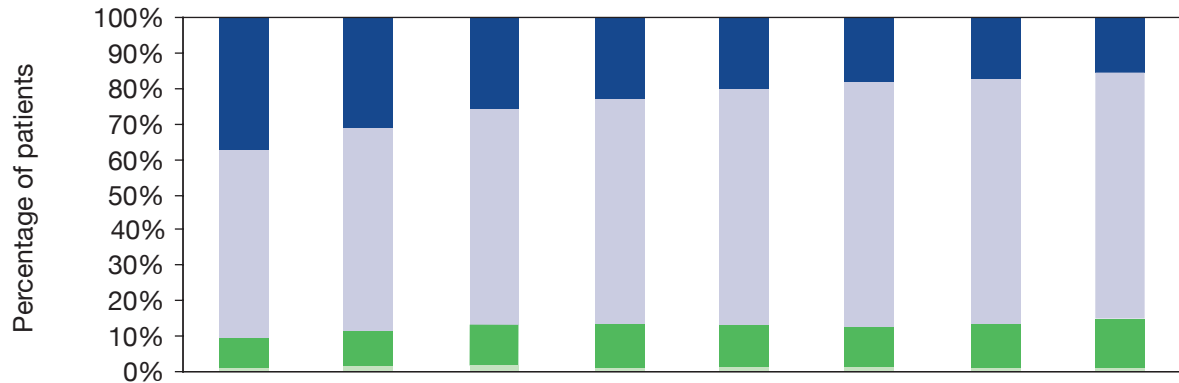
Age for primary hip replacement patients between 2003 and 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
<55	12%	12%	12%	12%	12%	13%	12%	12%
55-64	23%	23%	23%	24%	24%	24%	23%	23%
65-74	36%	37%	36%	35%	35%	34%	35%	35%
75+	29%	29%	29%	29%	30%	30%	30%	31%
Number of patients	14,420	27,941	39,950	47,176	59,634	65,827	66,377	65,113

**Figure 2.5**

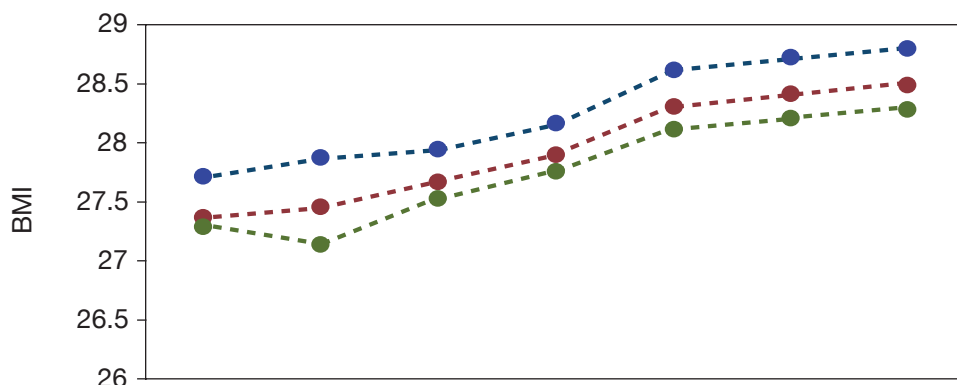
ASA grades for primary hip replacement patients between 2003 and 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
P1	37%	31%	26%	23%	20%	18%	17%	16%
P2	53%	57%	60%	63%	66%	69%	69%	69%
P3	9%	11%	13%	13%	13%	13%	14%	14%
P4 and P5	<1%	1%	1%	1%	1%	1%	<1%	1%
Number of patients	26,432	48,030	57,490	59,715	66,616	69,839	69,936	68,907

**Figure 2.6(a)**

BMI for primary hip replacement patients between 2004 and 2010.

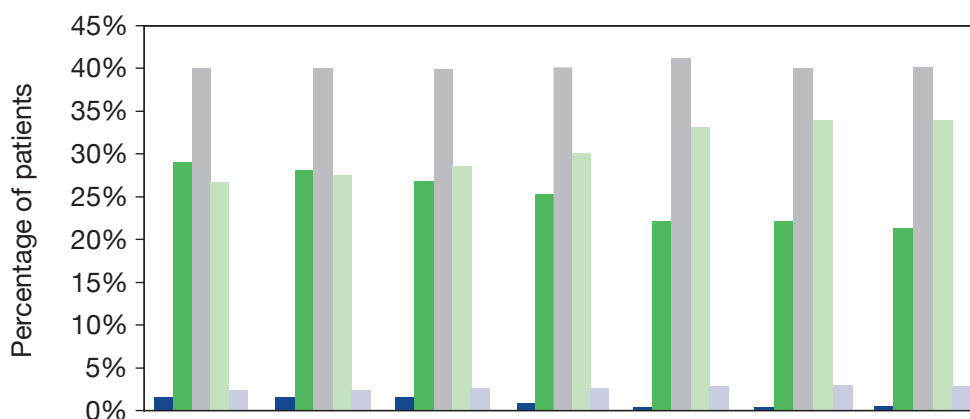


Year	2004	2005	2006	2007	2008	2009	2010
All	27.35	27.46	27.67	27.90	28.31	28.42	28.51
Female	27.28	27.15	27.53	27.76	28.12	28.21	28.30
Male	27.71	27.86	27.94	28.16	28.61	28.72	28.82
Number of patients with BMI data	5,906	8,984	10,443	14,134	33,655	39,002	41,761
Number of patients with BMI data (females)	2,471	4,410	5,465	8,093	19,565	22,524	24,306
Number of patients with BMI data (males)	1,753	2,947	3,715	5,412	13,353	15,646	16,781
Number of patients with BMI data (unknown gender)	1,682	1,627	1,263	629	737	832	674

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**Figure 2.6(b)**

BMI groups for primary hip replacement patients between 2004 and 2010.



Year	2004	2005	2006	2007	2008	2009	2010
BMI <18.5	2%	2%	2%	1%	<1%	<1%	<1%
BMI 18.5 - 24	29%	28%	27%	25%	22%	22%	21%
BMI 25 - 29	40%	40%	40%	40%	41%	40%	40%
BMI 30 - 39	27%	28%	29%	30%	33%	34%	34%
BMI 40+	2%	2%	3%	3%	3%	3%	3%
Number of patients	5,906	8,984	10,443	14,134	33,655	39,002	41,761

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## 2.2.1.2 Surgical techniques

The surgical techniques used in procedures undertaken in 2010 are summarised in Table 2.6. Patients were mainly positioned laterally. The lateral position was used more frequently in hybrid and resurfacing procedures than in cemented and cementless procedures. As would be expected, the most frequently used incision approach was posterior for all procedure types, though for cemented procedure types there were nearly as many procedures performed where a lateral (including Hardinge) approach was used.

The reduction in the use of cemented stems from 77%

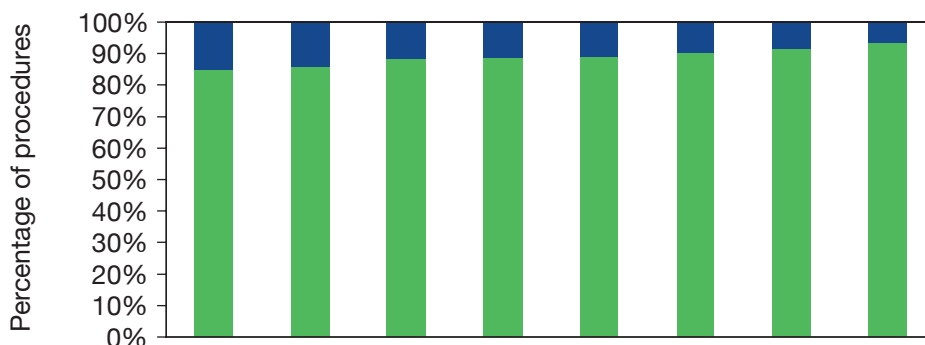
in 2004 to 50% in 2010 and also in the use of cemented cups, from 56% to 34%, is consistent with the reduction seen in the overall number of cemented procedures (Figure 2.3). The relative usage of different types of bone cement is shown in Figure 2.7 and shows that the use of antibiotic cement has increased from 85% in 2003 to 93% in 2010. Use of minimally invasive surgery was greatest in cementless procedures; even though it was used in less than 5% of all procedures (Table 2.6), this is a 3% increase on 2009. It should, of course, be remembered that the definition of minimally invasive in this instance is purely based upon the understanding of an individual surgeon rather than on pre-set criteria.

**Table 2.6** Characteristics of surgical practice for primary hip replacement procedures in 2010, according to procedure type.

	Primary total prosthetic replacement using cement		Primary total prosthetic replacement not using cement		Primary total prosthetic replacement not classified elsewhere (e.g. hybrid)		Primary resurfacing arthroplasty of joint		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Total</b>	<b>24,604</b>	<b>36%</b>	<b>30,827</b>	<b>45%</b>	<b>10,964</b>	<b>16%</b>	<b>2,512</b>	<b>4%</b>	<b>68,907</b>	
<b>Patient position</b>										
Lateral	21,519	87%	28,363	92%	10,420	95%	2,464	98%	62,766	91%
Supine	3,085	13%	2,464	8%	544	5%	48	2%	6,141	9%
<b>Incision</b>										
Antero/antero-lateral	68	<1%	30	<1%	75	<1%	9	<1%	182	<1%
Lateral (inc. Hardinge)	10,905	44%	10,834	35%	3,306	30%	443	18%	25,488	37%
Posterior	11,884	48%	18,316	59%	7,158	65%	1,989	79%	39,347	57%
Trochanteric osteotomy	423	2%	36	<1%	11	<1%	19	<1%	489	<1%
Other	1,324	5%	1,611	5%	414	4%	52	2%	3,401	5%
<b>Minimally invasive surgery</b>										
Yes	565	2%	2,410	8%	193	2%	44	2%	3,212	5%
No	24,038	98%	28,392	92%	10,727	98%	2,468	98%	65,625	95%
Not selected	1	<1%	25	<1%	44	<1%	0	0%	70	<1%
<b>Image-guided surgery</b>										
Yes	28	<1%	107	<1%	7	<1%	47	2%	189	<1%
No	24,575	100%	30,695	100%	10,913	100%	2,465	98%	68,648	100%
Not selected	1	<1%	25	<1%	44	<1%	0	0%	70	<1%
<b>Bone graft used - femur</b>										
Yes	143	<1%	253	<1%	38	<1%	19	<1%	453	<1%
No	24,461	99%	30,574	99%	10,926	100%	2,493	99%	68,454	99%
<b>Bone graft used - acetabular</b>										
Yes	791	3%	1,270	4%	745	7%	96	4%	2,902	4%
No	23,813	97%	29,557	96%	10,219	93%	2,416	96%	66,005	96%

**Figure 2.7**

Bone cement types for primary hip replacement procedures undertaken between 2003 and 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
Non-antibiotic bone cement	15%	14%	12%	11%	11%	10%	8%	7%
Antibiotic loaded bone cement	85%	86%	88%	89%	89%	90%	92%	93%
Number of procedures using cement	18,888	33,203	39,223	38,945	42,307	41,314	39,443	37,251

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### 2.2.1.3 Thromboprophylaxis

As shown in Table 2.7 the most frequently prescribed chemical method of thromboprophylaxis for hip replacement patients was LMWH, at 67%, and the most used mechanical method was TED stockings (65%). There has been a marked decrease over the past year in the use of aspirin (20% in 2009 to 12% in 2010) and LMWH (71% in 2009 to 67% in

2010). Direct thrombin inhibitor is now used in 7% of hip primary procedures and the use of what the NJR categorises as other chemicals has gone up from 7% in 2009 to 13% in 2010. This change is also seen in knee primary procedures. The number of procedures for which both chemical and mechanical methods were prescribed rose from 63% in 2007 to 87% in 2010.

**Table 2.7** Thromboprophylaxis regime for primary hip replacement patients, prescribed at time of operation.

	Primary total prosthetic replacement using cement		Primary total prosthetic replacement not using cement		Primary total prosthetic replacement not classified elsewhere (e.g. hybrid)		Primary resurfacing arthroplasty of joint		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Total</b>	<b>24,604</b>	<b>36%</b>	<b>30,827</b>	<b>45%</b>	<b>10,964</b>	<b>16%</b>	<b>2,512</b>	<b>4%</b>	<b>68,907</b>	
Aspirin	3,329	14%	2,910	9%	1,715	16%	543	22%	8,497	12%
LMWH	17,269	70%	20,412	66%	6,974	64%	1,399	56%	46,054	67%
Pentasaccharide	321	1%	546	2%	363	3%	48	2%	1,278	2%
Warfarin	286	1%	280	<1%	137	1%	28	1%	731	1%
Direct thrombin inhibitor	1,804	7%	2,359	8%	777	7%	140	6%	5,080	7%
Other chemical (all)	2,286	9%	4,892	16%	1,071	10%	379	15%	8,628	13%
No chemical	1,678	7%	1,560	5%	924	8%	193	8%	4,355	6%
Foot pump	6,939	28%	7,883	26%	3,138	29%	596	24%	18,556	27%
Intermittent calf compression	8,231	33%	12,433	40%	3,850	35%	1,052	42%	25,566	37%
TED stockings	15,272	62%	20,991	68%	6,726	61%	1,672	67%	44,661	65%
Other mechanical	1,072	4%	581	2%	515	5%	80	3%	2,248	3%
No mechanical	1,970	8%	1,817	6%	779	7%	236	9%	4,802	7%
Both mechanical and chemical	20,944	85%	27,472	89%	9,249	84%	2,099	84%	59,764	87%
Neither mechanical nor chemical	21	<1%	28	<1%	19	<1%	16	<1%	84	<1%

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#### 2.2.1.4 Untoward intra-operative events

Untoward intra-operative events were reported in just under 1% of procedures (Table 2.8). Of the 837 untoward events reported, a decrease of 67 events compared with 2009, 30% were attributed to calcar

crack. As would be expected, this occurred more often in cementless than in cemented hips. Furthermore, 16% were trochanteric fractures. More than one event could be recorded for a single procedure.

**Table 2.8** Reported untoward intra-operative events for primary hip replacement patients in 2010, according to procedure type.

	Primary total prosthetic replacement using cement	Primary total prosthetic replacement not using cement	Primary total prosthetic replacement not classified elsewhere (e.g. hybrid)	Primary resurfacing arthroplasty of joint	Total
	No.	No.	No.	No.	No.
<b>Total</b>	<b>24,604</b>	<b>30,827</b>	<b>10,964</b>	<b>2,512</b>	<b>68,907</b>
Not specified	24,372	30,350	10,841	2,507	68,070
<b>Event specified</b>	<b>232</b>	<b>477</b>	<b>123</b>	<b>5</b>	<b>837</b>
Calcar crack	34	190	31	0	255
Pelvic penetration	38	45	17	1	101
Shaft fracture	13	15	4	0	32
Shaft penetration	2	12	1	0	15
Trochanteric fracture	52	51	32	0	135
Other	93	169	40	4	306

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### 2.2.1.5 Hip primary components

This section outlines in more detail the trends in brand usage for hips. For a full listing of brands used in 2010, please visit the NJR website at [www.njrcentre.org.uk](http://www.njrcentre.org.uk). This section includes an analysis of usage according to National Institute for Health and Clinical Excellence (NICE) guidelines, as interpreted by ODEP.

#### 2.2.1.5.1 Compliance with ODEP and NICE guidelines

In 2010, 123 brands of acetabular cups, 13 brands of resurfacing cups and 146 brands of femoral stems were used in primary and revision procedures and recorded on the NJR. There was a small decrease in acetabular cups and stems compared with 2009.

The 2nd NJR Annual Report in 2004<sup>15</sup> gave a full description of the NICE guidance on the selection of prostheses for primary THRs and metal-on-metal hip resurfacing arthroplasty. It also described the establishment of the Orthopaedic Data Evaluation Panel (ODEP). Its remit is to provide an independent

assessment of clinical evidence, submitted by suppliers, on the compliance of their implants for THR and hip resurfacing against NICE benchmarks for safety and effectiveness. ODEP produced detailed criteria for this assessment and in 2010 there was an ongoing review of this guidance by all stakeholders.

The ODEP committee have reviewed suppliers' clinical data submissions and ODEP ratings have been given to 54 brands of femoral stems (38% of those available) and 48 brands of acetabular cups (41% of those available) used in primary procedures. However, there are 49 brands of acetabular cup (42%) and 67 brands of femoral stem (47%) currently being used in England and Wales for which no data have yet been submitted to ODEP. For information, the analysis in this report is based on the ODEP ratings as at March 2011. The latest listings for brands currently being used in England and Wales can be seen on the ODEP website:

<http://www.supplychain.nhs.uk/odep/>

<sup>15</sup> See pages 86 to 92 of the 2nd NJR Annual Report, available on the NJR website [www.njrcentre.org.uk](http://www.njrcentre.org.uk)

Analysis of the summary data for primary procedures shows that the usage of products meeting the full 10 year (10A) benchmark, as recommended by NICE, is as follows:

- cemented stems 84% (using 15 brands out of 70 recorded on the NJR)
- cementless stems 74% (12 brands out of 72)
- cemented cups 42% (10 brands out of 42)
- cementless cups 5% (7 brands out of 73)
- resurfacing cups 51% (1 brand out of 10).

These percentages are based on the current ODEP ratings from clinical outcomes data already submitted to the ODEP committee. Manufacturers are expected to submit additional data to progress through the ratings and this will result in these percentages changing in the future.

Comparison with the 2009 figures shows that usage of cemented stems fully compliant with NICE guidelines has not changed significantly (83% in 2009 to 84% in 2010). However, the usage of fully compliant ODEP

cementless stems has changed significantly from 62% in 2009 to 74% in 2010. Of some concern is the fact that only 5% of cementless cups currently implanted have a good ten year clinical history. This reflects the regularity with which manufacturers seem to launch new brands of acetabular cups aimed at improving clinical outcomes.

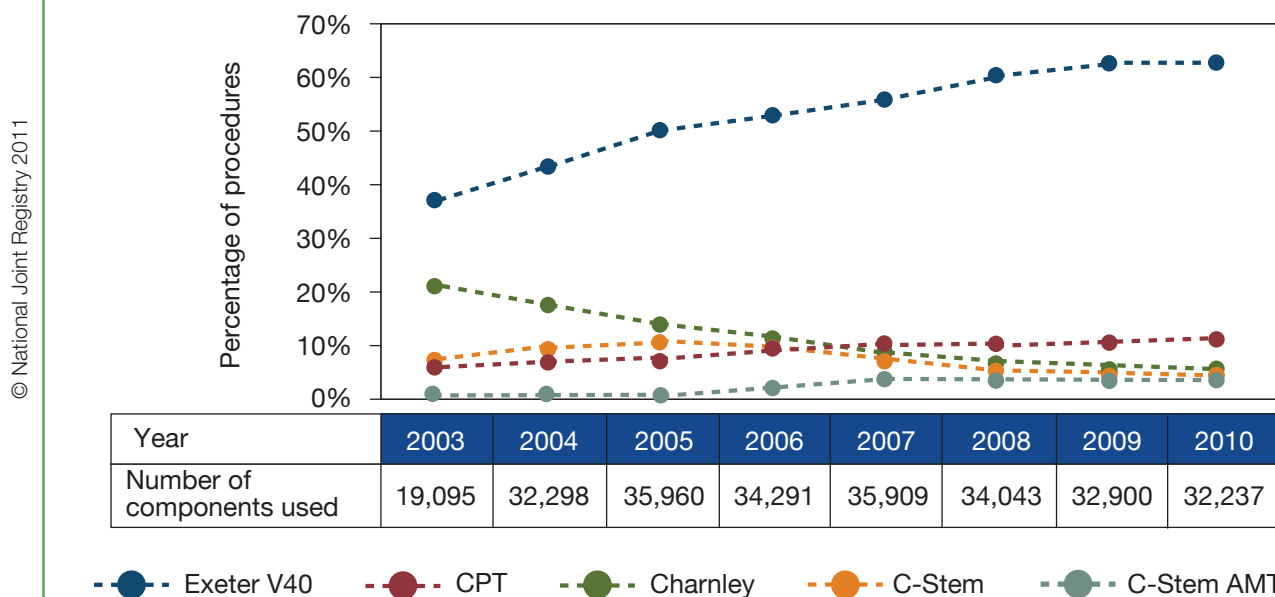
### 2.2.1.5.2 Hip brand usage in primary procedures

Figures 2.8 to 2.12 show historical trends in usage of the most popular brands of cemented stems, cemented cups, cementless stems, cementless cups and hip resurfacing cups.

Figure 2.8 shows that the market is dominated by polished collarless tapered stems, with the Exeter V40 having a market share of more than 63% and the CPT stem consolidating its position in second place. There has been a corresponding decrease in the usage of Charnley-type low friction arthroplasty implants; this segment in total now represents only approximately 8% of the overall market for cemented primary stems.

**Figure 2.8**

Top five cemented hip stem brands, usage trends 2003 to 2010.

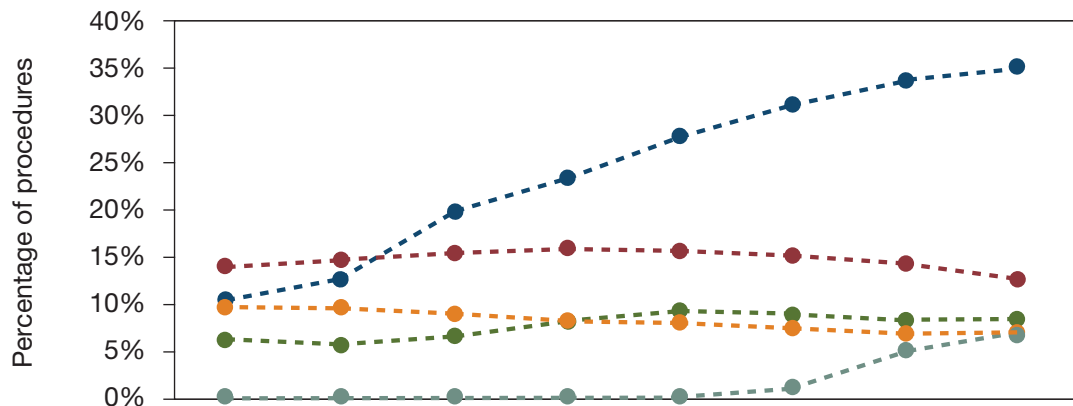


The trend for cemented cups (Figure 2.9) continues to show that sales of different brands are in line with the popularity of the stem manufacturer. Therefore, the market share of the Contemporary cup from Stryker

has grown, as sales of Exeter stems have increased during the last few years. The Marathon is now the fourth largest cemented cup after 2 years of being on the market.

**Figure 2.9**

Top five cemented hip cup brands, usage trends 2003 to 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
Number of components used	15,240	25,447	27,817	25,620	26,960	25,189	23,576	22,502

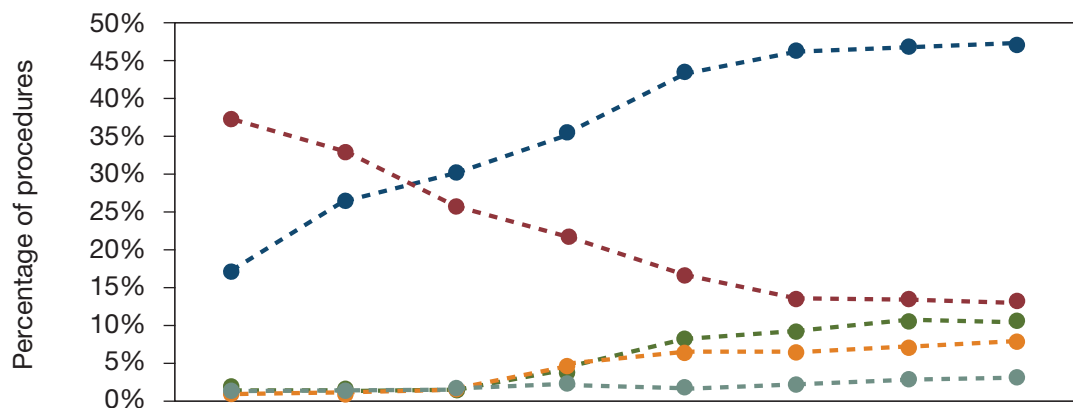
● Contemporary 
 ● Elite Plus Ogee 
 ● Elite Plus 
 ● Exeter Duration 
 ● Marathon

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The relative sales of cementless stem brands (Figure 2.10) are very similar to the previous year, with pressfit HA coated stems continuing to dominate the market.

**Figure 2.10**

Top five cementless hip stem brands, usage trends 2003 to 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
Number of components used	4,093	9,753	14,198	17,731	22,540	28,216	30,869	32,122

● Corail 
 ● Furlong HAC 
 ● Accolade 
 ● Taperloc 
 ● Profemur

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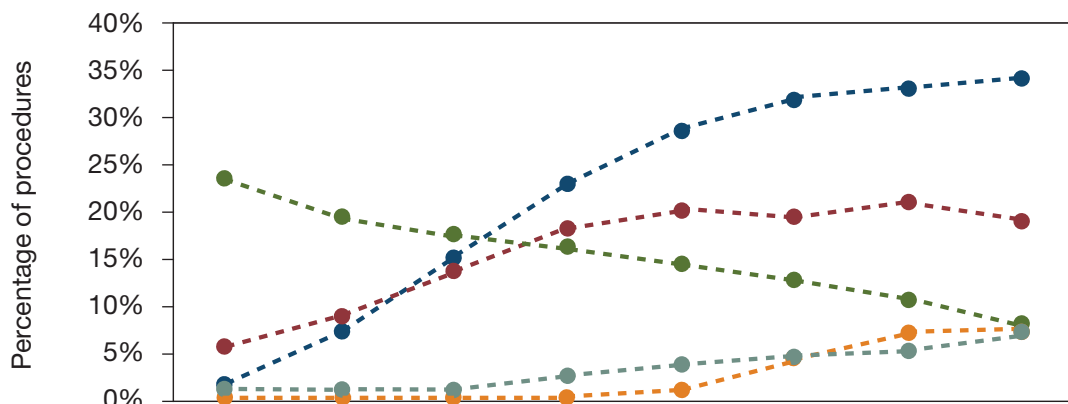
The cementless stem market share has again been reflected in the sales of the corresponding cementless cups from the same manufacturers, which means that the Pinnacle cup from DePuy has further consolidated its position as the market leader (Figure 2.11). Another

product enjoying high sales in this segment is the Trident cup from Stryker, partly due to its usage with the Exeter stem in hybrid procedures. It is especially interesting to note the relatively short clinical history of the two leading brands of cementless cups.

**Figure 2.11**

Top five cementless hip cup brands, usage trends 2003 to 2010.

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Year	2003	2004	2005	2006	2007	2008	2009	2010
Number of components used	7,859	16,362	21,133	24,017	28,420	33,874	38,919	42,260

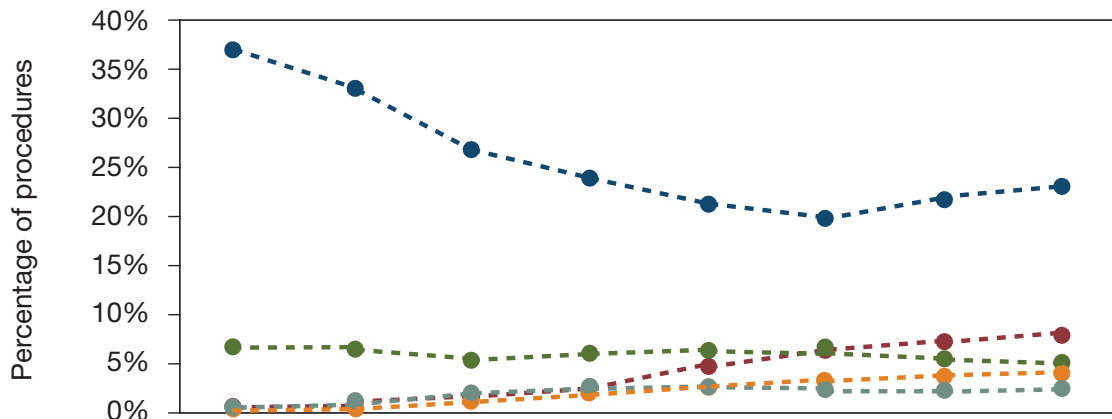
-●- Pinnacle    -●- Trident    -●- Trilogy    -●- CSF Plus    -●- Exceed

Figure 2.12 shows the sales evolution of brands of hip resurfacing prostheses in the English and Welsh markets. It is evident that the previous trend towards a decline in the usage of the original brands has been reversed. The market share of the BHR and Adept

brands, which are showing the best survivorship figures at five years, increased significantly during the course of 2010, at the expense of the ASR resurfacing prosthesis from DePuy which has now been withdrawn from the market due to poor outcome results.

**Figure 2.12**

Top five resurfacing head brands, usage trends 2003 to 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
Number of components used	2,637	4,981	6,198	6,484	6,662	5,750	4,327	2,577

● BHR    
 ● Adept    
 ● Cormet 2000    
 ● Recap    
 ● Conserve

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### 2.2.1.5.3 Trends in head size usage

Figure 2.13 shows the relative usage of different femoral head sizes each year since the inception of the NJR. It is immediately clear that there has been a gradual increase in the use of larger head sizes of 36mm diameter and above. This reflects an increase in LHMOM and ceramic-on-ceramic articulations used

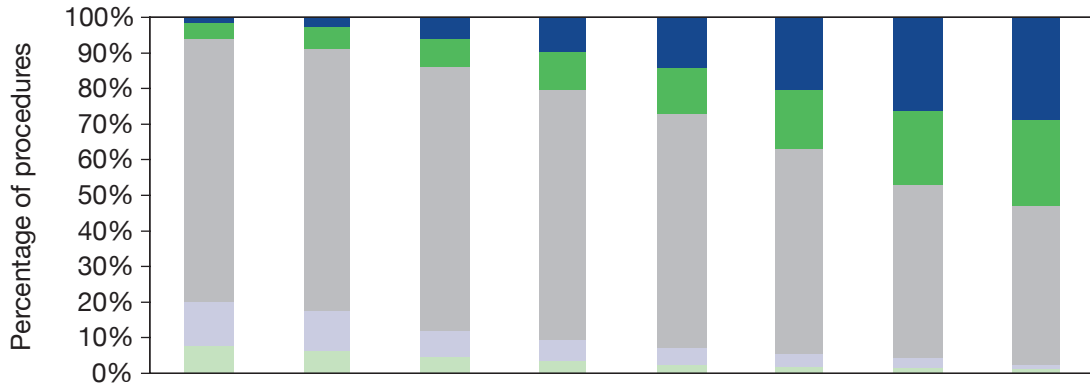
by surgeons in an attempt to reduce the incidence of dislocation, to reduce the number of revisions for recurrent dislocation and to reduce component wear.

This is perhaps the most profound change in clinical practice since the inception of the NJR and a detailed analysis of the practice will be undertaken by NJR research staff in the coming months.



**Figure 2.13**

Femoral head size trends, 2003 to 2010.



Year	2003	2004	2005	2006	2007	2008	2009	2010
36+mm	1%	3%	5%	10%	14%	20%	26%	28%
32mm	5%	6%	8%	11%	13%	16%	21%	24%
28mm	74%	74%	74%	70%	66%	58%	49%	44%
26mm	12%	11%	8%	6%	5%	4%	3%	2%
22mm	8%	6%	5%	4%	2%	2%	2%	1%
Number of components used	18,687	35,606	43,396	45,295	51,805	56,446	60,077	62,728

## 2.2.2 Hip revision procedures, 2010

A total of 7,852 hip revision procedures were reported in 2010, an increase of 649 compared with 2009. Table 2.9 shows that of these, 6,717 (86%) were single stage revision procedures, 486 (6%) were stage one of a two stage revision, 570 (7%) procedures were stage two of a two stage revision and 60 (<1%) were excision arthroplasty procedures. The 19 hip re-operations submitted are excluded from any counts

in this section. Previous years have shown a relative increase in stage two of two stage revisions compared with single stage revisions but in 2010 this changed with a higher percentage of single stage revisions up from 83% in 2009 to 86% last year. It is not immediately apparent why this should be the case as infection as an indication for revision is unchanged at about 8% of the total. Adverse soft tissue reaction was added to the list of reasons for revision in July 2009 and was reported in 5% of all revisions.

**Table 2.9** Patient characteristics for hip revision procedures in 2010, according to procedure type.

	Hip single stage revision		Hip stage one of two stage revision		Hip stage two of two stage revision		Hip excision arthroplasty		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Total</b>	<b>6,717</b>	<b>86%</b>	<b>486</b>	<b>6%</b>	<b>570</b>	<b>7%</b>	<b>60</b>	<b>&lt;1%</b>	<b>7,833</b>	
<b>Number with patient data</b>	<b>6,326</b>	<b>94%</b>	<b>456</b>	<b>94%</b>	<b>540</b>	<b>95%</b>	<b>55</b>	<b>92%</b>	<b>7,377</b>	<b>94%</b>
Average age	70.6		69.08		67.7		70.04		69.83	
SD	12.1		10.9		12.3		14.6		12.61	
Interquartile range	63.2-79.2		62.7-76.9		61.9-76.5		63.6-80.0		63.1-78.9	
<b>Gender</b>										
Female	3,788	60%	207	45%	253	47%	33	60%	4,281	58%
Male	2,538	40%	249	55%	287	53%	22	40%	3,096	42%
<b>Patient physical status</b>										
P1 - fit and healthy	695	10%	30	6%	42	7%	1	2%	768	10%
P2 - mild disease not incapacitating	4,241	63%	296	61%	355	62%	29	48%	4,921	63%
P3 - incapacitating systemic disease	1,682	25%	153	31%	170	30%	26	43%	2,031	26%
P4 - life threatening disease	99	1%	6	1%	3	<1%	4	7%	112	1%
P5 - expected to die within 24 hours with or without an operation	0	0%	1	<1%	0	0%	0	0%	1	<1%
<b>Indications for surgery</b>										
Aseptic loosening	3,387	50%	70	14%	62	11%	12	20%	3,531	45%
Lysis	1,019	15%	48	10%	32	6%	4	7%	1,103	14%
Pain	1,828	27%	102	21%	76	13%	11	18%	2,017	26%
Dislocation/subluxation	1,123	17%	15	3%	18	3%	13	22%	1,169	15%
Periprosthetic fracture	685	10%	21	4%	16	3%	9	15%	731	9%
Infection	213	3%	384	79%	423	74%	35	58%	1,055	13%
Malalignment	417	6%	9	2%	4	1%	3	5%	433	6%
Fractured acetabulum	100	1%	0	0%	2	<1%	0	0%	102	1%
Fractured stem	116	2%	2	<1%	5	1%	1	2%	124	2%
Fractured femoral head	25	<1%	0	0%	1	<1%	0	0%	26	<1%
Incorrect sizing head/socket	47	<1%	1	<1%	1	<1%	0	0%	49	<1%
Wear of acetabular component	935	14%	15	3%	12	2%	5	8%	967	12%
Dissociation of liner	93	1%	12	2%	3	<1%	3	5%	111	1%
Adverse soft tissue reaction	381	6%	6	1%	10	2%	1	2%	398	5%
Other	528	8%	20	4%	45	8%	4	7%	597	8%
<b>Side</b>										
Bilateral	0	0%	0	0%	0	0%	0	0%	0	0%
Left, unilateral	3,059	46%	233	48%	273	48%	25	42%	3,590	46%
Right, unilateral	3,658	54%	253	52%	297	52%	35	58%	4,243	54%

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### 2.2.2.1 Patient characteristics

Table 2.9 summarises patient characteristics for the 7,833 hip revision procedures undertaken in 2010. Compared with 2009, the patient demographics have largely remained unchanged. However, the percentage of patients who were graded as being fit

and healthy prior to surgery has decreased from 26% in 2003 to 10% in 2010.

Adverse soft tissue reaction was noted for 5% of all revision procedures (Table 2.9). Aseptic loosening and pain have decreased as reasons for revision compared with 2009 for all revision procedure types (Table 2.10).

**Table 2.10** Indication for surgery for hip revision procedures, 2006 to 2010.

	2006		2007		2008		2009		2010		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Indications for single stage revision</b>	<b>5,441</b>		<b>6,100</b>		<b>6,340</b>		<b>6,474</b>		<b>6,717</b>		<b>31,072</b>	
Aseptic loosening	3,439	63%	3,698	61%	3,758	59%	3,585	55%	3,387	50%	17,867	58%
Lysis	1,156	21%	1,103	18%	1,099	17%	978	15%	1,019	15%	5,355	17%
Pain	1,074	20%	1,231	20%	1,731	27%	1,999	31%	1,828	27%	7,863	25%
Adverse soft tissue reaction	-	-	-	-	-	-	-	-	381	6%	381	1%
Infection	104	2%	102	2%	171	3%	187	3%	213	3%	777	3%
<b>Indications for stage one of a two stage revision</b>	<b>376</b>		<b>399</b>		<b>453</b>		<b>546</b>		<b>486</b>		<b>2,260</b>	
Aseptic loosening	79	21%	73	18%	88	19%	83	15%	70	14%	393	17%
Lysis	57	15%	46	12%	58	13%	49	9%	48	10%	258	11%
Pain	64	17%	57	14%	87	19%	102	19%	102	21%	412	18%
Infection	302	80%	303	76%	363	80%	433	79%	384	79%	1,785	79%

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### 2.2.2.2 Components removed and components used

Both the acetabular and femoral components were removed in half of all revision procedures (Table 2.11). However, comparison of the different types of revision procedures indicates that both components

were more likely to be removed during a two stage revision process than during a single stage revision. This is expected since the majority of two stage revisions are carried out for reasons of infection, where all components are routinely removed. The components used during revision procedures are shown in Table 2.12.

**Table 2.11** Components removed during hip revision procedures in 2010.

	Hip single stage revision		Hip stage one of a two stage revision		Hip excision arthroplasty		Total	
	No.	%	No.	%	No.	%	No.	%
<b>Total</b>	<b>6,717</b>		<b>486</b>		<b>60</b>		<b>7,263</b>	
Both cup and stem	3,121	46%	389	80%	44	73%	3,554	49%
Acetabular cup only	1,861	28%	23	5%	1	2%	1,885	26%
Femoral stem only	1,145	17%	32	7%	8	13%	1,185	16%
Neither cup nor stem	590	9%	42	9%	7	12%	639	9%

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**Table 2.12** Components used during single stage hip revision procedures in 2010.

	Hip single stage revision	
	No. of procedures	%
<b>Total</b>	<b>6,717</b>	
<b>Femoral prosthesis</b>		
Cemented	3,205	48%
Cementless	1,085	16%
Not revised	2,427	36%
<b>Acetabular prosthesis</b>		
Cemented	1,242	18%
Cementless	4,123	61%
Not revised	1,352	20%

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