NEW ZEALAND ORTHOPAEDIC ASSOCIATION

THE NEW ZEALAND JOINT REGISTRY

TWELVE YEAR REPORT

JANUARY 1999 TO DECEMBER 2010

REGISTRY BOARD

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Date of Publication:
October 2011

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EDITORIAL COMMENT

It is our pleasure to present the twelve year report of the New Zealand Orthopaedic Associations New Zealand Joint Registry. The devastating series of earthquakes and aftershocks resulted in a very difficult year for the Christchurch based Registry staff and we are deeply appreciative of their dedication in very trying circumstances.

The total number of registered joint arthroplasties at 31st of December 2010 was 149027which had been performed on 109665 individual patients of which 13963(12.7%) have died during the 12 year period. The number of observed component years contained within the Registry has now reached well over 500,000 years. The increase of 16517 registered joints for 2010 compared to the 15885 in 2009 represents an overall annual gain of 4% which is slightly up on the increase for 2009(3.7%).There were increased registrations for hip, knee and ankle and falls for unicompartmental and elbow primary arthroplasty categories when compared to 2009. As for previous years analyses of revision data has been confined to primary registered arthroplasties.

In this year's report the format of previous years has been followed such that each arthroplasty section is self contained. This does, however, result in a certain amount of intersection repetition.

There are 71000 hip arthroplasties in the registry with an overall revision rate of 0.67 per 100 observed component-years (ocys) with an 11-year prosthesis survival of 92.1%. The annual percentage of uncemented hip arthroplasties continues to rise and in 2010 reached 52%. This rise is at the expense of fully cemented hips which last year fell to 13% of total compared to 56% in 1999. Hybrid arthroplasty remains relatively steady at 35%. As in previous years when the 3 types of hip fixation are analysed against the four age bands: under 55 years, 55-64 years, 65-74 years, and greater than 75 years, it shows that the uncemented arthroplasty has a significantly higher revision rate ($p<0.05$) in all except the under 55 age band. The data also shows that overall the hybrid hip has the lowest revision rate across the 4 age bands. However, the KM curves for the 3 types of arthroplasty continue to converge and at eleven years prostheses survival is 92.42%, 92.66% and 91.83% respectively for cemented, uncemented and hybrid hips. These percentages confirm the trend noted in recent years that the revision rate for uncemented hips is slowing in comparison to cemented and hybrid hips.
There are now 832 hip prosthesis combinations in the Registry; 510(61%) have fewer than 10 registered procedures and 263 (31%) one only.
Revision rates for individual hip component combinations (minimum of 250 primary procedures) as well as for individual components (minimum of 50 primary procedures) have been calculated. The Corail/Pinnacle, Twinsys uncem ented/Selexys, Spectron/ Duraloc and Elite plus/Duraloc have revision rates significantly higher ($p<0.05$) than the overall rate of 0.67/100 ocys. The first two combinations were among the top ten for 2010 and should therefore be flagged.

In view of the current controversy regarding large heads and the ASR in particular, it is appropriate to record that the Corail/ASR(156),S -Rom/ASR (130)and Summit/ASR(88) combinations have revision rates of 1.41, 4.01 and 1.86 /100ocys respectively. The S-Rom/ASR is the only statistically significant one due to the wide CIs for the other two combinations.-
The ASR cup revision rate increased from 1.73 to 2.39/100ocys in 2010 which is highly significant ($p<0.001$)

KM survival curves for some of the hip combinations with a minimum of 10 years of analysable data has been included for the first time. It is interesting to see that the Charnley, Muller and the ExeterV40/Contemporary lead the seven while Exeter/Contemporary and Spectron/ Reflection trail behind. The only uncemented combination, CLS/Morscher, is in the middle.

The revision rates for the various bearing surfaces used in primary hip arthroplasty i.e. metal on plastic, metal on metal, ceramic on plastic, ceramic on metal, ceramic on ceramic have been further analysed this year with respect to head size. Head sizes >36mm (86% are metal on metal articulation) had a significantly higher revision rate at 1.55 compared to 0.72 for sizes 29-36 mm and 0.66/100ocys for <29mm.Females with head size >36mm had a significantly higher revision rate than males. These findings are similar to those from other Registries. Across all head size categories the metal on plastic articulation has a significantly lower revision rate than the other combinations.
Overall, however, the hip revision rate noted above and the ten year prosthesis survival of 92.10% are among the best for similar national joint registries. A similar situation applies to knee prostheses with the overall revision rate 0.52/100 ocys, (95% confidence interval; 0.49- 0.55) and the ten year survival of 95.16% again among the best for national joint registries. New Zealand surgeons can therefore be justifiably proud of these medium term trends.

There are 85 different knee prostheses registered within the Registry with 52% having less than 10 registrations. Analyses of the 31 that have a minimum of 50 primary registered procedures were undertaken. The 2 LCS uncemented, the Insall Burstein, Nexgen LPS-flex cemented and Scorpio prostheses have significantly higher revision rates than the overall rate of

0.52/100 ocys @ the 95% confidence interval. The LCS Complete(268) and the Nexgen LPS-flex cemented (732) were the only ones implanted in 2010.

KM survival curves for four of the cemented knee prostheses with a minimum of 10 years of analysable data have been included for the first time. The PFC sigma has the best survival curve of the four.

Although uncemented knee arthroplasty represents just 4.5% of all primary knee arthroplasties it has a significantly higher revision rate ($P<0.05$) than either fully cemented or hybrid in which the tibial component is cemented and the femoral component uncemented. Analyses have confirmed that it is the loosening of the uncemented tibial component that is mainly responsible for the increased revision rate. The KM curves for the 3 types of fixation show that in contrast to the hips the uncemented curve continues to steeply diverge from the other two.

Image guidance (IG), first recorded by the registry in 2005, continues to be increasingly used for primary knee arthroplasty and during 2010 was used in 14% of procedures. Comparison of revision rates for IG with non IG procedures demonstrates a rate of 0.63 versus 0.52/100 ocys. There is no statistical difference between the two at this early stage.

This year a separate analysis was performed comparing revision rates and 10 year survival of fixed versus mobile bearing knees. It has shown that fixed bearing have significantly lower revision rates and better 10 year survival than mobile bearing. These findings are also being reported from other Registries.

There are 156 patello-femoral prostheses registered with 35 added in 2010, a 50% increase on 2009. Twelve (7.7%) have been revised.

With regard to unicompartmental knee arthroplasty there was a 6.7% decrease in registrations compared to 2009 but once again the Oxford uncemented prosthesis was very dominant. The minimally invasive approach for the uni-compartmental knee arthroplasty remains popular and in 2010 was used in 31% of procedures.

Once again we have compared the deep infection revision rates within six months of the primary procedure for primary hip and knee arthroplasty against the theatre environment. Six months has been chosen as infection within this time period is highly likely to have been introduced at the time of surgery. This year's analyses again demonstrate that for primary hip and knee arthroplasty there was 3 times the risk for revision for deep infection when the primary procedure was carried out in a laminar flow theatre with a space suit compared to a conventional theatre without a space suit. The use of space suits also significantly increases the risk of revision for deep infection in both conventional and laminar flow theatres. Last year, for the first time there was a slight drop in the percentage of arthroplasties performed in laminar flow theatres and the use of space suits.

Body mass index (BMI) data was analysed for the first time and for hip and knee patients the mean BMI was border line obesity (29, range 14-55, for hips & 31, range17-58, for knees) There were significant numbers of morbidly obese people receiving arthroplasties.

The number of primary ankle arthroplasties increased by 125 in 2010 which was 6 greater than the previous year. The Mobility is still the dominant prosthesis but the Salto usage increased in 2010.The KM survival curve demonstrates a rather steep descent for years 4-7.

In the shoulder arthroplasty section, resurfacing arthroplasty has been further divided into partial and total which along with hemi-arthroplasty makes 5 separate arthroplasty groups for analyses with respect to revision rates and Oxford scores. Although there is considerable variation in revision rates for the different prostheses there is no significant difference among the revision rates compared to the overall mean but Reverse and Partial Resurfacing are significantly higher than Conventional total arthroplasty.
Conventional total arthroplasty has a significantly better mean Oxford score than the other groups apart from Partial Resurfacing.

Oxford 12 Questionnaire

More 10 year Oxford scores have been analysed for primary hip and knee arthroplasty. When the various score categories are compared to the 6 month and 5 year outcomes the only significant difference is an increase in the pain category for hips but not for knees, These 10 year scores affirm that the six-month score is indicative of the longer term outcome.

As noted in previous years the statistically significant relationship between the 6 month score and revision within 2 years for primary hips and knees including unicompartmental, has again been demonstrated. Furthermore the 5 year score and revision within 2 years of that date demonstrates an even more significant relationship especially for knee arthroplasty. For the first time analyses of shoulder questionnaire data has been undertaken and demonstrates the same relationship between the Oxford score at 6 months and revision within 2 years.

In terms of using the Oxford scores as a screening tool for arthroplasty follow up it is worth noting that using 6 month data 70% of hip, 70% of knee and 72% of unicompartmental revisions within 2 years would have been captured by monitoring the lowest 31%, 25% and 30% respectively of the Oxford scores. From the 5 year data, 75% of hip and 80% of knee revisions would have been captured by monitoring the lowest 30% and 24% respectively of the Oxford scores.

Deceased Person's Data.

A deceased person's data is valid in perpetuity for all analyses involving the time interval prior to the person's death. e.g. if a person dies 8 years post primary hip replacement their data is always valid for the KM analyses for that 8 year period. Hence the rider "deceased patients censored at time of death."

Publications and Presentations

Since last year's report one further peer reviewed paper based on registry data has been published in the British Journal of Bone and Joint Surgery and a further one accepted for publication in the American Journal of Bone and Joint Surgery. In addition two papers written in collaboration with other Registries have also been accepted by the American Journal of Bone and Joint Surgery. (see appendix 2)

Alastair Rothwell	Toni Hobbs	Chris Frampton
Supervisor	Coordinator	Statistician

ACKNOWLEDGEMENTS

The Registry is very appreciative of the support from the following

Canterbury District Health Board:
for the website and other facilities

New Zealand Health Information Service :
For audit compliance information

Mike Wall, Alumni Software:
For continued monitoring and upgrading of data base software

FUNDING

The Registry wishes to acknowledge development and ongoing funding support from:

ACCIDENT COMPENSATION CORPORATION

CANTERBURY DISTRICT HEALTH BOARD

MINISTRY OF HEALTH

NEW ZEALAND ORTHOPAEDIC ASSOCIATION

ORTHOPAEDIC SURGEONS

SOUTHERN CROSS HOSPITALS

WISHBONE TRUST

Participating Hospitals

We wish to gratefully acknowledge the support of all participating hospitals and especially the coordinators who have taken responsibility for the data forms

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Public Hospitals

Auckland Hospital
Auckland 1142
Contact: Shelley Thomas

Christchurch Hospital
Christchurch 8140
Contact: Angela McIntyre

Gisborne Hospital
Gisborne 4010
Contact: Sharon Smythe

Hawkes Bay Hospital
Hastings 4120
Contact: Michaela Zemmerich

Kenepuru Hospital
Porirua 5240
Contact: Sue von Hartitzsch

Masterton Hospital
Masterton 5840
Contact: Lisa Manihera

Nelson Hospital
Nelson 7040
Contact: Pauline Manley or Anne Fryer

Palmerston North Hospital
Palmerston North 4442
Contact: Philip Prujean or Karen Langvad-Forster

Southland Hospital
Invercargill 9812
Contact: Helen Powley

Tauranga Hospital
Tauranga 3143
Contact: Sue Clynes

Waikato Hospital
Hamilton 3204
Contact: Lorraine Granger or Helen Keen

Wanganui Hospital
Wanganui
Contact: Sue Slight

Waitakere Hospital
Henderson, Auckland 0612
Contact: Alannah Domigan

Burwood Hospital
Christchurch 8083
Contact: Diane Darley

Dunedin Hospital
Dunedin 9016
Contact: Jenni Taylor

Grey Base Hospital
Greymouth 7840
Contact: Arianne Go or Marg Wafer

Hutt Hospital
Lower Hutt 5040
Contact: Gavin Rodgers

Manukau Surgery Centre
Auckland 2104
Contact: Amanda Ellis

Middlemore Hospital
Auckland 1640
Contact: Francine Gabriel

Northshore Hospital,
Waitemata DHB
Takapuna 0740
Contact: Chris Cavalier

Rotorua Hospital (Lakes DHB)
Rotorua 3046
Contact: Janice Reynolds

Taranaki Base Hospital
New Plymouth 4342
Contact: Allison Tijsen

Timaru Hospital
Timaru 7940
Contact: Sally Vernon

Wairau Hospital
Blenheim 7240
Contact: Monette Johnston

Wellington Hospital
Newtown 6242
Contact: Rebecca Kay

Whakatane Hospital
Whakatane 3158
Contact: Karen Burke

Whangarei Area Hospital
Whangarei 0140
Contact: Helen Harris

Private Hospitals

Aorangi Hospital
Palmerston North 4410
Contact: Frances Clark

Ascot Integrated Hospital
Remuera 1050
Contact: Elizabeth Hollier

Belverdale Hospital
Wanganui 4500
Contact: Jane Young

Bidwill Trust Hospital
Timaru 7910
Contact: Kay Taylor

Boulcott Hospital
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Contact: Karen Hall

Bowen Hospital
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Braemar Private Hospital
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Chelsea Hospital
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Contact: Jenny Long

Grace Hospital (Norfolk Southern Cross)
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Kensington Hospital
Whangarei 0112
Contact: Sandy Brace

Manuka Street Trust Hospital
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Mercy Integrated Hospital
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Profile of the Average New Zealand Orthopaedic Surgeon*

From our analyses the average orthopaedic surgeon performed in 2010

- 37 Total hip arthroplasties — with 52% using uncemented,13 % fully cemented and 35 % hybrid prostheses: has a 92.10% survival at 11 years and a revision rate of 0.67 per 100 component years; 0.43% have been revised for deep infection; 85% at 6 months, 89% at five years and 85 % at 10years had an excellent or good Oxford score.
- 32 Total knee arthroplasties — with almost all cemented but only 10 with patellae resurfaced; has a 95.16 % survival at 11 years and a revision rate of 0.52 per 100 component years; 0.58% have been revised for deep infection; 72% at 6 months, 82% at 5 years and 79 % at ten years had an excellent or good Oxford score.
- 9 Unicompartmental knee arthroplasties — with most cemented; has a 89.83% survival at 9 years and a revision rate of 1.34per 100 component years; 0.26% have been revised for deep infection; 81% at six months and 87% at 5 years had an excellent or good Oxford score.
- 7 Shoulder arthroplasties — with a 60:40 split between total arthroplasty varieties and hemiarthroplasty; has a 95.17% survival at 5 years and a revision rate of 0.99per 100 component years; 0.3% have been revised for deep infection; 67% had an excellent or good Oxford score at 6 months.
- 9 Total ankle arthroplasties — mostly uncemented; 88.39% survival at 7years and a revision rate of 1.36per 100 component years; 0.3 % revised for deep infection; 56% had excellent or good Oxford derived scores at 6 months.
- 1.8 Total elbow arthroplasties — most likely a cemented Coonrad-Morrey prosthesis; 93.73% survival at 4 years and a revision rate of 1.19per 100 component years; 0.4% have been revised for deep infection; 68% had excellent or good Oxford derived scores at 6 months.

*** averages derived from the number of surgeons recorded performing the above procedures during 2010 and not from the total pool of orthopaedic surgeons**.

DEVELOPMENT AND IMPLEMENTATION OF THE NEW ZEALAND JOINT REGISTRY

The year 1997 marked 30 years since the first total hip replacement had been performed in New Zealand and as a way of recognising this milestone it was unanimously agreed by the membership of the NZOA to adopt a proposal by the then President, Alastair Rothwell to set up a National Joint Registry.

New Zealand surgeons have always been heavily dependent upon northern hemisphere teaching, training and outcome studies for developing their joint arthroplasty practice and it was felt that it was more than timely to determine the characteristics of joint arthroplasty practice in New Zealand and compare the outcomes with northern hemisphere counterparts. It was further considered that New Zealand would be ideally suited for a National Registry with its strong and co-operative NZOA membership, close relationship with the implant supply industry and its relatively small population. Advantages of a Registry were seen to be: survivorship of different types of implants and techniques; revision rates and reasons for; infection and dislocation rates, patient satisfaction outcomes, audit for individual surgeons, hospitals, and regions; opportunities for in-depth studies of certain cohorts and as a data base for fund raising for research.

Administrative Network

It was decided that the Registry should be based in the Department of Orthopaedic Surgery, Christchurch Hospital and initially run by three part time staff: a Registry Supervisor (Alastair Rothwell), the Registry Coordinator (Toni Hobbs) and the Registry secretary (Pat Manning). As all three already worked in the Orthopaedic Department it was a cost effective and efficient arrangement to get the Registry underway.

New Zealand was divided into 19 geographic regions and an orthopaedic surgeon in each region was designated as the Regional Coordinator whose task was to set up and maintain the data collection network within the hospitals for his region.

This network included a Theatre Nurse Coordinator in every hospital in New Zealand who voluntarily took responsibility for supervising the completion, collection and dispatch of the data forms to the Registry.

Data Collection Forms

The clear message from the NZOA membership was to keep the forms for data collection simple and user friendly. The Norwegian Joint Registers form was used as a starting point but a number of changes were made following early trials. The forms are largely if not completely filled out by the Operating Theatre Circulating Nurse and are meant to be checked and signed by the surgeon at the end of the operation.

Data Base

The Microsoft Access 97 data base programme was chosen because it is easy to use, has powerful query functions, can cope with one patient having several procedures on one or more joints over a lifetime and has "add on" provisions. The data base is expected to meet the projected requirements of the Registry for at least 20 years. It can accommodate software upgrades as required.

Patient Generated Outcomes

The New Zealand Registry is one of the first to collect data from Patient Generated Outcomes. The validated Oxford Hip and Knee outcomes questionnaires were chosen to which were added questions relating to dislocation, infection and any other complication that did not require further joint surgery. It was agreed that these questionnaires should be sent to all registered patients six months following surgery and then at five yearly intervals. The initial response rate was between 70 & 75% and this has remained steady over the five year period.

However, because of the large numbers of registered primary hip and knee arthroplasties and on the advice of our statistician, questionnaires have been sent out on a random selection basis since July 2002 to achieve an annual response of 20% for each group. All patients in the other arthroplasty groups including revision arthroplasty are sent the questionnaires.

Funding

Several sources of funding were investigated including contributions from the Ministry of Health, various funding agencies, medical insurance societies and an implant levy payable by surgeons and public hospitals to supplement a grant from the NZOA. In the early years the Registry had a "hand to mouth" existence relying on grants from the NZOA and Wishbone Trust until it received significant annual grants from the Accident Compensation Corporation. From 2002 funding became more reliable with the surgeons paying a $10 levy, increased to $15 in 2008, for each joint registered from a private hospital, and the Ministry of Health agreeing to pay $72,000 a year as part of the Government Joint Initiative. Since 2005 the Southern Cross Hospitals have contributed $10,000 annually.

Ethical Approval

Application was made to the Canterbury Ethical Committee early in 1998; first for approval for hospital data collection without the need for patient consent and

second for the patient generated outcomes using the Oxford 12 questionnaire plus the additional questions. The first part of the application was initially readily approved but the second part required several amendments to patient information and consent forms before approval was obtained.

A reapplication had to be made when the Ethics Committee of a private hospital chain refused to allow their nurses to participate in the project unless there was prior written patient consent. This view was supported by the Privacy Commissioner on the grounds that the Registry data includes patient identification details. The approval process was eventually successful but having to obtain patient consent has created some difficulties with compliance.

Surgeon and Hospital Reports

It was agreed that every six months reports were to be generated from the Registry data base for primary and revision hip and knee replacements and to consist of: the number of procedures performed by the individual surgeon or at the hospital; the total number of procedures performed in the region in which the surgeon works; the national total and cumulative totals for each of these categories. Six month and more recently 5 year Oxford 12 scores are also included. Since 2008 each surgeon also receives their individual revision rate for their registered primary arthroplasties, and the reports have become annual rather than six monthly.

Introduction of the Registry

The National Joint Registry was introduced as a planned staged procedure.

Stage I November 1997 to March 1998
The base administrative structure was established. The data forms and the data base were developed and a trial was performed at Burwood Hospital.

Stage II April 1998 to June 1998
Further trialling was performed throughout the Christchurch Hospitals and the data forms and information packages were further refined.

Stage III July 1998 to March 1999
The data collection was expanded into five selected New Zealand regions for trial and assessment.

Also during this time communication networks and the distribution of information packages into the remaining regions of New Zealand were carried out.

Stage IV April 1st 1999 the National Joint Registry became fully operational throughout New Zealand.

DEVELOPMENTS SINCE THE INTRODUCTION OF THE REGISTRY

Inclusion of other joint replacement arthroplasties

At the request of the NZOA membership the data base for the Registry was expanded to include total hip replacements for fractured neck of femur, unicompartmental replacements for knees, and total joint replacements for ankles, elbows and shoulders including hemiarthroplasty for the latter. Commencement of this data collection was in January 2000 and this information is included in the annually surgeon and hospital reports.

The validated-Oxford questionnaire was available for the shoulder and was adapted but not validated for the elbow and ankle joints. All those receiving total arthroplasty of the above joints as well as unicompartmental knee arthroplasty are sent questionnaires with a reply rate of between 70 and 75%. As for hips and knees the questionnaires are sent out 6 months post surgery and then at five yearly intervals.

Monitoring of Data Collection

The aim of the Registry is to achieve a minimum of 90% compliance for all hospitals undertaking joint replacement surgery in New Zealand.

It is quite easy to check the compliance for public hospitals as they are required to make regular returns with details of all joint replacement surgery to the NZ Health Information Service. For a small fee the registered joints from the Registry can be compared against the hospital returns for the same period and the compliance calculated. Any obvious discrepancies are checked out with the hospitals concerned and the situation remedied. It is more difficult with private hospital surgery as they are not required to file electronic returns. However by enlisting the aid of prosthesis supply companies it is possible to check the use of prostheses region by region and any significant discrepancy is further investigated.

Another method is to check data entry for each hospital against the previous corresponding months and if there is an obvious trend change then again this is investigated.

The most recent compliance audit in March 2009 again demonstrated a New Zealand wide public hospital compliance of 98% when compared to NZHIS data

Registered patient deaths are also obtained from the NZHIS.

DATA ENTRY BY SCANNING

Barcoding of the labels containing all the prosthesis identification data has now become widespread throughout the implant industry and currently staff are able to scan in 84% of hip and 90% of knee prosthesis data directly into the Registry.

All manually entered data is at least double checked for accuracy.

Staffing

Staff have expanded to four part time data entry and secretarial personnel. This is in order to maintain a lag time between receipt and entry of data forms of no more than two months. It has also been necessary to employ extra staff in order to free up the Coordinator to cope with the ever increasing numbers of requests for Registry data.

The 2010 Registry staff are; Alastair Rothwell, Supervisor, Toni Hobbs, Coordinator, Pat Manning Secretary, Lynley Diggs, Anne McHugh and Jane Tope-Cobb data processors.

Use of Registry Data

There have been increasing numbers of requests for information from the Registry from a wide variety of sources. Great care is taken to protect patient confidentiality at all times and patient details are only released to appropriately accredited personnel and it is emphasised that Ethics Committee approval is required for any research projects involving patient contact.

Registry Board

This Registry Board membership consists of: 5 Orthopaedic Surgeons; Registry Coordinator; Orthopaedic Implant Industry Representative; Arthritis New Zealand Representative; Chief Executive NZOA. The main tasks of the Board are to monitor the organisational structure and functions of the Registry, rule on difficult requests for information from the Registry, advise appropriate authorities regarding data from the Registry that could effect the health status of implant patients, encourage and support research and work with the International Society of Arthroplasty Registries.

NUMBER OF JOINTS ANALYSED
1ST JANUARY 1999 – 31ST DECEMBER 2011

Numbers of procedures registered

	12 years	11 years	10 years	9 years	8 years	7 years	6 years	1-5 years
Hips, primary	71057	63681	56383	49374	42421	35998	29680	23457
Hips, revision	10463	9445	8405	7360	6383	5487	4570	3641
Knees, primary	52214	46093	40068	34458	28705	23565	18537	14371
Knees, revision	4159	3727	3293	2883	2499	2149	1736	1419
Knees unicompartmental	6035	5452	4826	4284	3709	3122	2565	1926
Shoulders, primary	3505	3013	2498	2044	1641	1275	982	693
Shoulders, revision	255	213	180	139	105	80	57	45
Elbows, primary	331	301	267	227	191	160	130	101
Elbows, revision	56	49	41	36	31	26	20	15
Ankles, primary	728	603	484	377	298	216	146	99
Ankles, revision	50	38	29	26	19	12	8	6
Lumbar Disc, primary	129	111	94	75	59	38	22	
Lumbar Disc, revision	3	3						
Cervical Disc, primary	122	95	57	31				
Cervical Disc, revision	1	1						
TOTAL	**149027**	**132510**	**116625**	**101314**	**86061**	**72128**	**58,453**	**45,776**

Bilateral joint replacements carried out under the same anaesthetic

Bilateral hips 1477 patients (2954 hips) 4.0% of primary hips

Bilateral knees 2273 patients (4546 knees) 9.0% of primary knees

Bilateral Unicompartmental knees 497 patients (994 knees) 16.0% of primary uni knees

Bilateral ankles 2 patients (4 ankles)

Bilateral shoulders 4 patients (8 shoulders)

The percentages have remained essentially unchanged from the previous reports

.During the 12 year period 109665 individual patients were registered of which 13963 (12.7%) have died.

Trainee Surgeons: In the following analyses consultants took responsibility for their registrar surgeon procedures.

HIP ARTHROPLASTY

PRIMARY HIP ARTHROPLASTY

The twelve year report analyses data for the period January 1999 – December 2010. There were 71,057 primary hip procedures registered including 1093 resurfacing arthroplasties. This is an additional 7,378 compared to last year's report.

1999	4114
2000	4715
2001	4932
2002	4830
2003	5059
2004	6029
2005	6320
2006	6430
2007	6958
2008	7003
2009	7306
2010	7361

There was a 0.75% increase in hip registrations for 2010, which is considerably down on the 4.3% increase in 2009.

DATA ANALYSIS

Age and sex distribution

The average age for all patients with primary hip arthroplasty was 66.83 years, with a range of 15.43 – 100.13 years.

All hip arthroplasty

	Female	Male
Number	37395	33662
Percentage	52.63	47.37
Mean age	68.36	65.13
Maximum age	100.13	96.97
Minimum age	15.43	15.87
Standard dev.	11.68	11.51

Conventional hip arthroplasty

	Female	Male
Number	37158	32806
Percentage	53.11	46.89
Mean age	68.48	65.47
Maximum age	100.13	96.97
Minimum age	15.43	15.87
Standard dev.	11.61	11.37

Resurfacing hip arthroplasty

	Female	Male
Number	237	856
Percentage	21.68	78.32
Mean age	49.84	52.03
Maximum age	65.88	75.69
Minimum age	25.72	17.74
Standard dev.	7.11	8.64

A further 184 resurfacing hips were registered during 2010, 19 less than for 2009.

2004	21
2005	138
2006	169
2007	187
2008	191
2009	203
2010	184

Body Mass Index

For 2010, there were 2193 BMI registrations for primary hip replacements. The average was 28.73 with a range of 14-55 and a standard deviation of 5.54.

Previous operation

None	67731
Internal fixation	1521
Osteotomy	430
Internal fixation for SUFE	146
Arthroscopy/arthrotomy	77
Arthrodesis	63
Open reduction	49
Core decompression	41
Girdlestone	19
Other	127

Diagnosis

Osteoarthritis	61517
Acute fracture NOF	2525
Avascular necrosis	2244
Developmental dysplasia	1857
Rheumatoid arthritis	1073
Old fracture NOF	941
Other inflammatory	647
Tumour	330
Post acute dislocation	242
Fracture acetabulum	145
Other	206

Approach

Posterior	44458
Lateral	20026
Anterior	3285
Minimally invasive	1309
Trochanteric osteotomy	147
Image guided surgery	101

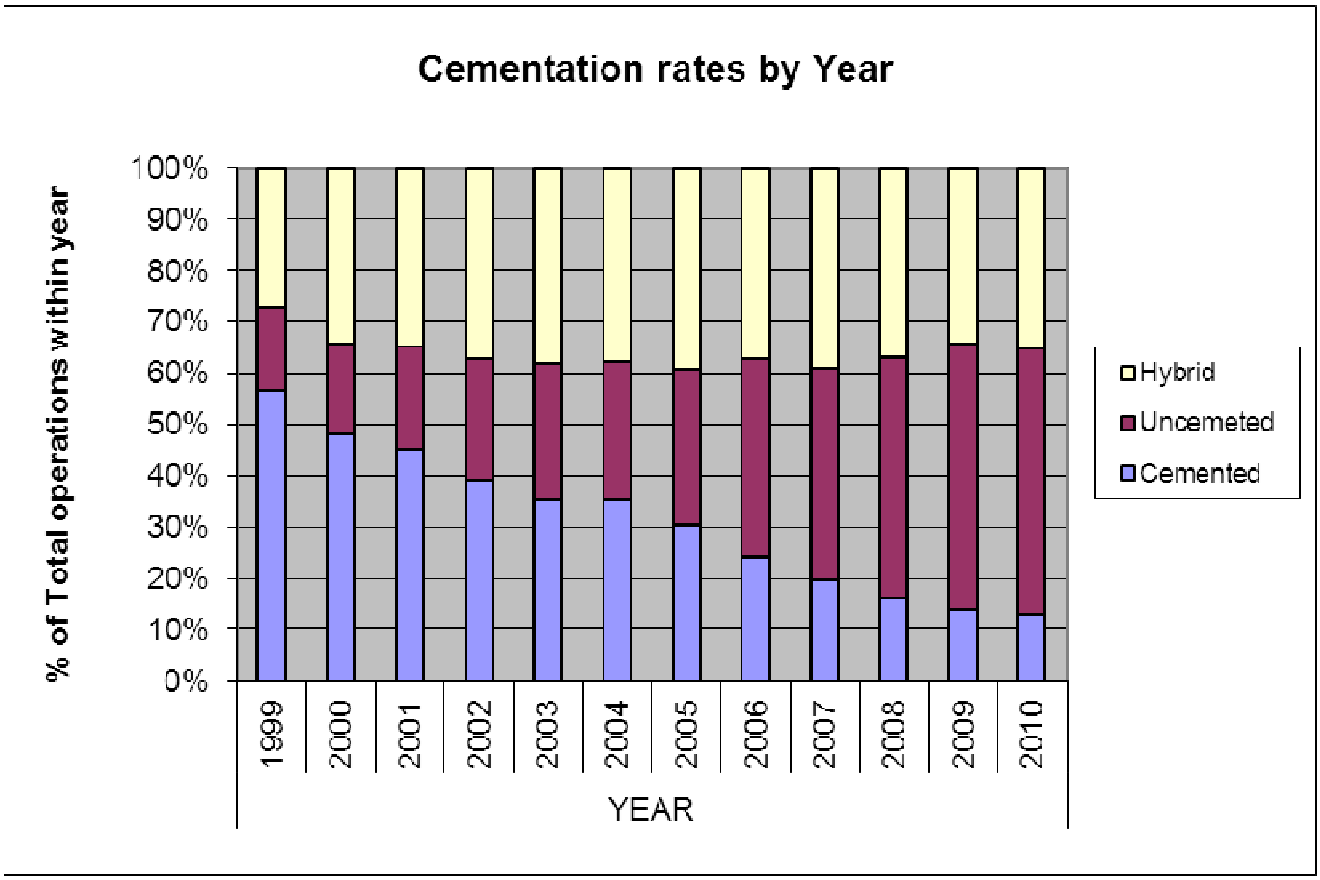
Image guided surgery was added to the updated forms at the beginning of 2005, but there continues to be little interest in the technique. The minimally invasive approach has also waned after a surge in 2008

Bone graft

Femoral autograft	183
Femoral allograft	33
Femoral synthetic	5
Acetabular autograft	579
Acetabular allograft	85
Acetabular synthetic	4

Cement

Femur cemented	46082	(65%)
Antibiotic in cement	27156	(59%)
Acetabulum cemented	20934	(30%)
Antibiotic in cement	12115	(58%)



The proportion of fully cemented hips has further fallen to 13% with corresponding rise to 52% for uncemented.

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic
68050 (96%)

A cephalosporin was used in 85% of patients.

Operating theatre

Conventional	44190
Laminar flow	25680
Space suits	18923

In 2010, 45% of hip arthroplasties were performed in laminar flow theatres and space suits were used for 39%; both figures a slight drop from 2009, the first drop for some years.

ASA Class
This was introduced with the updated forms at the beginning of 2005.

Definitions

ASA class 1:	A healthy patient
ASA class 2:	A patient with mild systemic disease
ASA class 3:	A patient with severe systemic disease that limits activity but is not incapacitating
ASA class 4:	A patient with an incapacitating systemic disease that is a constant threat to life

For the six year period 2005 – 2010, there were 37,870 (92%) primary hip procedures with the ASA class recorded.

ASA	Number	Percentage
1	6807	18
2	22251	59
3	8505	22
4	307	1

Operative time – skin to skin

Mean	80 minutes
Standard deviation	28 minutes
Minimum	24 minutes
Maximum	459 minutes

Surgeon grade
The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the six year period 2005 – 2010.

Consultant	35658
Advanced trainee supervised	3334
Advanced trainee unsupervised	1105
Basic trainee	1025

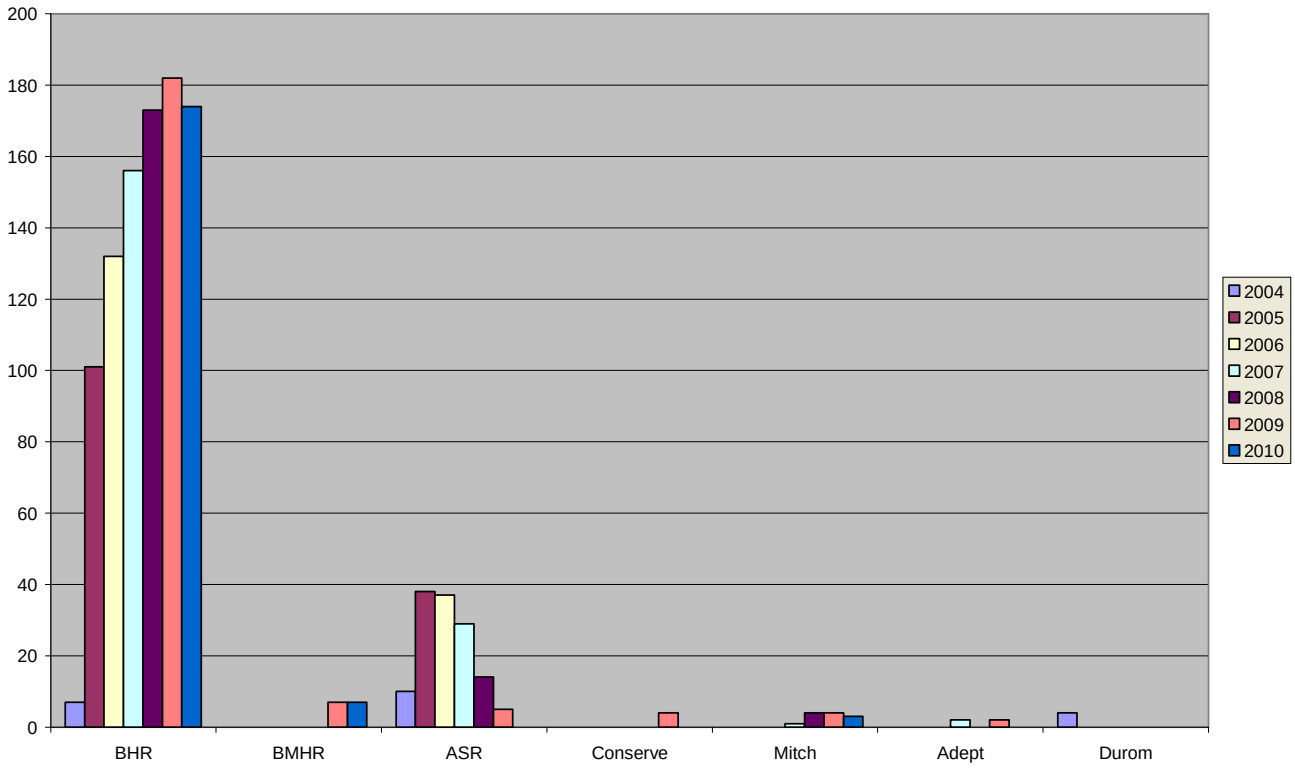
Prosthesis usage

Resurfacing hips used in 2010

BHR	174
BMHR	7
Mitch TRH	3

The ASR was absent in 2010 owing to its withdrawal from the market.

Most used Resurfacing Components 2004-2010



Conventional primary hips

Top 10 femoral components used in 2010

Exeter V40	2101
TwinSys uncemented	974
Corail	850
CLS	451
Spectron	325
Synergy porous	314
Accolade	207
MS 30	196
TwinSys cemented	195
Avenir Muller	178

The only change to last year is that the Summit has been replaced by the Avenir Muller

Top 10 acetabular components used in 2010

Pinnacle	1363
RM cup	966
Trident	606
Reflection porous	575
Continuum TM	511
Trilogy	467
Fitmore	390
Contemporary	379
Tritanium	284
Selexys TPS	259

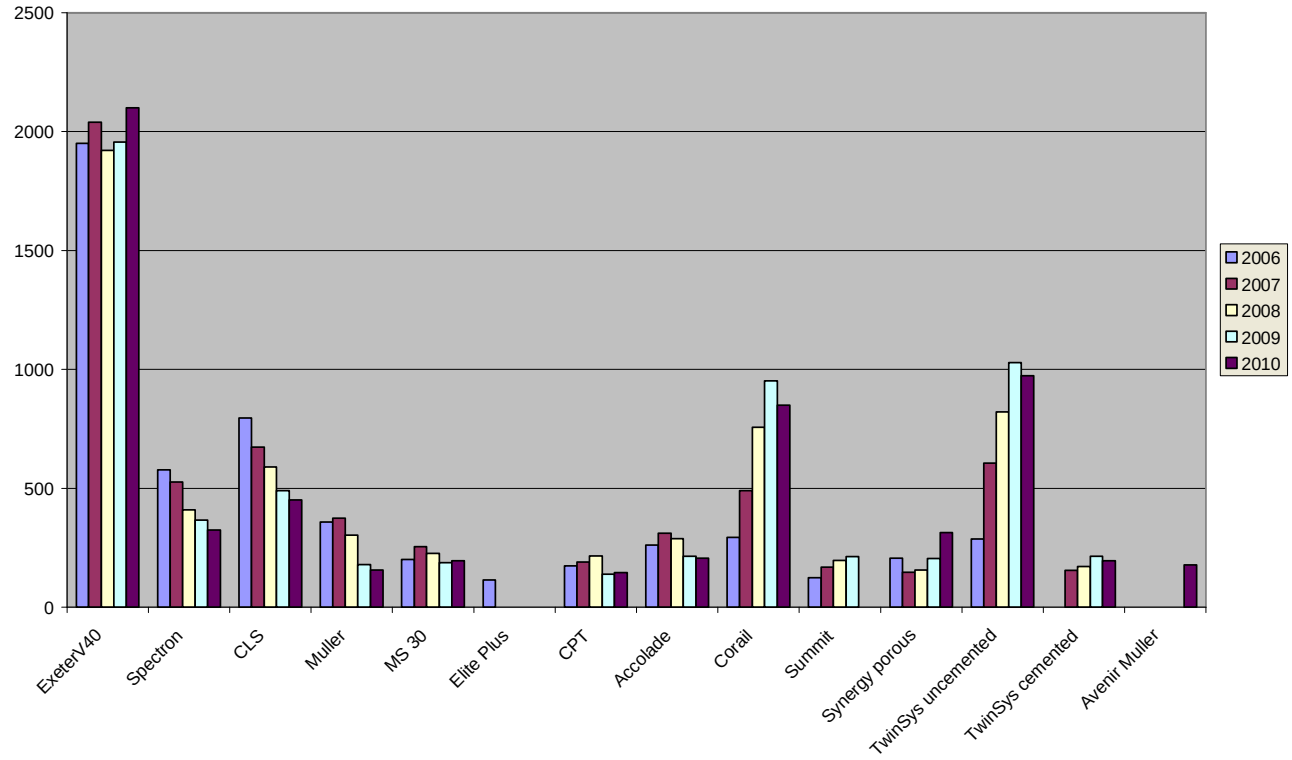
No change at the top but the Continuum TM and to a lesser extent the Tritanium made major advances in 2010, at the expense of Trabecular Metal and CCB.

Top Ten Combinations used in 2010

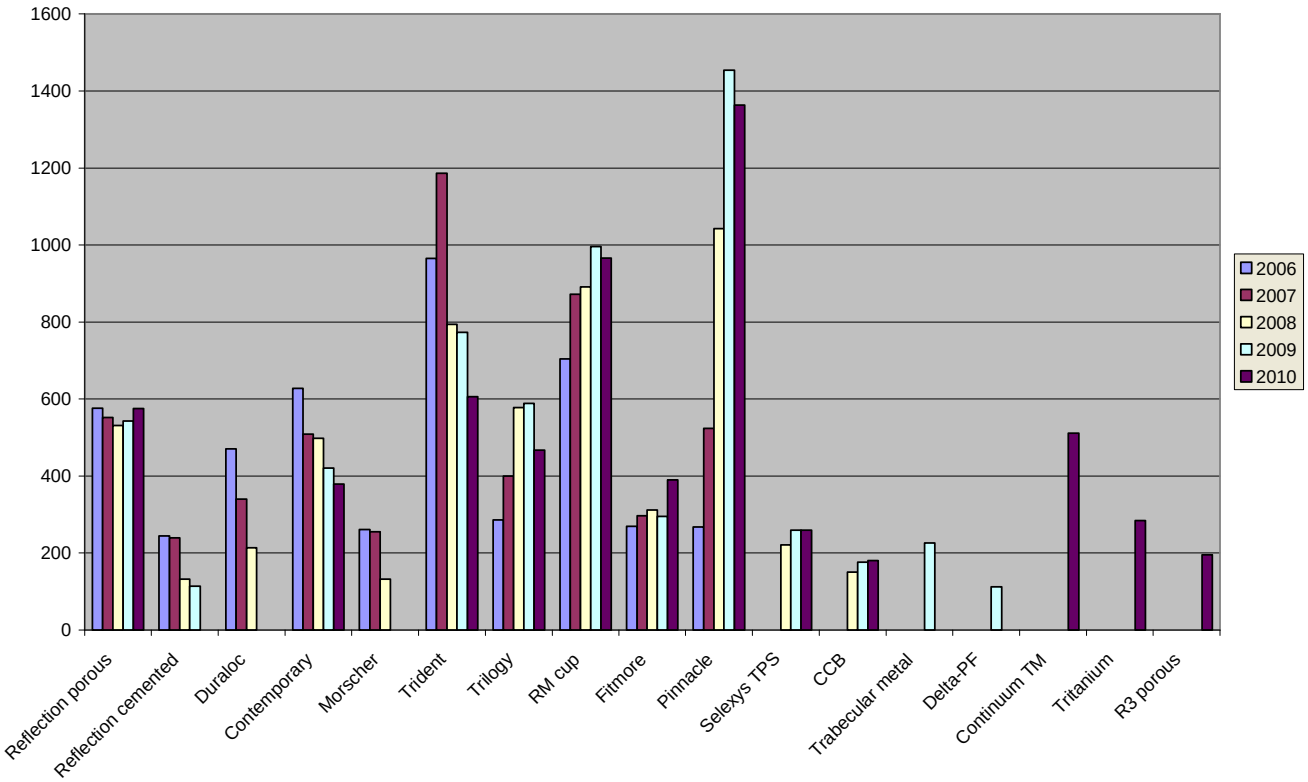
Corail	Pinnacle	771
TwinSys stem uncemented	RM Pressfit cup	502
Exeter V40	Trident	455
Exeter V40	Contemporary	364
Spectron	Reflection porous	245
TwinSys stem uncemented	Selexys TPS	231
Exeter V40	Pinnacle	219
Exeter V40	Trilogy	184
Synergy Porous	Reflection porous	167
Exeter V40	Tritanium	157

In 2010 the Twinsys uncemented/RM Pressfit more than doubled in number. Exeter V40/tritanium, ExeterV40/Trilogy and Synergy Porous/ Reflection Porous have replaced Summit/Pinnacle, CLS/Fitmore and ExeterV40/RM Pressfit from the 2009 list.

Most used femoral components 5 years 2006- 2010



Most used acetabular components 5 years 2006 -2010



Surgeon and hospital workload

Surgeons

In 2010, 199 surgeons performed 7,361 total hip replacements, an average of 37 procedures per surgeon.

31 surgeons performed less than 10 procedures and 47 performed more than 50.

Hospitals

In 2010, primary hip replacement was performed in 52 hospitals, 27 public and 25 private.

The average number of total hip replacements per hospital was 141.

REVISION HIP ARTHROPLASTY

Revision is defined by the Registry as a new operation in a previously replaced hip joint during which one of the components are exchanged, removed, manipulated or added. It includes excision arthroplasty and amputation, but not soft tissue procedures. A two-stage procedure is registered as one revision.

Data analysis

For the twelve-year period January 1999 – December 2010, there were 10,463 revision hip procedures registered. This is an additional 1,019 compared to last year's report.

The average age for a revision hip replacement was 69.92 years, with a range of 17.52 – 97.72 years.

Revision hips

	Female	Male
Number	5102	5361
Percentage	48.76	51.24
Mean age	70.03	69.81
Maximum age	97.72	95.78
Minimum age	17.52	25.68
Standard dev.	12.13	10.84

The percentage of revision hips to primary hips is 13% or a ratio of 1:7.8

REVISION OF REGISTERED PRIMARY HIP ARTHROPLASTIES

This section analyses data for revisions of **registered primary hip arthroplasties** for the twelve-year period.

There were 2,278 revisions of the 69,964 primary conventional hip replacements (3.3%) and 32 revisions of the 1093 resurfacing hip replacements (2.9%), a total of 2310.

Conventional hip arthroplasty analyses

Time to revision

Mean	1238 days
Maximum	4246 days
Minimum	0 days
Standard deviation	1149 days

Reason for revision

Dislocation	698
Loosening acetabular comp.	534
Loosening femoral component	400
Deep infection	301
Pain	243
Fracture femur	217
Wear polyethylene	47
Osteolysis	37
Implant breakage	37
ALVAL	15
Other	84

There was often more than one reason listed on the data form and all were entered. ALVAL also includes listed revision reasons of metallosis, pseudotumour, hypersensitivity and synovitis. They all relate to metal on metal bearing revisions.

Analysis by time of the 6 main reasons for revision

		Years since operation													
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
1	Count	281	65	102	64	48	27	34	27	16	17	4	11	2	698
	%	40.26	9.31	14.61	9.17	6.88	3.87	4.87	3.87	2.29	2.44	0.57	1.58	0.29	100
2	Count	60	31	49	45	44	41	36	54	45	45	49	26	9	534
	%	11.24	5.81	9.18	8.43	8.24	7.68	6.74	10.11	8.43	8.43	9.18	4.87	1.69	100
3	Count	30	19	48	42	38	37	38	46	32	28	26	14	2	400
	%	7.50	4.75	12.00	10.50	9.50	9.25	9.50	11.50	8.00	7.00	6.50	3.50	0.50	100
4	Count	67	35	62	44	21	22	16	11	7	8	5	3	0	301
	%	22.26	11.63	20.60	14.62	6.98	7.31	5.32	3.65	2.33	2.66	1.66	1.00	0.00	100
5	Count	16	23	55	32	20	13	14	16	13	13	18	7	3	243
	%	6.58	9.47	22.63	13.17	8.23	5.35	5.76	6.58	5.35	5.35	7.41	2.88	1.23	100
6	Count	76	22	19	23	13	17	13	6	8	7	9	3	1	217
	%	35.02	10.14	8.76	10.60	5.99	7.83	5.99	2.76	3.69	3.23	4.15	1.38	0.46	100

1 = Dislocation, 2 = Loosening acetabular component, 3 = Loosening femoral component. 4 = Deep Infection, 5 = Pain, 6 = Fractured femur,

73% of revisions for dislocation, 69% for deep infection,65% for femoral #s and 51% for pain are within 4 years of primary arthroplasty compared to just 35% for femoral and acetabular loosening.

Resurfacing hip analyses

Time to revision

Mean	666 days
Maximum	1960 days
Minimum	10 days
Standard deviation	494 days

Reason for revision

Fracture femur/neck of femur	9
Deep infection	8
Loosening acetabular comp.	7
Loosening femoral component	3
Pain	2
Dislocation	1
Other	4

Statistical note

In the tables below there are two statistical terms readers may not be familiar with.

Observed component years

This is the number of registered primary procedures multiplied by the number of years each component has been insitu.

Rate/100 component years

This is equivalent to the yearly revision rate expressed as a percentage and is derived by dividing the number of prostheses revised by the observed component years multiplied by 100. It therefore allows for the number of years of post operative follow up in calculating the revision rate. These rates are usually very low, hence it is expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

Statistical Significance

Where it is stated that a difference among results is significant the p value is 0.05 or less. In most of these situations this is because there is no overlap of the confidence intervals (CIs) but sometimes significance can apply in the presence of CI overlap

All Primary Hip Arthroplasties

	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
All patients	69964	340513	2278	0.67	0.64	0.70

Revisions versus hip prostheses combinations sorted on number of implantations.

Minimum of 250 primary registered arthroplasties

Femur Prosthesis	Acetabular Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Exeter V40	Contemporary	4461	18454	90	0.49	0.39	0.60
Exeter V40	Trident	4155	15024	82	0.55	0.43	0.68
Spectron	Reflection cemented	2887	19221	142	0.74	0.62	0.87
Corail	Pinnacle	2624	5063	48	0.95	0.70	1.26
Spectron	Reflection porous	2553	11700	78	0.67	0.53	0.83
TwinSys stem uncemented	RM Pressfit cup	2135	4412	32	0.73	0.50	1.02
Muller	Muller PE cup	1891	12553	46	0.37	0.27	0.49
CLS	Fitek/Fitmore	1721	9055	35	0.39	0.27	0.54
Accolade	Trident	1721	7599	56	0.74	0.56	0.96
CLS	Morscher	1678	11349	61	0.54	0.41	0.69
Exeter	Contemporary	1551	13195	105	0.80	0.65	0.96
Exeter V40	Exeter	1456	7502	35	0.47	0.32	0.65
Exeter V40	Trilogy	1454	5323	22	0.41	0.26	0.63
Exeter	Exeter	1326	10802	72	0.67	0.52	0.84
CLS	CLS Expansion	1237	7974	59	0.74	0.56	0.95
Spectron	Duraloc	1154	8628	82	0.95	0.76	1.18
Muller	RM cup	1022	6199	45	0.73	0.53	0.97
Exeter V40	Duraloc	987	5055	37	0.73	0.52	1.01
Synergy Porous	Reflection porous	964	3470	22	0.63	0.40	0.96
TwinSys stem uncemented	Selexys TPS	926	1842	26	1.41	0.92	2.07
MS 30	Fitek/Fitmore	911	3814	10	0.26	0.13	0.48
Exeter	Osteolock	836	7266	42	0.58	0.42	0.78
Summit	Pinnacle	799	2360	20	0.85	0.52	1.31
MS 30	Morscher	785	5457	39	0.71	0.51	0.98
CLS	Duraloc	699	5032	40	0.79	0.57	1.08
Exeter V40	Pinnacle	661	1138	4	0.35	0.10	0.90
Exeter V40	Morscher	629	3285	19	0.58	0.35	0.90
CCA	CCB	625	2787	12	0.43	0.22	0.75
Elite plus	Duraloc	608	3917	48	1.23	0.90	1.62
CPT	Trilogy	569	2056	21	1.02	0.63	1.56
Exeter	Duraloc	553	5060	44	0.87	0.63	1.17
Exeter	Morscher	551	5102	21	0.41	0.25	0.63
Exeter V40	RM Pressfit cup	547	1371	6	0.44	0.16	0.95

CPT	ZCA	524	3320	15	0.45		0.75
Corail	Duraloc	464	2214	14	0.63	0.35	1.06
MS 30	Muller PE cup	462	2948	13	0.44	0.23	0.75
Charnley	Charnley	456	3343	11	0.33	0.16	0.59
Muller	Weber	430	2431	8	0.33	0.14	0.65
Exeter V40	Reflection cemented	399	1265	3	0.24	0.05	0.69
TwinSys stem cemented	RM Pressfit cup	397	890	2	0.22	0.03	0.81
Versys cemented	ZCA	390	2436	14	0.57	0.31	0.96
ABGII	Trident	342	1689	19	1.12	0.68	1.76
Charnley	Charnley Cup Ogee	303	2378	12	0.50	0.26	0.88
Exeter V40	Reflection porous	302	1039	7	0.67	0.27	1.39
Elite plus	Charnley	298	2544	16	0.63	0.36	1.02
CLS	Trilogy	292	852	7	0.82	0.33	1.69
Elite plus	Elite Plus LPW	282	1944	8	0.41	0.18	0.81
S-Rom	Pinnacle	279	1287	11	0.85	0.43	1.53
Versys	Trilogy	272	2200	11	0.50	0.25	0.89
Exeter V40	Osteolock	270	1798	9	0.50	0.23	0.95

There are 832 hip prosthesis combinations in the Registry; 510 (61%) have fewer than 10 registered procedures and 263 (31%) one only.

The table above contains the analyses of the 73 that have a minimum of 250 primary registered procedures. As stated above it is important to note the confidence intervals and observed component years in conjunction with the revision rates.

The Corail/Pinnacle, Spectron/ Duraloc, TwinSys uncemented/Selexys and Elite plus/Duraloc have revision rates significantly higher than the overall rate of 0.67/100 ocys @ the 95% confidence interval.

In view of the current controversy regarding large heads and the ASR in particular, it is appropriate to record that the Corail/ASR(156),S -Rom/ASR (130)and Summit/ASR(88) combinations have revision rates of 1.41, 4.01 and 1.86 /100ocys respectively. The S-Rom/ASR is the only statistically significant one due to the wide CIs for the other two.

Acetabular Components sorted on number of implantations

Minimum of 50 implantations

Acetabular Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Trident	7054	28750	190	0.66	0.57	0.76
Contemporary	6390	33999	217	0.64	0.56	0.73
Duraloc	5756	39652	344	0.87	0.78	0.96
Pinnacle	5170	11401	99	0.87	0.71	1.06
Reflection porous	4439	18213	126	0.69	0.58	0.82
Morscher	4132	28946	161	0.56	0.47	0.65
RM Pressfit cup	4046	9770	55	0.56	0.42	0.73
Trilogy	3913	16009	98	0.61	0.50	0.75
Reflection cemented	3445	21356	152	0.71	0.60	0.83
Fitek/Fitmore	3276	16225	68	0.42	0.33	0.53

Muller PE cup	2846	18677	73	0.39	0.31	0.49
Exeter	2807	18462	108	0.58	0.48	0.71
CLS Expansion	1639	10584	80	0.76	0.60	0.94
RM cup	1527	7906	62	0.78	0.60	1.01
ZCA	1171	6545	33	0.50	0.35	0.71
Osteolock	1131	9257	57	0.62	0.47	0.80
CCB	1100	3710	15	0.40	0.23	0.67
Selexys TPS	980	1908	28	1.47	0.97	2.12
Charnley	804	6177	32	0.52	0.35	0.73
Delta-PF Cup	756	2240	13	0.58	0.31	0.99
Continuum TM	602	327	6	1.84	0.67	4.00
Weber	555	3193	10	0.31	0.15	0.58
Monoblock Acetabular Cup	553	2414	21	0.87	0.54	1.33
ASR	376	1171	28	2.39	1.59	3.46
Charnley Cup Ogee	374	2885	19	0.66	0.40	1.03
R3 porous	372	395	6	1.52	0.56	3.31
Elite Plus LPW	341	2167	11	0.51	0.25	0.91
Tritanium	335	182	4	2.20	0.60	5.63
Trabecular Metal Shell	309	605	13	2.15	1.14	3.68
BHR Acetabular Cup	264	614	9	1.46	0.67	2.78
Ultima	254	1517	7	0.46	0.19	0.95
Allofit	248	816	7	0.86	0.34	1.77
Durom	246	883	12	1.36	0.70	2.37
Elite Plus Ogee	242	1399	5	0.36	0.12	0.83
Bio-clad poly	212	1320	7	0.53	0.21	1.09
Mallory-Head	197	1191	7	0.59	0.24	1.21
Expansion Shell	190	704	8	1.14	0.49	2.24
ABGII	174	1606	17	1.06	0.62	1.69
M2A	173	858	5	0.58	0.19	1.36
Marathon cemented	165	197	1	0.51	0.01	2.83
Delta-TT Cup	137	96	0	0.00	0.00	3.82
DeltaMotion Cup	133	114	0	0.00	0.00	3.22
Biomex acet shell porous	112	955	4	0.42	0.11	1.07
Weill ring	108	917	5	0.55	0.18	1.27
Recap Resurfacing Acetabular S	90	362		0.28	0.01	1.54
Artek	72	554	21	3.79	2.35	5.80
Furlong cup	64	362	4	1.11	0.30	2.83
Fitek	58	624	4	0.64	0.17	1.64
Mitch TRH System Cup	58	148	3	2.03	0.42	5.93

The Artek, ASR, SelexysTPS, Duraloc, Trabecular Metal Shell and Pinnacle cups have significantly higher revision rates than the overall rate of 0.67/100 ocys @ the95% confidence interval. **However the fact that a component had been entered as revised does not necessarily mean it had failed or had to be replaced.**

Femoral Components sorted on number of implantations

Minimum of 50 implantations

Femur Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-Component years	Exact 95% confidence interval	
Exeter V40	16895	65783	335	0.51	0.46	0.57
Spectron	7522	45307	343	0.76	0.68	0.84
CLS	7305	41204	277	0.67	0.60	0.76
Exeter	5750	49289	322	0.65	0.58	0.73
Muller	4204	24539	118	0.48	0.40	0.58
Corail	3877	9734	81	0.83	0.66	1.03
TwinSys stem uncemented	3741	7318	70	0.96	0.75	1.21
MS 30	2713	14646	76	0.52	0.41	0.65
Accolade	2209	9060	65	0.72	0.55	0.91
CPT	1829	8705	61	0.70	0.54	0.90
Synergy Porous	1369	4459	29	0.65	0.44	0.93
Elite plus	1353	9591	81	0.84	0.67	1.05
Summit	1123	3612	34	0.94	0.65	1.32
CCA	1003	5043	38	0.75	0.53	1.03
TwinSys stem cemented	868	1898	9	0.47	0.22	0.90
Charnley	825	6185	25	0.40	0.26	0.60
ABGII	765	4136	44	1.06	0.77	1.43
Versys cemented	666	4135	21	0.51	0.31	0.78
S-Rom	584	2950	40	1.36	0.97	1.85
C-Stem AMT	496	854	6	0.70	0.26	1.53
CBC Stem	457	1633	20	1.23	0.75	1.89
Versys	317	2420	15	0.62	0.35	1.02
Avenir Muller uncemented	287	239	3	1.26	0.26	3.67
Femoral Stem Press Fit	265	413	3	0.73	0.15	2.12
Mallory-Head	250	1433	11	0.77	0.38	1.37
C-Stem	239	1510	16	1.06	0.61	1.72
Trabecular Metal Stem	218	482	5	1.04	0.34	2.42
Omnifit	202	1307	11	0.84	0.42	1.51
Friendly	195	512	2	0.39	0.05	1.41
ABG	189	1961	17	0.87	0.51	1.39
Wagner cone stem	162	1056	13	1.23	0.66	2.11
Anthology Porous	149	255	1	0.39	0.01	2.18
Prodigy	149	1203	11	0.91	0.46	1.64
FTC	126	110	0	0.00	0.00	3.36
H-Max M	119	98	1	1.02	0.03	5.68
Basis	118	324	1	0.31	0.01	1.72
DSP Thrust Plate	104	1063	13	1.22	0.65	2.09
Charnley Modular	94	296	0	0.00	0.00	1.25
Polarstem uncemented	93	56	4	7.12	1.94	18.23
AML MMA	75	594	4	0.67	0.18	1.72
Furlong	75	363	7	1.93	0.78	3.98
Contemporary	71	636	8	1.26	0.54	2.48

Zimmer M/L Taper	71	218	2	0.92	0.11	3.31
CPCS	68	359	4	1.11	0.30	2.85
Modular Taperloc	59	245	1	0.41	0.01	2.27
AML	55	480	2	0.42	0.05	1.51
Modulus Hip	53	197	1	0.51	0.01	2.83

The Spectron,Twinsys uncemented,ABG2, S-Rom and CBC stems have significantly higher revision rates than the overall rate of 0.67/100 ocys @ the 95% confidence interval**. However the fact that a component had been entered as revised does not necessarily mean it had failed or had to be replaced.**

Revision vs Different Liner/Cup Combinations vs Head size <=28mm or >28mm

CC = ceramic/ceramic; CP = ceramic/polyethylene; MM = metal/metal & MP = metal/polyethylene
(Resurfacing hips excluded)

Uncemented cups no liner

Size	Surfaces	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-Component years	Exact 95% confidence interval	
<=28	CC	0					
<=28	CP	2893	16014	103	0.64	0.53	0.78
<=28	MM	1288	8465	52	0.61	0.46	0.81
<=28	MP	4080	20217	124	0.61	0.51	0.73
>28	CC	133	114	0	0.00	0.00	3.22
>28	CP	367	422	1	0.24	0.01	1.32
>28	MM	1529	5195	81	1.56	1.24	1.94
>28	MP	1340	2897	16	0.55	0.32	0.90

The MM articulation >28 head size had significantly higher revision rate when compared to MP and CP articulation.

Uncemented cups with liner

Size	Surfaces	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-Component years	Exact 95% confidence interval	
<=28	CC	604	2957	33	1.12	0.77	1.57
<=28	CM	15	20	0	0.00	0.00	18.88
<=28	CP	4666	25823	187	0.72	0.62	0.84
<=28	MM	1477	11546	67	0.58	0.45	0.74
<=28	MP	15806	85306	627	0.73	0.68	0.79
>28	CC	4963	14455	107	0.74	0.61	0.89
>28	CM	341	415	3	0.72	0.15	2.11
>28	CP	2382	5185	43	0.83	0.60	1.12
>28	MC	2	5	0	0.00	0.00	71.67
>28	MM	1476	4768	40	0.84	0.60	1.14
>28	MP	4895	9754	69	0.71	0.55	0.90

The CC articulation with head size <= 28mm had a significantly higher revision rate when compared to CP MP and MM articulations despite some overlap in the CIs

Cemented cups

Size	Surfaces	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-Component years	Exact 95% confidence interval	
<=28	CP	414	2480	18	0.73	0.43	1.15
<=28	MP	17190	104008	603	0.58	0.53	0.63
>28	CP	90	276	2	0.73	0.09	2.62
>28	MM	7	22	0	0.00	0.00	17.02
>28	MP	1554	3753	21	0.56	0.35	0.86

Summation for Revision vs Bearing Surfaces

Surfaces	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
CC	5700	17527	140	0.80	0.67	0.94
CP	9205	50199	354	0.71	0.63	0.78
CM	356	434	3	0.69	0.14	2.02
MM	5778	29995	240	0.80	0.70	0.91
MP	44865	225935	1460	0.65	0.49	0.55

The MP has a significantly lower revision rate than CC CP and MM

Revision vs Bearing Surface Articulations vs Head size <=28mm, 29-36mm & >36mm

CC = ceramic/ceramic; CP = ceramic/polyethylene; MM = metal/metal & MP = metal/polyethylene
(Resurfacing hips excluded)

Size	Surfaces	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-Component years	Exact 95% confidence interval	
<=28	CP	7973	44316	308	0.70	0.62	0.78
<=28	CM	15	20	0	0.00	0.00	18.88
<=28	MM	2765	20010	119	0.59	0.49	0.71
<=28	MP	37076	209531	1354	0.65	0.52	0.59
29_36	CC	4846	14377	106	0.74	0.60	0.89
29_36	CP	2839	5883	46	0.78	0.57	1.04
29_36	CM	335	407	3	0.74	0.15	2.15
29_36	MM	1421	4880	39	0.80	0.57	1.09
29_36	MP	7776	16359	106	0.65	0.53	0.78
>36	CC	250	192	1	0.52	0.01	2.90
>36	CM	6	7	0	0.00	0.00	51.47
>36	MM	1591	5104	82	1.61	1.28	1.99
>36	MP	13	45	0	0.00	0.00	8.13

Revision vs Head Size

Size	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
<=28	48433	276834	1814	0.66	0.63	0.69
29-36	17219	41911	300	0.72	0.64	0.80
>36	1860	5349	83	1.55	1.24	1.92

The >36 head size (86% are Metal on Metal articulation) has a significantly higher revision rate compared to the other two

Revision vs Gender and Head Size

Size			No. Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
>36	MM	F	444	1606	37	2.30	1.62	3.18
>36	MM	M	1147	3497	45	1.29	0.94	1.72

The only significant gender difference is with head size >36mm

Revision vs Age Bands

Age Bands	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	10538	55098	488	0.89	0.81	0.97
55-64	17519	88229	667	0.76	0.70	0.82
65-74	23156	114359	725	0.63	0.59	0.68
GE75	18751	82828	398	0.48	0.43	0.53

The < 55 age band has significantly higher revision rate than the other 3

Revision vs Gender

Gender	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
F	37158	180528	1109	0.61	0.58	0.65
M	32806	159986	1169	0.73	0.69	0.77

Males have a significantly higher revision rate than females

Revision vs Surgeon annual workload

Operations per Year	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT10	803	4289	47	1.10	0.81	1.46
10_25	7026	34518	284	0.82	0.73	0.92
26_50	33221	160265	1118	0.70	0.66	0.74
51_75	16517	78890	465	0.59	0.54	0.65
76_100	5057	24279	125	0.51	0.43	0.61
GE100	7322	38185	238	0.62	0.55	0.71

Those surgeons performing <10 arthroplasties a year have significantly higher revision rate than those performing 26 or more per year.

Revision vs Approach

Approach	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Anterior	3159	17974	118	0.66	0.54	0.79
Posterior	43517	206065	1433	0.70	0.66	0.73
Lateral	19716	94086	564	0.60	0.55	0.65
Troch	86	424	9	2.12	0.97	4.03

The posterior approach has a significantly higher revision rate than the lateral approach

Revision for Dislocation vs Approach

Approach	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Anterior	3159	17974	28	0.16	0.10	0.23
Posterior	43517	206065	524	0.25	0.23	0.28
Lateral	19716	94086	114	0.12	0.10	0.15
Troch	86	424	1	0.24	0.01	1.31
Total	66478	318549	667	0.21	0.19	0.23

The posterior approach has a significantly higher revision rate for dislocation than the lateral approach.

Revision vs Arthroplasty Fixation

Fixation	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Cemented	20324	119639	678	0.57	0.52	0.61
Uncemented	24331	97270	790	0.81	0.76	0.87
Hybrid	25309	123604	810	0.66	0.61	0.70

Uncemented hips have a significantly higher revision rate than either fully cemented or hybrid hips

Revision by Arthroplasty Fixation vs Age Bands

LT55	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Cemented	581	4153	66	1.59	1.23	2.02
Uncemented	7487	35201	272	0.77	0.68	0.87
Hybrid	2470	15743	150	0.95	0.81	1.12
55-64						
Cemented	2097	14682	140	0.95	0.80	1.13
Uncemented	9098	38045	307	0.81	0.72	0.90
Hybrid	6324	35502	220	0.62	0.54	0.71
65-74						
Cemented	7394	47418	266	0.56	0.50	0.63
Uncemented	5757	18861	162	0.86	0.73	1.00
Hybrid	10005	48080	297	0.62	0.55	0.69
GE75						
Cemented	10252	53386	206	0.39	0.33	0.44
Uncemented	1989	5163	49	0.95	0.70	1.25
Hybrid	6510	24279	143	0.59	0.50	0.69

Cemented	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	581	4153	66	1.59	1.23	2.02
55-64	2097	14682	140	0.95	0.80	1.13
65-74	7394	47418	266	0.56	0.50	0.63
GE75	10252	53386	206	0.39	0.33	0.44
Uncemented						
LT55	7487	35201	272	0.77	0.68	0.87
55-64	9098	38045	307	0.81	0.72	0.90
65-74	5757	18861	162	0.86	0.73	1.00
GE75	1989	5163	49	0.95	0.70	1.25

Hybrid						
LT55	2470	15743	150	0.95	0.81	1.12
55-64	6324	35502	220	0.62	0.54	0.71
65-74	10005	48080	297	0.62	0.55	0.69
GE75	6510	24279	143	0.59	0.50	0.69

For age band 55-64 hybrids hips have a significantly lower revision rate than both cemented and uncemented hips, but there is no significant difference between the latter two. For the 65-74 age band both cemented and hybrid hips have significantly lower revision rates than uncemented. For the >74 age band both cemented and hybrid hips have significantly lower revision rates than uncemented.

For the >74 age band cemented hips have a significantly lower revision rate than both hybrid and uncemented hips and in turn hybrid hips have a significantly lower revision rate than uncemented hips.

Revision vs ASA status

ASA Class	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
1	6393	16609	129	0.78	0.65	0.92
2	21000	53938	389	0.72	0.65	0.80
3	7877	19356	167	0.86	0.74	1.00
4	253	548	4	0.73	0.20	1.87

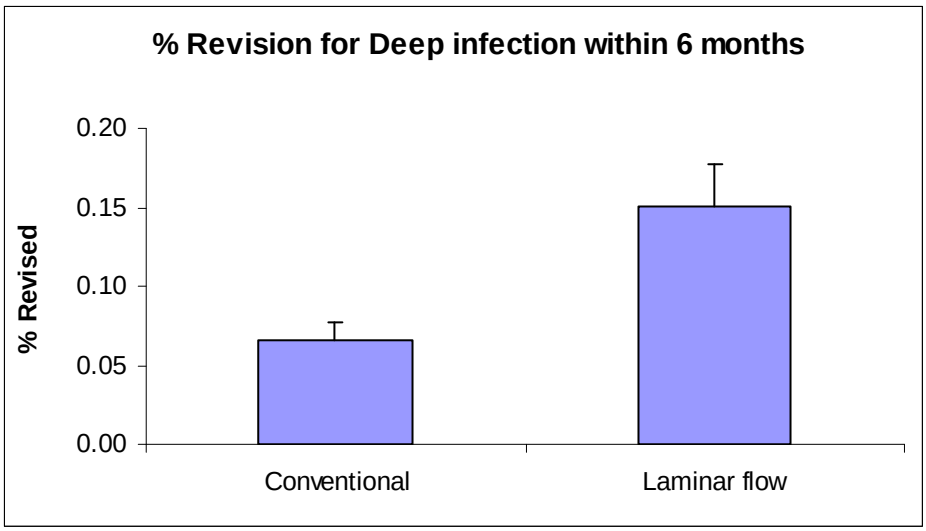
Revision vs ASA public private hospitals

Public/Private	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Public	18096	45740	338	0.74	0.66	0.82
Private	17427	44711	351	0.79	0.71	0.87

There are no significant differences among ASA groups or between public & private hospitals

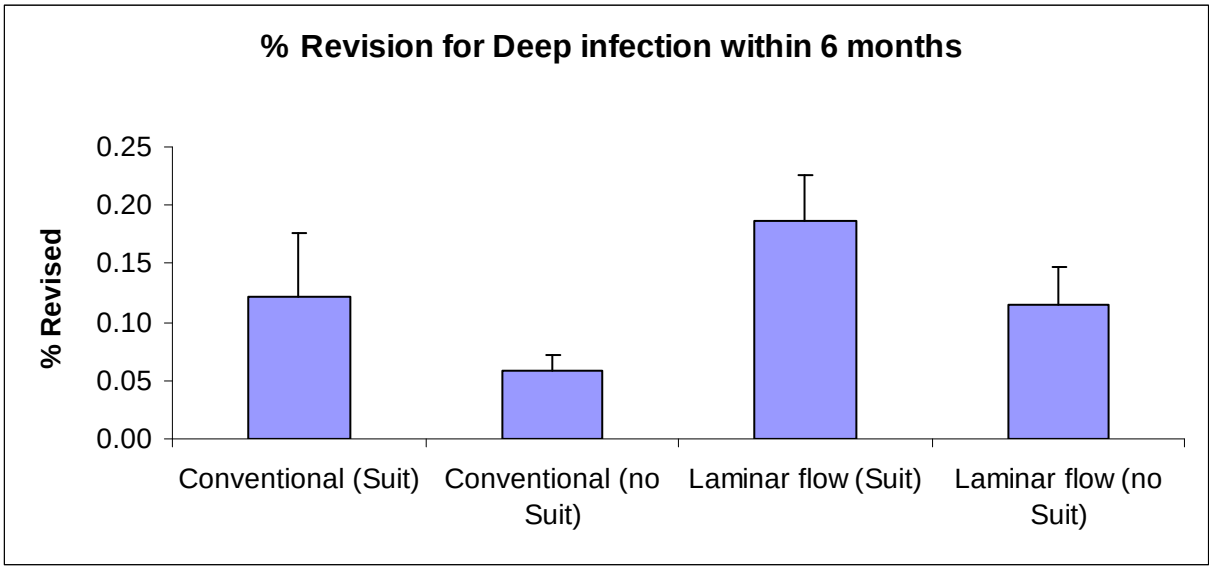
Revision for Deep Infection within 6 months vs Theatre Environment

Theatre	Total Number	Number revised	%	Std Error
Conventional	41372	27	0.07	0.01
Laminar flow	23146	35	0.15	0.03



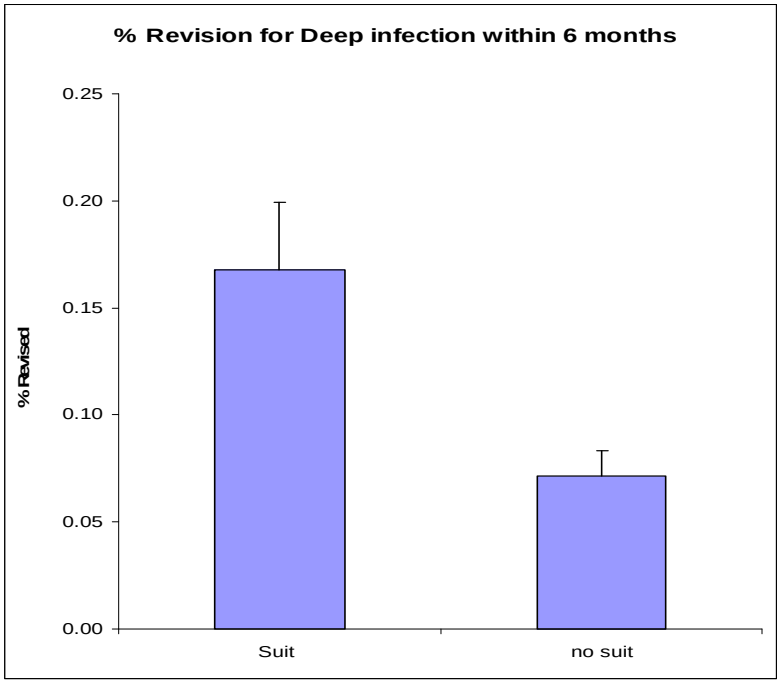
There is a significant difference in revision rates for deep infection within 6 months of surgery between conventional and laminar flow theatres.

		Total Number	Number revised	%	Std Error
Conventional	Suit	4090	5	0.12	0.05
	no suit	37282	22	0.06	0.01
Laminar flow	Suit	11806	22	0.19	0.04
	no suit	11340	13	0.11	0.03



There is a significant difference in the revision rates between conventional/ no suit and laminar flow/suit environments. There is 3.2 times the risk for revision in the latter compared to the former environment.

	Total Number	Number revised	%	Std Error
Suit	16711	28	0.17	0.03
no suit	48980	35	0.08	0.01

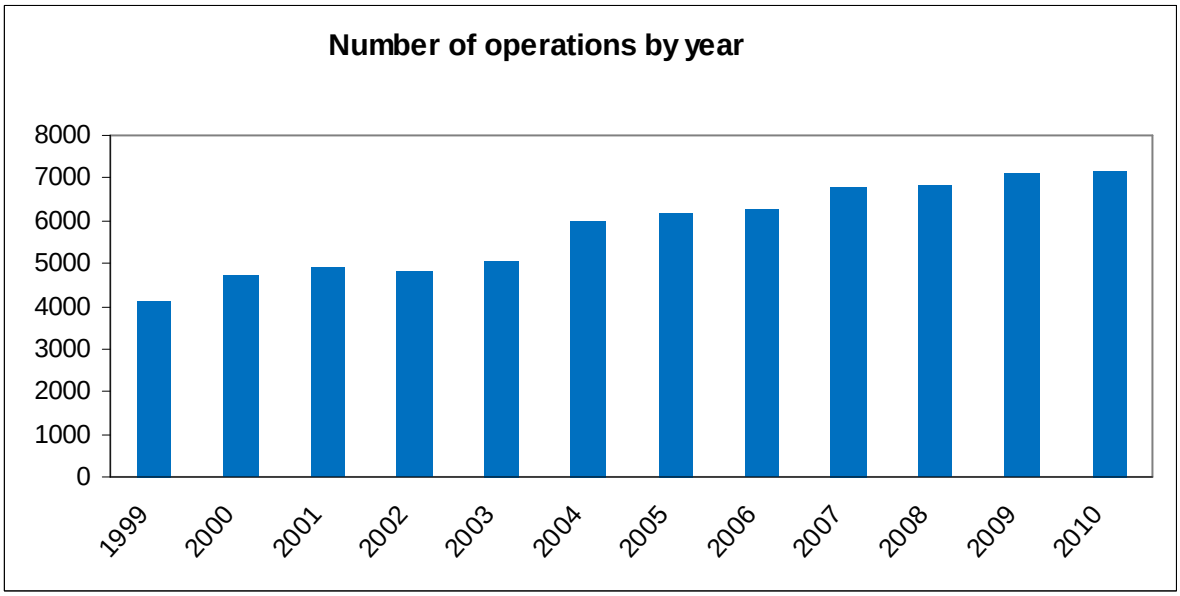


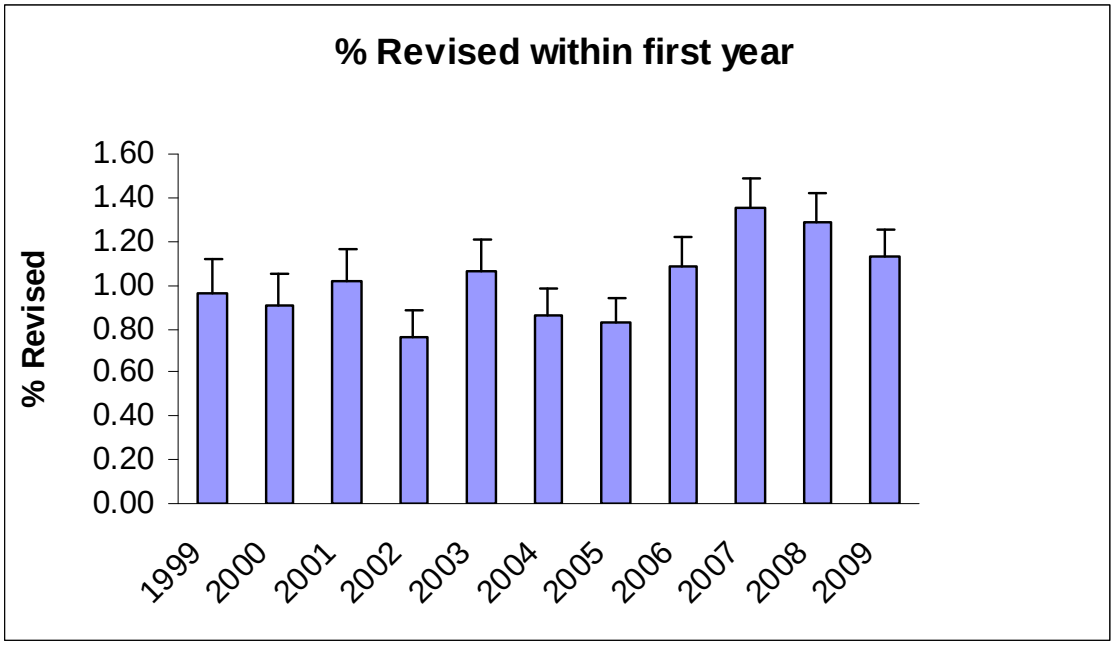
Furthermore there is a significant increase in revision rates (2.4x) when suits are used in either conventional or laminar flow theatres.

From the above data it would appear that the use of space suits increases the risk of deep infection threefold within the first 6 months following hip arthroplasty and that there is no advantage to using laminar flow theatres.

Percentage of hips revised in the first year

The following two bar graphs show that the % of hips revised in the first year after arthroplasty has again fallen slightly from the 2007 peak.





Resurfacing Arthroplasty

All patients	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
	1093	3073	32	1.04	0.71	1.47

There is a significantly higher revision rate compared to conventional hip arthroplasty.

Resurfacing prosthesis vs revision rate

Prosthesis	No. Ops.	Sum comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Adept	4	11	0	0.00	0.00	33.20
ASR	131	551	9	1.63	0.75	3.10
BHR	924	2448	20	0.82	0.50	1.26
BMHR	15	15	0	0.00	0.00	25.11
Conserve Superfinish	3	5	0	0.00	0.00	80.30
Durom	4	26	0	0.00	0.00	14.05
Mitch TRH Resurfacing Head	12	18	3	17.05	3.52	49.82

The Mitch TRH has a very significantly higher revision rate. Three were implanted in 2010.

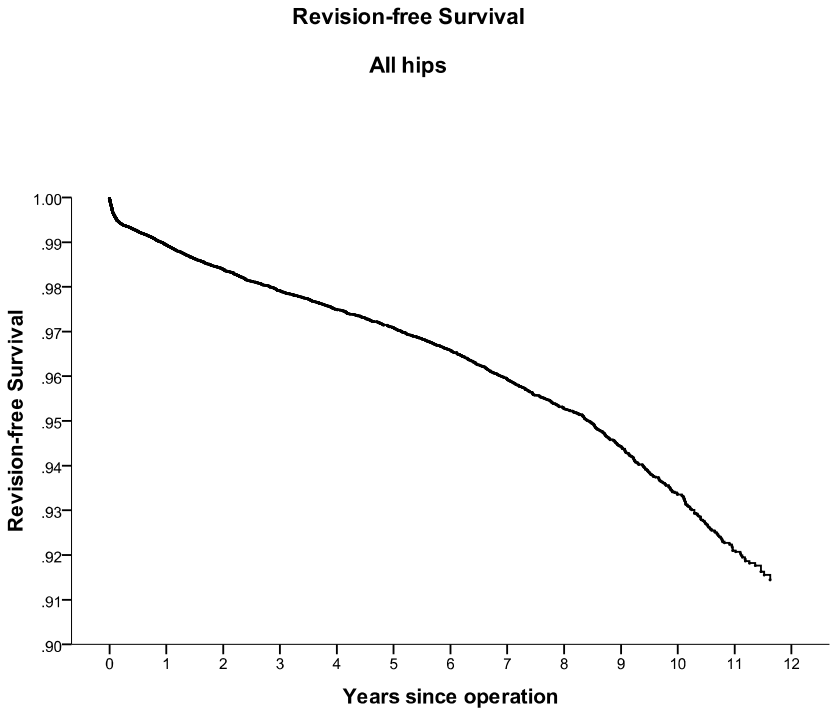
Head size vs revision rate

Hips resurfacing head size	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
<=44	88	235	7	2.97	1.20	6.13
45-49	264	779	10	1.28	0.62	2.36
50-54	668	1790	13	0.73	0.39	1.24
>=55	73	268	2	0.75	0.09	2.69

There are no significant differences among the components due to wide CIs.

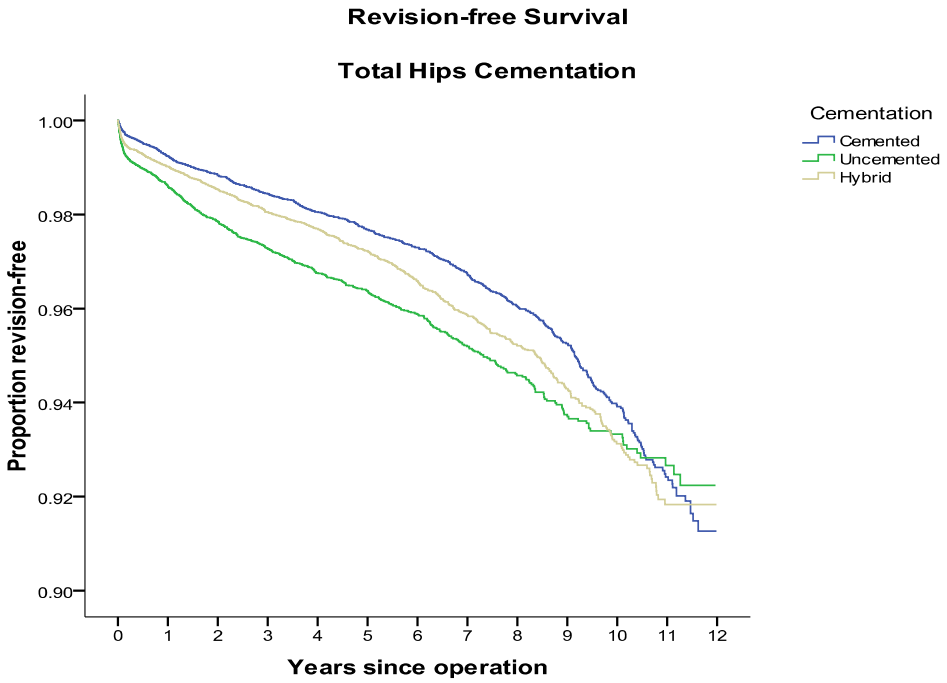
KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for the years 1999 – 2010 with deceased patients censored at time of death.



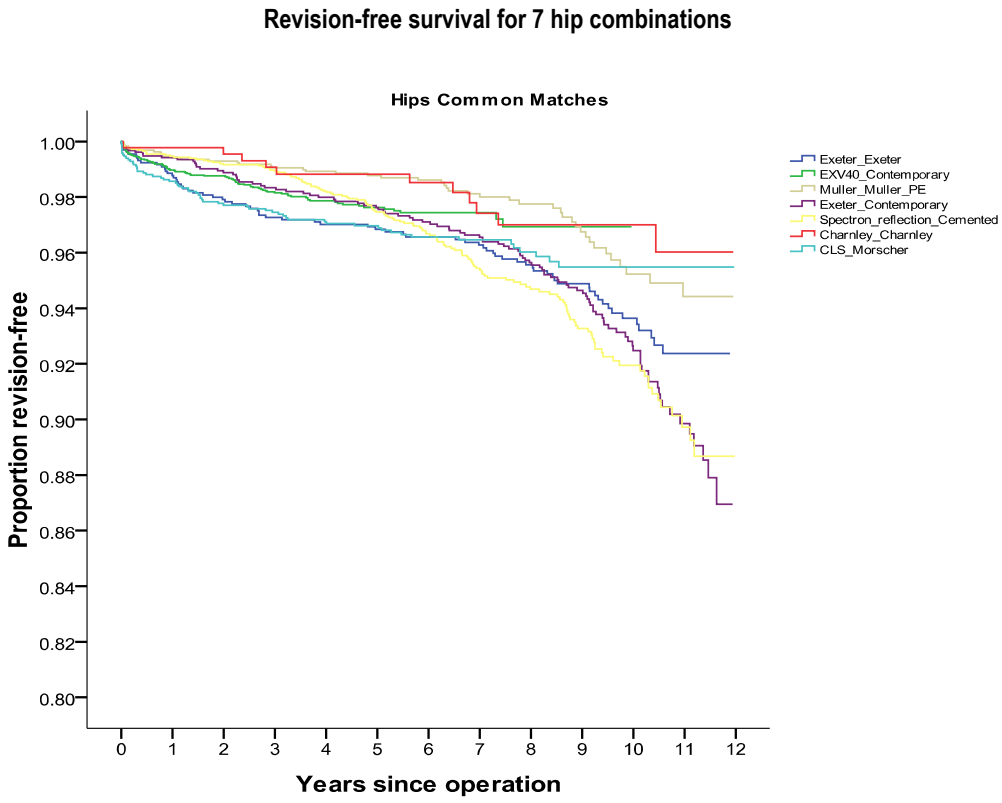
Years	% Revision-free	No in each year
1	98.94	61034
2	98.39	52926
3	97.91	45366
4	97.50	38023
5	97.08	31407
6	96.59	25113
7	95.93	19231
8	95.27	14410
9	94.44	10097
10	93.36	6156
11	92.10	2700

The KM analysis is to11yrs rather than 12 as too few registered hips were revised in 2010.



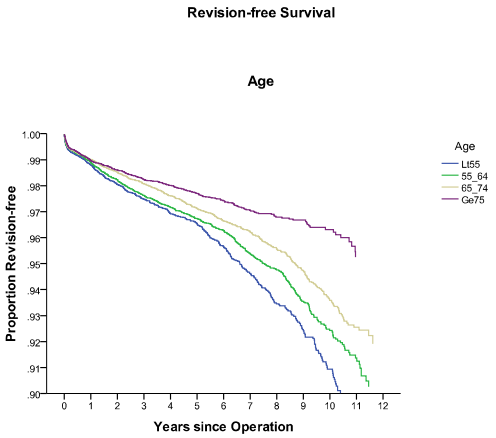
Survival at 11 years;	uncemented	92.66%
	cemented	92.42%
	hybrid	91.83%

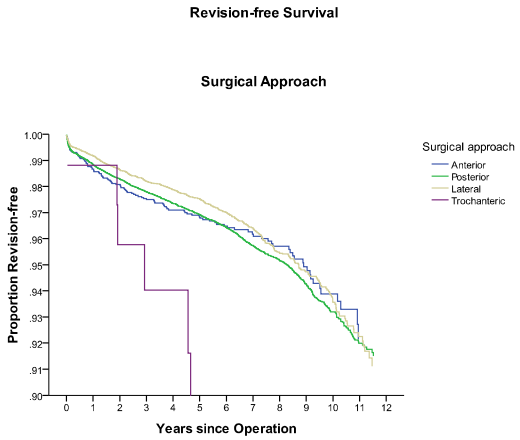
As predicted last year the uncemented survival curve has crossed over both the cemented & hybrid curves.

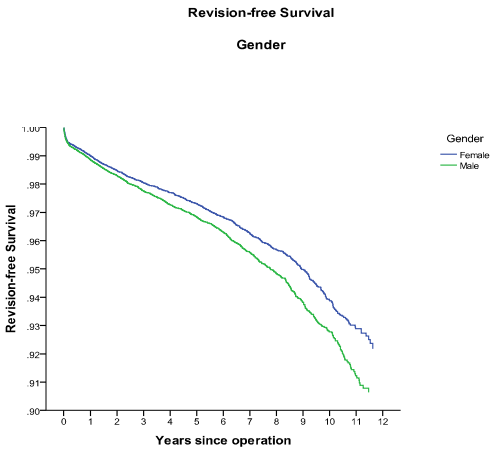


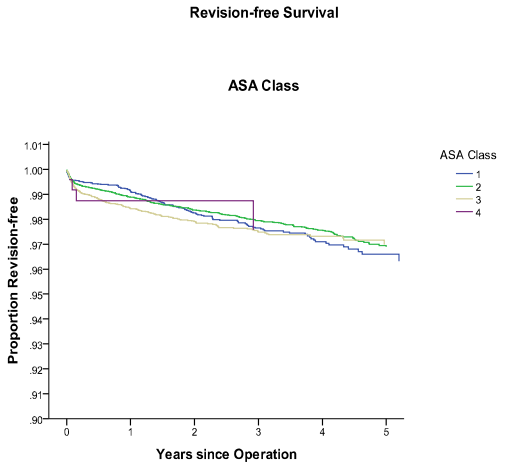
The KM curves for 7 hip combinations with minimum 10 years of sufficient data for analyses.

The CLS/ Morscher is the only uncemented combination. The best performing are the Charnley/Charnley and the ExeterV40/Contemporary; the worst performing the Exeter/Contemporary and the Spectron/Reflection.









Re-revisions of conventional hips

Analysis was undertaken of 3 groups of hip re-revisions.

There were 259 registered primary conventional hip replacements that had been revised twice, 55 that had been revised three times, 10 that had been revised four times and 1 revised 5 times.

First Re-revision

Time between the first and second revisions averaged 521 days, with a range of 1 – 3426 and a standard deviation of 597. This compares to an average of 1238 days between the primary and first revision.

Reason for re-revision

Dislocation	94
Deep infection	71
Loosening acetabular comp.	33
Loosening femoral comp.	33
Pain	27
Fracture femur	18
Other	21

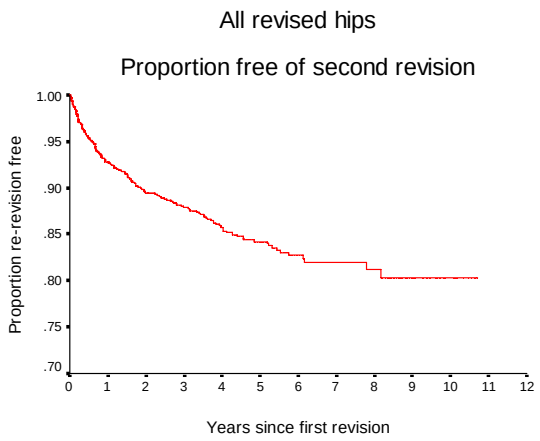
Re-revision

Change of head	151
Change of acetabular comp.	93
Change of liner	101
Change of all	69
Change of femoral comp	69

First Re- revision

Number of primary revisions	Observed comp. Yrs	Number of First Re-Revisions	Rate/100-component-years	Exact 95% confidence interval	
2278	7814	259	3.31	2.92	3.74

The re revision rate is highly significant when compared to the primary revision rate.



The KM graph confirms that survival following the first revision is poorer than for primary arthroplasty

Second Re-revision

The average time between second and third revisions for the 55 arthroplasties was 389 days with a range of 1 – 1665 and a standard deviation of 397.

Third Re-revision

The average time between the third and fourth revisions for the 10 arthroplasties was 239 days with a range of 25 – 679 and a standard deviation of 232.

Fourth Re-revision

There was 1 registered with time to revision 399 days

Overall it can be noted that the time between successive revisions steadily decreases.

Re- revisions of resurfacing hip replacements

There have been 9 re-revisions.

The time between the first and second revisions averaged 352 days, with a range of 21 – 908 and a standard deviation of 322.

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS, FIVE YEARS AND TEN YEARS POST SURGERY

Questionnaires at six months post surgery

At six months post surgery a random selection of patients are sent the Oxford12 questionnaire in order to achieve a response rate of 20% of the total which is deemed to be ample to provide powerful statistical analysis.

The new scoring system as recommended by the original authors has been adopted. (see appendix 1)

There are 12 questions with the scores now ranging from 4 to 0. A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

In addition we have grouped the questionnaire responses according to the classification system published by Kalairajah et al,2005. (see appendix1)

This groups each score into four categories;

Category 1	>41	excellent
Category 2	34 – 41	good
Category 3	27 – 33	fair
Category 4	< 27	poor

For the twelve year period, and as at August 2011, there were 22,503 primary hip questionnaire responses registered six months post surgery.
The mean hip score was 40.64 (standard deviation 7.45, range 48 – 2)

Scoring	> 41	12986
Scoring	34 -41	6041
Scoring	27 -33	2121
Scoring	< 27	1355

At six months post surgery, 85% had an excellent or good score.

Questionnaires at five years' post surgery

All patients who had a six month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at 5 years post surgery.

This dataset represents sequential Oxford hip scores for 5,350 individual patients

At five years' post surgery, 89% of these patients achieved an excellent or good score and had a mean of 42.50.

Questionnaires at ten years post surgery

All patients who had a six month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at 10 years post surgery.

This dataset represents sequential Oxford hip scores for 2,716 individual patients.

At ten years post surgery, 85% of these patients achieved an excellent or good score and had a mean of 41.75.

Analysis of the individual questions at six months, five years and ten years post surgery

Analysis of the individual questions showed that the most common persisting six month problem was limping (Q10). However, for the five year and ten year analyses the most common persisting problem was pain Q1).

Percentage scoring 0 or 1 (worst categories) for each question (22,503) at six months, at five years post surgery (5,350) and at ten-years post surgery (2716).

		% 6m	% 5y	% 10y
1	Moderate or severe pain from the operated hip	9	10	17
2	Only able to walk around the house or unable to walk before pain becomes severe	4	3	4
3	Extreme difficulty or impossible to get in and out of a car or public transport	2	2	3
4	Extreme difficulty or impossible to put on a pair of socks	9	6	7
5	Extreme difficulty or impossible to do the household shopping on your own	4	3	3
6	Extreme difficulty or impossible to wash and dry yourself	2	1	1
7	Pain interfering greatly or totally with your work	4	3	3
8	Very painful or unbearable to stand up from a chair after a meal	2	1	2
9	Sudden severe pain	1	1	2

	most or all of the time			
10	Limping most or every day	13	9	8
11	Extreme difficulty or impossible to climb a flight of stairs	4	3	5
12	Pain from your hip in bed most or every nights	5	3	4

Revision hip questionnaire responses

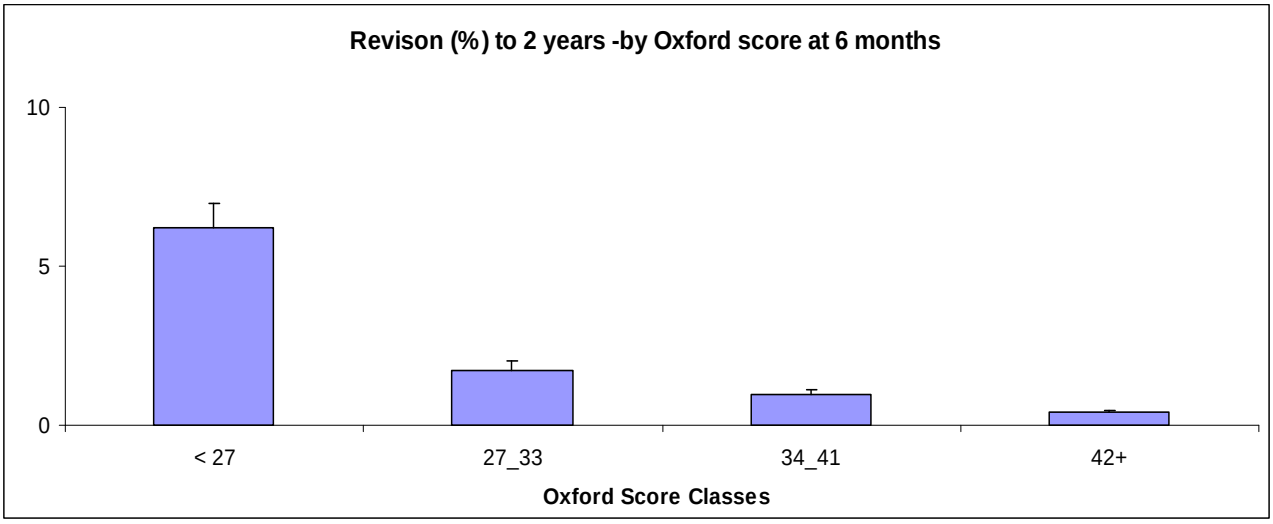
There were 5,448 revision hip responses with 65% achieving an excellent or good score. This group includes all revision hip procedures. The mean revision hip score was 35.79 (standard deviation 9.51, range 48 – 1)

OXFORD 12 SCORE AS A PREDICTOR OF HIP ARTHROPLASTY REVISION

A statistically significant relationship has been confirmed between the Oxford scores at 6 months and 5 years post surgery and arthroplasty revision within two years of the Oxford 12 questionnaire date.

Six month score and revision arthroplasty

By plotting the patients six month scores in the Kalairajah groupings, against the proportion of hips revised for that same group it demonstrates that there is an incremental increase in risk during the next 2 years related to the Oxford score. A patient with a score below 27 has 16 times the risk of a revision within 2 years compared to a person with a score >41

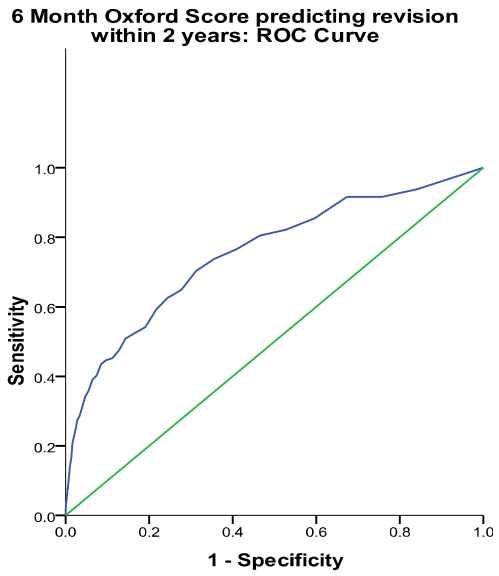


Revision risk versus Kalairajah groupings of Oxford scores within two years of the 6 month score date

Kalairajah Group	No in Group	No. revised	%	Std error
< 27	1028	64	6.23	0.75
27_33	1592	27	1.70	0.32
34_41	4726	46	0.97	0.14
42+	10485	42	0.40	0.06

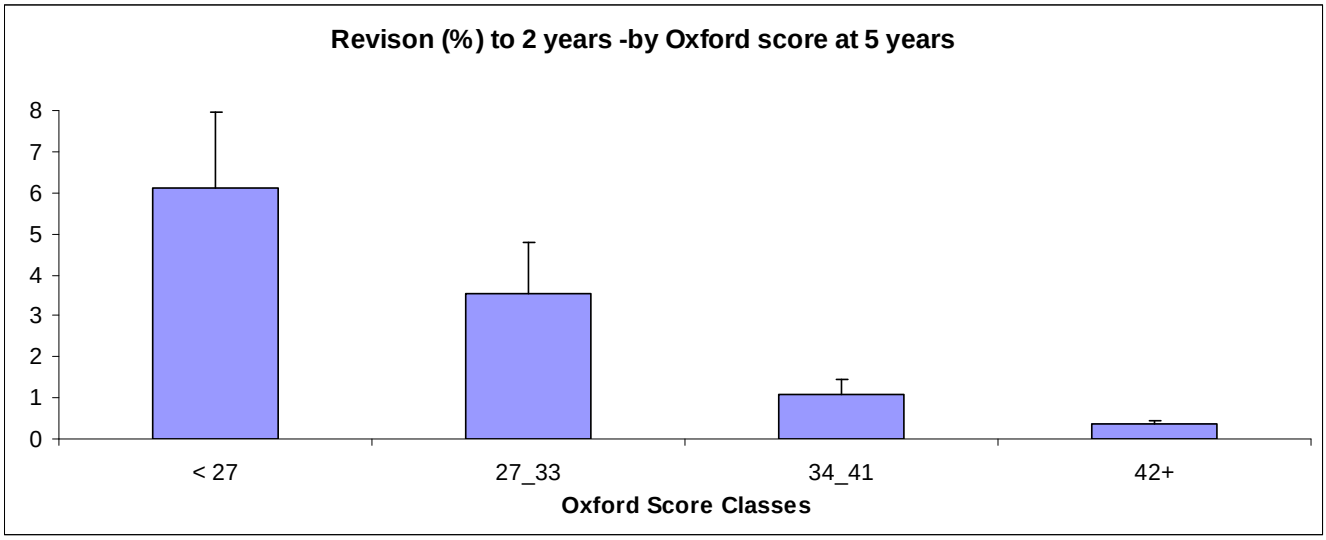
A person with a 6 month Oxford score >42 has a 0.4% risk of revision within two years compared to a 6.23% risk with a score of 27 or less

A ROC analysis has demonstrated that a patient with a score less than or equal to 38.5 has 5 times the risk of needing a revision within 2 years compared to a person with a score greater than 38.5.
Alternatively the ROC analysis predicted 70% of the revisions within 2 years from just the lowest 31% of Oxford scores.



Five year score and revision arthroplasty

As with the six month scores, plotting the patients 5 year scores in the Kalairajah groupings against the proportion of hips revised for that same group demonstrates that there is an incremental increase in risk during the next 2 years related to the Oxford score. A patient with a score below 27 has 18 times the risk of a revision within 2 years compared to a person with a score >41.

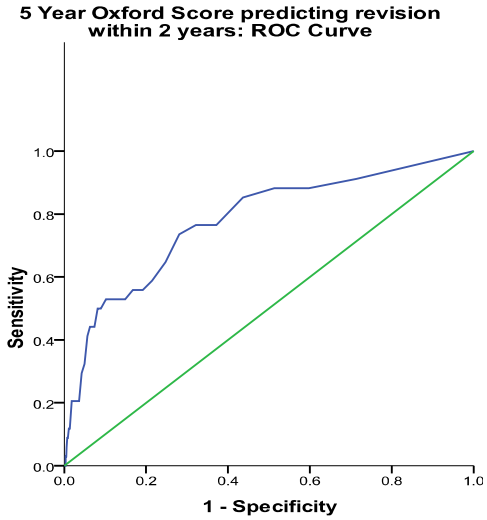


Revision risk versus Kalairajah groupings of Oxford scores within two years of the 5 year score date.

Kalairajah Group	No in Group	No. revised	%	Std error
< 27	164	10	6.10	1.87
27_33	225	8	3.56	1.23
34_41	657	7	1.07	0.40
42+	2619	9	0.34	0.11

A person with a 5 year Oxford score >42 has a 0.34 % risk of revision within two years compared to a 6.10% risk with a score of 27 or less

The ROC analysis at 5 years has demonstrated that a patient with a score less than or equal to 41.5 has 8 times the risk of needing a revision within 2 years compared to a person with a score greater than 41.5.
Alternatively the ROC analysis predicted 75% of the revisions within 2 years from just the lowest 30% of Oxford scores.



A receiver operating characteristic (ROC) curve is a graphical representation of the tradeoff between the false negative and false positive rates for every possible cutoff. Equivalently, the ROC curve is the representation of the tradeoffs between sensitivity and specificity. The more the curve climbs towards the upper left corner the better the reliability of the test.

KNEE ARTHROPLASTY

PRIMARY KNEE ARTHROPLASTY

The twelve year report analyses data for the period January 1999 – December 2010. There were 52,214 primary knee procedures registered, an additional 6,124 compared to last year's report.
This includes 156 patello-femoral prostheses with 35 registered in 2010.

1999	2429
2000	3015
2001	3059
2002	2896
2003	3046
2004	4102
2005	5027
2006	5153
2007	5760
2008	5601
2009	6019
2010	6107

There has been overall a 1.4% increase compared to last year but a 52% increase in patello-femoral registrations.

DATA ANALYSIS

Age and sex distribution

The average age for a knee replacement was 68.54 years, with a range of 8.19 – 100.49 years.

All knee arthroplasty

	Female	Male
Number	27007	25207
Percentage	51.72	48.28
Mean age	68.90	68.15
Maximum age	100.49	98.68
Minimum age	10.17	8.19
Standard dev.	9.94	9.45

Conventional knee arthroplasty

	Female	Male
Number	26885	25173
Percentage	51.64	48.36
Mean age	68.93	68.16
Maximum age	100.49	98.68
Minimum age	10.17	8.19
Standard dev.	9.92	9.44

Patello-femoral arthroplasty

	Female	Male
Number	122	34
Percentage	78.21	21.79
Mean age	62.47	61.62
Maximum age	87.75	83.63
Minimum age	32.93	34.38
Standard dev.	10.79	11.59

Body Mass Index

For 2010, there were 1698 BMI registrations for primary knee replacements. The average was 30.81(obese) with a range of 17 – 58 and a standard deviation of 5.81.

Previous operation

None	43507
Menisectomy	5385
Osteotomy	965
Arthroscopy/debridement	873
Ligament reconstruction	559
Internal fixation for juxtarticular fracture	396
Patellectomy	208
Synovectomy	102
Removal of loose body	37
Other	139

Diagnosis

Osteoarthritis	48995
Rheumatoid arthritis	1483
Post fracture	553
Other inflammatory	485
Post ligament disruption /reconstruction	316
Avascular necrosis	190
Tumour	59
Other	88

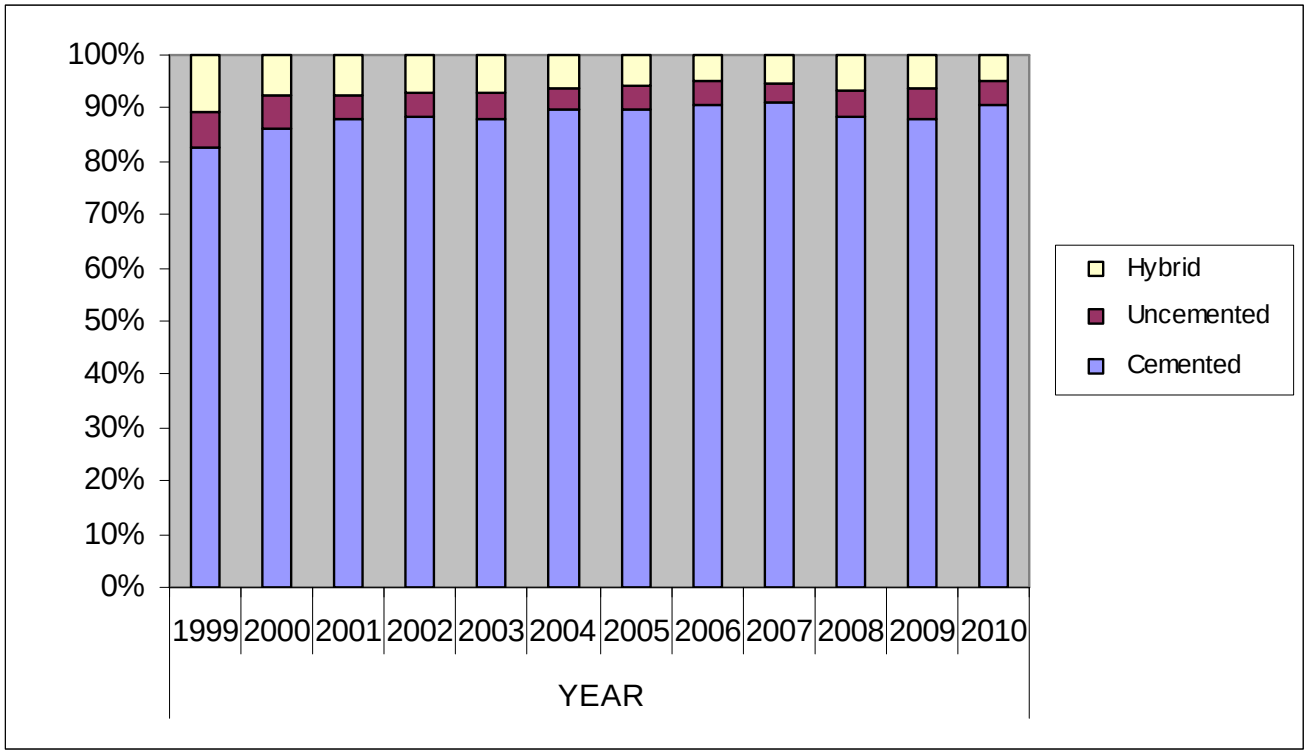
Approach

Medial parapatellar	47391
Other	1330
Lateral parapatellar	873
Image guided surgery	3656
Minimally invasive surgery	110

Image guided surgery was added to the updated forms at the beginning of 2005 and in 2010 was used for 14% of primary knee arthroplasties, the same as for 2009

Bone graft

Femoral autograft	105
Femoral allograft	9
Femoral synthetic	2
Tibial autograft	56
Tibial allograft	15



A hybrid knee has cemented tibia and uncemented femur.

Cement

Femur cemented	46742	90%
Antibiotic in cement	31176	67%
Tibia cemented	49292	94%
Antibiotic in cement	32397	66%

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic

	49350	95%

A cephalosporin was used in 88% of arthroplasties.

Operating theatre

Conventional	30070
Laminar flow	21727
Space suits	15616

In 2010, 51% of knee arthroplasties were performed in laminar flow theatres and space suits were used in 40%; slightly down from 2009 in both categories.

ASA Class

This was introduced with the updated forms at the beginning of 2005. For the six-year period 2005 – 2010, there were 30560 (91%) primary knee procedures with the ASA class recorded.

Definitions

ASA class 1: A healthy patient
ASA class 2: A patient with mild systemic disease
ASA class 3: A patient with severe systemic disease that limits activity but is not incapacitating
ASA class 4: A patient with an incapacitating disease that is a constant threat to life

ASA	Number	Percentage
1	3532	11
2	19352	63
3	7531	25
4	145	1

Operative time (skin to skin)

Mean	84	minutes
Standard deviation	26	minutes
Minimum	24	minutes
Maximum	443	minutes

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the six-year period 2005 – 2010.

Consultant	29451
Advanced trainee supervised	2672
Advanced trainee unsupervised	656
Basic trainee	771

Prosthesis usage

Patello-femoral prostheses

Avon-patello	108
Journey	21
Gender	18
LCS PFJ	6
Mod 3	1
RBK	1
Themis	1

There are 156 patello-femoral procedures registered to 45 surgeons. Avon- patello is the most common prosthesis at 69% of the total but significant increases in Journey and Gender prostheses in 2010.

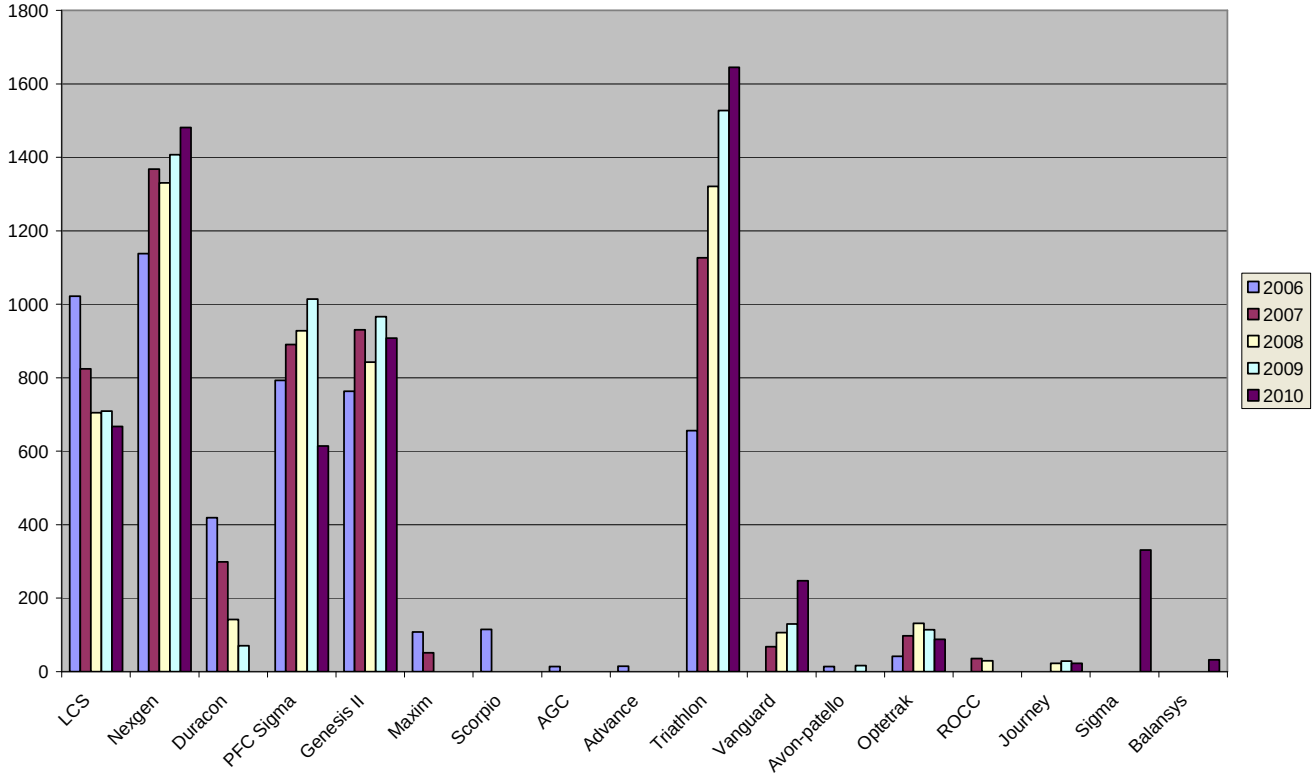
Conventional primary knees

Top 10 knee prostheses used in 2010

Triathlon	1645
Nexgen	1481
Genesis II	908
LCS	668
PFC Sigma	614
Sigma	331
Vanguard	247
Optetrak	88
Balansys	32
Journey	23

No change at the top but Sigma and Balansys have replaced Duracon and RPS.

Most used knee prostheses for 5 years 2006 - 2010



Nexgen, Triathlon and Vanguard continue upward and Sigma makes a bold entry

Patellar resurfacing
36,414 (70%) of the conventional knee procedures were registered with the patella not resurfaced and 15,644 (30%) resurfaced.

Surgeon and hospital workload

Surgeons
In 2010, 193 surgeons performed 6,107 total knee replacements, an average of 32 procedures per surgeon. 23 surgeons performed less than 10 procedures and 55 performed more than 40.

Hospitals
In 2010 primary knee replacement was performed in 52 hospitals; 27 were public hospitals and 25 were private. For 2010 the average number of total knee replacements per hospital was 117.

REVISION KNEE ARTHROPLASTY

Revision is defined by the Registry as a new operation in a previously replaced knee joint during which one or more of the components are exchanged, removed, manipulated or added. It includes arthrodesis or amputation, but not soft tissue procedures. A two or more staged procedure is registered as one revision.

Data analysis

For the twelve year period January 1999 – December 2010, there were 4,158 revision knee procedures registered. This is an additional 432 compared to last year's report.

The average age for a revision knee replacement was 69.90 years, with a range of 10.57 – 98.39 years.

Revision knees

	Female	Male
Number	1979	2179
Percentage	47.59	52.41
Mean age	70.44	69.41
Maximum age	95.80	98.39
Minimum age	10.57	15.49
Standard dev.	10.60	10.22

The percentage of revision knees to primary knees is 8%, a ratio of 1:12.5.

REVISION OF REGISTERED PRIMARY KNEE ARTHROPLASTIES

This section analyses data for **revisions of the primary registered knee arthroplasties** for the twelve year period.

There were 1234 revisions of the 52,058 primary conventional knee replacements (2.4%) and 12 revisions of the 156 patello-femoral prostheses (7.7%).

Conventional knee replacement analysis

Time to revision

Mean	1000 days
Maximum	4095 days
Minimum	0 days
Standard deviation	892 days

Reason for revision

Pain	380
Deep infection	307
Primary patellar comp.	287
Loosening tibial component	287
Loosening femoral component	145
Instability	98
Stiffness	51
Dislocation component	32
Fracture tibia	22
Loosening patellar component	19
Wear component	20
Malalignment	16
Fracture femur	15
Implant breakage	11
Osteolysis	10
Other	48

There is often more than 1 reason for revision and all are registered.

Analysis by time of the 4 main reasons for revision

		Years since operation													
		0	1	2	3	4	5	6	7	8	9	10	11	12	Total
1	Count	15	61	131	59	40	27	14	9	10	6	3	5		380
	%	3.90	16.10	34.50	15.50	10.50	7.10	3.70	2.40	2.60	1.60	0.80	1.30		100
2	Count	72	53	70	35	34	9	9	9	8	3	2	3	0	307
	%	23.50	17.30	22.80	11.40	11.10	2.90	2.90	2.90	2.60	1.00	0.70	1.00	0.00	100
3	Count	9	55	106	45	33	15	6	4	4	5	1	3	1	287
	%	3.10	19.20	36.90	15.70	11.50	5.20	2.10	1.40	1.40	1.70	0.30	1.00	0.30	100
4	Count	10	21	42	51	45	32	22	20	21	7	10	3	3	287
	%	3.50	7.30	14.60	17.80	15.70	11.10	7.70	7.00	7.30	2.40	3.50	1.00	1.00	100

1 = Pain, 2 = Deep infection, 3 = Primary patellar component, 4 = loosening tibial component

70% of revisions for pain,75%for deep infection and 75% for patellar replacement are within 4 years of primary arthroplasty compared to just 43% for tibial loosening.

Patello-Femoral Arthroplasty

Time to revision for patello-femoral knees

Mean	815 days
Maximum	1582 days
Minimum	126 days
Standard deviation	472 days

Reason for revision

Pain	5
Loosening patellar	2
Progression of disease	4
Synovitis	1

Patellar resurfacing

As noted previously, 70 %(36,414) of the 52,058 conventional primary knees registered were not resurfaced and 30% (15,644) were resurfaced.
Of the group that was not resurfaced, 185 (0.5%) had the patella later resurfaced as the only revision procedure and a further 102 (0.2%) had the patella resurfaced as part of other component revision

Statistical note

In the tables below there are two statistical terms readers may not be familiar with.

Observed component years

This is the number of registered primary procedures multiplied by the number of years each component has been insitu.

Rate/100 component years

This is equivalent to the yearly revision rate expressed as a percentage and is derived by dividing the number of prostheses revised by the observed component years multiplied by 100. It therefore allows for the number of years of post operative follow up in calculating the revision rate. These rates are usually very low, hence it is expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

Statistical Significance

Where it is stated that a difference among results is significant the p value is 0.05 or less. In most of these situations this is because there is no overlap of the confidence intervals (CIs) but sometimes significance can apply in the presence of CI overlap

All Primary Total Knee Arthroplasties

All Patients	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
	52058	236375	1234	0.52	0.49	0.55

Revision rate of individual knee prostheses sorted on number of implantations

Minimum of 50 primary registered arthroplasties

Prosthesis	No. Ops.	Observed comp. yrs	No revised	Rate/100-component-years	Exact 95% CI confidence interval	
Genesis II cemented	6990	27982	144	0.515	0.43	0.61
PFC Sigma cemented	6974	30115	131	0.43	0.36	0.52
Triathlon cemented	6234	13215	52	0.39	0.29	0.52
LCS Complete cemented	4189	17457	87	0.50	0.40	0.61
Nexgen LPS-Flex cemented	3665	10561	78	0.74	0.58	0.92
Duracon cemented	3418	21875	70	0.32	0.25	0.41
Nexgen CR cemented	2723	18744	70	0.37	0.29	0.47
Nexgen LPS cemented	2362	12184	72	0.59	0.46	0.74
LCS Complete uncemented	2212	7472	74	0.99	0.78	1.24
Nexgen CR Flex Cemented	2068	5000	28	0.56	0.37	0.81
LCS uncemented	1091	9019	75	0.83	0.65	1.04
Scorpio	851	4919	39	0.79	0.56	1.08
Maxim	822	5478	20	0.36	0.22	0.56
Duracon uncemented	788	5329	17	0.32	0.18	0.51
Nexgen CR uncemented	423	2362	12	0.51	0.26	0.89
Vanguard (TM) CR	434	678	4	0.59	0.16	1.51
AGC cemented	376	2975	11	0.37	0.19	0.66
Optetrak cemented	262	748	9	1.20	0.55	2.28
Insall/Burstein	249	2164	41	1.89	1.36	2.57
Optetrak uncemented	246	486	4	0.82	0.22	2.10
PFC Sigma uncemented	246	902	4	0.44	0.12	1.13
MBK cemented	222	1816	10	0.55	0.26	1.01
Sigma CR150	179	58	0	0.00	0.00	6.33
Advance cemented	157	1115	5	0.45	0.15	1.05
Sigma Cemented	152	65	0	0.00	0.00	5.66
Triathlon uncemented	124	269	2	0.74	0.09	2.68
Vanguard (TM) PS	121	123	2	1.63	0.20	5.87

Nexgen LPS uncemented	108	96	0	0.00	0.00	3.82
AMK cemented	95	896	1	0.11	0.00	0.62
Journey	80	117	2	1.70	0.20	6.13
Cruciate Retained uncemented	76	361	1	0.28	0.00	1.54

There are 85 different knee prostheses registered within the registry with 52% having fewer than 10 registrations

The table above contains the analyses of the 31 that have a minimum of 50 primary registered procedures. As stated above it is important to note the confidence intervals and observed component years in conjunction with the revision rates.

The 2 LCS uncemented, the Insall Burstein, Nexgen LPS-flex cemented and Scorpio prostheses have significantly higher revision rates than the overall rate of 0.52/100 ocys @ the 95% confidence interval. The LCS Complete(268) and the Nexgen LPS-flex cemented (732) were the only ones implanted in 2010

Revision rates for Fixed vs Mobile Bearing Knees

	Bearing	No. of Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Femur	Fixed	7424	32276	150	0.46	0.39	0.55
	Mobile	11116	63816	382	0.60	0.54	0.66
	Total	18540	96092	532	0.55	0.51	0.60
Tibia	Fixed	25056	107971	489	0.45	0.41	0.49
	Mobile	11336	41013	233	0.57	0.50	0.65
	Total	36392	148985	722	0.48	0.45	0.52

There is a significantly higher revision rate for mobile bearing knees when compared to fixed bearing knees.
The total number of arthroplasties exceeds the total number of registered primary knees because the coding of some individual prostheses link the bearing to both the tibial & femoral components.

Revision vs Age Bands

Age Bands	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	4339	19795	206	1.04	0.90	1.19
55-64	13857	62558	431	0.69	0.63	0.76
65-74	19515	89896	420	0.47	0.42	0.51
GE75	14347	64126	177	0.28	0.24	0.32

Each successive age band in ascending order has a significantly lower revision rate

Revision vs Gender

Gender	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Female	26885	124476	589	0.47	0.44	0.51
Male	25173	111899	645	0.58	0.53	0.62

The revision rate for males is significantly higher than for females

Revision vs Arthroplasty Fixation

Cementation	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Cemented	19404	104944	574	0.55	0.50	0.59
Uncemented	20581	76248	625	0.82	0.76	0.89
Hybrid	22782	102535	671	0.65	0.61	0.71

Hybrid Knee: tibia cemented, femur uncemented

Uncemented knees have a significantly higher revision rate than either cemented or hybrid knees. Further analyses have shown that it is loosening of the uncemented tibial component that is responsible for the higher revision rate.

Revision by Age Bands vs Arthroplasty Fixation

Cemented	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	3473	15554	144	0.93	0.78	1.09
55-64	11964	53426	356	0.67	0.60	0.74
65-74	17639	80807	375	0.46	0.42	0.51
GE75	13224	58862	157	0.27	0.23	0.31

Each of the age bands has a significantly lower revision rate than the preceding lower age bands.

Uncemented	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	464	2519	46	1.83	1.34	2.44
55-64	876	4141	40	0.97	0.69	1.32
65-74	745	3187	20	0.63	0.38	0.97
GE75	375	1492	7	0.47	0.19	0.97

The lowest age band has a significantly higher revision rate than the other bands.

Hybrid	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	402	1721	16	0.93	0.53	1.51
55-64	1017	4990	35	0.70	0.49	0.98
65-74	1131	5902	25	0.42	0.27	0.63
GE75	748	3773	13	0.34	0.18	0.59

No significant difference among the age bands.

Revision vs Approach

Approach	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Medial	47236	207381	1080	0.52	0.49	0.55
Lateral	866	4643	26	0.56	0.37	0.82
Other	1312	7175	29	0.40	0.27	0.58

There is no significant difference among the 3 approaches.

Revision vs Image Guidance

Image Guided	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
No	48402	228132	1182	0.52	0.49	0.55
Yes	3656	8243	52	0.63	0.47	0.83

Although there is no significant difference in revision rate between the 2, the anticipated advantages of image guided arthroplasty are not yet apparent.

Revision vs Surgeon Annual Output

Operations per year	No. Ops.	Observed comp Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT10	1177	6194	31	0.50	0.34	0.71
10-25	11682	55635	311	0.56	0.50	0.62
25-50	25247	115138	583	0.51	0.47	0.55
50-75	10589	44182	239	0.54	0.47	0.61
75-100	1055	5816	19	0.33	0.20	0.51
GE100	2301	9360	51	0.54	0.41	0.72

The 75-100 group have a significantly lower revision rate than the 10-25 age group.

Revision vs ASA status

ASA Class	No. Ops.	Observed Comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
1	3503	8710	57	0.65	0.50	0.85
2	19287	49497	302	0.61	0.54	0.68
3	7512	19057	115	0.60	0.50	0.72
4	145	367	1	0.27	0.01	1.52

There is no significant difference among the 4 classes

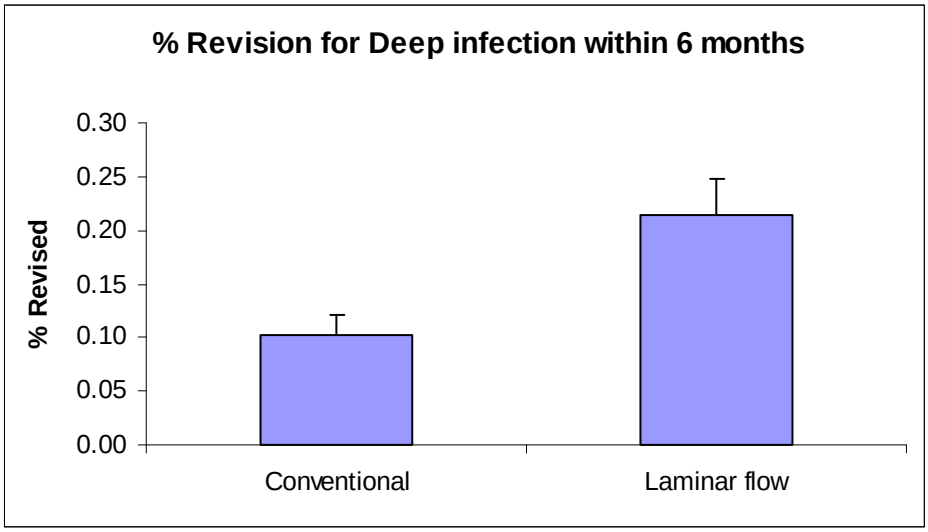
Revision vs ASA public private hospitals

	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Public	15611	40661	251	0.62	0.54	0.70
Private	14836	36970	224	0.61	0.53	0.69

There is no significant difference between the 2 groups

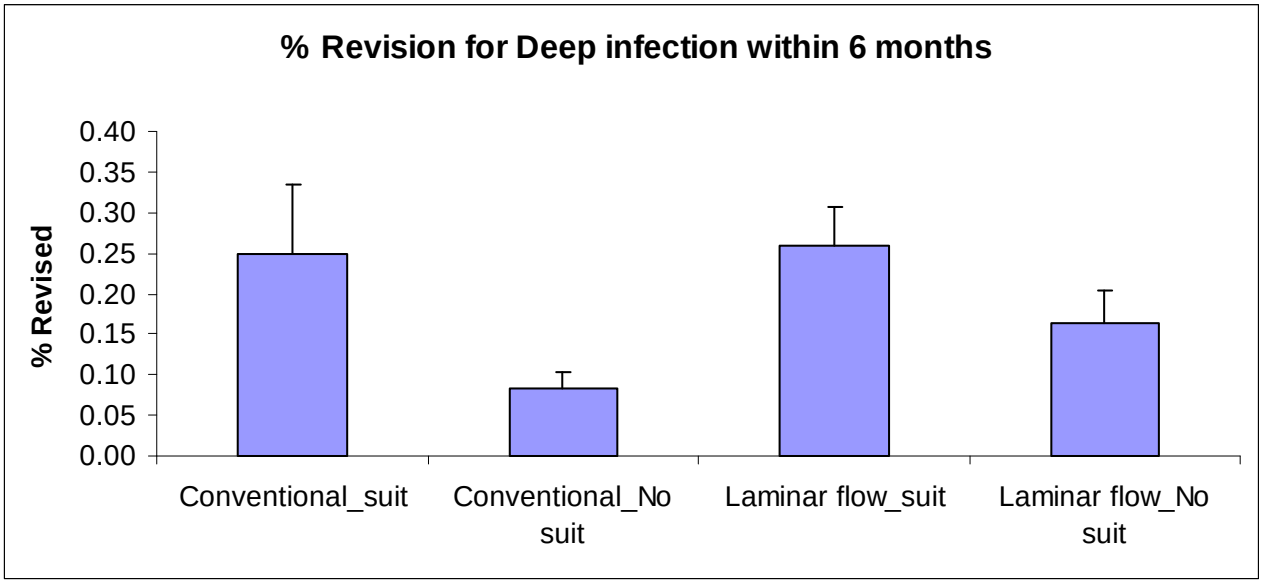
Revision for Deep Infection within 6 months versus theatre environment

	Total Number	Number Revised	%	Std Error
Conventional	28174	29	0.10	0.02
Laminar flow	20058	43	0.21	0.03



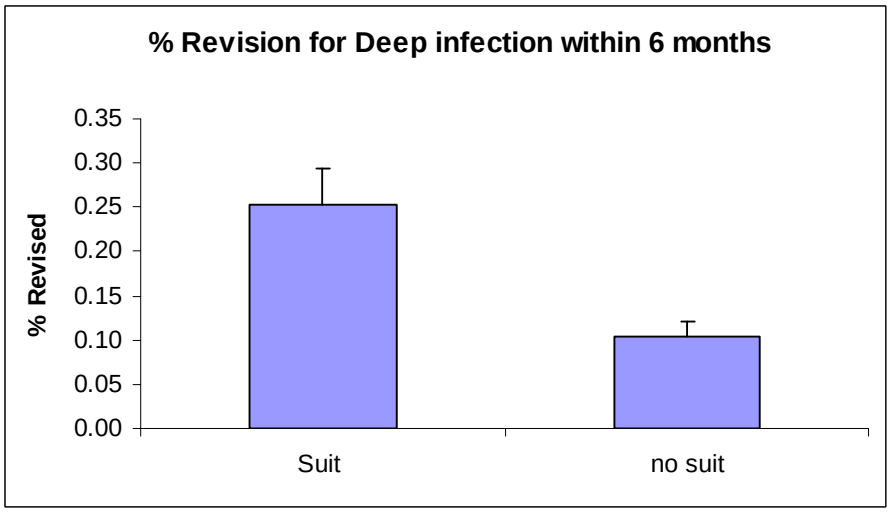
As with hip arthroplasty there is a significant difference in knee revision rates for deep infection within 6 months of surgery between conventional and laminar flow theatres.

	Total Number	Number Revised	%	Std Error
Conventional suit	3225	8	0.25	0.09
Conventional No suit	24949	21	0.08	0.02
Laminar flow suit	10849	28	0.26	0.05
Laminar flow No suit	9209	15	0.16	0.04



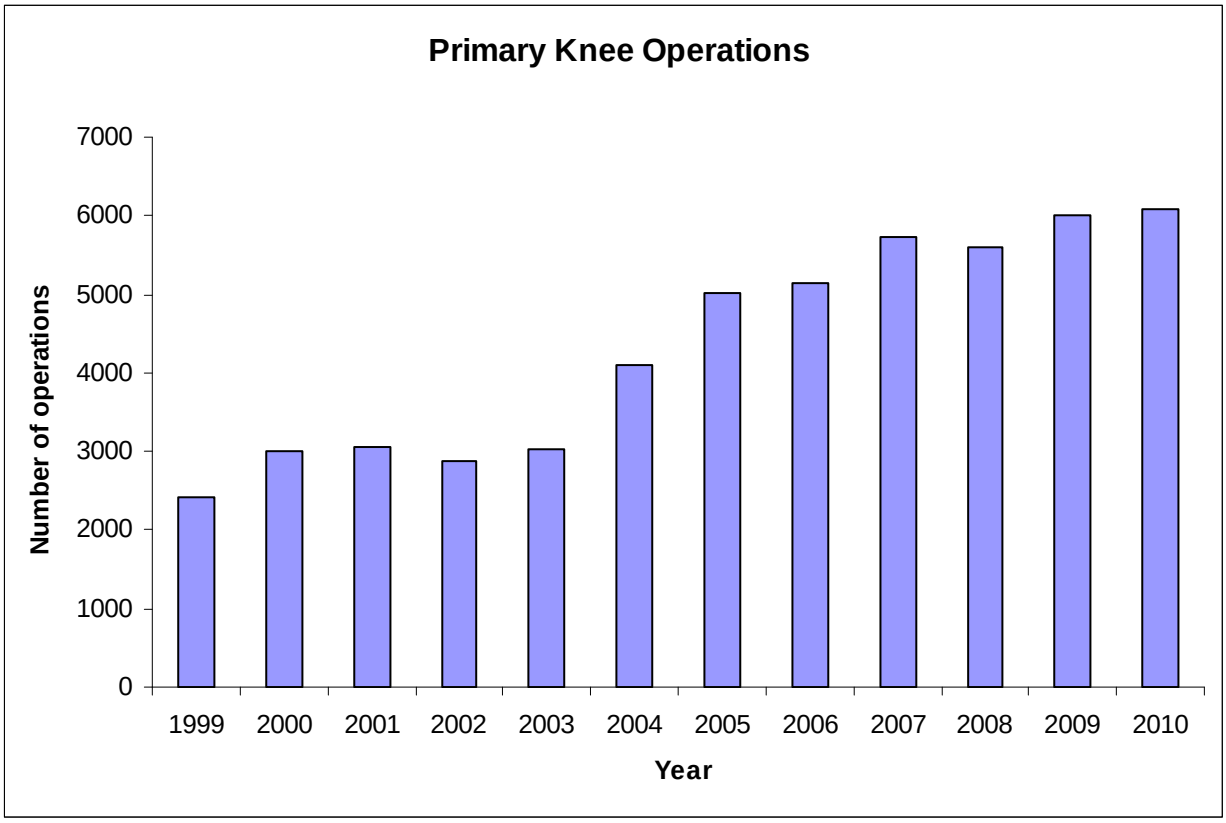
There is a significant difference in the revision rates between conventional/no suit and the conventional and laminar /suit environments. There is 3 times the risk for revision in the latter two compared to the former environment.

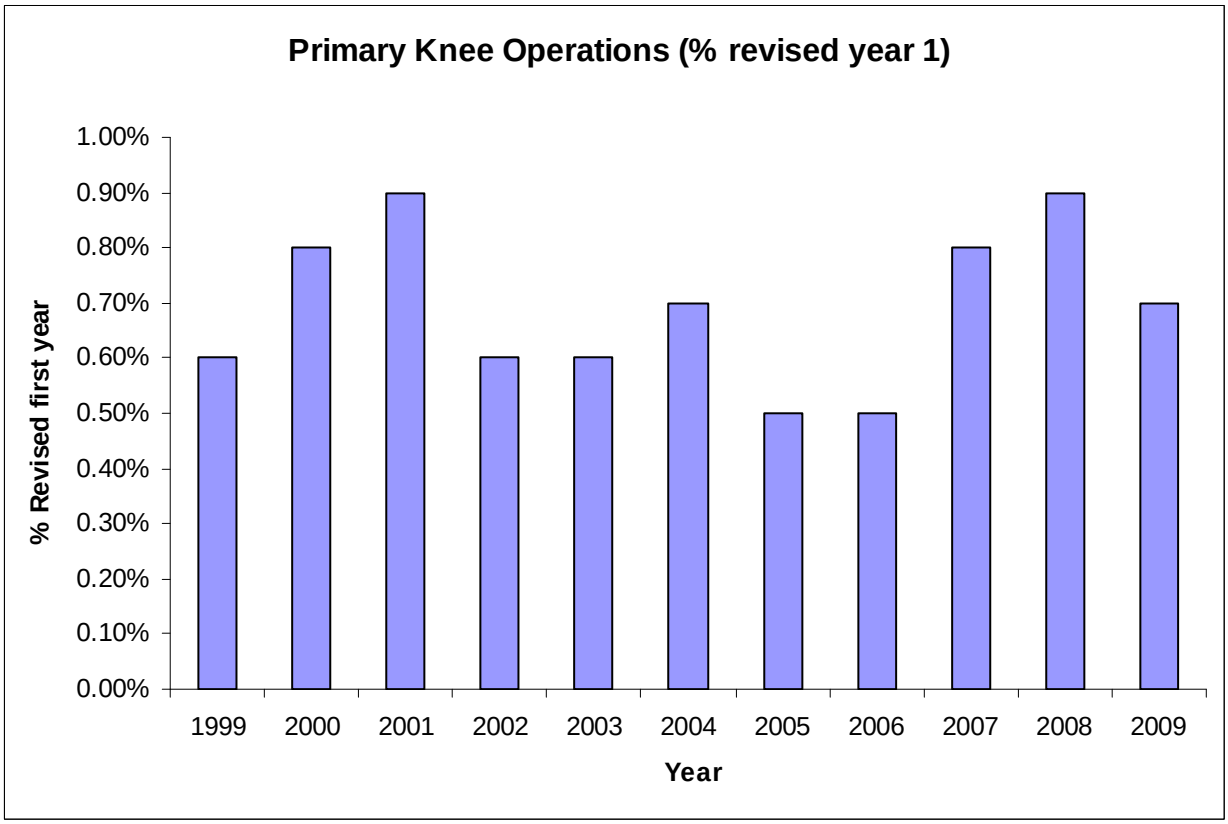
	Total Number	Number Revised	%	Std Error
Suit	14262	36	0.25	0.04
no suit	34428	36	0.10	0.02



Furthermore there is a significant increase in revision rates (2.5x) when suits are used in either conventional or laminar flow theatres.
From the above data it would seem that, similar to hip arthroplasty, the use of space suits increases almost threefold the risk of deep infection within the first 6 months following the arthroplasty and that there is no advantage to using laminar flow theatres.

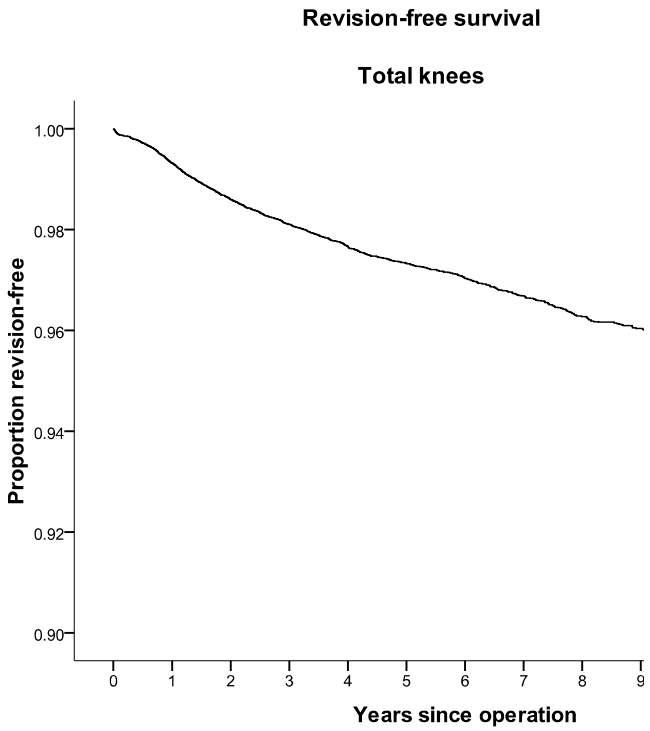
Percentage of knees revised in the first year





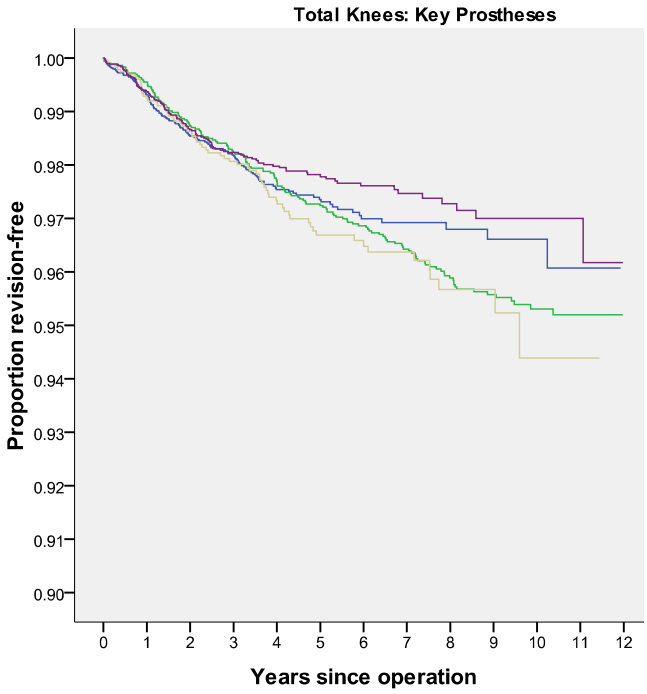
Kaplan Meier Curves

The following Kaplan Meier survival analyses are for years 1999 – 2010 with deceased patients censored at time of death

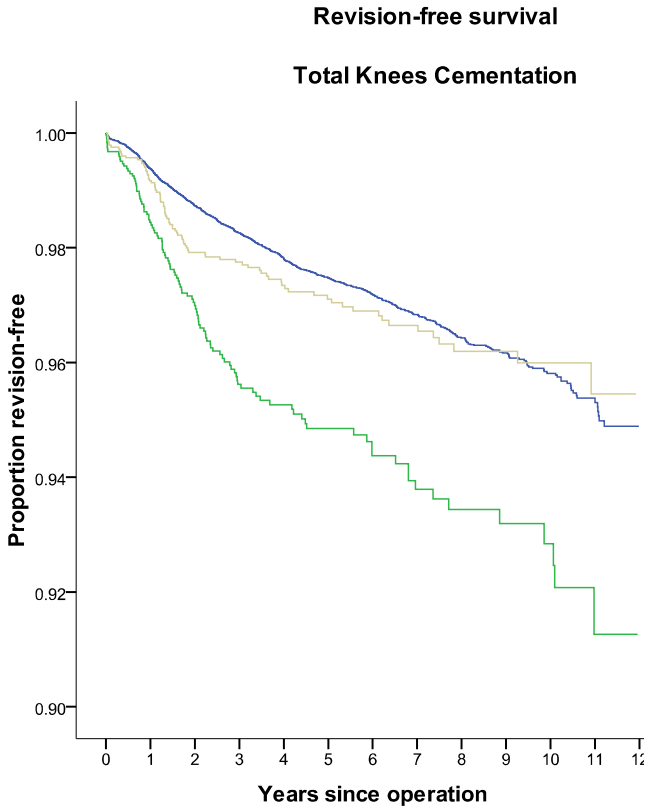


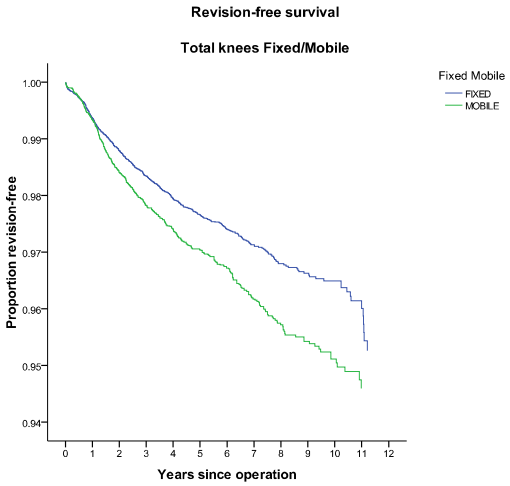
Years	% Revision-free	No in each year
1	99.32	45182
2	98.60	38448
3	98.10	32283
4	97.67	26159
5	97.34	20803
6	97.04	15777
7	96.68	11751
8	96.27	8804
9	96.03	6232
10	95.69	3713
11	95.16	1540

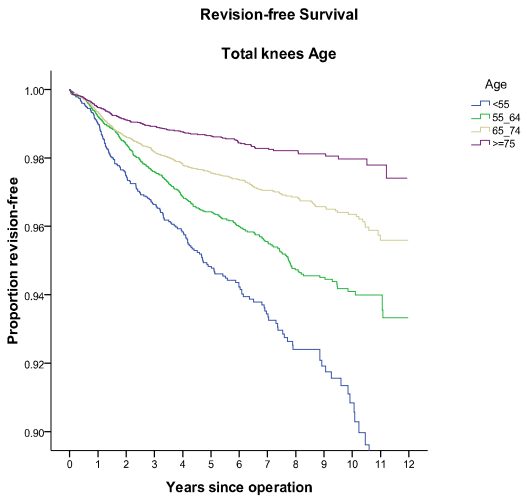
The KM analysis is to 11 years rather than 12 as too few registered knees were revised in 2010

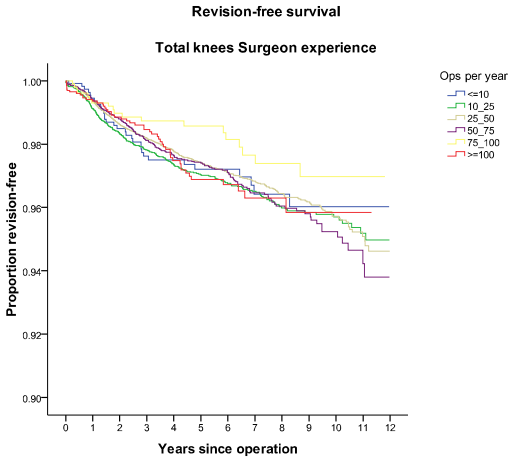


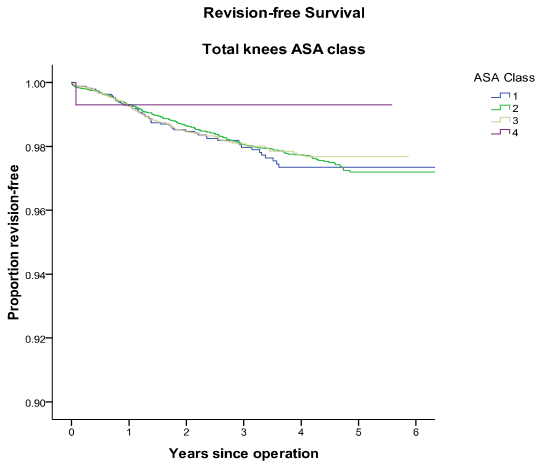
The KM curves for 4 knee combinations with minimum 10 years of sufficient data for analyses.











KNEE RE-REVISIONS

There were 149 registered primary knee revisions that had been revised twice, 22 that had been revised 3 times, 4 that had been revised 4 times and 1 that had been revised 5 times.

First re revision

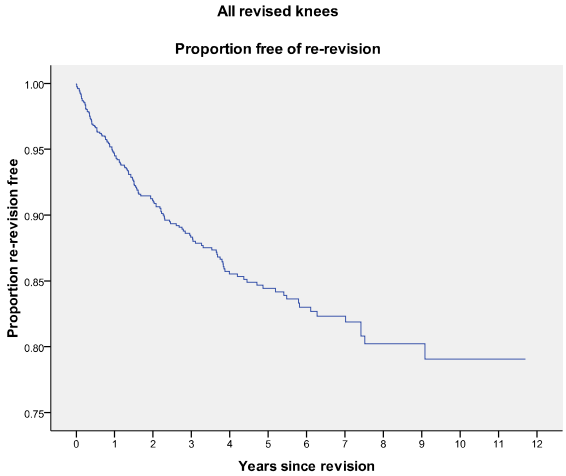
Time between the first and second revision for the 149 knee arthroplasties averaged 692 days, with a range of 2 – 3318 and a standard deviation of 679 days.
This compares to an average of 1000 days between primary and first revision arthroplasty.

Reason for re-revision	
Deep infection	62
Pain	38
Loosening tibial component	29
Loosening femoral component	22
Instability	13
Dislocation	7
Stiffness	4
Patellar fracture	2
Loosening patellar component	2
Fracture femur	1
Other	12

Re- revision rate after first Revision of Primary

	No of Primary Revisions.	Observed comp. Yrs	Number Re revised	Rate/100-component-years	Exact 95% confidence interval	
	1234	4349	149	3.43	2.90	4.02

Re revisions have a very significantly higher revision rate than the overall rate of 0.52/100 ocys @ the 95% confidence interval for primary arthroplasty.



The KM graph confirms that survival following the first revision is poorer than for primary arthroplasty.

Second re revision
The average time between second and third revisions for the 22 knee arthroplasties was 609 days, with a range of 28 – 1885 and a standard deviation of 522 days.

Third re- revision
The average time between third and fourth revisions for the 4 knee arthroplasties was 476 days.

Fourth re-revision
The time between 3rd and 4th revision was 559 days

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX-MONTHS, FIVE-YEARS AND TEN-YEARS POST SURGERY

Questionnaires at six months post surgery

At six months post surgery a random selection of patients are sent the Oxford12 hip questionnaire in order to achieve a response rate of 20% of the total which is deemed to be ample to provide powerful statistical analysis.

The new scoring system as recommended by the original authors has been adopted. (see appendix 1)

The scores now range from 4 to 0. A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

In addition we have grouped the questionnaire responses according to the classification system published by Kalairajah et al, in 2005. (see appendix 1)

This groups each score into four categories;

Category 1	>41	excellent
Category 2	34 – 41	good
Category 3	27 – 33	fair
Category 4	< 27	poor

For the twelve year period and as at August 2011, there were 18,182 primary knee questionnaire responses registered six months post surgery.
The mean knee score was 37.19 (standard deviation 8.22, range 48 – 0)

Scoring	> 41	6701
Scoring	34 – 41	6440
Scoring	27 – 33	2902
Scoring	< 27	2139

At six months post surgery, 72% had an excellent or good score.

Questionnaires at five years post surgery

All patients who had a six month registered questionnaire, and who had not had revision surgery were sent a further questionnaire five years post surgery.

This dataset represents sequential Oxford knee scores for 5,226 individual patients.

At five years post surgery, 82% of patients achieved an excellent or good score and had a mean of 39.90.

Questionnaires at ten years post surgery

All patients who had a six month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at ten years post surgery.

This dataset represents sequential Oxford knee scores for 1736 individual patients.

At ten years post surgery, 79% of patients achieved an excellent or good score and had a mean of 39.28.

Analysis of the individual questions at six months, five years and ten years post surgery

Analysis of the individual questions showed that the most common persisting problem was difficulty with kneeling (Q4).

Percentage scoring 0 or 1(worst categories) for each question out of the group of 18,182 primary knee responses at six-months, 5,226 at five-years and 1,736 at ten-years.

		% 6	%5	%10
1	Moderate or severe pain from the operated knee	13	9	9
2	Only able to walk around the house or unable to walk before pain becomes severe	5	4	5
3	Extreme difficulty or impossible to get in and out of a car or public transport	4	4	5
4	Extreme difficulty or impossible to kneel down and get up afterwards	42	40	44
5	Extreme difficulty or impossible to do the household shopping on your own	4	5	6
6	Extreme difficulty or impossible to wash and dry yourself	1	2	2
7	Pain interfering	6	4	4

	greatly or totally with your work			
8	Very painful or unbearable to stand up from a chair after a meal	4	2	2
9	Most of the time or always feeling that the knee might suddenly "give way"	2	2	2
10	Limping most or every day	11	8	7
11	Extreme difficulty or impossible to walk down a flight of stairs	7	7	9
12	Pain from your knee in bed most or every nights	10	5	5

As noted in previous years there is little significant change between the six-month and five-year scores which means the six-month score is indicative of the medium term. Limp and pain at night tend to diminish over time.

Revision knee questionnaire responses

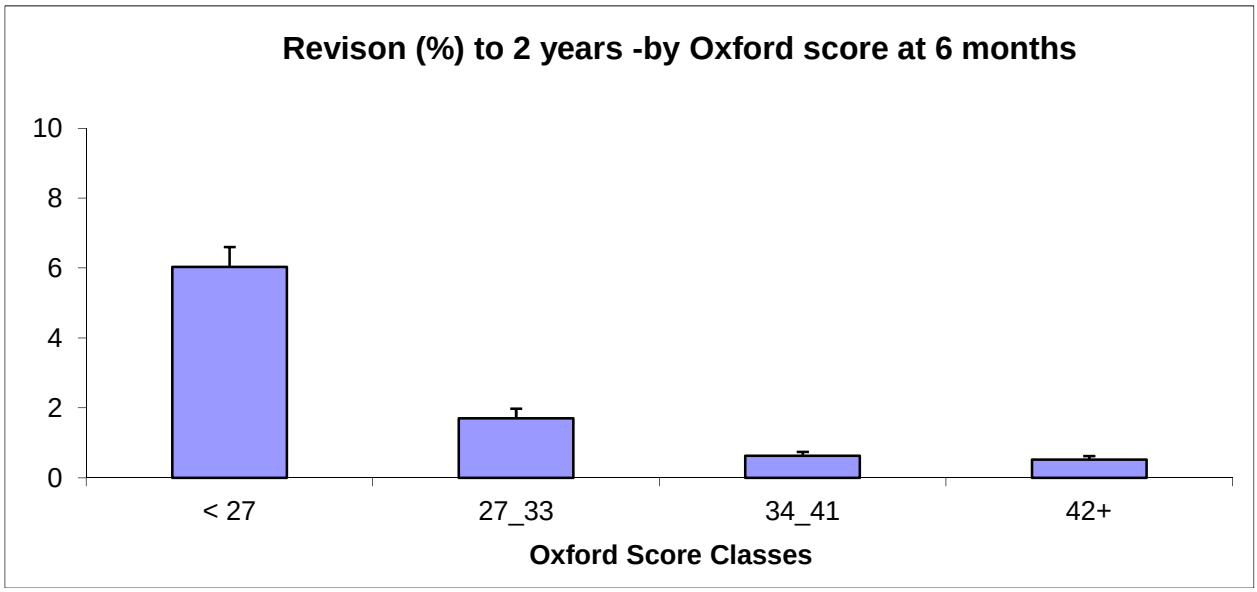
There were 2,229 revision knee responses with 51% achieving an excellent or good score. This group includes all revision knee procedures. The mean revision knee score was 32.63 (standard deviation 10.13, range 48 – 3)

OXFORD 12 SCORE AS A PREDICTOR OF KNEE ARTHROPLASTY REVISION

A statistically significant relationship has been confirmed between the Oxford scores at 6 months and 5 years post surgery and arthroplasty revision within two years of the Oxford 12 questionnaire date.

Six month score and revision arthroplasty

By plotting the patients six month scores in the Kalairajah groupings, against the proportion of knees revised for that same group it demonstrates that there is an incremental increase in risk during the next 2 years related to the Oxford score. A patient with a score below 27 has 12 times the risk of a revision within 2 years compared to a person with a score >41



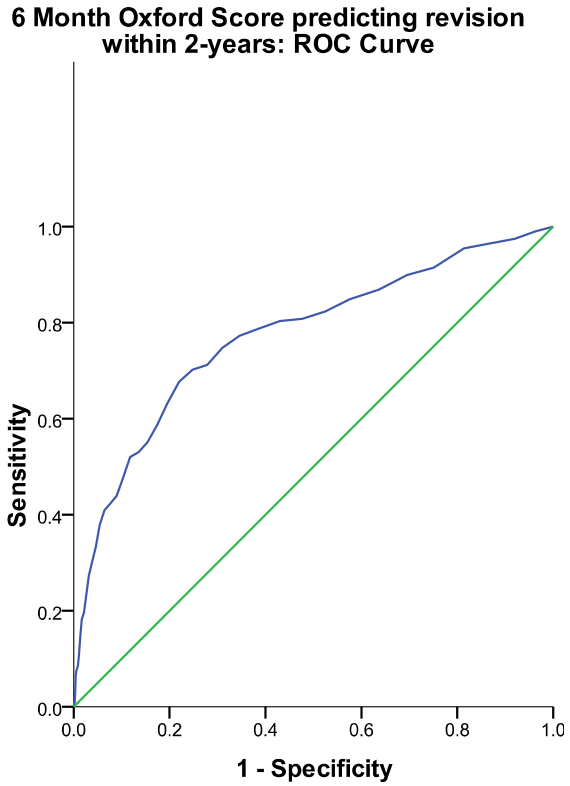
Revision risk versus Kalairajah groupings of Oxford scores within two years of the 6 month score date

Kalairajah groups	No in group	No. revised	%	Std error
< 27	1708	103	6.03	0.57
27_33	2228	38	1.70	0.27
34_41	4908	31	0.63	0.11
42+	4980	26	0.52	0.10

A person with an oxford score >42 has a 0.52% risk of revision within two years compared to a 6.03% risk with a score of 27 or less

A ROC analysis has demonstrated that a patient with a score less than or equal to 31.5 has 8 times the risk of needing a revision within 2 years compared to a person with a score greater than 31.5.
Alternatively the ROC analysis predicted 70% of the revisions within 2 years from just the lowest 25% of Oxford scores.

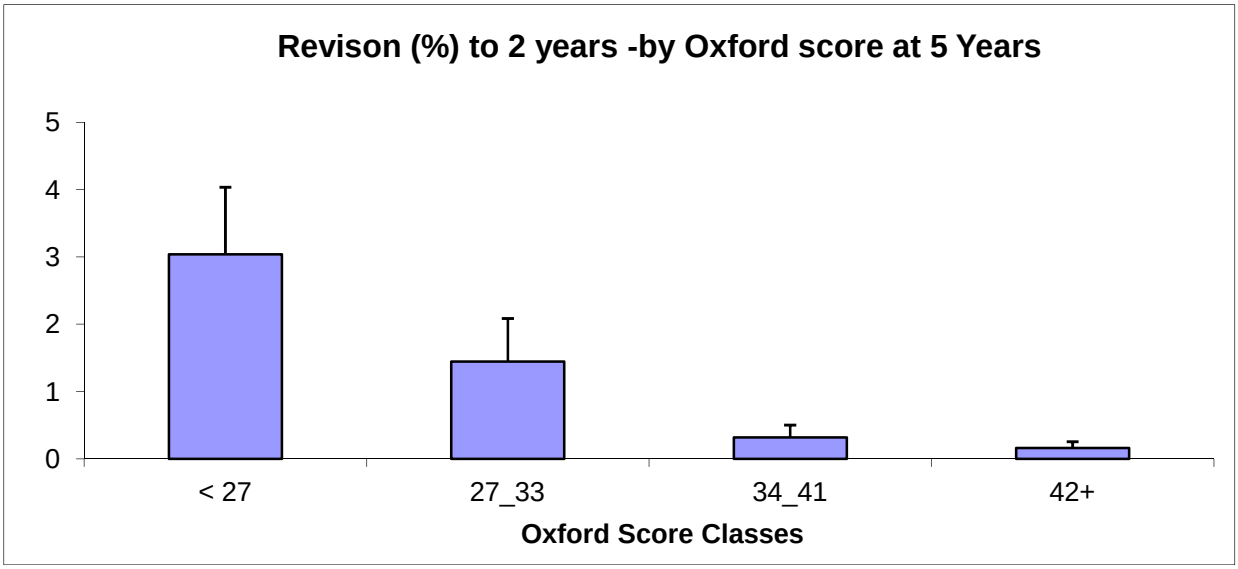
ROC curve at six months versus revision within two years



A receiver operating characteristic (ROC) curve is a graphical representation of the tradeoff between the false negative and false positive rates for every possible cutoff. Equivalently, the ROC curve is the representation of the tradeoffs between sensitivity and specificity. The more the curve climbs towards the upper left corner the better the reliability of the test.

Five year score and revision arthroplasty

As with the six month scores, plotting the patients 5 year scores in the Kalairajah groupings against the proportion of knees revised for that same group demonstrates that there is an incremental increase in risk during the next 2 years related to the Oxford score. A patient with a score below 27 has 19 times the risk of a revision within 2 years compared to a person with a score >41



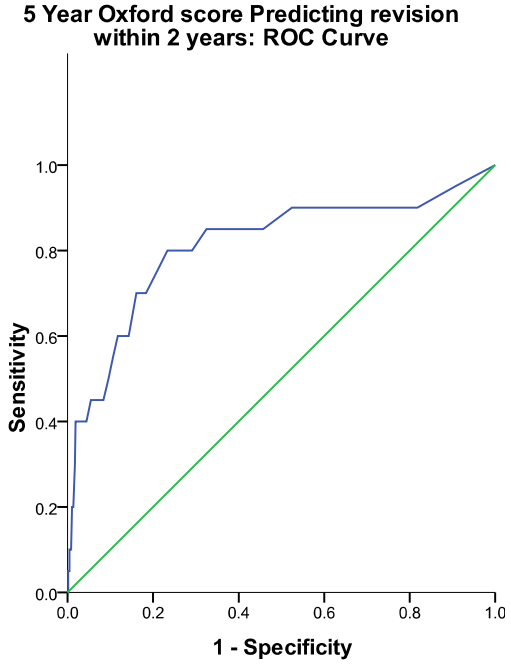
Revision risk versus Kalairajah groupings of Oxford scores within two years of the 5 year score date

Kalairajah groups	No in group	No. revised	%	Std error
< 27	296	9	3.04	0.99
27_33	346	5	1.45	0.64
34_41	943	3	0.32	0.18
42+	1865	3	0.16	0.09

A person with an Oxford score >42 has a 0.16 % risk of revision within two years compared to a 3.04% risk with a score of 27 or less

The ROC analysis at 5 years has demonstrated that a patient with a score less than or equal to 35.5 has 13 times the risk of needing a revision within 2 years compared to a person with a score greater than 35.5. Alternatively the ROC analysis predicted 80% of the revisions within 2 years from just the lowest 24% of Oxford scores.

ROC curve at five years versus revision within two years



UNICOMPARTMENTAL KNEE ARTHROPLASTY

PRIMARY UNICOMPARTMENTAL KNEE ARTHROPLASTY

The **eleven** year report analyses data for the period January 2000 – December 2010. There were 6,035 unicompartmental knee procedures registered, an additional 582 compared to last year's report.

2000	340
2001	430
2002	533
2003	634
2004	634
2005	558
2006	584
2007	576
2008	540
2009	624
2010	582

There was a 6.7% decrease in registrations in 2010.

DATA ANALYSIS

Age and sex distribution

The average age for a unicompartmental knee replacement was 66.45 years, with a range of 33.05 – 94.71 years.

	Female	Male
Number	2849	3186
Percentage	47.21	52.79
Mean age	66.38	66.51
Maximum age	94.71	93.42
Minimum age	33.05	35.24
Standard dev.	10.13	8.97

Body Mass Index

For 2010, there were 227 BMI registrations for unicompartmental knee replacements. The average was 29.29 with a range of 18.5 – 43.5 and a standard deviation of 4.97.

Previous operation

None	4754
Menisectomy	951
Arthroscopy/debridement	285
Internal fixation	26
Osteotomy	22
Ligament reconstruction	24
Arthrotomy	3
Synovectomy	3
Other	13

Diagnosis

Osteoarthritis	5882
Avascular necrosis	51
Post ligament disruption	27
Other inflammatory	18
Rheumatoid arthritis	13
Post fracture	12
Tumour	1
Other	11

Approach

Medial	4684
Minimally invasive surgery	1382
Other	193
Lateral	128
Image guided surgery	11

Image guided surgery was added to the up dated forms at the beginning of 2005, but unlike the total knee arthroplasty, has never become popular.

Cement

Femur cemented	5196	86%
Antibiotic in cement	3163	61%
Tibia cemented	5267	87%
Antibiotic in cement	3211	61%

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic

5805	96%

Operating theatre

Conventional	4381
Laminar flow	1578
Space suits	1486

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the six year period 2005 – 2010, there were 3,187 (92%) unicompartmental knee procedures with the ASA class recorded.

Definitions

ASA class 1:	A healthy patient
ASA class 2:	A patient with mild systemic disease
ASA class 3:	A patient with severe systemic disease that limits activity but is not incapacitating
ASA class 4:	A patient with an incapacitating disease that is a constant threat to life

ASA	Number	Percentage
1	610	19
2	2074	65
3	493	15
4	10	1

Operative time (skin to skin)

Mean	79 minutes
Standard deviation	24 minutes
Minimum	24 minutes
Maximum	195 minutes

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the six- year period 2005 – 2010.

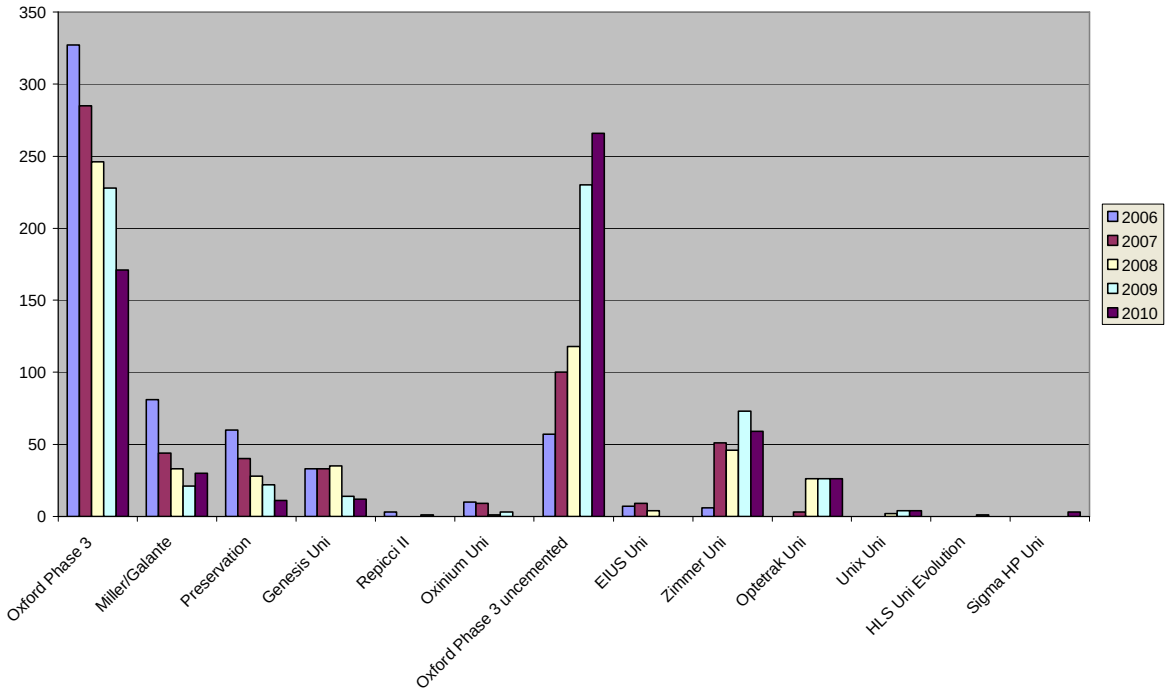
Consultant	3254
Advanced trainee supervised	186
Advanced trainee unsupervised	12
Basic trainee	8

Prosthesis usage

Unicompartmental knee prostheses used in 2010

Oxford Phase 3 uncemented	266
Oxford Phase 3	171
Zimmer Uni	59
Miller/Galante	30
Optetrak	26
Genesis Uni	12
Preservation	11
Unix Uni	4
Sigma HP Uni	3

Most used unicompartmental prostheses 2006 - 2010



The Oxford phase 3 uncemented continues its upward climb.

Surgeon and hospital workload

Surgeons

In 2010, 68 surgeons performed 582 unicompartmental knee replacements, an average of 9 procedures per surgeon.
39 surgeons performed less than 5 procedures and 11 performed more than 15 procedures.

Hospitals

In 2010 unicompartmental knee replacement was performed in 32 hospitals. 17 were public and 15 were private.
For 2010 the average number of unicompartmental knee replacements per hospital was 18.

REVISION OF REGISTERED PRIMARY UNICOMPARTMENTAL ARTHROPLASTIES

This section analyses the data for revision of unicompartmental knee replacement over the eleven year period.

There were 382 revisions of the 6,035 registered primary unicompartmental knee replacements (6.3%).

A further 32 had a second revision and 5 a third revision.

330 of the 382 (86%) were revised to total knee replacements. 52 (14%) were revised to further unicompartmental replacements

Time to revision

Mean	1016 days
Maximum	3503 days
Minimum	10 days
Standard deviation	821 days

Reason for revision

Pain	155
Loosening tibial component	92
Loosening femoral component	58
Progression of disease	29
Bearing dislocation	27
Deep infection	16
Fracture tibia	16
Fracture femur	1
Other	33

There was often more than one reason listed on the data form and all were entered.

Analysis by time of the 3 main reasons for revision

		Years since operation													
		0	1	2	3	4	5	6	7	8	9	10	11	12	Total
1	Count	7	23	52	24	10	15	9	5	6	2	2	0	0	155
	%	4.50	14.80	33.50	15.50	6.50	9.70	5.80	3.20	3.90	1.30	1.30	0.00	0.00	100
2	Count	8	16	31	7	7	9	4	5	5	0	0	0	0	92
	%	8.70	17.40	33.70	7.60	7.60	9.80	4.30	5.40	5.40	0.00	0.00	0.00	0.00	100
3	Count	0	12	17	6	10	2	3	2	4	2	0	0	0	58
	%	0.00	20.70	29.30	10.30	17.20	3.40	5.20	3.40	6.90	3.40	0.00	0.00	0.00	100

1 = Pain, 2 = Loosening tibial component, 3 = Loosening femoral component

Statistical note
In the tables below there are two statistical terms readers may not be familiar with.

Observed component years
This is the number of registered primary procedures multiplied by the number of years each component has been insitu.

Rate/100 component years
This is equivalent to the yearly revision rate expressed as a percentage and is derived by dividing the number of prostheses revised by the observed component years multiplied by 100. It therefore allows for the number of years of post operative follow up in calculating the revision rate. These rates are usually very low, hence it is expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

Statistical significance
Where it is stated that a difference among results is significant the p value is 0.05 or less. In most of these situations this is because there is no overlap of the confidence intervals (CIs) but sometimes significance can apply in the presence of CI overlap.

All Primary Unicompartmental Knee Arthroplasties

All patients	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
	6035	28419	382	1.34	1.21	1.49

Revision rate of individual unicompartmental knee prostheses sorted alphabetically

Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
EIUS Uni Knee	22	84	0	0.00	0.00	4.40
Genesis Uni	329	1670	27	1.62	1.07	2.35
HLS Uni Evolution	1	1	1	193.25	4.89	1076.74
LCS Uni	6	46	2	4.37	0.53	15.79
Miller/Galante	672	3907	36	0.92	0.65	1.28
Optetrak Unicondylar Cemented	81	128	0	0.00	0.00	2.88
Oxford Phase 3	3267	17364	241	1.39	1.22	1.57
Oxford Phase 3 uncemented	795	1462	11	0.75	0.38	1.35
Oxinium Uni	33	118	10	8.48	4.07	15.60
Preservation	484	2426	41	1.69	1.21	2.29
Repicci II	97	761	9	1.18	0.54	2.24
Sigma HP Uni	3	1	0	0.00	0.00	383.86
Unix Uni	10	12	0	0.00	0.00	31.50
Zimmer Unicompartmental Knee	235	441	4	0.91	0.25	2.32

The oxinium uni has a very significantly higher revision rate, but despite widely varying revision rates for the other prostheses there are no significant differences because of the relatively small numbers & wide CIs. No oxinium unis were recorded for 2010.

Revision vs Arthroplasty Fixation

Operation Type	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Cemented	5178	26708	367	1.37	1.24	1.52
Uncemented	750	1494	14	0.94	0.51	1.57
Hybrid	107	218	1	0.46	0.01	2.56

Although the uncemented and hybrid unis appear to have significantly lower revision rates than cemented unis they are not statistically significant in view of the small number of ocys

Revision vs Age Bands

Age Groups	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	712	3385	63	1.86	1.43	2.38
55-64	2069	9694	165	1.70	1.45	1.98
65-74	2022	9810	103	1.05	0.86	1.27
GE75	1232	5530	51	0.92	0.69	1.21

There are significantly higher revision rates for the lower 2 age bands when compared to the upper two.

Revision vs Gender

Sex	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Male	2849	13484	192	1.42	1.23	1.64
Female	3186	14936	190	1.27	1.10	1.47

There is no significant difference in revision rates between males and females

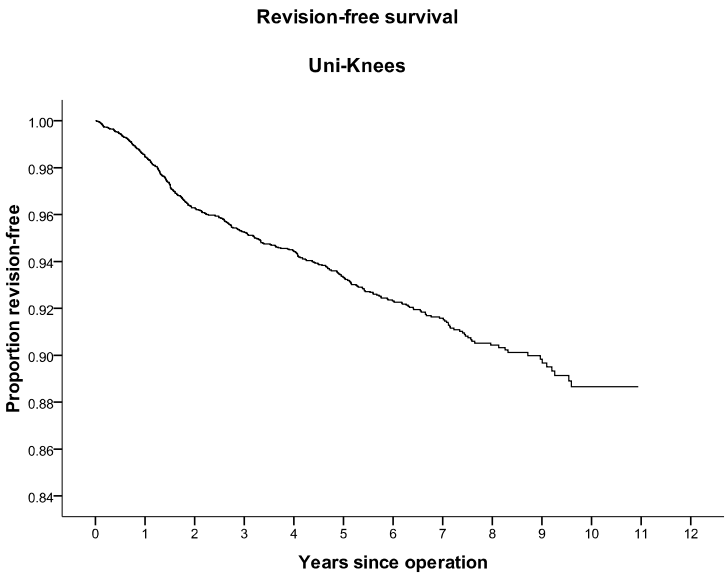
Revision vs Surgeon annual workload

Consultant Number of ops/yr	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
<10	3200	15642	244	1.56	1.37	1.77
>=10	2821	12712	135	1.06	0.89	1.26

Those surgeons performing <10 per year have a significantly higher revision rate.

Kaplan Meier Curves

The following Kaplan Meier survival analyses are for years 2000 to 2010 with deceased patients censored at time of death.



Years	% Revision-free	No in each year
1	98.54	5337
2	96.29	4582
3	95.26	3973
4	94.45	3337
5	93.33	2712
6	92.31	2152
7	91.57	1567
8	90.43	1004
9	89.83	562

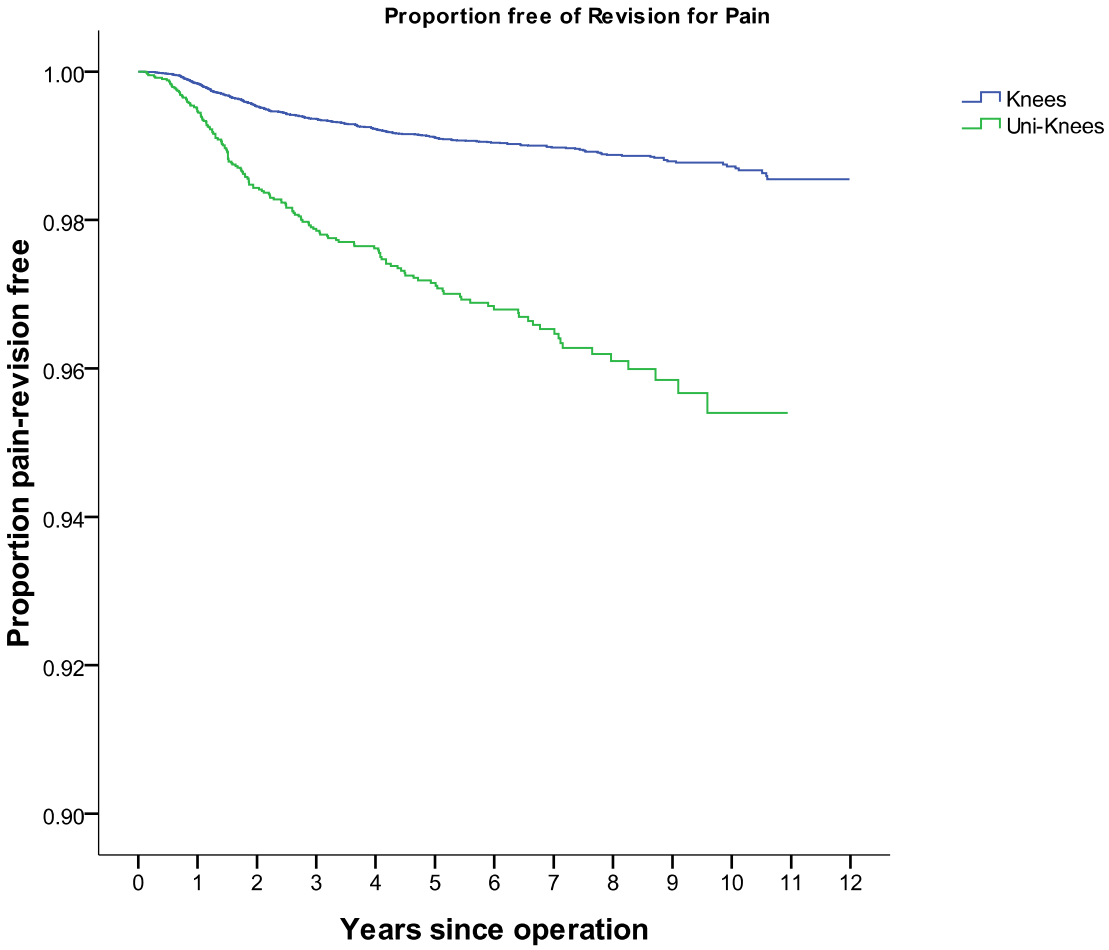
Numbers too few for accurate percentage survival beyond 9 years.

Revision rate for Re-revisions

Re Revisions	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Revised to full	330	1268	25	1.97	1.28	2.91
Revised to Uni	52	195	7	3.59	1.44	7.40

When compared to the primary total knee arthroplasty revision rate of 0.52 @ the 95% confidence interval there is a significantly increased revision rate when a unicompartmental arthroplasty is converted to a total knee arthroplasty. This statistic is even more significant following conversion of a unicompartmental to a further unicompartmental arthroplasty. Further evidence is that the average six month Oxford score following conversion of a unicompartmental to total arthroplasty is similar to that for a revised primary total knee arthroplasty.

Survivorship of Uni-knee revised to Total Knee for pain alone vs revised Total Knee also revised for pain alone



There is a significantly better survivorship for total knees revised for pain alone than for uniknees revised to total knees for pain alone but overall for both groups the survival at ten years is still very good and may reflect that there is no indication for further revision even if pain persists. This is supported by the six month revision Oxford score mean of 32.63 compared to the six month primary score mean of 37.19.

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX-MONTH POST SURGERY

At six-month post surgery all patients are sent the Oxford12 questionnaire.

The new scoring system as recommended by the original authors has been adopted. (See appendix one)

There are 12 questions, with the scores now ranging from 4 to 0. A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

In addition we have grouped the questionnaire responses according to the classification system published by Kalairajah et al,2005.. (See appendix 1)
This groups each score into four
Categories;

Category 1	>41	excellent
Category 2	34 – 41	good
Category 3	27 – 33	fair
Category 4	< 27	poor

For the eleven year period and as at August 2011, there were 4,207 unicompartmental knee questionnaire responses registered six months post surgery.
The mean unicompartmental knee score was 39.16 (standard deviation 7.39, range 3 – 48)

Scoring > 41	2020
Scoring 34 - 41	1370
Scoring 27 - 33	523
Scoring < 27	294

At six months post surgery, 81% had an excellent or good score.

Questionnaires at five years post surgery
Patients who had a six-month questionnaire registered, and who had not had revision surgery were sent a further questionnaire at five years post surgery.

This dataset represents sequential Oxford knee scores for individual patients.

The number of patients with six month and five year scores was 1196.

At six months post surgery, 83% of patients had achieved an excellent or good score and had a mean of 39.66.

At five years post surgery, 87 % of patients had achieved an excellent or good score and had a mean of 41.06.

Analysis of the individual questions at six months and five years post surgery

Analysis of the individual questions showed that the most common persisting problem was kneeling (Q4).

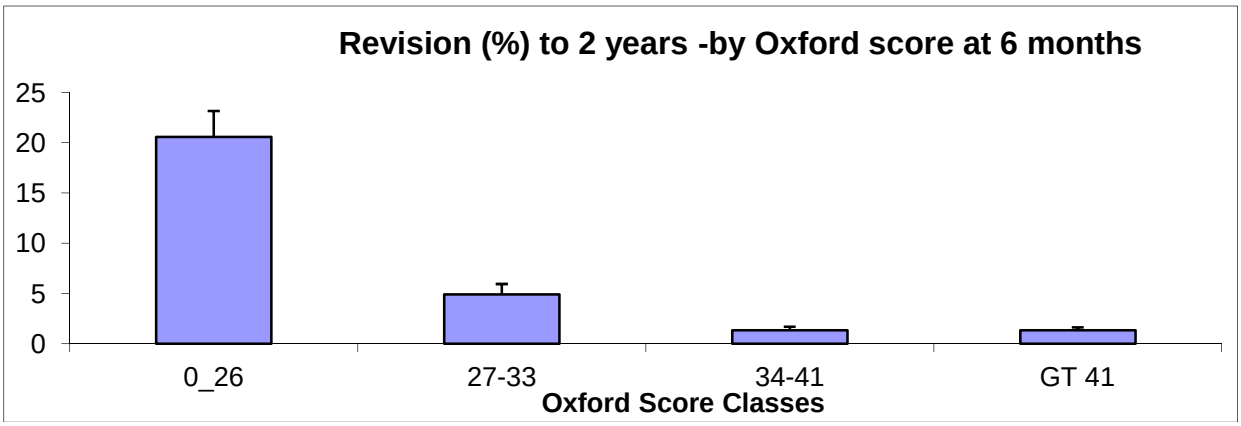
Percentage scoring 0 or 1 for each question out of the group of 4,207 at six-month post surgery and 1196 at five-years.

		% 6/12	% 5 yrs
1	Moderate or severe pain from the operated knee	10	9
2	Only able to walk around the house or unable to walk before pain becomes severe	3	2
3	Extreme difficulty or impossible to get in and out of a car or public transport	2	1
4	Extreme difficulty or impossible to kneel down and get up afterwards	32	29
5	Extreme difficulty or impossible to do the household shopping on your own	2	1
6	Extreme difficulty or impossible to wash and dry yourself	0.5	0.4
7	Pain interfering greatly or totally with your work	3	3
8	Very painful or unbearable to stand up from a chair after a meal	3	2
9	Most of the time or always feeling that the knee might suddenly “give way"	2	2
10	Limping most or every day	9	6
11	Extreme difficulty or impossible to walk down a flight of stairs	3	3
12	Pain from your knee in bed most or every nights	7	4

OXFORD 12 SCORE AS A PREDICTOR OF KNEE ARTHROPLASTY REVISION

A statistically significant relationship has been confirmed between the Oxford scores at 6 months and arthroplasty revision within two years of the Oxford 12 questionnaire date.

By plotting the patients six month scores in the Kalairajah groupings, against the proportion of knees revised for that same group it demonstrates that there is an incremental increase in risk during the next 2 years related to the Oxford score. A patient with a score below 27 has 15 times the risk of a revision within 2 years compared to a person with a score >41

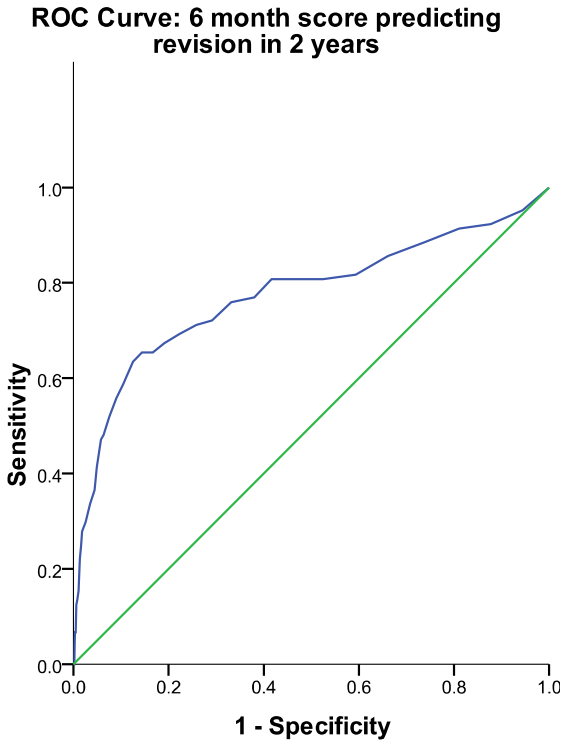


Revision risk versus Kalairajah groupings of Oxford scores within two years of the 6 month score date

Kalairajah group	No in group	No. revised	%	Std error
0_26	243	50	20.58	2.59
27-33	408	20	4.90	1.07
34-41	1030	14	1.36	0.36
GT 41	1466	20	1.36	0.30

A person with an oxford score >42 has a 1.36% risk of revision within two years compared to a 20.58% risk with a score of 27 or less

A ROC analysis has demonstrated that a patient with a score less than or equal to 32 has 10 times the risk of needing a revision within 2 years compared to a person with a score greater than 32
Alternatively the ROC analysis predicted 72% of the revisions within 2 years from just the lowest 30% of Oxford scores.



A receiver operating characteristic (ROC) curve is a graphical representation of the tradeoff between the false negative and false positive rates for every possible cut off. Equivalently, the ROC curve is the representation of the tradeoffs between sensitivity and specificity. The more the curve climbs towards the upper left corner the better the reliability of the test.

ANKLE ARTHROPLASTY

PRIMARY ANKLE ARTHROPLASTY

The **eleven** year report analyses data for the period January 2000 – December 2010. There were 728 primary ankle procedures registered, an additional 125 compared to last year's report and an increase of 6 (5%) compared to 2009.

2000	17
2001	28
2002	28
2003	26
2004	48
2005	70
2006	81
2007	79
2008	107
2009	119
2010	125

DATA ANALYSIS

Age and sex distribution

The average age for an ankle replacement was 65.20 years, with a range of 32.32 – 88.38 years.

	Female	Male
Number	285	443
Percentage	39.15	60.85
Mean age	63.43	66.34
Maximum age	85.84	88.38
Minimum age	32.32	35.62
Standard dev.	9.43	8.45

Body Mass Index

For 2010, there were 34 BMI registrations for primary ankle replacements. The average was 27.58 with a range of 17 – 37 and a standard deviation of 4.66.

Previous operation

None	568
Internal fixation for juxtarticular fracture	79
Arthroscopy/debridement	31
Arthrodesis	22
Osteotomy	15
Reconstruction/repair	6
Other	7

Diagnosis

Osteoarthritis	525
Post trauma	138
Rheumatoid arthritis	74
Other inflammatory	7
Avascular necrosis	2
Other	12

Approach

Anterior	636
Anterolateral	31
Other	8

Bone graft

Tibia autograft	32
Tibia allograft	2
Talus autograft	6
Talus allograft	3

Cement

Tibia cemented	14
Antibiotic in cement	7
Talus cemented	7
Antibiotic in cement	3

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic	696	(96%)

Operating theatre

Conventional	390
Laminar flow	332
Space suits	125

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the six-year period 2005 -2010, there were 497 (86%) primary ankle procedures with the ASA class recorded.

Definitions

ASA class 1:	A healthy patient
ASA class 2:	A patient with mild systemic disease
ASA class 3:	A patient with severe systemic disease that limits activity but is not incapacitating
ASA class 4:	A patient with an incapacitating disease that is a constant threat to life

ASA	Number
1	104
2	314
3	77
4	2

Operative time (skin to skin)

Mean	124 minutes
Standard deviation	36 minutes
Minimum	30 minutes
Maximum	290 minutes

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the six-year period 2005 - 2010.

Consultant	576
Advanced trainee supervised	4

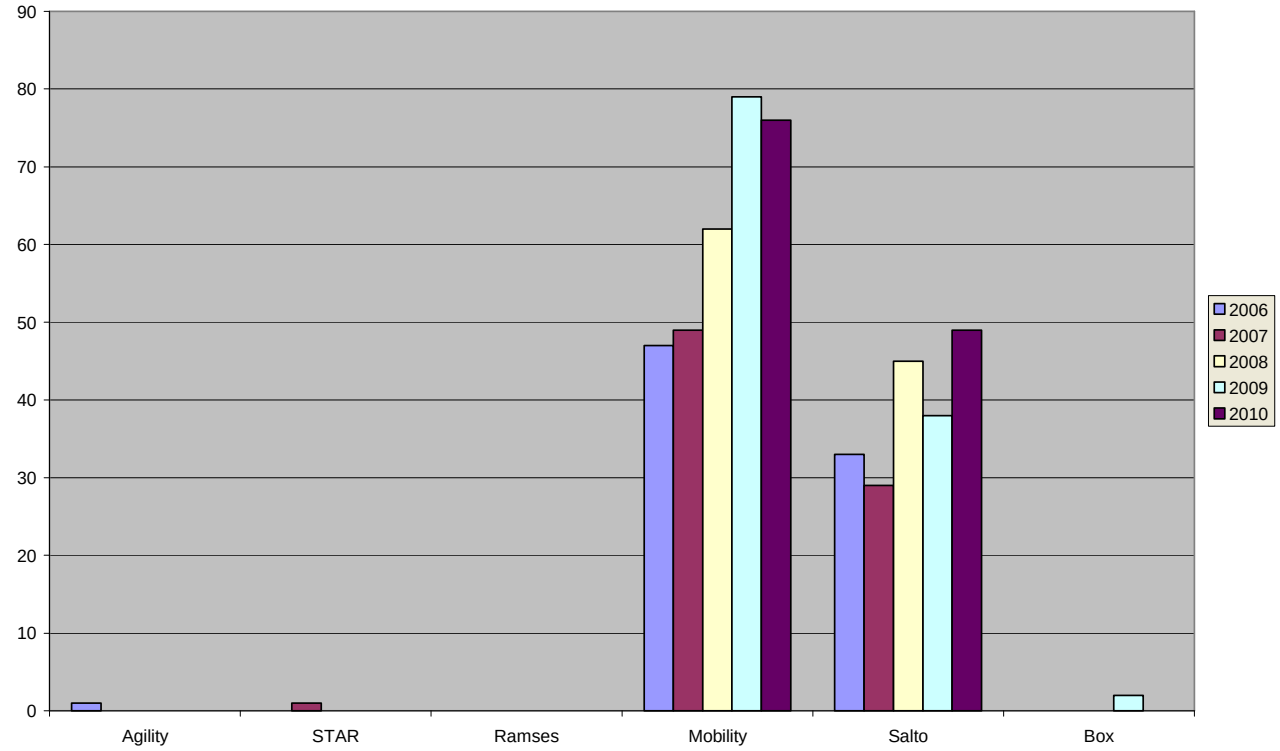
Prosthesis usage

Ankle prostheses used in 2010

Mobility	76
Salto	49

The Mobility still the dominant prosthesis but the Salto usage increased in 2010.

MOST USED ANKLE PROSTHESES 2006 – 2010



Surgeon and hospital workload

Surgeons

In 2010, 14 surgeons performed 125 primary ankle procedures, an average of 9 procedures per surgeon. 1 surgeon performed more than 20 procedures and 1 performed 1 procedure.

Hospitals

In 2010 primary ankle replacement was performed in 30 hospitals. 14 were public and 16 were private.

REVISION ANKLE ARTHROPLASTY

Revision is defined by the Registry as a new operation in a previously replaced ankle joint during which one or more of the components are exchanged, removed, manipulated or added. It includes arthrodesis or amputation, but not soft tissue procedures. A two or more staged procedure is registered as one revision.

Data analysis

For the eleven year period January 2000– December 2010, there were 50 revision ankle procedures registered. The average age for an ankle revision was 65.29 years, with a range of 42.13 – 83.06.

	Female	Male
Number	15	35
Percentage	30.00	70.00
Mean	62.15	66.64
Maximum age	78.98	83.06
Minimum age	42.13	49.04
Standard dev.	12.07	8.08

REVISION OF REGISTERED PRIMARY ANKLE ARTHROPLASTIES

This section analyses data for revisions of registered primary ankle procedures for the eleven year period.

There were 34 revisions of the primary group of 767 (4.15%) and 2 re-revisions.

Time to revision

Mean	1196 days
Maximum	3325 days
Minimum	21 days
Standard deviation	786 days

Reason for revision

Loosening talar component	17
Pain	17
Loosening tibial component	7
Deep infection	3
Other	6

Analysis by time of the 2 main reasons for revision

Loosening talar component	17
Pain	17

		Years since operation											
		0	1	2	3	4	5	6	7	8	9	10	Total
1	Count	1	0	0	3	3	5	3	1	0	0	1	17
	%	5.90	0.00	0.00	17.60	17.60	29.40	17.60	5.90	0.00	0.00	5.90	100.00
2	Count	0	1	6	1	2	5	1	1	0	0	0	17
	%	0.00	5.90	35.30	5.90	11.80	29.40	5.90	5.90	0.00	0.00	0.00	100.00

1 = Loosening talar component, 2 = Pain

Statistical note

In the tables below there are two statistical terms readers may not be familiar with.

Observed component years

This is the number of registered primary procedures multiplied by the number of years each component has been in situ.

Rate/100 component years

This is equivalent to the yearly revision rate expressed as a percent and is derived by dividing the number of prostheses revised by the observed component years multiplied by 100. It therefore allows for the number of years of post operative follow up in calculating the revision rate. These rates are usually very low, hence it is expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

Statistical Significance

Where it is stated that a difference among results is significant the p value is 0.05 or less. In most of these situations this is because there is no overlap of the confidence intervals (CIs) but sometimes significance can apply in the presence of CI overlap

All primary ankle arthroplasties

All Patients	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
	728	2497	34	1.36	0.94	1.90

Revision vs prosthesis type sorted in alphabetical order

Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Agility Tibial Shell	119	820	13	1.58	0.84	2.71
Box	2	3	0	0.00	0.00	131.07
Mobility	350	846	11	1.30	0.65	2.33
Ramses	11	61	2	3.30	0.40	11.91
Salto	199	464	1	0.22	0.01	1.20
Scandinavian Total Ankle Repl.	47	302	7	2.31	0.93	4.77

There is no statistically significant difference in the revision rates among the prostheses or compared to the overall mean due to the wide CIs.

Revision vs gender

Sex	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Females	285	979	10	1.02	0.49	1.88
Males	443	1517	24	1.58	1.01	2.35

Although there appears to be a higher revision rate for males, this is not statistically significant

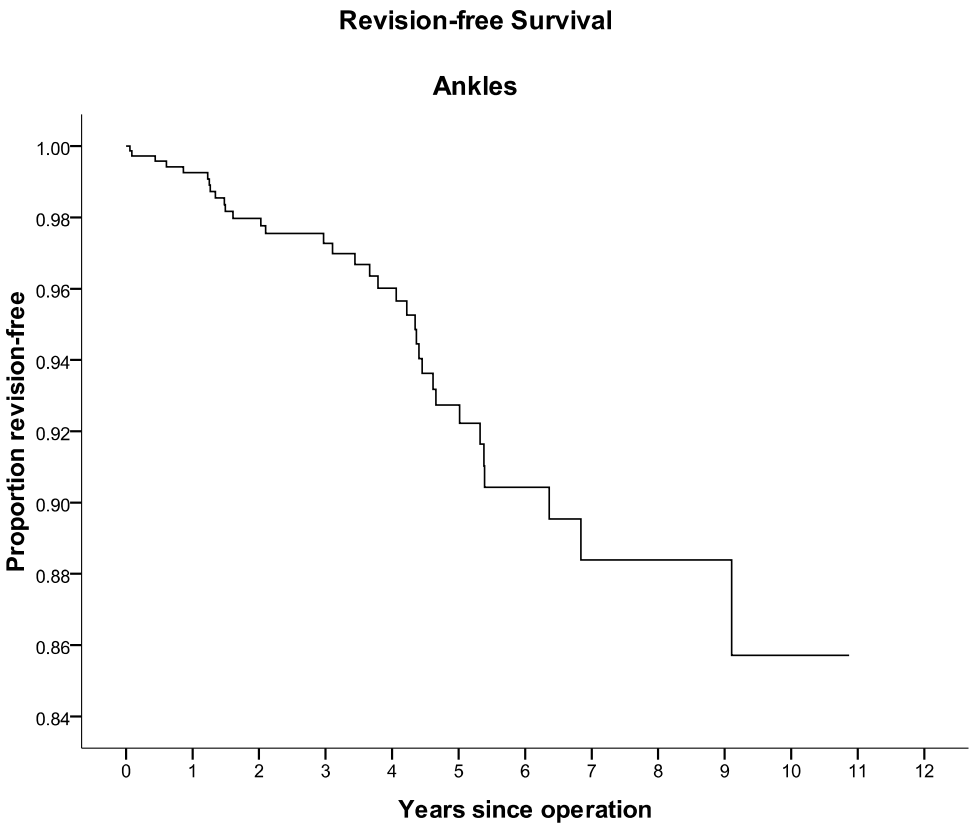
Revision vs age bands

Age Groups	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	80	326	6	1.84	0.68	4.01
55_64	272	946	13	1.37	0.73	2.35
65_74	275	921	13	1.41	0.75	2.41
GE75	101	304	2	0.66	0.08	2.38

There is no significant difference in the revision rates among the age groups

KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for the 11 years, 2000 to 2010 with deceased patients censored at time of death



Years	% Revision-free	No in each year
1	99.26	592
2	97.97	463
3	97.27	348
4	96.01	268
5	92.73	182
6	90.43	116
7	88.39	73

There are insufficient numbers to give an accurate revision free % beyond 7 years.

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS AND FIVE YEARS POST SURGERY

Questionnaire at six months post surgery

At six-month post surgery patients are sent a questionnaire which is modelled on the Oxford 12 for hip/knee, but is not validated.

The new scoring system has been adopted as recommended by the original authors of the Oxford hip and knee questionnaires. (see appendix 1)

The scores range from 4 to 0. A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

We have grouped the questionnaire responses based on the scoring system published by Kalairajah et al (see appendix1)
This groups each score into four categories;

Category 1	>41	excellent
Category 2	34 – 41	good
Category 3	27 – 33	fair
Category 4	< 27	poor

For the eleven year period and as at August 2011, there were 574 primary ankle questionnaire responses registered at six months post surgery.

The mean primary ankle score was 33.38 (standard deviation 9.67, range 2 – 48)

Scoring > 41	137
Scoring 34 - 41	183
Scoring 27 - 33	112
Scoring < 27	142

At six months post surgery, 56% had an excellent or good score.

Questionnaires at five years post surgery

All patients who had a six month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at five years post surgery.

At five years post surgery, 64% of the 83 respondents achieved an excellent or good score.

Analysis of the individual questions

Analysis of the individual questions showed that the main concerns at 6 months were limping (Q6), pain (Qs 1&9) and swelling of the foot (Q10).

Percentage scoring 0 or 1 for each question (574) at six-months.

		%
1	Moderate or severe pain from the operated ankle	22
2	Only able to walk around the house or unable to walk before the pain becomes severe	6
3	Extreme difficulty or impossible to walk on uneven ground	15
4	Most of the time or always have to use an orthotic	23
5	Pain greatly or totally interferes with usual work	16
6	Limping most or every day	34
7	Extreme difficulty or impossible to climb a flight of stairs	6
8	Pain from your ankle in bed most or every nights	7
9	Pain from your ankle greatly or totally interferes with usual recreational activities	23
10	Have swelling of your foot most or all of the time	31
11	Very painful or unbearable to stand up from a chair after a meal	6
12	Sudden severe pain from your ankle most or every day	6

Revision ankle questionnaire responses

There were 26 revision ankle responses with 46% achieving an excellent or good score. This group includes all revision ankle responses. The mean revision ankle score was 31.04 (standard deviation 11.50, range 8 – 48).

SHOULDER ARTHROPLASTY

PRIMARY SHOULDER ARTHROPLASTY

The **eleven** year report analyses data for the period January 2000 – December 2010. There were 3503 primary shoulder procedures registered, an additional 492 compared to last year's report but 21(4%) fewer than recorded in 2009.

2000	122
2001	162
2002	193
2003	225
2004	280
2005	293
2006	366
2007	400
2008	457
2009	513
2010	492

Of the 3503 shoulder registrations, 1254(36%) are hemi shoulder replacements, 1398(40%) are conventional total shoulder replacements, 692(20%) are reverse shoulder replacements, 125(3.6%) are partial resurfacing shoulder replacements and 34(0.4%) are total resurfacing replacements.

DATA ANALYSIS

Age and sex distribution

The average age for all patients with a shoulder arthroplasty was 70.26 years, with a range of 15.63 – 97.71 years.

All shoulder arthroplasty

	Female	Male
Number	2248	1255
Percentage	64.17	35.83
Mean age	71.90	67.32
Maximum age	97.71	90.48
Minimum age	15.63	21.83
Standard dev.	10.11	10.63

Hemiarthroplasty

	Female	Male
Number	845	409
Percentage	67.38	32.62
Mean age	71.45	65.74
Maximum age	97.71	90.48
Minimum age	15.63	25.83
Standard dev.	10.97	12.12

Conventional total shoulder arthroplasty

	Female	Male
Number	898	500
Percentage	64.23	35.77
Mean age	70.98	67.62
Maximum age	94.62	85.72
Minimum age	26.64	29.38
Standard dev.	9.16	7.93

Reverse shoulder arthroplasty

	Female	Male
Number	443	249
Percentage	64.02	35.98
Mean age	76.14	73.52
Maximum age	91.60	88.25
Minimum age	40.70	49.41
Standard dev.	7.41	7.81

Partial Resurfacing arthroplasty

	Female	Male
Number	43	82
Percentage	34.40	65.60
Mean age	57.13	54.70
Maximum age	87.06	79.37
Minimum age	20.70	21.83
Standard dev.	14.88	11.63

Total resurfacing arthroplasty

	Female	Male
Number	19	15
Percentage	55.88	44.12
Mean age	70.72	66.62
Maximum age	85.71	76.03
Minimum age	53.18	55.04
Standard dev.	8.31	6.17

There is a female to male preponderance of almost 2:1 in all groups except partial resurfacing where the ratio is reversed. This group also has a significantly lower mean age at time of surgery.

Previous operation

None	2990
Rotator cuff repair	133
Internal fixation for juxtarticular fracture	92
Previous stabilisation	68
Arthroscopy/debridement	59
Acromioplasty	45
Subacromial decompression	6
Osteotomy	1
Other	27

Diagnosis

Osteoarthritis	1900
Cuff tear arthropathy	498
Acute fracture prox. humerus	374
Rheumatoid arthritis	345
Post old trauma	256
Avascular necrosis	116
Post recurrent dislocation	45
Other inflammatory	37
Tumour	16
Other	41

Approach

Deltopectoral	3132
Deltoid split	86
Other	13

Bone graft

Humeral autograft	73
Humeral allograft	15
Humeral synthetic	3
Glenoid autograft	21
Glenoid allograft	6

Cement

Humerus cemented	1125
Antibiotic in cement	647
Glenoid cemented	1012
Antibiotic in cement	670

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic	3281	(94%)

Operating theatre

Conventional	1949
Laminar flow	1028
Space suits	411

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the six-year period 2005 – 2010 there were 2328 (92%) shoulder procedures with the ASA class recorded.

Definitions

ASA class 1: A healthy patient
ASA class 2: A patient with mild systemic disease
ASA class 3: A patient with severe systemic disease that limits activity but is not incapacitating
ASA class 4: A patient with an incapacitating disease that is a constant threat to life

ASA	Number	Percentage
1	239	10
2	1260	54
3	805	35
4	24	1

Operative time (skin to skin in minutes)

	Mean	Min	Max	St Dev
Hemi	107	30	360	36
Total Sh.	130	53	270	33
Partial R.	98	44	285	39
Total R.	137	84	220	33
Reverse	117	39	246	30

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the six-year period 2005 – 2010.

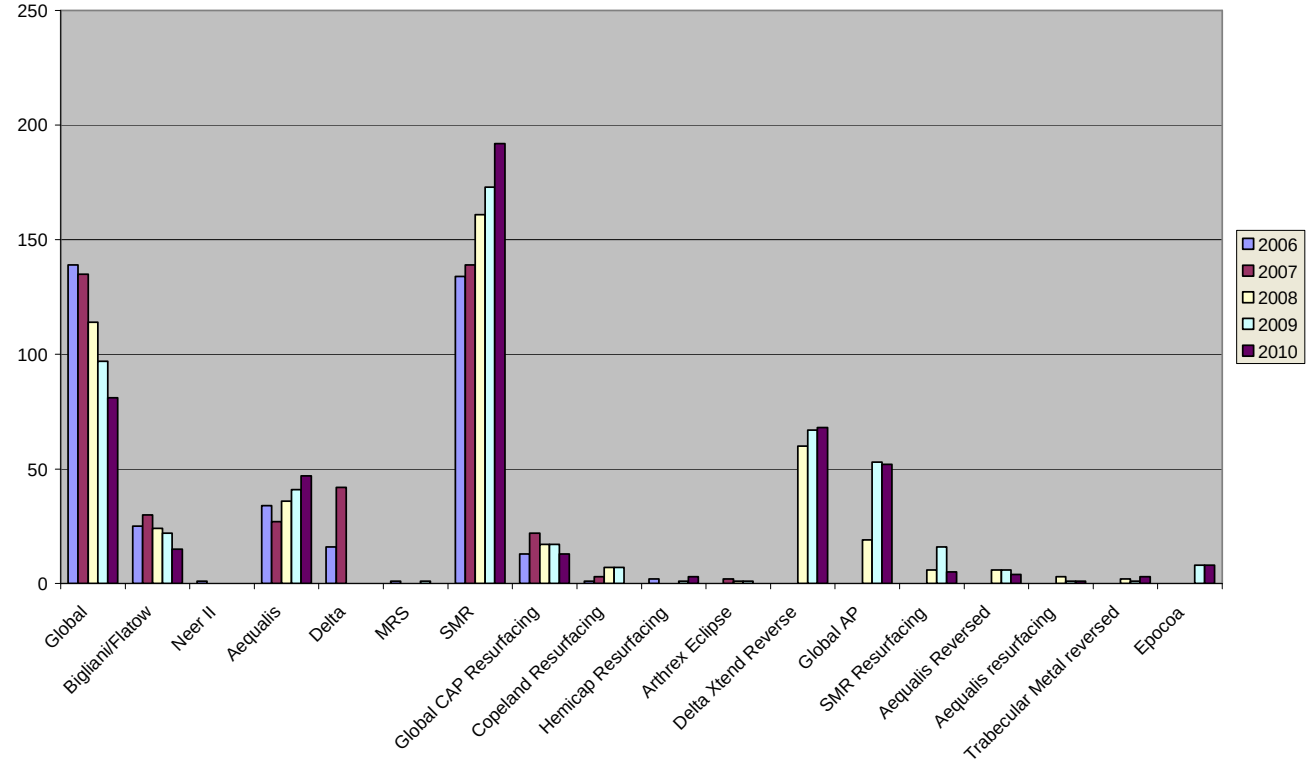
Consultant	2407
Advanced trainee supervised	112
Advanced trainee unsupervised	7
Basic trainee	1

Prosthesis usage

Shoulder prostheses used in 2010

SMR	192
Global	81
Delta Xtend Reverse	68
Global AP	52
Aequalis	47
Bigliani/Flatow	15
Global CAP Resurfacing	13
Epocoa	8
SMR Resurfacing	5
Aequalis Reversed	4
Trabecular Metal Reverse	3
Hemicap Resurfacing	3
Aequalis Resurfacing	1

Most used shoulder prostheses 2006 -2010



Surgeon and hospital workload

Surgeons

In 2010, 71 surgeons performed 492 shoulder procedures, an average of 7 procedures per surgeon. 4 surgeons performed more than 20 procedures and 16 surgeons performed 1 procedure.

Hospitals

In 2010, shoulder replacement was performed in 46 hospitals. 23 were public and 23 were private.
For 2010 the average number of shoulder replacements per hospital was 11.

REVISION SHOULDER ARTHROPLASTY

Revision is defined by the Registry as a new operation in a previously replaced shoulder joint during which one or more of the components are exchanged, removed, manipulated or added. It includes arthrodesis, excision arthroplasty or amputation, but not soft tissue procedures. A two or more staged procedure is registered as one revision.

Data analysis

For the eleven year period January 2000 – December 2010, there were 255 revision shoulder procedures registered.

The average age for a shoulder revision was 67.46 years with a range of 24.05 – 89.68 years.

	Female	Male
Number	148	107
Percentage	58.04	41.96
Mean	69.28	64.94
Maximum age	89.68	81.86
Minimum age	33.89	24.05
Standard dev.	11.43	11.28

REVISION OF REGISTERED PRIMARY SHOULDER ARTHROPLASTIES

This section analyses data for revisions of registered primary shoulder procedures for the eleven year period.

There were 130 revisions of the primary group of 3503 (3.71%). There were 9 procedures that had been revised twice and 1 that had been revised 3 times.

Time to revision

Mean	687	days
Maximum	3340	days
Minimum	0	days
Standard deviation	708	days

Reason for revision

Pain	37
Dislocation/instability anterior	26
Loosening glenoid	16
Deep infection	14
Wear glenoid	14
Subacromial cuff impingement	12
Cuff failure	5
Instability posterior	5
Loosening humeral	4
Fracture humerus	1
Subacromial tuberosity imping.	1
Other	14

Analysis by time for the 4 main reasons for revision

Pain	37
Dislocation	26
Loosening glenoid	16
Deep infection	14

		Years since surgery											
		0	1	2	3	4	5	6	7	8	9	10	Total
1	Count	1	8	11	7	3	4	0	2	0	1	0	37
	%	2.70	21.60	29.70	18.90	8.10	10.80	0.00	5.40	0.00	2.70	0.00	100.00
2	Count	18	3	4	0	1	0	0	0	0	0	0	26
	%	69.20	11.50	15.40	0.00	3.80	0.00	0.00	0.00	0.00	0.00	0.00	100.00
3	Count	5	2	4	2	1	1	0	0	0	0	1	16
	%	31.30	12.50	25.00	12.50	6.30	6.30	0.00	0.00	0.00	0.00	6.30	100.00
4	Count	3	2	5	3	1	0	0	0	0	0	0	14
	%	21.40	14.30	35.70	21.40	7.10	0.00	0.00	0.00	0.00	0.00	0.00	100.00

1 = Pain, 2 = Dislocation, 3 = Loosening glenoid, 4 = Deep infection

Statistical note

In the tables below there are two statistical terms readers may not be familiar with.

Observed component years
This is the number of registered primary procedures multiplied by the number of years each component has been in situ.

Rate/100 component years
This is equivalent to the yearly revision rate expressed as a percent and is derived by dividing the number of prostheses revised by the observed component years multiplied by 100. It therefore allows for the number of years of post operative follow up in calculating the revision rate. These rates are usually very low, hence it is expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

Statistical Significance
Where it is stated that a difference among results is significant the p value is 0.05 or less. In most of these situations this is because there is no overlap of the confidence intervals (CIs) but sometimes significance can apply in the presence of CI overlap

All Total Shoulder Arthroplasties

All patients	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
	3503	13180.17	130	0.99	0.82	1.17

Revision rate of Shoulder Prostheses vs Arthroplasty Type

Operation Type	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Conventional Total	1398	5216.79	32	0.6	0.42	0.87
Reverse	692	1780.44	27	1.5	0.99	2.21
Hemis	1254	5842.31	63	1.08	0.83	1.38
Total Resurfacing	34	41.49	0	0	0	8.89
Part. Resurfacing	125	299.14	8	2.6	1.16	5.27

There is no significant difference among the revision rates compared to the overall mean but Reverse and Partial Resurfacing are significantly higher than Conventional Total arthroplasty

Revision rate of Individual Shoulder Prostheses sorted on alphabetical order

Operation Type	Prosthesis	No of Ops	Observed comp. Yrs	Number Revised	Rate/100-componen t-years	Exact 95% confidence interval	
Conventional	Aequalis	182.00	649.39	5	0.77	0.25	1.80
	Affinis	1.00	4.64	0	0	0	79.58
	Anatomical	8.00	56.59	0	0	0	6.52
	Bi-Angular	8.00	50.93	0	0	0	7.24
	Bigliani/ Flatow	202.00	1058.11	3	0.28	0.06	0.83
	Cofield 2	21.00	164.31	0	0	0	2.25
	Epoca Humeral stem	2.00	2.87	0	0	0	128.32
	Global	394.00	1509.25	5	0.33	0.11	0.77

	Global AP	101.00	117.15	0	0	0	3.15
	Global Stem	1	1.61	0	0	0	229.14
	Humeral component	49	324.81	3	0.92	0.19	2.70
	Humeral stem	27	210.79	0	0	0	1.75
	Neer 3	2	18.20	0	0	0	20.27
	Neer II	12	104.28	0	0	0	3.54
	SMR	383	920.69	16	1.74	0.99	2.82
	Univers 3D	5	23.16	0	0	0	15.92
Reverse	Aequalis Reversed	21	42.91	0	0	0	8.60
	Delta	55	287.64	1	0.35	0.10	1.94
	Delta Xtend Reverse	223	355.70	7	1.97	0.79	4.05
	SMR	388	1089.16	19	1.74	1.05	2.72
	Trabecular Metal Reverse	5	5.03	0	0	0	73.35
Hemi	Aequalis	98	428.24	6	1.40	0.51	3.05
	Anatomical	5	41.64	0	0	0	8.86
	Arthrex Eclipse	2	4.20	0	0	0	87.83
	Bi-Angular	19	153.06	2	1.31	0.19	4.72
	Bigliani/Flatow	122	712.53	10	1.40	0.67	2.58
	Bio-modular	1	7.14	1	14.00	0.36	78.03
	Cofield 2	50	380.94	0	0	0	0.97
	Delta	1	4.28	0	0	0	86.26
	Delta Xtend Reverse	7	11.31	1	8.84	0.22	49.27
	Global	646	2921.49	29	0.99	0.66	1.43
	Global AP	23	28.02	1	3.57	0.09	19.88
	Humeral component	43	289.54	1	0.34	0.10	1.92
	Humeral stem	14	109.11	0	0	0	3.38
	MRS Humeral	4	10.94	0	0	0	33.71
	Neer II	24	163.67	0	0	0	2.25
	Randelli	1	8.23	0	0	0	44.82
	SMR	192	562.93	12	2.13	1.10	3.72
	Trabecular Metal Reverse	1	1.23	0	0	0	299.41
	Univers 3D	1	3.82	0	0	0	96.58
Total Resurfacing	Aequalis Resurfacing Head	5	7.42	0	0	0	49.74
	Epoca Head	9	7.93	0	0	0	46.53
	Global CAP Resurfacing	19	25.92	0	0	0	14.23
	SMR Resurfacing	1	0.22	0	0	0	1684.20
Partial resurfacing	Copeland Resurfacing	19	43.14	1	2.32	0.06	12.91
	Eclipse	2	4.33	2	46.17	5.59	166.80
	Epoca Head	5	2.87	0	0	0	128.69
	Global CAP Resurfacing	66	194.44	3	1.54	0.32	4.51
	Hemicap Resurfacing	6	10.93	0	0	0	33.76
	SMR	22	34.98	1	2.86	0.07	15.93

	Resurfacing						
	SMR Resurfacing CTA	5	8.45	1	11.83	0.30	65.92

Although there appear to be some prostheses with comparatively higher revision rates none are statistically significant owing to wide CIs

Revision vs glenoid fixation

Glenoid	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Cemented	987	4177.96	18	0.43	0.26	0.68
Un Cemented	411	1038.83	14	1.35	0.74	2.26

The uncemented glenoids have a significantly higher revision rate. **However the fact that a glenoid component had been entered as revised does not necessarily mean it had failed or had to be replaced.**

Revision vs Age Bands

Age Groups	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	267	1070.56	21	1.96	1.21	2.99
55_64	670	2559.36	35	1.37	0.95	1.90
65_74	1287	4864.60	48	0.99	0.73	1.31
GE75	1279	4685.65	26	0.55	0.36	0.81

The <55 age band have a significantly increased revision rate compared to the >75 age band.

Revision vs Gender

Sex	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Female	2248	8667.46	76	0.88	0.69	1.09
Male	1255	4512.71	54	1.20	0.90	1.56

There is no significant difference between the two groups.

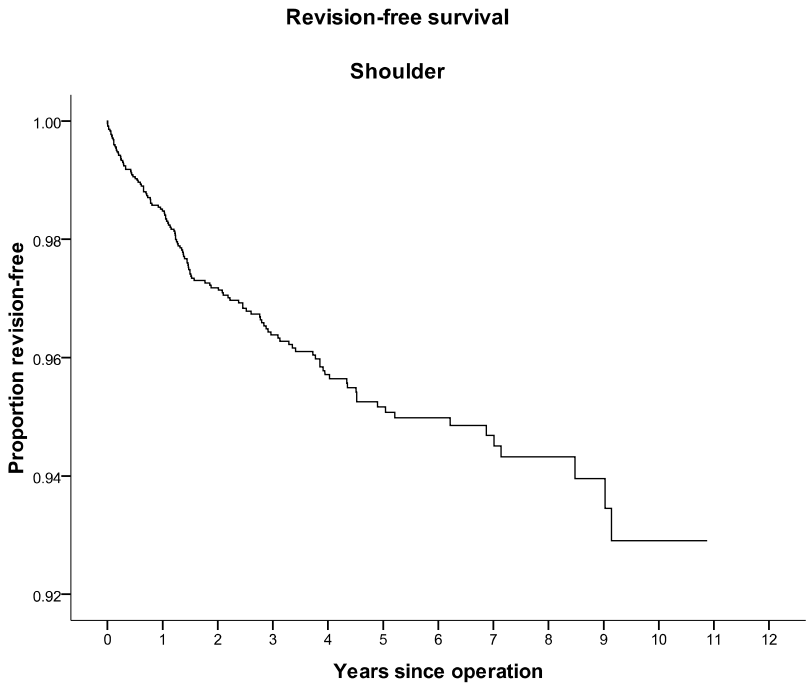
Revision vs Surgeon annual workload

Consultant Number of ops/yr	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
<10	1773	6817.65	71	1.04	0.81	1.31
>=10	1683	6168.89	56	0.91	0.69	1.18

There is no significant difference between the two groups.

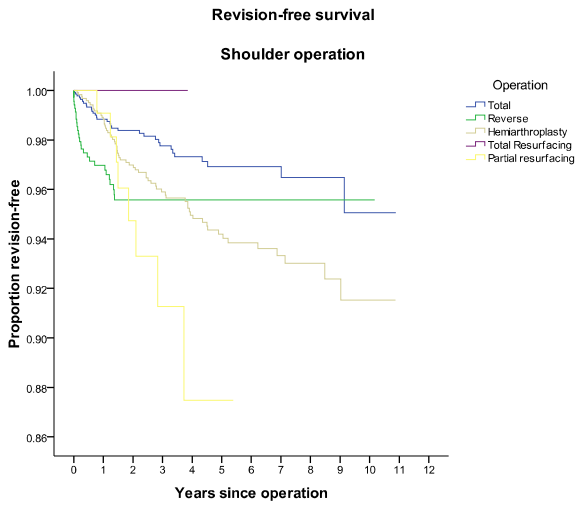
KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for the years 2000 – 2010 with deceased patients censored at time of death.



Years	% Revision-free	No in each year
1	98.51	2922
2	97.18	2340
3	96.38	1834
4	95.71	1413
5	95.17	1055

There are insufficient numbers to give an accurate revision free % beyond 5 years.



PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS AND FIVE YEARS POST SURGERY

Questionnaires at six months post surgery

At six month post surgery all patients are sent the Oxford12 shoulder questionnaire.

The new scoring system has been adopted as recommended by the original authors. (see appendix 1)

The scores now range from 4 to 0. A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

In addition we have grouped the questionnaire responses according to the classification system published by Kalairajah et al, in 2005. (see appendix 1)

This groups each score into four categories;

Category 1	>41	excellent
Category 2	34 – 41	good
Category 3	27 – 33	fair
Category 4	< 27	poor

For the eleven year period and as at August 2011, there were 2,393 shoulder questionnaire responses registered at six months post surgery.
The mean shoulder score was 36.09 (standard deviation 9.71, range 2 – 48)

Scoring	> 41	877
Scoring	34 - 41	729
Scoring	27 - 33	374
Scoring	<27	413

At six months post surgery, 67% had an excellent or good score.

Mean 6 month Oxford Scores for the different prosthesis categories

Operation types	No of patients	Mean Score	Std. Error	Lower Bound	Upper Bound
Conventional Total	1041	40.0	0.24	39.53	40.47
Hemi	789	31.6	0.35	30.90	32.3
Reverse	469	34.8	0.45	33.91	35.69
Resurface head	28	39.9	1.10	37.67	42.18
Partial resurfaced head	66	35.5	1.80	33.36	37.64
Total	2393	36.1	0.20	35.70	36.47

Questionnaires at five years post surgery
All patients who had a six month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at five year post surgery.

This dataset represents sequential Oxford shoulder scores for 466 individual patients.

At six months post surgery, 73% of these patients achieved an excellent or good score and had a mean of 36.99.

At five years post surgery, 71% of these patients achieved an excellent or good score and had a mean of 38.49.

Analysis of the individual questions
Analysis of the individual questions showed that there were persisting concerns with pain and activities such as brushing hair (Q7) and hanging clothes in a wardrobe Q9).

Percentage scoring 0 or 1 for each question out of the group of 2,393 at six months and 466 at five years.

		6/12	5 yrs
1	The worst pain from the shoulder is severe or unbearable	17	11
2	Usually have moderate or severe pain from the operated shoulder	21	13
3	Extreme difficulty or impossible to get in and out of a car or public transport	3	2
4	Extreme difficulty or impossible to use a knife and fork at the same time	5	2
5	Extreme difficulty or impossible to do the household shopping on your own	7	7
6	Extreme difficulty or impossible to carry a tray containing a plate of food across a room	8	7
7	Extreme difficulty or impossible to brush or comb hair with the operated arm	18	13
8	Extreme difficulty or impossible to dress yourself because of your operated shoulder	7	3
9	Extreme difficulty or impossible to hang clothes in a wardrobe using operated arm	16	14
10	Extreme difficulty or impossible to wash and dry under both arms	9	6
11	Pain from operated shoulder greatly or totally interfering with usual work	13	12
12	Pain from shoulder in bed most or every nights	15	10

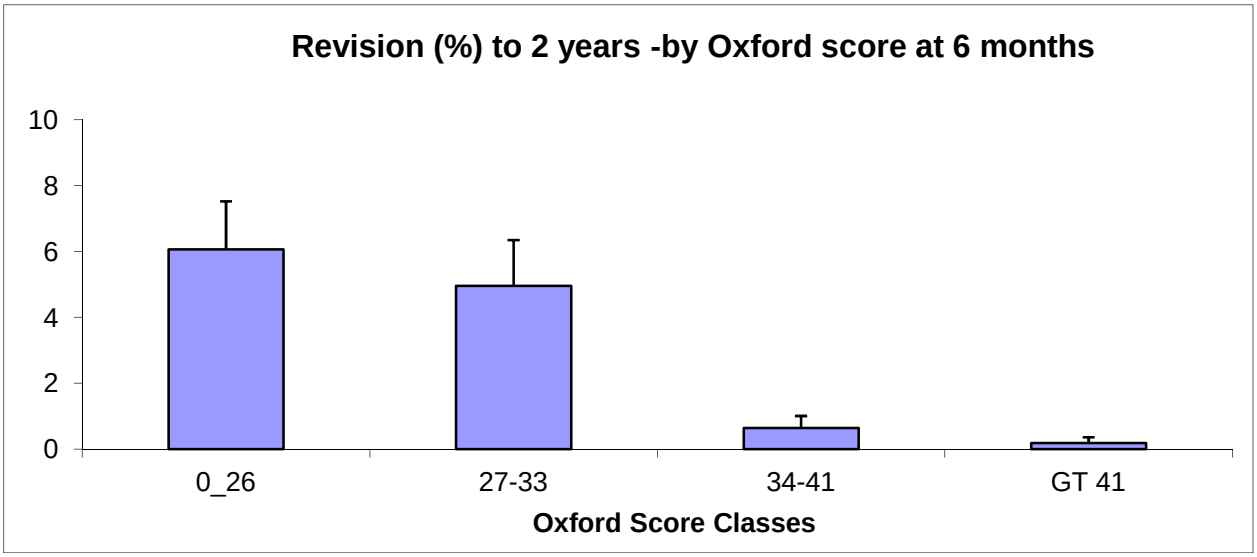
Revision shoulder questionnaire responses
There were 144 revision shoulder responses with 47% achieving an excellent or good score. This group includes all revision shoulder responses. The mean revision shoulder score was 31.33(standard deviation 10.20, range 3 – 48).

OXFORD 12 SCORE AS A PREDICTOR OF SHOULDER ARTHROPLASTY REVISION

A statistically significant relationship has been confirmed between the Oxford scores at 6 months and arthroplasty revision within two years of the Oxford 12 questionnaire date.

Six month score and revision arthroplasty

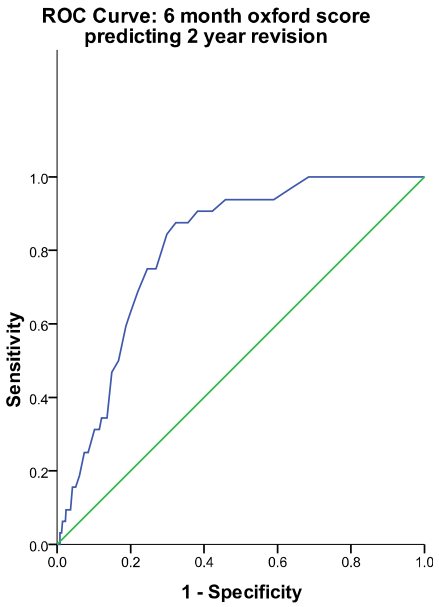
By plotting the patients six month scores in the Kalairajah groupings, against the proportion of shoulders revised for that same group it demonstrates that there is an incremental increase in risk during the next 2 years related to the Oxford score. A patient with a score below 27 has 33 times the risk of a revision within 2 years compared to a person with a score >41



Kalairajah group	No in group	No. revised	%	Std error
0_26	264	16	6.06	1.47
27-33	242	12	4.96	1.40
34-41	467	3	0.64	0.37
GT 41	541	1	0.18	0.18

A person with an oxford score >42 has a 0.18% risk of revision within two years compared to a 6.06% risk with a score of 27 or less

A ROC analysis has demonstrated that a patient with a score less than or equal to 33 has 14 times the risk of needing a revision within 2 years compared to a person with a score greater than 33.



A receiver operating characteristic (ROC) curve is a graphical representation of the trade off between the false negative and false positive rates for every possible cut off. Equivalently, the ROC curve is the representation of the tradeoffs between sensitivity and specificity. The more the curve climbs towards the upper left corner the better the reliability of the test

ELBOW ARTHROPLASTY

PRIMARY ELBOW ARTHROPLASTY

The **eleven year** report analyses data for the period January 2000 – December 2010. There were 331 primary elbow procedures registered, an additional 30 compared to last year's report but 4 fewer than registered in 2009.

2000	18
2001	29
2002	32
2003	23
2004	28
2005	30
2006	31
2007	36
2008	40
2009	34
2010	30

DATA ANALYSIS

Age and sex distribution

The average age for an elbow replacement was 65.53 years, with range of 15.16 – 91.73 years.

	Female	Male
Number	265	66
Percentage	80.06	19.94
Mean age	66.00	63.60
Maximum age	91.17	91.73
Minimum age	36.38	15.16
Standard dev.	11.64	14.55

Previous operation

None	282
Internal fixation for juxtarticular fracture	13
Synovectomy+-removal radial head	10
Debridement	9
Nerve transposition/ Decompression	5
Osteotomy	2
Ligament reconstruction	1
Interposition arthroplasty	1
Other	4

Diagnosis

Rheumatoid arthritis	191
Post fracture	86
Osteoarthritis	39
Other inflammatory	8
Tumour	6
Post dislocation	5
Post ligament disruption	3
Other	4

Approach

Posterior	213
Medial	67
Lateral	23

Bone graft

Humeral autograft	27
Humeral allograft	2
Humeral synthetic	1
Ulnar autograft	2

Cement

Humerus cemented	309	
Antibiotic in cement	213	(69%)
Ulna cemented	295	
Antibiotic in cement	197	(67%)
Radius cemented	19	
Antibiotic in cement	18	(95%)

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic	309	(94%)

Operating theatre

Conventional	235
Laminar flow	95
Space suits	42

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the six-year period 2005 – 2010, there were 201 (90%) primary elbow procedures with the ASA class recorded.

Definitions

ASA class 1:	A healthy patient
ASA class 2:	A patient with mild systemic disease
ASA class 3:	A patient with severe systemic disease that limits activity but is not incapacitating
ASA class 4:	A patient with an incapacitating disease that is a constant threat to life

ASA	Number
1	6
2	76
3	94
4	4

Operative time (skin to skin)

Mean	135 minutes
Maximum	255 minutes
Minimum	29 minutes
Standard dev	34 minutes

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the six- year period 2005 – 2010.

Consultant	198
Advanced trainee supervised	3
Advanced trainee unsupervised	2

Surgeon and hospital workload

In 2010, 17 surgeons performed 30 primary elbow procedures.

Hospitals

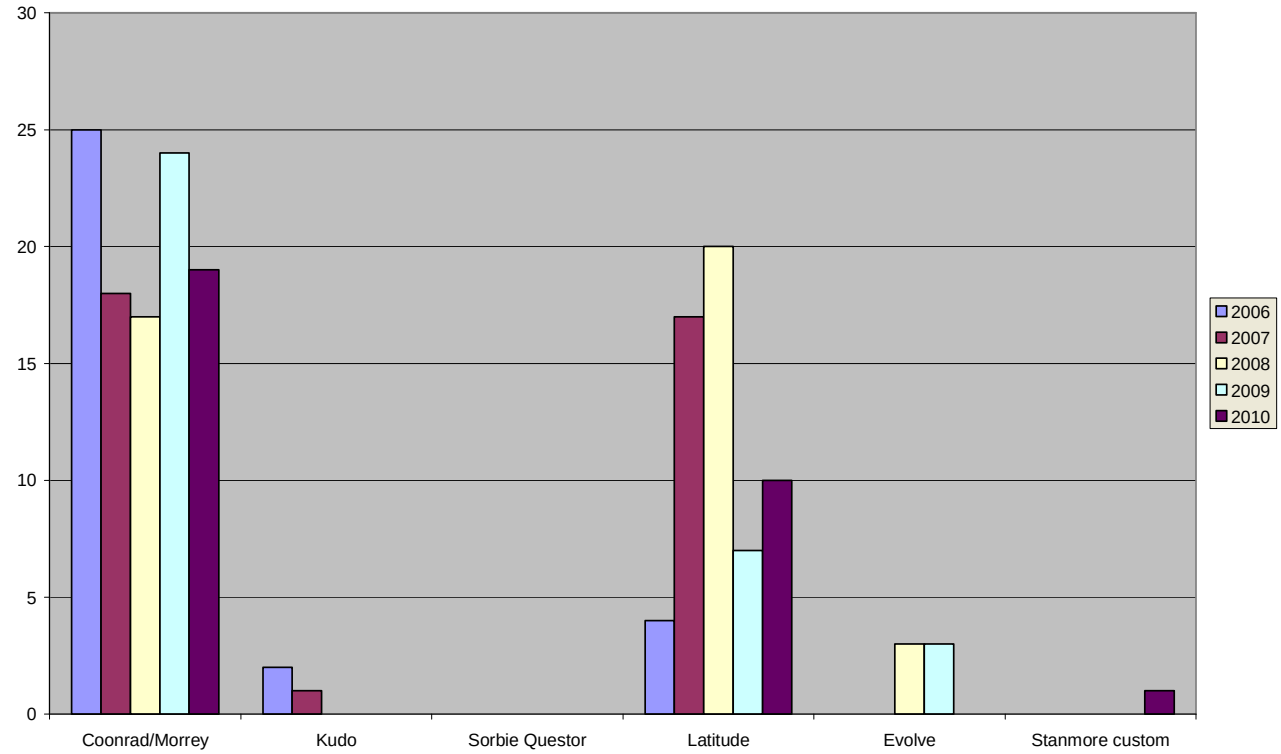
In 2010, primary elbow replacement was performed in 13 hospitals. 10 were public and 3 were private.

Prosthesis usage

Elbow prostheses used in 2010

Coonrad/Morrey	19
Latitude	10
Stanmore custom	1

MOST USED ELBOW PROSTHESES 2006 – 2010



REVISION ELBOW ARTHROPLASTY

Revision is defined by the Registry as a new operation in a previously replaced elbow joint during which one or more of the components are exchanged, removed, manipulated or added. It includes arthrodesis or amputation, but not soft tissue procedures. A two or more staged procedure is registered as one revision.

Data analysis

For the eleven year period January 2000 – December 2010, there were 56 revision elbow procedures registered. This is an additional 7 compared to last year's report.
The average age for a revision elbow replacement was 64.67 years, with a range of 30.97 – 88.95 years.

	Female	Male
Number	39	17
Percentage	69.64	30.36
Mean	64.94	64.03
Maximum age	88.95	84.17
Minimum age	42.23	30.97
Standard dev.	9.49	12.43

REVISION OF REGISTERED PRIMARY ELBOW ARTHROPLASTIES

This section analyses data for revisions of registered primary elbow procedures for the eleven year period January 2000 – December 2010.

There were 17 revisions of the primary group of 331 (5.14%).
There were 3 that had been revised twice and 1 that had been revised 3 times.

Time to revision

Mean	704 days
Maximum	1180 days
Minimum	62 days
Standard deviation	310 days

Reason for revision

Loosening humeral component	6
Loosening ulnar component	4
Deep infection	3
Pain	3
Fracture humerus	1
Other	3

		Years since operation											
		0	1	2	3	4	5	6	7	8	9	10	Total
1	Count	0	0	2	2	2	0	0	0	0	0	0	6
	%	0.00	0.00	33.30	33.30	33.30	0.00	0.00	0.00	0.00	0.00	0.00	100.00
2	Count	0	0	0	3	1	0	0	0	0	0	0	4
	%	0.00	0.00	0.00	74.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00

1 = Loosening humeral component, 2 = Loosening ulnar component

Statistical note

In the tables below there are two statistical terms readers may not be familiar with.

Observed component years

This is the number of registered primary procedures multiplied by the number of years each component has been insitu.

Rate/100 component years

This is equivalent to the yearly revision rate expressed as a percent and is derived by dividing the number of prostheses revised by the observed component years multiplied by 100. It therefore allows for the number of years of post operative follow up in calculating the revision rate. These rates are usually very low, hence it is expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

Statistical Significance

Where it is stated that a difference among results is significant the p value is 0.05 or less. In most of these situations this is because there is no overlap of the confidence intervals (CIs) but sometimes significance can apply in the presence of CI overlap

All primary total elbow replacements

All patients	No. Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
	331	1433	17	1.19	0.69	1.90

Revision rate of individual prostheses sorted in alphabetical order

Prosthesis	No. Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Acclaim	16	85	3	3.52	0.73	10.28
Coonrad/Morrey	229	1083	8	0.74	0.32	1.45
Custom device	1	10	0	0	0	36.24
Evolve Stem	6	11	0	0	0	31.95
Kudo	18	100	2	1.98	0.24	7.16
Latitude	59	135	4	2.95	0.80	7.55
Sorbie Questor	1	5	0	0	0	71.52
Stanmore custom implant	1	0	0	0	0	852.76

Although there appear to be some prostheses with comparatively higher revision rates none are statistically significant owing to wide CIs

Revision vs Gender

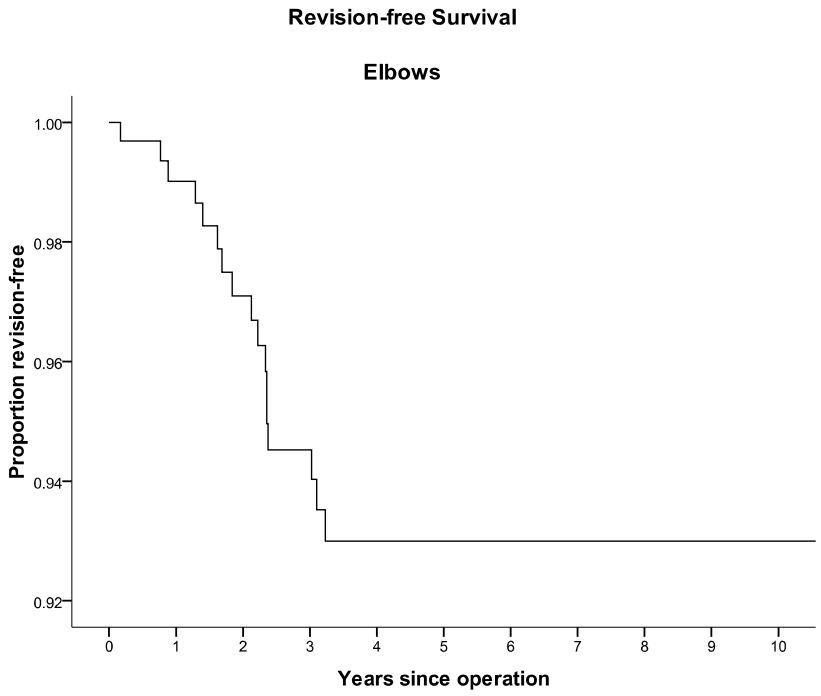
Sex	No. Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Females	265	1188	10	0.84	0.40	1.55
Males	66	244	7	2.86	1.15	5.89

Revision vs age bands

Age Groups	No. Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
LT55	64	302	2	0.66	0.08	2.39
55_64	93	422	8	1.89	0.82	3.73
65_74	93	367	5	1.36	0.44	3.17
GE75	81	340	2	0.59	0.07	2.12

KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses for the years 2000 to 2010 with deceased patients censored at time of death.



Years	% Revision-free	N
1	99.01	285
2	97.10	242
3	94.52	191

There are insufficient numbers to give an accurate revision free % beyond 3 years.

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS AND FIVE YEARS POST SURGERY

Questionnaires at six months post surgery

At six-month post surgery patients are sent a questionnaire which is modelled on the Oxford 12, but is not validated.
The new scoring system has been adopted as recommended by the original authors of the Oxford hip and knee questionnaires.

The scores now range from 4 to 0. A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

We have grouped the questionnaire responses based on the scoring system published by Kalairajah et al (see appendix1)

This groups each score into four categories;

Category 1	>41	excellent
Category 2	34 – 41	good
Category 3	27 – 33	fair
Category 4	< 27	poor

For the eleven year period and as at August 2011, there were 240 primary elbow responses registered at six months post surgery.

The mean primary elbow score was 36.71 (standard deviation 9.93, range 7 – 48)

Scoring	> 41	104
Scoring	34 - 41	60
Scoring	27 - 33	33
Scoring	< 27	43

At six months post surgery, 68% had an excellent or good score.

Analysis of the individual questions

Analysis of the individual questions showed that a significant percentage were still troubled by pain & activity limitation.

Percentage scoring 0 or 1 for each question (240) at six months

		%
1	The worst pain from the shoulder is severe or unbearable	12
2	Extreme difficulty or impossible to dress yourself because of your operated elbow	6
3	Extreme difficulty or impossible to lift a teacup safely with your operated arm	6
4	Extreme difficulty or impossible to get your hand to your mouth	4
5	Extreme difficulty or impossible to carry the household shopping with your operated arm	18
6	Extreme difficulty or impossible to carry a tray containing a plate of food across a room	14
7	Extreme difficulty or impossible to brush or comb hair with the affected arm	15
8	Usually have moderate or severe pain from the operated elbow	14
9	Extreme difficulty or impossible to hang clothes in a wardrobe using operated arm	10
10	Extreme difficulty or impossible to wash and dry under both arms	13
11	Pain from operated elbow greatly or totally interfering with usual work or hobbies	14
12	Pain from elbow in bed most or every nights	8

Revision elbow questionnaire responses

There were 27 revision elbow responses with 59% achieving an excellent or good score. This group includes all revision elbow responses. The mean revision elbow score was 35.81 (standard deviation 7.89, range 22 – 48).

LUMBAR DISC REPLACEMENT

PRIMARY LUMBER DISC REPLACEMENT

This report analyses data for the nine-year period January 2002 – December 2010. There were 129 primary lumbar disc replacements registered to 10 surgeons.

2002	1
2003	3
2004	18
2005	16
2006	21
2007	16
2008	19
2009	17
2010	18

DATA ANALYSES

The average age for a lumbar disc replacement was 40.18 years, with a range of 25.22 – 62.19 years.

	Female	Male
Number	62	67
Percentage	48.06	51.94
Mean age	40.56	39.84
Maximum age	62.19	60.71
Minimum age	25.22	27.19
Standard dev.	8.51	7.20

Disc replacement levels

L3/4	19
L4/5	91
L5/S1	28

Fusion levels

L3/4	1
L4/5	10
L5/S1	48

Previous operation

Discectomy	25
L3/4	0
L4/5	12
L5/S1	16
Fusion	10
ALIF	1
L3/4	0
L4/5	4
L5/S1	11

Diagnosis

Degenerative disc disease	
L3/4	10
L4/5	51
L5/S1	73
Other	1
Annular tear MRI scan	
L3/4	12
L4/5	66
L5/S1	23
Other	1
Discogenic pain on discography	
L3/4	19
L4/5	82
L5/S1	61
Other	1

Approach

Retroperitoneal midline	120
Retroperitoneal lateral	2
Transperitoneal	2
Other- mini open horizontal	1

Intraoperative complications

Damage to major veins	10
Subsidence	1

Systemic antibiotic prophylaxis

Patient number receiving systemic antibiotic prophylaxis	103

Operating theatre

Conventional	75
Laminar flow	54
Spacesuits	2

Operative time (skin to skin)

Mean	139 minutes
Standard deviation	41 minutes
Minimum	49 minutes
Maximum	276 minutes

Surgeon grade

Consultant	129

REVISION OF REGISTERED PRIMARY LUMBAR DISC REPLACEMENTS

This section analyses data for revisions of primary lumbar disc replacements for the nine-year period.

The figures are the same as last year. There have been no further revisions or re- revisions registered.

There were 2 revisions of the primary group of 111 lumbar disc replacements (1.8%) and 1 re-revision.

Time to revision

Mean	457 days
Maximum	672 days
Minimum	242 days

Reason for revision

Pain	2
Loss of spinal alignment	1

Oswestry Disability Index

There are 10 sections. For each section, the total score is 5: if the first statement is marked the score = 0; if the last statement is marked, the score = 5. Intervening statements are scored according to rank.

If more than one box is marked in each section, take the highest score.
If all 10 sections are completed, the score is calculated as follows:
Example: 16 (total scored)/50(total possible score) x 100 = 32%
If one section is missed (or not applicable) the score is calculated:
Example: 16 (total scored)/45(total possible score) x 100 = 35.5%
0 is the best score and 100 is the worst score.

Pre operative scores
Modified Roland and Morris n = 108

Mean	14.97
Maximum	66
Minimum	1
Standard deviation	6.50

Oswestry Disability Index	37

Mean	57.60
Maximum	82
Minimum	30
Standard deviation	13.11

Post operative score

Oswestry Disability Index	24

Mean	22.78
Maximum	58
Minimum	0
Standard deviation	17.00

CERVICAL DISC REPLACEMENT

PRIMARY CERVICAL DISC REPLACEMENT

This report analyses data for the seven-year period January 2004 – December 2010. There were 122 primary cervical disc replacements registered to 14 surgeons.

2004	1
2005	13
2006	14
2007	13
2008	25
2009	32
2010	24

DATA ANALYSIS

The average age for a cervical disc replacement was 43.98 years, with a range of 24.92 – 65.76 years.

	Female	Male
Number	51	71
Percentage	41.80	58.20
Mean age	45.14	43.15
Maximum age	65.76	58.89
Minimum age	28.59	24.92
Standard dev.	7.60	6.99

Disc replacement levels

C3/4	6
C4/5	11
C5/6	67
C6/7	58
C7T1	0

Previous operation

Foraminotomy	3
Adjacent level fusion	12
Adjacent level disc arthroplasty	1
Discectomy	3
Other	1

Diagnosis

Acute disc prolapse	90
Chronic spondylosis	4
Neck pain	4
Degenerative disc disease	14
Myelopathy	2
Other	1

Approach

Anterior right	83
Anterior left	5
Smith Robinson	1

Intra operative complications

Equipment failure	1
Removal of implant	1

Systemic antibiotic prophylaxis

Patient number receiving systemic antibiotic prophylaxis	74

Operating theatre

Laminar flow	69
Conventional	52
Spacesuits	1

Operative time (skin to skin)

Mean	138 minutes
Standard deviation	60 minutes
Minimum	41 minutes
Maximum	302 minutes

Surgeon grade

Consultant	122

REVISION CERVICAL DISC REPLACEMENT

There was 1 revision cervical disc replacement registered from a non registered primary replacement.

There were no revisions of the 122 primary cervical disc replacements.

Neck Disability Index Scoring
There are 10 sections. For each section, the total score is 5: if the first statement is marked the score = 0; if the last statement is marked, the score = 5. Intervening statements are scored according to rank.

If more than one box is marked in each section, take the highest score.
If all 10 sections are completed, the score is calculated as follows:
Example: 16 (total scored)/50(total possible score) x 100 = 32%
If one section is missed (or not applicable) the score is calculated:
Example: 16 (total scored)/45(total possible score) x 100 = 35.5%
0 is the best score and 100 is the worst score.

Pre operative score

Neck Disability Index	49
Mean	48.55
Maximum	92
Minimum	14
Standard deviation	18.93

Post operative score

Neck Disability Index	58
Mean	24.31
Maximum	72
Minimum	0
Standard deviation	19.37

Appendix I

Murray, D.W et al, The use of the Oxford hip and knee scores. J Bone Joint Surg (Br) 2007; 89-B: 1010-14

Questionnaire on the perceptions of patients about shoulder surgery
Jill Dawson, Ray Fitzpatrick, Andrew Carr. J Bone Joint Surg B. 1996 July;78(4) 593-600

Kalairajah, Y et al, Health outcome measures in the evaluation of total hip arthroplasties: a comparison between the Harris hip score and the Oxford hip score. J Arthroplasty 2005; 20: 1037-41

Appendix II

Publications in Peer Reviewed Journals

1 Development of the New Zealand Joint Register
Rothwell A G. Bull Hosp Jt Dis. 1999;58(3):148-60

2 The early failure of the Oxford Phase 3 unicompartmental arthroplasty - an audit of revisions. The New Zealand experience. Hartnett NI, Tregonning RJA, Rothwell A, Hobbs T.
J Bone Joint Surg Br, Orthopaedic Proceedings 2006;88 B Supp II:318

3 A New Zealand national joint registry review of 202 total ankle replacements followed for up to 6 years
Hosman AH, Mason RB, Hobbs T, Rothwell AG.
Acta Orthop. 2007 Oct; 78(5):584-91

4 Functional outcomes of femoral peri prosthetic fracture and revision hip arthroplasty: a matched pair study from the New Zealand Registry.
Young SW, Walker CG, Pitto RP.
Acta Orthop. 2008 Aug: 79(4); 483-8

5 Bilateral total joint arthroplasty : the early results from the New Zealand National Joint Registry
Hooper GJ, Hopper NM, Rothwell AG, Hobbs T.
J Arthroplasty. 2008 Dec 2. (Pub Med)

6 Revision following cemented and uncemented primary total hip replacement: a seven year analysis from the New Zealand Joint Registry
Hooper GJ, Rothwell AG, Stringer M, Frampton C.
J Bone Joint Surg Br. 2009 Apr;91(4):451-8

7 An analysis of the Oxford hip and knee scores and their relationship to early joint revision
Data from the New Zealand Joint Registry
Rothwell AG, Hooper GJ, Hobbs A, Frampton C.
J Bone Joint Surg Br.2010 Mar;92(3)413-418

8 The survivorship and functional outcomes of unicompartmental knee replacements converted to total knee replacements: The New Zealand National Joint Registry
Andrew J Pearse, Gary J Hooper, Alastair G Rothwell, Chris Frampton.
J Bone Joint Surg Br. 2010 Apr;92(4):508-12

9 Does the use of Laminar Flow and Space Suits Reduce Early Deep Infection in Total Hip and Knee Replacement? The ten year results of the New Zealand Joint Registry
G J Hooper, AG Rothwell, M Wyatt, C Frampton
J bone Joint Surg Br.2011 Jan;93(1): 85-90

Accepted by J Bone and Joint Surg. Am

10 Use of Patient-Reported Outcomes in the context of Different Levels of Data
Rolfson, A Rothwell, K Chenok, E Bohm, K Bozic, G Garellick

11 A Multinational Assessment of Metal in Metal bearings in Hip Replacement
S Graves, A Rothwell, K Tucker, J Jacobs, A Sedrakyan

12 Does the ASA physical rating score predict early complications or poorer outcomes following hip or knee arthroplasty Analyses from the NZJR
Hooper G J, Rothwell A G, Hooper N, Frampton C

Submitted to J Bone and Joint Surg. Am

13 Are the outcomes following total hip replacement compromised by supervision of surgeons in training?
Inglis TEW, Dalzell K, Hooper GJ, Rothwell AG, Frampton C.

Appendix III

PROSTHESIS INVENTORY HIPS		
	Femoral Components	**Acetabular Components**
DE PUY	Elite Plus	Charnley
	Summit	Duraloc
	Charnley	Pinnacle
	Corail	
	C-Stem	
	Trilock	
	Proxima	
	Silent	
	S-Rom	
	ASR	
STRYKER	Accolade	Trident
	Exeter V40	Exeter
	ABGII	Contemporary
	Securfit	Tritanium
	TM Stem	
	ML Taper Stem	
	Avenir Muller	
	Continuum	
	TM Modular	
	TM Revision	
ZIMMER		
	CLS	CLS
	CPT	Fitek
	MS30	Fitmore
	Versys	Morscher
	Muller	ZCA
	Duron	Osteolock
		Trilogy
		Continuum

SMITH & NEPHEW	Spectron	Reflection cemented
	Basis	Polar cup cemented
	CPCS	
	Synergy Porous	BHR porous
	BHR resurfacing	R3 porous
	Anthology Porous	Reflection porous
	Emperion Porous	Polar Cup uncemented
	SL Plus	EP Fit uncemented
	Echelon Porous	
MATHY'S	Twinsys	RM
		Selexys
BIOMET	Bi-Metric	Exceed Ringloc X

KNEES		
BIOMET	AGC	
	Maxim	
	Vanguard	
De Puy	LCS	
	PFC Sigmar	
	LCS PFJ	
	S-Rom – Noiles	
Global Orthopaedics	MBK	
Smith & Nephew	Genesis II	
	Genesis II Oxinium	
	Journey	
	Legion	
STRYKER	Duracon	
	Scorpio	
	Triathlon	
	Avon Patello	
ZIMMER	Insall Burstein	
	Nexgen	
ORTHOTEC	Optetrak	
	Themis	
ADVANCED SURGICAL TECHNOLOGIES	Advance	
MATHYS	Balansys	

UNI COMPARTMENTAL KNEES		
BIOMET	Oxford Cemented Oxford Cementless	
	Repicci II	
Zimmer	Miller/Galante	
	Zimmer Uni	
De Puy	Preservation	
	Sigma Partial	
Smith & Nephew	Genesis	
	Oxinium	
STRYKER	EIUS Uni	

SHOULDERS		
DEPUY	Global	
	Delta	
Orthotec	SMR	
	Hemicap Resurfacing	
REM Systems	Aequalis	
Zimmer	Bigliani/Flatow	
	Neer	
Biomet	Copeland Resurfacing	
Smith & Nephew		

ANKLES		
DEPUY	Agility	
	Mobility	
Orthotec	Ramses	
REM Systems	Salto	
Link	Star	

ELBOWS		
ZIMMER	Coonrad/Morrey	
DEPUY	Acclaim	
Biomet	Kudo Discovery Elbow	
REM Systems	Latitude	

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Replacement Hip
Free Phone 0800-274-989 **Total Hip Arthroplasty ❑** **Resurfacing Arthroplasty ❑**
31.05.2010

Date: .....

Patient Name:
Address:

d.o.b. **NHI:**
Attach Patient Label

Consultant: .....

[If different from patient label]

BMI:.....

Side:..... **

Hospital: .....

Town/City

Tick Appropriate Boxes

PREVIOUS OPERATION ON INDEX JOINT

- ❑ **None**
- ❑ **Internal fixation for juxtarticular fractures**
- ❑ **Osteotomy**
- ❑ **Arthrodesis**
- ❑ **Other: .....**

DIAGNOSIS

- ❑ **Osteoarthritis**
- ❑ **Rheumatoid arthritis**
- ❑ **Other inflammatory**
- ❑ **Acute fracture NOF**
- ❑ **Developmental dysplasia/dislocation**
- ❑ **Old fracture NOF**
- ❑ **Post acute dislocation**
- ❑ **Avascular necrosis**
- ❑ **Tumour**
- ❑ **Other: Name: .....**

APPROACH ❑ **Image guided surgery** ❑ **Minimally invasive surgery**
❑ **Anterior** ❑ **Posterior** ❑ **Lateral** ❑ **Trochanteric osteotomy**

FEMUR

Please do not fold bar-coded label

ACETABULUM

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - FEMUR

- ❑ **Allograft**
- ❑ **Autograft**
- ❑ **Synthetic**

BONE GRAFT - ACETABULUM

- ❑ **Allograft**
- ❑ **Autograft**
- ❑ **Synthetic**

FEMORAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT
❑ **Femur** ❑ **Acetabulum** ❑ **Antibiotic brand: .....**

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**
Name: ..... **ASA Class: 1 2 3 4 (please circle one)**

OPERATING THEATRE

❑ **Conventional** ❑ **Laminar flow or similar** ❑ **Space suits**

SKIN TO SKIN TIME ***mins*** **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON

❑ **Consultant** ❑ **Adv Trainee Supervised** ❑ **Adv Trainee Unsupervised** **Year.....** ❑ **Basic Trainee**

*****NB*** ***If bilateral procedure two completed forms are required***

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Revision Hip Joint

Free Phone 0800-274-989
07.04.2005

Date: .....

Side:..... **

Patient Name:
Address:

d.o.b. **NHI:**

Attach Patient Label

Consultant: .....
[Confirm patient label]
Hospital: .....
Town/City: .....

Tick Appropriate Boxes

REASON FOR REVISION

- ❑ **Loosening acetabular component**
- ❑ **Loosening femoral component**
- ❑ **Dislocation**
- ❑ **Pain**
- ❑ **Previous hemiarthroplasty**
- ❑ **Deep infection**
- ❑ **Fracture femur**
- ❑ **Removal of components**
- ❑ **Other: Name: .....**

Date Index Operation: .....

If re-revision - Date previous revision: .....

REVISION

- ❑ **Change of femoral component**
- ❑ **Change of acetabular component**
- ❑ **Change of head**
- ❑ **Change of liner**
- ❑ **Change of all components**

APPROACH ❑ **Image guided surgery** ❑ **Minimally invasive surgery**
❑ **Anterior** ❑ **Posterior** ❑ **Lateral** ❑ **Trochanteric osteotomy**

FEMUR

Please do not fold bar-coded label

ACETABULUM

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - FEMUR
❑**Allograft** ❑ **Synthetic**
❑**Autograft**

BONE GRAFT - ACETABULUM
❑**Allograft** ❑ **Synthetic**
❑**Autograft**

FEMORAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT
❑ **Femur** ❑ **Acetabulum** ❑ **Antibiotic brand:**
.....

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

Name ..... ASA Class: 1 2 3 4 (please circle one)

OPERATING THEATRE
❑ **Conventional** ❑ **Laminar flow or similar** ❑ **Space suits**

SKIN TO SKIN TIME *mins* **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON
❑ **Adv Trainee Supervised**
❑ **Consultant** ❑ **Adv Trainee Supervised** **Year.....** ❑ **Basic Trainee**

****NB*** ***If bilateral procedure two completed forms are required***

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Replacement Knee
Free Phone 0800-274-989 ❑ Total Knee Arthroplasty ❑ Unicompartmental ❑ Patellofemoral
31.05.2010

Date: .....
BMI:.....
Side:..... **

Tick Appropriate Boxes

Patient Name:
Address:

d.o.b. NHI:
Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital: .....
Town/City:.....

PREVIOUS OPERATION ON INDEX JOINT

- ❑ None
- ❑ Internal fixation for juxtarticular fracture
- ❑ Ligament reconstruction
- ❑ Menisectomy
- ❑ Synovectomy
- ❑ Osteotomy
- ❑ Other: Name: .....

DIAGNOSIS

- ❑ Osteoarthritis
- ❑ Rheumatoid arthritis
- ❑ Other inflammatory
- ❑ Tumour
- ❑ Post fracture
- ❑ Post ligament disruption/reconstruction
- ❑ Avascular necrosis
- ❑ Other: Name: .....

APPROACH ❑ Image guided surgery ❑ Minimally invasive surgery
❑ Medial parapatellar ❑ Lateral parapatellar ❑ Other

FEMUR

Please do not fold bar-coded label

TIBIA

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - FEMUR

- ❑ Allograft
- ❑ Autograft
- ❑ Synthetic

BONE GRAFT - TIBIA

- ❑ Allograft
- ❑ Autograft
- ❑ Synthetic

PATELLA

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ Femur ❑ Tibia ❑ Patella ❑ Antibiotic brand: .....

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS

Name ..... ASA Class: 1 2 3 4 (please circle one)

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME *mins* **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Unsupervised ❑ Adv Trainee Supervised **Year.....** ❑ Basic Trainee

***NB If bilateral procedure two completed forms are required*

NEW ZEALAND JOINT REGISTRY
Revision Knee Joint

Free Phone 0800-274-989
07.04.2005

Date: .....

Side:..... **

Patient Name:
Address:

d.o.b. **NHI:**
Attach Patient Label

Consultant: .....
[If different from patient label]

Hospital: .....

Town/City:.....

Tick Appropriate Boxes

REASON FOR REVISION

- ❑ **Loosening femoral component**
- ❑ **Loosening tibial component**
- ❑ **Loosening patellar component**
- ❑ **Pain**
- ❑ **Previous Unicompartmental**
- ❑ **Deep infection**
- ❑ **Fracture femur**
- ❑ **Fracture tibia**
- ❑ **Other details: .....**

Date Index Operation: ..... **If re-revision - Date previous revision: .....**

REVISION

- ❑ **Change of femoral component**
- ❑ **Change of tibial component**
- ❑ **Change of patellar component**
- ❑ **Addition of patellar component**
- ❑ **Change of tibial polyethylene only**
- ❑ **Change of all components**
- ❑ **Removal of components**
- ❑ **Other**

APPROACH ❑ **Image guided surgery** ❑ **Minimally invasive surgery**
❑ **Medial parapatellar** ❑ **Lateral parapatellar** ❑ **Other**

FEMUR

Please do not fold bar-coded label

TIBIA

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT – FEMUR

- ❑ **Allograft**
- ❑ **Autograft** ❑ **Synthetic**

BONE GRAFT – TIBIA

- ❑ **Allograft**
- ❑ **Autograft** ❑ **Synthetic**

PATELLA

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT
❑ **Femur** ❑ **Tibia** ❑ **Patella** ❑ **Antibiotic brand: .....**

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

Name ..... **ASA Class: 1 2 3 4 (please circle one)**

OPERATING THEATRE

❑ **Conventional** ❑ **Laminar flow or similar** ❑ **Space suits**

SKIN TO SKIN TIME *mins* **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON

❑ **Consultant** ❑ **Adv Trainee Supervised** **Year.....** ❑ **Adv Trainee Unsupervised** ❑ **Basic Trainee**

****NB** If bilateral procedure two completed forms are required*

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Replacement Shoulder
0800-274-989 ❑ **Total shoulder Arthroplasty** ❑ **Hemiarthroplasty** ❑ **Reverse Shoulder**
06.05.2009

Date: ……

Side:…… **

Patient Name:
Address:

d.o.b. NHI:
Attach Patient Label

Consultant: ……
[If different from patient label]
Hospital: ……
Town/City……

.

Tick Appropriate Boxes

PREVIOUS OPERATION ON INDEX JOINT

❑ **None**
❑ **Internal fixation for juxtarticular fracture**
❑ **Previous stabilisation**
❑ **Osteotomy**
❑ **Arthrodesis**
❑ **Other: Name:**

……

DIAGNOSIS

❑ **Rheumatoid arthritis**
❑ **Osteoarthritis**
❑ **Other inflammatory**
❑ **Acute fracture proximal humerus**
❑ **Post recurrent dislocation**
❑ **Avascular necrosis**
❑ **Cuff tear arthropathy**
❑ **Post old trauma**
❑ **Other: Name:**

……

APPROACH

❑ **Deltopectoral** ❑ **Other : specify**

HUMERUS

Please do not fold bar-coded label

GLENOID

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - HUMERUS

❑ **Allograft**
❑ **Autograft** ❑ **Synthetic**

BONE GRAFT - GLENOID

❑ **Allograft**
❑ **Autograft** ❑ **Synthetic**

HUMERAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK ALL LABELS ON REVERSE SIDE

CEMENT

❑ **Humerus** ❑ **Glenoid** ❑ **Antibiotic brand:** ……

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

Name: …… **ASA Class: 1 2 3 4 (please circle one)**

OPERATING THEATRE

❑ **Conventional** ❑ **Laminar flow or similar** ❑ **Space suits**

SKIN TO SKIN TIME ***mins*** **Start skin**…… **Finish skin**……

PRIMARY OPERATING SURGEON

❑ **Consultant** ❑ **Adv Trainee Unsupervised** ❑ **Adv Trainee Supervised** **Year**…… ❑ **Basic Trainee**

NB** ***If bilateral procedure two completed forms are required

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Revision Shoulder

Free Phone 0800-274-989
07.04.2005

Date: .....

Side:..... **

Tick Appropriate Boxes

Patient Name:
Address:

d.o.b. **NHI:**

Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital: .....

Town/City:.....

REASON FOR REVISION

- ❑ Loosening glenoid component
- ❑ Loosening humeral component
- ❑ Loosening both components
- ❑ Dislocation/instability anterior
- ❑ Instability posterior
- ❑ Subacromial tuberosity impingement
- ❑ Subacromial cuff impingement/tear
- ❑ Fracture humerus
- ❑ Deep infection
- ❑ Pain
- ❑ Other: Name: .....

Date Index Operation: ..... **If re-revision - Date previous revision: .....**

REVISION

- ❑ Change of head only
- ❑ Change of humeral component
- ❑ Change of glenoid component
- ❑ Change of liner (glenoid non cemented)
- ❑ Change of all components
- ❑ Remove glenoid
- ❑ Remove humerus
- ❑ Removal of components
- ❑ Other Specify: .....

APPROACH

- ❑ Deltopectoral
- ❑ Other: specify

HUMERUS

Please do not fold bar-coded labels

GLENOID

Please do not fold bar-coded labels

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - HUMERUS

- ❑Allograft
- ❑Autograft
- ❑ Synthetic

BONE GRAFT - GLENOID

- ❑Allograft
- ❑Autograft
- ❑ Synthetic

HUMERAL HEAD

Please do not fold bar-coded labels

AUGMENTS

Please do not fold bar-coded labels

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ Humerus ❑ Glenoid ❑ Antibiotic brand: .....

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS

Name ..... **ASA Class: 1 2 3 4 (please circle one)**

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME *mins* **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Unsupervised ❑ Adv Trainee Supervised Year..... ❑ Basic Trainee

NB* ***If bilateral procedure two completed forms are required

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Replacement Ankle

Free Phone 0800-274-989
31.05.2010

Date: .....
BMI:.....
Side:..... **

Patient Name:
Address:

d.o.b. NHI:

Consultant: .....
[If different from patient label]
Hospital: .....
Town/City.....

Tick Appropriate Boxes

PREVIOUS OPERATION ON INDEX JOINT

- ❑ None
- ❑ Internal fixation for juxtarticular fractures
- ❑ Osteotomy
- ❑ Arthrodesis
- ❑ Other: Name: .....

DIAGNOSIS

- ❑ Osteoarthritis
- ❑ Rheumatoid arthritis
- ❑ Other inflammatory
- ❑ Post trauma
- ❑ Avascular necrosis talus
- ❑ Other: Name:

.....

APPROACH

❑ Anterior ❑ Anterio-lateral ❑ Other

TIBIA

Please do not fold bar-coded label

TALUS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - TIBIA

- ❑ Allograft
- ❑ Autograft ❑ Synthetic

BONE GRAFT - TALUS

- ❑ Allograft
- ❑ Autograft ❑ Synthetic

AUGMENTS

Please do not fold bar-coded label

FUSION DISTAL TFJ

STICK ALL LABELS ON REVERSE SIDE

CEMENT

❑Tibia ❑ Talus ❑ Antibiotic Brand:
.....

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

Name: ..... **ASA Class: 1 2 3 4 (please circle one)**

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME *mins* **Start skin**..... **Finish skin**.....

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Unsupervised ❑ Adv Trainee Supervised ❑ Basic Trainee **Year**.....

NB** ***If bilateral procedure two completed forms are required

DO NOT PLACE IN PATIENT NOTES **TO BE RETAINED IN THEATRE SUITE**

NEW ZEALAND JOINT REGISTRY
Revision Ankle Joint

Free Phone 0800-274-989
07.04.2005

Date: .....

Side:..... **

Patient Name:
Address:

d.o.b. **NHI:**
Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital:.....
Town/City: .....

Tick Appropriate Boxes

REASON FOR REVISION

- ❑ **Loosening talar component**
- ❑ **Loosening tibial component**
- ❑ **Dislocation**
- ❑ **Pain**
- ❑ **Deep infection**
- ❑ **Fracture talus**
- ❑ **Fracture tibia**
- ❑ **Dislocations**
- ❑ **Other details:** .....

Date Index Operation: ..... **If re-revision - Date previous revision:** .....

REVISION

- ❑ **Change of talar component**
- ❑ **Change of tibial component**
- ❑ **Change of polyethylene only**
- ❑ **Change of all components**
- ❑ **Removal of components**
- ❑ **Other Name:** .....

APPROACH

❑ **Anterior** ❑ **Anterio-lateral** ❑ **Posterior**

TIBIA

Please do not fold bar-coded label

TALUS

Please do not fold bar-coded label

STICK ALL LABELS ON REVERSE SIDE

BONE GRAFT - TIBIA

❑ **Allograft**
❑ **Autograft** ❑ **Synthetic**

BONE GRAFT - TALUS

❑ **Allograft**
❑ **Autograft** ❑ **Synthetic**

AUGUMENTS

Please do not fold bar-coded label

FUSION DISTAL TFJ

Yes ❑ No ❑

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ **Talus** ❑ **Tibia** ❑ **Antibiotic brand:** .....

❑ **SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

Name ..... **ASA Class: 1 2 3 4 (please circle one)**

OPERATING THEATRE

❑ **Conventional** ❑ **Laminar flow or similar** ❑ **Space suits**

SKIN TO SKIN TIME ***mins*** **Start skin**..... **Finish skin**.....

PRIMARY OPERATING SURGEON

❑ **Consultant** ❑ **Adv Trainee Unsupervised** ❑ **Adv Trainee Supervised Year**..... ❑ **Basic Trainee**

*****NB If bilateral procedure two completed forms are required***

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Replacement Elbow

Free Phone 0800-274-989
07.04.2005

Date: .....

Patient Name:
Address:

d.o.b. **NHI:**

Consultant: .....
[If different from patient label]
Hospital: .....
Town/City:.....

Side:..... **

Tick Appropriate Boxes

PREVIOUS OPERATION ON INDEX JOINT

- ❑ None
- ❑ Internal fixation for juxtarticular fracture
- ❑ Ligament reconstruction
- ❑ Interposition arthroplasty
- ❑ Debridement
- ❑ Synovectomy ± removal radial head
- ❑ Osteotomy
- ❑ Other: Name:

.....

DIAGNOSIS

- ❑ Rheumatoid arthritis
- ❑ Osteoarthritis
- ❑ Other inflammatory
- ❑ Post fracture
- ❑ Post ligament disruption
- ❑ Other: Name:

.....

- ❑ Post dislocation

APPROACH

❑ Medial ❑ Lateral ❑ Posterior

HUMERUS

Please do not fold bar-coded label

ULNA

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - HUMERUS

- ❑ Allograft
- ❑ Autograft
- ❑ Synthetic

BONE GRAFT - ULNA

- ❑ Allograft
- ❑ Autograft
- ❑ Synthetic

RADIAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ Humerus ❑ Ulna ❑ Radius ❑ Antibiotic brand: .....

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS

Name ..... ASA Class: 1 2 3 4 (please circle one)

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME ***mins*** **Start skin**..... **Finish skin**.....

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Unsupervised ❑ Adv Trainee Supervised Year..... ❑ Basic Trainee

NB** ***If bilateral procedure two completed forms are required

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Revision Elbow Joint

Free Phone 0800-274-989 **07.04.2005**

Date: .....

Side:..... **

Patient Name:
Address:

d.o.b. NHI:

Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital: .....
Town/City: .....

Tick Appropriate Boxes

REASON FOR REVISION

- ❑ Loosening humeral component
- ❑ Loosening ulnar component
- ❑ Loosening radial head component
- ❑ Pain
- ❑ Deep infection
- ❑ Fracture humerus
- ❑ Fracture ulna
- ❑ Dislocations
- ❑ Other Name: .....

Date Index Operation: ..... **If re-revision - Date previous revision: .....**

REVISION

- ❑ Change of humeral component
- ❑ Change of ulnar component
- ❑ Change of radial head component
- ❑ Change of all components
- ❑ Removal of components
- ❑ Other Name: .....

APPROACH

❑ Medial ❑ Lateral ❑ Posterior

HU

Please do not fold bar-coded label

UL

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - HUMERUS

❑ Allograft
❑ Autograft ❑ Synthetic

BONE GRAFT - ULNA

❑ Allograft
❑ Autograft ❑ Synthetic

RADIAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ Humerus ❑ Ulna ❑ Radius ❑ Antibiotic brand: .....

❑ **SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

Name ..... ASA Class: 1 2 3 4 (please circle one)

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME *mins* **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Supervised Year..... ❑ Adv Trainee Unsupervised ❑ Basic Trainee

****NB If bilateral procedure two completed forms are required***

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Cervical Disc Replacement

Free Phone 0800-274-989 **14.08.2008**

Date: .....

Patient Name:
Address:

DOB: **NHI:**
Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital: .....
Town/City:.....

Tick Appropriate Boxes

ACC ☐ **ACC Claim No: .....**

LEVELS OF DISC REPLACEMENT

.....

- ❑ C3/4 ❑ C6/7
- ❑ C4/5 ❑ C7/T1
- ❑ C5/6 Other .....

PRE OP PATIENT SCORE (NECK DISABILITY INDEX)

PREVIOUS OPERATION

- ❑ Foreminotomy ❑ Adjacent Level Disc Arthroplasty
- ❑ Adjacent Level Fusion ❑ Other.....

DIAGNOSIS

- ❑ Acute Disc Prolapse
- ❑ Chronic Spondylosis
- ❑ Neck Pain
- ❑ Other .....

APPROACH

❑ Anterior Right ❑ Anterior Left ❑ Other .....

IMPLANTS

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

INTRAOPERATIVE COMPLICATIONS

.....
.....
..

SYSTEMIC ANTIBIOTIC PROPHYLAXIS

❑ Yes ❑ No

OPERATIVE THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME *mins* **Start skin.....** **Finish skin.....**

PRIMARY OPERATING SURGEON

- ❑ Consultant
- ❑ Adv Trainee Unsupervised
- ❑ Adv Trainee Supervised Year .....
- ❑ Basic Trainee

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Revision Cervical Disc Replacement

Free Phone 0800-274-989
14.08.2008

Date: .....

Patient Name:
Address:

DOB: NHI:
Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital:

LEVEL OF REVISION
.....

- ❑ C3/4
- ❑ C4/5
- ❑ C5/6
- ❑ C6/7
- ❑ C7/T1
- ❑ Other:

Town/City: .....

Tick Appropriate Boxes

ACC ☐ **ACC Claim No:** .....

REASON FOR REVISION

- ❑ Dislocation of component
- ❑ Failure of component
- ❑ Infection
- ❑ Pain (Neck)
- ❑ Adjacent level surgery
- ❑ Additional decompression required
- ❑ Heterotopic calcification
- ❑ Other: Name: .....

Date Index Operation: .....
If re-revision - Date previous revision: ...

REVISION

- ❑ Replace disc prosthesis (same)
- ❑ Replace disc prosthesis (different)
- ❑ Fuse
- ❑ Removal only
- ❑ Other: .....

APPROACH ❑ Image guided surgery ❑ Minimally invasive surgery
❑ Anterior ❑ Posterior ❑ Lateral ❑ Trochanteric

Osteotomy

IMPLANTS

Please do not fold bar-coded label

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

Please do not fold bar-coded label

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

SYSTEMIC ANTIBIOTIC PROPHYLAXIS
Name .....

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

SKIN TO SKIN TIME *mins* **Start skin**..... **Finish skin**.....

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Unsupervised ❑ Adv Trainee Supervised **Year**..... ❑ Basic Trainee

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Primary Lumbar Disc Replacement

Free Phone 0800-274-989
14.08.2008

Date: .....

Patient Name:
Address:

d.o.b. NHI:
Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital: .....

Town/City.....

Tick Appropriate Boxes **ACC** ☐ **ACC Claim No.**

.....

DISC REPLACEMENT Levels **FUSION Levels** **PRE OP PATIENT SCORE**
Modified Roland and Morris

❑ **L3/4** ❑ **L3/4** **Total number of "Yes"**
responses.....
❑ **L4/5** ❑ **L4/5** ***Oswestry Score*** ❑ **L5/S1**
❑ **L5/S1** **Percentage score** **Other .....**

PREVIOUS OPERATION
❑ **Discectomy** ❑ **L3/4**❑ **L4/5**❑ **L5/S1** ❑ **Other .....**
❑ **Other .....** ❑ **L3/4**❑ **L4/5**❑ **L5/S1**

DIAGNOSIS
1. Degenerative Disc disease (plain x-ray changes present) ❑ **L3/4**❑ **L4/5**❑ **L5/S1** ❑ **Other .....**
2. Annular tear MRI scan (normal plain x-ray) ❑ **L3/4**❑ **L4/5**❑ **L5/S1** ❑ **Other .....**
3. Discogenic pain on discography ❑ **L3/4**❑ **L4/5**❑ **L5/S1** ❑ **Other .....**

APPROACH
❑ **Retroperitoneal midline abdominal wall incision** ❑ **Transperitoneal**
❑ **Retroperitoneal lateral abdominal wall incision** ❑ **Other .....**

IMPLANTS

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

INTRAOPERATIVE COMPLICATIONS
.....
.....

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**
Yes ❑ **No** ❑

OPERATIVE THEATRE
❑**Conventional** ❑ **Laminar flow or similar** ❑ **Space suits**

SKIN TO SKIN TIME *mins* **Start skin .....** **Finish skin .....**

PRIMARY OPERATING SURGEON

❑ **Consultant** ❑ **Adv Trainee** **Year.....** ❑ **Basic Trainee**

DO NOT PLACE IN PATIENT NOTES TO BE RETAINED IN THEATRE SUITE

NEW ZEALAND JOINT REGISTRY
Revision Lumbar Disc Replacement

Free Phone 0800-274-989
14.08.2008

Date: .....

Patient Name:
Address:

d.o.b. **NHI:**
Attach Patient Label

Consultant: .....
[If different from patient label]
Hospital: .....
Town/City: .....

Tick Appropriate Boxes **ACC** ☐ **ACC Claim No: .....**

REASON FOR REVISION

- ❑ **Loosening of components**
- ❑ **Dislocation of articulating core**
- ❑ **Loss of spinal alignment**
- ❑ **Pain**
- ❑ **Deep infection**
- ❑ **Fracture of vertebra**
- ❑ **Removal of components**
- ❑ **Other: Name: .....**

Date Index Operation: ..... **If re-revision - Date previous revision: .....**

REVISION

- ❑ **Change of TDR components**
- ❑ **Change to Anterior Fusion**
- ❑ **Change of articulating core**
- ❑ **In-situ posterior instrumented fusion**

APPROACH

- ❑ **Retroperitoneal midline abdominal wall incision**
- ❑ **Retroperitoneal lateral abdominal wall incision**
- ❑ **Transperitoneal**
- ❑ **Other .....**
- ❑ **Posterior Approach for in-situ fusion**

NEW DISC REPLACEMENT Levels

- ❑ **L3/4**
- ❑ **L4/5**
- ❑ **L5/S1**

NEW FUSION Levels

- ❑ **L3/4**
- ❑ **L4/5**
- ❑ **L5/S1**

PRE OP PATIENT SCORE
Modified Roland and Morris
Total number of "Yes" responses.....
Oswestry Score
Percentage score

Other .....

IMPLANTS

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

INTRAOPERATIVE COMPLICATIONS

.....

.....

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS
Yes ❑ **No ❑**

OPERATIVE THEATRE
❑Conventional **❑ Laminar flow or similar** **❑ Space suits**

SKIN TO SKIN TIME *mins* **Start skin .....** **Finish skin .....**

PRIMARY OPERATING SURGEON
❑ Consultant **❑ Adv Trainee** **Year.....** **❑ Basic Trainee**

TOTAL HIP REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating Surgeon:**.....

..... **Date of Surgery**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the pain you usually had from your operated on hip?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

2 For how long have you been able to walk before the pain from your operated on hip becomes severe? (with or without a stick)
- 4 No pain/more than 30 minutes
- 3 16 to 30 minutes
- 2 5 to 15 minutes
- 1 Around the house only
- 0 Unable to walk because of severe pain

3 Have you had any trouble getting in and out of a car or using public transport because of your operated on hip?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Have you been able to put on a pair of socks, stockings or tights?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you do the household shopping on your own?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Have you had any trouble with washing and drying yourself (all over) because of your operated on hip?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

7 How much has pain from your operated on hip interfered with your usual work (including housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

8 After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your operated on hip?
- 4 Not at all painful
- 3 Slightly painful
- 2 Moderately painful
- 1 Very painful
- 0 Unbearable

9 Have you had any sudden, severe pain - 'shooting', 'stabbing' or 'spasms' - from the affected operated on hip?
- 4 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

10 Have you been limping when walking, because of your operated on hip?
- 4 Rarely/never
- 3 Sometimes or just at first
- 2 Often, not just at first
- 1 Most of the time
- 0 All of the time

11 Have you been able to climb a flight of stairs?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

12 Have you been troubled by pain from your operated on hip in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□	□	.
The joint became infected?	□	□.....	

or for any other reason related to the artificial joint:.....

.....

.....

Hospital admitted to: .....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

REVISION HIP REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating Surgeon:**.....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the pain you usually had from your operated on hip?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

2 For how long have you been able to walk before the pain from your operated on hip becomes severe? (with or without a stick)
- 4 No pain/more than 30 minutes
- 3 16 to 30 minutes
- 2 5 to 15 minutes
- 1 Around the house only
- 0 Unable to walk because of severe pain

3 Have you had any trouble getting in and out of a car or using public transport because of your operated on hip?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Have you been able to put on a pair of socks, stockings or tights?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you do the household shopping on your own?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Have you had any trouble with washing and drying yourself (all over) because of your operated on hip?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

7 How much has pain from your operated on hip interfered with your usual work (including housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

8 After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your operated on hip?
- 4 Not at all painful
- 3 Slightly painful
- 2 Moderately painful
- 1 Very painful
- 0 Unbearable

9 Have you had any sudden, severe pain - 'shooting', 'stabbing' or 'spasms' - from the affected operated on hip?
- 4 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

10 Have you been limping when walking, because of your operated on hip?
- 4 Rarely/never
- 3 Sometimes, or just at first
- 2 Often, not just at first
- 1 Most of the time
- 0 All of the time

11 Have you been able to climb a flight of stairs?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

12 Have you been troubled by pain from your operated on hip in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□	□	
The joint became infected?	□	□	.....

or for any other reason related to the artificial joint.....

.....

.....

Hospital admitted to:.....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

TOTAL KNEE REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating Surgeon:**.....

..... **Date of Surgery:** .....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the pain you usually have from your operated on knee?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

2 For how long have you been able to walk before the pain from your operated on knee becomes severe? (with or without a stick)
- 4 No pain/more than 30 minutes
- 3 16 to 30 minutes
- 2 5 to 15 minutes
- 1 Around the house only
- 0 Unable to walk because of severe pain

3 Have you had any trouble getting in and out of a car or using public transport because of your operated on knee?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Could you kneel down and get up again afterwards on your operated knee?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you do the household shopping on your own?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Have you had any trouble with washing and drying yourself (all over) because of your operated on knee?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

7 How much has pain from your operated on knee interfered with your usual work (including housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

8 After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your operated on knee?
- 4 Not at all painful
- 3 Slightly painful
- 2 Moderately painful
- 1 Very painful
- 0 Unbearable

9 Have you felt that your operated on knee might suddenly "give way" or let you down?
- 4 Rarely/never
- 3 Sometimes, or just at first
- 2 Often, not just at first
- 1 Most of the time
- 0 All of the time

10 Have you been limping when walking, because of your operated on knee?
- 4 Rarely/never
- 3 Sometimes, or just at first
- 2 Often, not just at first
- 1 Most of the time
- 0 All of the time

11 Could you walk down one flight of stairs?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

12 Have you been troubled by pain from your operated on knee in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

Yes No Approx Date

The artificial joint dislocated? □ □.....

The joint became infected? □ .

or for any other reason related to the artificial joint:

.....

.....

Hospital admitted to:

.....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

REVISION KNEE REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating Surgeon:**.....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the pain you usually have from your operated on knee?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

2 For how long have you been able to walk before the pain from your operated on knee becomes severe? (with or without a stick)
- 4 No pain/more than 30 minutes
- 3 16 to 30 minutes
- 2 5 to 15 minutes
- 1 Around the house only
- 0 Unable to walk because of severe pain

3 Have you had any trouble getting in and out of a car or using public transport because of your operated on knee?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Could you kneel down and get up again afterwards?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you do the household shopping on your own?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Have you had any trouble with washing and drying yourself (all over) because of your operated on knee?
- 4 No trouble at all
- 3 Very little trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

7 How much has pain from your operated on knee interfered with your usual work (including housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

8 After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your operated on knee?
- 4 Not at all painful
- 3 Slightly painful
- 2 Moderately painful
- 1 Very painful
- 0 Unbearable

9 Have you felt that your operated on knee might suddenly "give way" or let you down?
- 4 Rarely/never
- 3 Sometimes, or just at first
- 2 Often, not just at first
- 1 Most of the time
- 0 All of the time

10 Have you been limping when walking, because of your operated on knee?
- 4 Rarely/never
- 3 Sometimes, or just at first
- 2 Often, not just at first
- 1 Most of the time
- 0 All of the time

11 Could you walk down one flight of stairs?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

12 Have you been troubled by pain from your operated on knee in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□		
The joint became infected?	□		

or for any other reason related to the artificial joint:

.....

.....

.....

Hospital admitted to:.....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

TOTAL ANKLE REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:**.....

Patient Address: ..... **Operating Surgeon:**.....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please **circle the number** which best describes yourself **OVER THE LAST 4 WEEKS**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the pain you usually have from your operated on ankle?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

2 For how long have you been able to walk before the pain from your operated on ankle becomes severe?
- 4 No pain up to 30 minutes
- 3 16 to 30 minutes
- 2 5 to 15 minutes
- 1 Around the house only
- 0 Unable to walk at all because of severe pain

3 Have you been able to walk on uneven ground?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 Extreme difficulty
- 0 No impossible

4 Have you had to use an orthotic (shoe insert), heel lift, or special shoes?
- 4 Never
- 3 Occasionally
- 2 Often
- 1 Most of the time
- 0 Always

5 How much has pain from your ankle interfered with your usual work (including housework and hobbies)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

6 Have you been limping when walking because of your operated on ankle?
- 4 No days
- 3 Only one or two days
- 2 Some days
- 1 Most days
- 0 Every day

7 Have you been able to climb a flight of stairs?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 Impossible

8 Have you been troubled by pain from your operated on ankle in bed at night?
- 4 No nights
- 3 Only one or two nights
- 2 Some nights
- 1 Most nights
- 0 Every night

9 How much has pain from your operated on ankle interfered with your usual recreational activities?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

10 Have you had swelling of your foot?
- 4 None at all
- 3 Occasionally
- 2 Often
- 1 Most of the time
- 0 All the time

11 After a meal (sat at a table) how painful has it been for you to stand up from a chair because of your operated on ankle?
- 4 Not at all painful
- 3 Slightly painful
- 2 Moderately painful
- 1 Very painful
- 0 Unbearable

12 Have you had any sudden severe pain – shooting, stabbing or spasms from your operated on ankle?
- 4 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

Additional Information

Have you at any time been hospitalised because:

Yes No Approx Date

The artificial joint dislocated? □ .....

The joint became infected? □ .....

or for any other reason related to the artificial joint:.....

.....

Hospital admitted to.....

□□I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone

REVISION ANKLE REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:**.....

Patient Address: ..... **Operating Surgeon:** .....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the pain you usually have from your operated on ankle?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

2 For how long have you been able to walk before the pain from your operated on ankle becomes severe?
- 4 No pain up to 30 minutes
- 3 16 to 30 minutes
- 2 5 to 15 minutes
- 1 Around the house only
- 0 Unable to walk at all because of severe pain.

3 Have you been able to walk on uneven ground?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 Extreme difficulty
- 0 No impossible.

4 Have you had to use an orthotic (shoe insert), heel lift, or special shoes?
- 4 Never
- 3 Occasionally
- 2 Often
- 1 Most of the time
- 0 Always

5 How much has pain from your ankle interfered with your usual work (including housework and hobbies)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

6 Have you been limping when walking because of your operated on ankle?
- 4 No days
- 3 Only one or two days
- 2 Some days
- 1 Most days
- 0 Every day

7 Have you been able to climb a flight of stairs?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 Impossible

8 Have you been troubled by pain from your operated on ankle in bed at night?
- 4 No nights
- 3 Only one or two nights
- 2 Some nights
- 1 Most nights
- 0 Every night

9 How much has pain from your operated on ankle interfered with your usual recreational activities?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

12 Have you had swelling of your foot?
- 4 None at all
- 3 Occasionally
- 2 Often
- 1 Most of the time
- 0 All the time

13 After a meal (sat at a table) how painful has it been for you to stand up from a chair because of your operated on ankle?
- 4 Not at all painful
- 3 Slightly painful
- 2 Moderately painful
- 1 Very painful
- 0 Unbearable

12 Have you had any sudden severe pain – shooting, stabbing or spasms from your operated on ankle?
- 4 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□	□	.....
The joint became infected?	□	□	.....

or for any other reason related to the artificial joint:.....

Hospital admitted to: .....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed, try to answer the question from the joint replacement aspect alone.

TOTAL SHOULDER REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating Surgeon:**.....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please **circle the number** which best describes yourself **OVER THE LAST 4 WEEKS** **Which is your dominant arm?** **Left** **Right**

Please circle the SIDE on which you had your surgery performed **Left** **Right**

1 How would you describe the ***worst*** pain you have had from your operated on shoulder?
- 4 None
- 3 Mild
- 2 Moderate
- 1 Severe
- 0 Unbearable

2 How would you describe the pain you ***usually*** have from your operated on shoulder?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

3 Have you had any trouble getting in and out of a car or using public transport because of your operated on shoulder?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Have you been able to use a knife and fork at the same time?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you do the household shopping on your own?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Could you carry a tray containing a plate of food across a room?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

7 Could you brush/comb your hair with the operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, Impossible

8 Have you had any trouble dressing yourself because of your operated on shoulder?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

9 Could you hang your clothes up in a wardrobe – using the operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

10 Have you been able to wash and dry yourself under both arms?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

11 How much has pain from your operated on shoulder interfered with your usual work hobbies or recreational activities (including housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

12 Have you been troubled by pain from your operated on shoulder in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□		.....
The joint became infected?	□		.....

or for any other reason related to the artificial joint:.....

.....

Hospital admitted to: .....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

REVISION SHOULDER REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating urgeon:**.....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS** **Which is your dominant arm?** **Left** **Right**

Please circle the SIDE on which you had your surgery performed **Left** **Right**

1 How would you describe the ***worst*** pain you have had from your operated on shoulder?
- 4 None
- 3 Mild
- 2 Moderate
- 1 Severe
- 0 Unbearable

2 How would you describe the pain you ***usually*** have from your operated on shoulder?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

3 Have you had any trouble getting in and out of a car or using public transport because of your operated on shoulder?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Have you been able to use a knife and fork at the same time?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you do the household shopping on your own?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Could you carry a tray containing a plate of food across a room?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

7 Could you brush/comb your hair with the operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, Impossible

8 Have you had any trouble dressing yourself because of your operated on shoulder?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

9 Could you hang your clothes up in a wardrobe – using the operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

10 Have you been able to wash and dry yourself under both arms?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

11 How much has pain from your operated on shoulder interfered with your usual work hobbies or recreational activities (including housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

12 Have you been troubled by pain from your operated on shoulder in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□	□	.....
The joint became infected?	□	□	.....

or for any other reason related to the artificial joint:.....

.....

Hospital admitted to: .....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

TOTAL ELBOW REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:**.....

Patient Address: ..... **Operating Surgeon:** .....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS** **Which is your dominant arm? Left Right**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the ***worst*** pain you have had from your operated on elbow?
- 4 None
- 3 Mild
- 2 Moderate
- 1 Severe
- 0 Unbearable

2 Have you had any trouble dressing yourself because of your operated on elbow?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

3 Can you lift a teacup safely with your operated on arm?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Have you been able to get your hand to your mouth?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you carry the household shopping with your operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Could you carry a tray containing a plate of food across a room?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

7 Could you brush/comb your hair with the affected arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, Impossible

8 How would you describe the pain you ***usually*** have from your operated on elbow?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

9 Could you hang your clothes up in a wardrobe – using the operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

14 Have you been able to wash and dry yourself under both arms?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

15 How much has pain from your operated on elbow interfered with your usual work hobbies or recreational activities (including hobbies and housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

12 Have you been troubled by pain from your operated on elbow in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□		.....
The joint became infected?	□		.....

or for any other reason related to the artificial joint:

.....

.....

Hospital admitted to: .....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.

REVISION ELBOW REPLACEMENT - QUESTIONNAIRE

Patient Name: ..... **Date of Birth:** .....

Patient Address: ..... **Operating Surgeon:** .....

..... **Date of Surgery:**.....

We would like you to score yourself on the following 12 questions. Each question is scored from 4 to 0, from least to most difficulty or severity: 4 being the least difficult/severe and 0 being the most difficult/severe. Please circle the number which best describes yourself **OVER THE LAST 4 WEEKS** **Which is your dominant arm? Left Right**

Please circle the SIDE on which you had your surgery performed Left Right

1 How would you describe the ***worst*** pain you have had from your operated on elbow?
- 4 None
- 3 Mild
- 2 Moderate
- 1 Severe
- 0 Unbearable

2 Have you had any trouble dressing yourself because of your operated on elbow?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

3 Can you lift a teacup safely with your operated on arm?
- 4 No trouble at all
- 3 A little bit of trouble
- 2 Moderate trouble
- 1 Extreme difficulty
- 0 Impossible to do

4 Have you been able to get your hand to your mouth?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

5 Could you carry the household shopping with your operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

6 Could you carry a tray containing a plate of food across a room?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

7 Could you brush/comb your hair with the affected arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, Impossible

8 How would you describe the pain you ***usually*** have from your operated on elbow?
- 4 None
- 3 Very mild
- 2 Mild
- 1 Moderate
- 0 Severe

9 Could you hang your clothes up in a wardrobe – using the operated on arm?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

16 Have you been able to wash and dry yourself under both arms?
- 4 Yes, easily
- 3 With little difficulty
- 2 With moderate difficulty
- 1 With extreme difficulty
- 0 No, impossible

17 How much has pain from your operated on elbow interfered with your usual work hobbies or recreational activities (including hobbies and housework)?
- 4 Not at all
- 3 A little bit
- 2 Moderately
- 1 Greatly
- 0 Totally

12 Have you been troubled by pain from your operated on elbow in bed at night?
- 4 No nights
- 3 Only 1 or 2 nights
- 2 Some nights
- 1 Most nights
- 0 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	□		.....
The joint became infected?	□		.....

or for any other reason related to the artificial joint:.....

.....

Hospital admitted to:.....

□ I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed; try to answer the question from the joint replacement aspect alone.