# NEW ZEALAND ORTHOPAEDIC ASSOCIATION

# THE NEW ZEALAND JOINT REGISTRY


# NINE YEAR REPORT

## JANUARY 1999 TO DECEMBER 2007

## REGISTRY BOARD

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| Alastair G Rothwell | Chairman and Registry Supervisor |
| James Taylor | Deputy Chairman |
| Mark Wright | Orthopaedic Surgeon |
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| Kim Miles | CEO New Zealand Orthopaedic Association |
| Toni Hobbs | Registry Coordinator |

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| Statistician | Dr Chris Frampton |

**This report was prepared by staff of the New Zealand Joint Registry.**

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## EDITORIAL COMMENT

It is our pleasure to present the nine year report of the New Zealand Orthopaedic Associations National Joint Registry. The format of previous years has been followed such that each arthroplasty section is self contained. There is greater statistical analyses of the performance of prostheses especially for the hip and knee. As well as Kaplan Meier curves we have continued with revision rates per 100 component years which statisticians consider is the more accurate way of deriving our revision rates when analysing data with widely ranging follow-up times. This and other statistical terms are explained in the appropriate sections.

In December 2007 we reached an important milestone with the 100,000$^{th}$ joint arthroplasty registration. This was reached at least two years earlier than anticipated when the Registry commenced in 1999. The total number of registered joint arthroplasties at 31.12.2007 was 101,314 an increase of 15253 for 2007 and compared to the 13933 increase in 2006 represents a 9.4% gain which is a significant increase when compared to the 1.8% gain for 2006. The main areas of increase were primary hips 8.1%, primary knees 11.6%, and primary shoulders 9.2%. As for last year, the analysis of data for revision joints that had had the primary operation prior to 1999 has not been undertaken.

The annual percentage of uncemented hip arthroplasties continues to rise at the expense of the fully cemented hips with the latter just 20% of the total for 2007 but cemented femur fixation was used in 60% of the 2007 procedures. When the 3 types of hip fixation were analysed against the various age bands it demonstrated that over the 9 year period uncemented arthroplasties have the lowest revision rate in the under 55 age group, hybrid hips the lowest rate in the 55 to 64 age group and fully cemented the lowest rate in the greater than 75 age group. There was no significant difference among the three types of fixation in the 65 – 74 age group.

Revision rates for individual hip component matchings as well as for individual components for which we have a minimum of 250 primary procedures were also estimated. A very few have been identified as having a statistically significant higher revision rate than the average of 0.57 per 100 component years (95% confidence intervals; 0.55, 0.61). This does not automatically mean that they are poorly performing prostheses or components as there are many factors apart from the prosthesis or component which can effect its performance. Furthermore and perhaps most importantly the overall revision rate noted above and the nine year failure of 4.56% are among the lowest of similar joint registries so that a prosthesis with a statistically significant higher revision rate in the New Zealand Registry is unlikely to be identified as statistically significant in other Registries.

A similar situation applies to knee prostheses with the overall revision rate per 100 component years of 0.48 (95% confidence intervals; 0.45, 0.52) and the nine year failure of just 3.33% again among the lowest for Joint Registries. New Zealand surgeons can therefore be justifiable proud of these medium term trends.

Image guidance continues to be popular for primary knee arthroplasty and during 2007 was used in 11% of procedures. In a few years time it will be opportune to compare the revision rates with standard knee arthroplasty approaches. The same applies to the minimally invasive approach which was used for 32% of unicompartmental replacement procedures in 2007.

This year we have compared the deep infection revision rates within six months of the primary procedure for primary hips and knees against theatre environment. Six months was chosen as infection within this time period is highly likely to have been introduced at the time of surgery. With regard to hips the results are somewhat puzzling in that the revision rates per 100 component years were statistically significantly worse for laminar flow theatres with or without a space suit than for conventional theatres. However, there was no statistically significant difference between theatre types for knee revision rates. One third of primary arthroplasties are performed in laminar flow theatres.

The annual rate of unicompartmental knee replacements has remained static over the last few years but the uncemented Oxford Phase 3 prosthesis has become increasingly popular. This year the revision rate for unicompartmental knees that had been converted to total knee replacements was analysed. Somewhat surprisingly it was found that the revision rate per 100 component years was four times that of primary knee

replacements and in addition the six month Oxford 12 score was the same as that following revision of a primary knee arthroplasty. Although the numbers are not large the findings are statistically significant and run contrary to the belief that conversion of a unicompartmental knee to a total knee has a similar outcome as a primary total knee arthroplasty.

Amongst the shoulder procedures it is noted that the revision rate for the reverse prostheses is almost four times that for conventional prostheses. It is acknowledged that reverse shoulder arthroplasties are mainly used as a salvage procedure and therefore a higher revision rate is to be expected, but we will continue to monitor this.

**Oxford 12 Questionnaire**

This year, as signalled in last years report the new scoring system as recommended by the original authors has been adopted. (See appendix I). The individual item scores now range from 4 to 0 so that a total score of 48 is the best, indicating normal function and a score of zero is the worst indicating the most severe disability. In addition we have grouped the total scores according to the classification system published by Kallairajah J et al., which has been recommended by the original authors (See appendix I). The categories are graded excellent, good, fair and poor according to the patient's score. The six month and five year questionnaire results particularly for hips and knees are again analysed this year. As in the previous two years the statistically significant relationship between the six month score and revision within two years is again noted. In addition we analysed the relationship between the five year score and revision within two years of that date and again the same statistically significant relationship was noted. These findings reinforce the importance of the Oxford 12 questionnaire in post operative monitoring of patients and will be particularly useful in deciding which patients should be called back for more regular longer term review.

It is pleasing to report that the number of conference presentations of papers based on the registry data continues to increase each year. In addition several have been submitted for publication in international refereed journals and some have already been accepted.

| | | |
|---|---|---|
| Alastair Rothwell | Toni Hobbs | Chris Frampton |
| Supervisor | Coordinator | Statistician |

## ACKNOWLEDGMENTS

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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

## 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

## PUBLIC HOSPITALS

Auckland Hospital, Auckland, 1142 Contact: Shelley Thomas

Burwood Hospital, Christchurch 8083, Contact: Diane Darley

Christchurch Hospital, Christchurch 8140, Contact: Barbara Clark

Dunedin Hospital, Dunedin 9016, Contact: Jenni Taylor

Gisborne Hospital, Gisborne 4010, Contact: Jackie Dearman

Grey Base Hospital, Greymouth 7840, Contact: Peter Watson

Hawkes Bay Hospital, Hastings 4120, Contact: Jane Hurford-Bell

Hutt Hospital, Lower Hutt 5040, Contact: Sonja Dowle/ Elizabeth Browne

Kenepuru Hospital, Porirua 5240, Contact: Emma Brooks/ Sue Vonhartitzsch

Manukau Surgery Centre, Auckland 2104, Contact Amanda Ellis

Masterton Hospital, Masterton 5840, Contact: Sarah Duckett

Middlemore Hospital, Auckland, 1640 Contact: Francine Gabriel

Nelson Hospital, Nelson 7040, Contact: Pauline Manley/ Anne fryer

North Shore Hospital, Waitemata DHB, Takapuna 0740, Contact: Chris Cavalier

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

Rotorua Hospital (Lakeland), Rotorua 3046, Contact: Maggie Walsh

Southland Hospital, Invercargill 9812, Contact: Helen Powley

Taranaki Base Hospital, New Plymouth 4342, Contact: Allison Tijsen

Tauranga Hospital, Tauranga 3143, Contact: Susan Clynes

Timaru Hospital, Timaru 7940, Contact: Philippa Wilson

Waikato Hospital, Hamilton 3204, Contact: Maria Ashhurst or Helen Keen

Wairau Hospital, Blenheim 7240, Contact: Monette Johnston

Wanganui Hospital, Wanganui, Contact: Heather Richardson

Wellington Hospital, Newtown 6242, Contact: Rebecca Kay

Whakatane Hospital, Whakatane 3158, Contact: Karen Burke

Whangarei Area Hospital, Whangarei 0140, Contact: Beth McLean

## PRIVATE HOSPITALS

Aorangi Hospital, Palmerston North 4410, Contact: Frances Clark

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Belverdale Hospital, Wanganui 4500, Contact: Jane Young

Bidwill Trust Hospital, Timaru 7910, Contact Kay Taylor

Boulcott Hospital, Lower Hutt 5040, Contact: Karen Hall

Bowen Hospital, Wellington, 6035 Contact: Pam Kohnke

Braemar Hospital Ltd, Hamilton 3204, Contact: Allison Vince

Chelsea Hospital, Gisborne 4010, Contact Jenny Long

Kensington Hospital, Whangarei 0112, Contact: Sandy Brace

Manuka Street Trust Hospital, Nelson 7010, Contact: Diane Molyneux

Mercy Integrated Hospital, Auckland 1023, Contact: Margie Robertson

Mercy Hospital, Dunedin 9054, Contact: Liz Cadman

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Norfolk Southern Cross Hospital, 62 Grace Road, Tauranga 3112, Contact: Anne Clemance

Queen Elizabeth Hospital, Rotorua 3010, Contact: Chris Mott

Royston Hospital, Hastings 4112, Contact: Suzette Du Plessis

St Georges Hospital, Christchurch, 8014, Contact: Steph May

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Southern Cross Hospital, Hamilton East 3216, Contact: Sharon Buttimore

Southern Cross Hospital, Invercargill Central, 9810, Contact: Jill Hansen

Southern Cross Hospital, New Plymouth 4310, Contact: Raewyn Woolliams

Southern Cross North Harbour, Wairau Valley 0627, Contact: Rita Redman

Southern Cross Hospital, Palmerston North 4410, Contact: Susan Wright

Southern Cross Hospital, Rotorua 3015, Contact: Eleanor Spencer

Southern Cross Hospital, Newtown, Wellington, 6021, Contact: Shannon Hindle

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ACCIDENT COMPENSATION CORPORATION

CANTERBURY DISTRICT HEALTH BOARD

MINISTRY OF HEALTH

NEW ZEALAND ORTHOPAEDIC ASSOCIATION

ORTHOPAEDIC SURGEONS

SOUTHERN CROSS HOSPITALS

WISHBONE TRUST

## PROFILE OF THE AVERAGE NEW ZEALAND ORTHOPAEDIC SURGEON 2007 *

From our analyses the average orthopaedic surgeon performs on an annual basis:

- 39 Total hip arthroplasties — with 40% using uncemented, 20% fully cemented and 40% hybrid prostheses: has a 75.44% survival at 9 years and a revision rate of 0.57 per 100 component years; 0.35% have been revised for deep infection; 85% at 6 months and 87% at five years had an excellent or good Oxford Score.
- 32 Total knee arthroplasties — with almost all cemented but only 10 with patellae resurfaced; has a 96.63% survival at 9 years and a revision rate of 0.48 per 100 component years; 0.47% have been revised for deep infection; 72% at 6 months and 81% at 5 years had an excellent or good Oxford Score.
- 7 Unicompartmental knee arthroplasties — almost all cemented; has a 92.03% survival at 6 years and a revision rate of 1.44 per 100 component years; 0.3% have been revised for deep infection; 79% at six months and 85% at 5 years had an excellent or good Oxford Score.
- 5 Shoulder arthroplasties — with close to a 50/50 split between total and hemi; has a 95.84% survival at 5 years and a revision rate of 0.88 per 100 component years; 0.24 have been revised for deep infection; 65% had an excellent or good Oxford Score at 6 months.
- 6 total ankle arthroplasties — mostly uncemented; 89.2% survival at 6 years and a revision rate of 1.1 per 100 component years; none revised for deep infection; 42% had excellent or good Oxford derived scores at 6 months.
- 2 total elbow arthroplasties — most likely a cemented Coonrad-Morrey prosthesis; 95.36% survival at 3 years and a revision rate of 1.3 per 100 component years; 1.0% have been revised for deep infection; 65% had excellent or good Oxford derived scores at 6 months.

*** averages derived from the number of surgeons actually doing the above procedures 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 the first Registry to collect data from Patient Generated Outcomes. The “Oxford 12” validated Hip and Knee patient 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 THA’s and TKA’s and on the advice of our statistician, questionnaires have been sent out on a random selection basis since July 2002 to achieve 1000 annual responses for each group.

### 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, the Wishbone Trust and for the last three years significant annual grants from the ACC. From 2002 funding has become more reliable with the surgeons

paying the $10 levy for each joint registered from a private hospital, and the MOH agreeing to pay $72,000 a year as part of the Government Joint Initiative. For 2005 the Southern Cross Hospitals have contributed $10,000.

**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.

**Reporting to the NZOA**
A Registry update is provided in the quarterly newsletter as well as an annual report and financial statement.

**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 trialing 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 six monthly surgeon and hospital reports.

The Oxford questionnaire was available for the shoulder joint and was adapted for the elbow and ankle joints.

### 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 2008 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 has expanded to include up 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 three 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 2007 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 Joint 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 credited personnel and it is emphasised that Ethics Committee approval is required for any research projects involving patient contact.

### Registry Committee

This committee has now been formalised and the membership consists of: 5 Orthopaedic Surgeons; Registry Coordinator; OILA Representative; Arthritis New Zealand Representative; Chief Executive NZOA. The main tasks of the Committee 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 Registry Association.

## NUMBER OF JOINTS ANALYSED
## 1ST JANUARY 1999 – 31ST DECEMBER 2007

**Numbers of procedures registered**

| | 9 years | 8 years | 7 Years | 6 Years | 5 Years |
|---|---|---|---|---|---|
| Hips, primary | 49374 | 42421 | 35998 | 29680 | 23457 |
| Hips, revision | 7360 | 6383 | 5487 | 4570 | 3641 |
| Knees, primary | 34458 | 28705 | 23565 | 18537 | 14371 |
| Knees, revision | 2883 | 2499 | 2149 | 1736 | 1419 |
| Knees, unicompartmental | 4284 | 3709 | 3122 | 2565 | 1926 |
| Shoulders, primary | 2044 | 1641 | 1275 | 982 | 693 |
| Shoulders, revision | 139 | 105 | 80 | 57 | 45 |
| Elbows, primary | 227 | 191 | 160 | 130 | 101 |
| Elbows, revision | 36 | 31 | 26 | 20 | 15 |
| Ankles, primary | 377 | 298 | 216 | 146 | 99 |
| Ankles, revision | 26 | 19 | 12 | 8 | 6 |
| Lumbar Disc, primary | 75 | 59 | 38 | 22 | |
| Cervical Disc, primary | 31 | | | | |
| **TOTAL** | **101314** | **86061** | **72128** | **58,453** | **45,776** |

**BILATERAL JOINT REPLACEMENTS CARRIED OUT UNDER THE SAME ANAESTHETIC**

| | | | | |
|---|---|---|---|---|
| Bilateral hips | 1042 patients | (2084 hips) | 4.0% | of primary hips |
| Bilateral knees | 1569 patients | (3138 knees) | 9.0 % | of primary knees |
| Bilateral Unicompartmental knees | 345 patients | (690 knees) | 16.0% | of primary uni knees |
| Bilateral ankles | 2 patients | (4 ankles) | | |
| Bilateral shoulders | 2 patients | (4 shoulders) | | |

The percentages have remained essentially unchanged from the previous reports.

**Registrar Surgeons** In the following analyses consultants took responsibility for their registrar surgeon procedures.

# HIP ARTHROPLASTY

## PRIMARY HIP ARTHROPLASTY

The nine-year report analyses data for the period January 1999 – December 2007. There were 49,375 primary hip procedures registered including 517 resurfacing arthroplasties. This is an additional 6,952 compared to last year's report.

| | |
|---|---|
| 1999 | 4117 |
| 2000 | 4721 |
| 2001 | 4931 |
| 2002 | 4830 |
| 2003 | 5051 |
| 2004 | 6028 |
| 2005 | 6318 |
| 2006 | 6427 |
| 2007 | 6952 |

There has been an 8.1% increase in the number of hip registrations for 2007 compared to 2006 which is the biggest jump in yearly registrations since the commencement of the MOH initiative in 2004. Overall there has been a 69% increase in annual registrations since 1999.

## DATA ANALYSIS

### Age and sex distribution

The average age for all patients with primary hip arthroplasty was 66.86 years, with a range of 15.43 – 100.13 years.

**All hip arthroplasty**

| | Female | Male |
|---|---|---|
| Number | 26029 | 23346 |
| Percentage | 52.72 | 47.30 |
| Mean age | 68.37 | 65.18 |
| Maximum age | 100.13 | 96.97 |
| Minimum age | 15.43 | 15.87 |
| Standard dev. | 11.76 | 11.50 |

**Conventional hip arthroplasty**

| | Female | Male |
|---|---|---|
| Number | 25895 | 22963 |
| Percentage | 53.00 | 47.00 |
| Mean age | 68.47 | 65.40 |
| Maximum age | 100.13 | 96.97 |
| Minimum age | 15.43 | 15.87 |
| Standard dev. | 11.70 | 11.42 |

**Resurfacing hip arthroplasty**

| | Female | Male |
|---|---|---|
| Number | 134 | 383 |
| Percentage | 25.92 | 74.08 |
| Mean age | 49.25 | 51.91 |
| Maximum age | 65.88 | 71.98 |
| Minimum age | 25.72 | 20.55 |
| Standard dev. | 7.62 | 8.58 |

A further 188 resurfacing hips were registered during 2007 representing an increase of 11% over 2006

**Previous operation**

| | |
|---|---|
| None | 46721 |
| Internal fixation | 1068 |
| Osteotomy | 338 |
| Internal fixation for SUFE | 91 |
| Arthrodesis | 49 |
| Core decompression | 37 |
| Arthroscopy/arthrotomy | 38 |
| Open reduction | 32 |
| Other | 73 |

**Diagnosis**

| | |
|---|---|
| Osteoarthritis | 42152 |
| Acute fracture NOF | 1746 |
| Avascular necrosis | 1587 |
| Developmental dysplasia | 1368 |
| Rheumatoid arthritis | 825 |
| Old fracture NOF | 675 |
| Other inflammatory | 497 |
| Post acute dislocation | 177 |
| Tumour | 229 |
| Fracture acetabulum | 94 |
| Other | 93 |

**Approach**

| | |
|---|---|
| Posterior | 30061 |
| Lateral | 14208 |
| Anterior | 2679 |
| Minimally invasive | 724 |
| Trochanteric osteotomy | 111 |
| Image guided surgery | 30 |

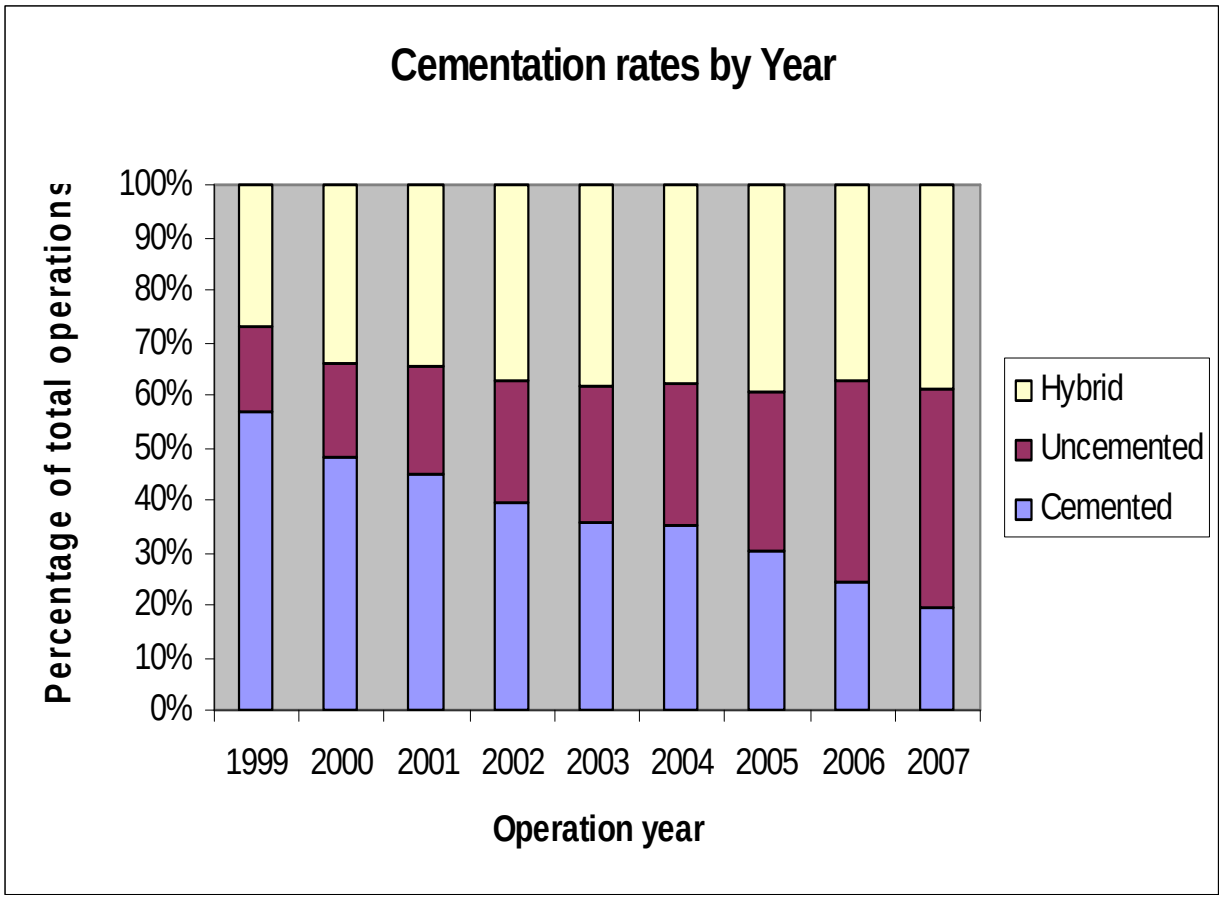
Image guided surgery was added to the updated forms at the beginning of 2005 but there has been little interest in the technique. In contrast the minimally invasive approach is still gaining in popularity and in 2007 accounted for 2.6% of registered approaches. The posterior approach was used in 64% of arthroplasties.

**Bone graft**

| | |
|---|---|
| Femoral autograft | 125 |
| Femoral allograft | 25 |
| Femoral synthetic | 2 |
| | |
| Acetabular autograft | 362 |
| Acetabular allograft | 62 |
| Acetabular synthetic | 2 |

**Cement**

| | | |
|---|---|---|
| Femur cemented | 35193 | (71%) |
| Antibiotic in cement | 18962 | (54%) |
| Acetabulum cemented | 17807 | (37%) |
| Antibiotic in cement | 9685 | (54%) |




The proportion of uncemented hips is steadily increasing at the expense of fully cemented hips which in 2007 were just 20% of total. However, 60% of femurs were cemented

**Systemic antibiotic prophylaxis**

Patient number receiving at least one systemic antibiotic 47125 (95%)

A cephalosporin was used in 91% of patients.

**Operating theatre**

| | |
|---|---|
| Conventional | 33008 |
| Laminar flow | 15554 |
| Space suits | 10172 |

**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 three-year period 2005 -2007, there were 16256 (83%) primary hip procedures with the ASA class recorded.

| ASA | Number | % |
|---|---|---|
| 1 | 2900 | 18 |
| 2 | 9552 | 59 |
| 3 | 3665 | 22 |
| 4 | 139 | 1 |

**Operative time – skin to skin**

| | |
|---|---|
| Mean | 82 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 three-year period 2005 – 2007.

| | |
|---|---|
| Consultant | 17043 |
| Advanced trainee supervised | 1435 |
| Basic trainee | 558 |
| Advanced trainee unsupervised | 468 |

The number of unsupervised advanced trainee procedures increased by 30% in 2007 but no change for supervised advanced trainees.

**Prosthesis usage**

**Resurfacing hips**

| | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|
| BHR | 7 | 101 | 132 | 156 |
| ASR | 10 | 38 | 37 | 29 |
| Durom | 4 | | | |
| Adept | | | | 2 |
| Mitch | | | | 1 |
| Total | 21 | 139 | 169 | 188 |

The BHR is still the most popular resurfacing prosthesis accounting for 77% of the total.

**Conventional primary hips**

**Top 10 femoral components used in 2007**

| | |
|---|---|
| Exeter V40 | 2040 |
| CLS | 674 |
| TwinSys uncemented | 606 |
| Spectron | 527 |
| Corail | 491 |
| Muller | 374 |
| Accolade | 311 |
| MS 30 | 255 |
| CPT | 191 |
| Summit | 168 |

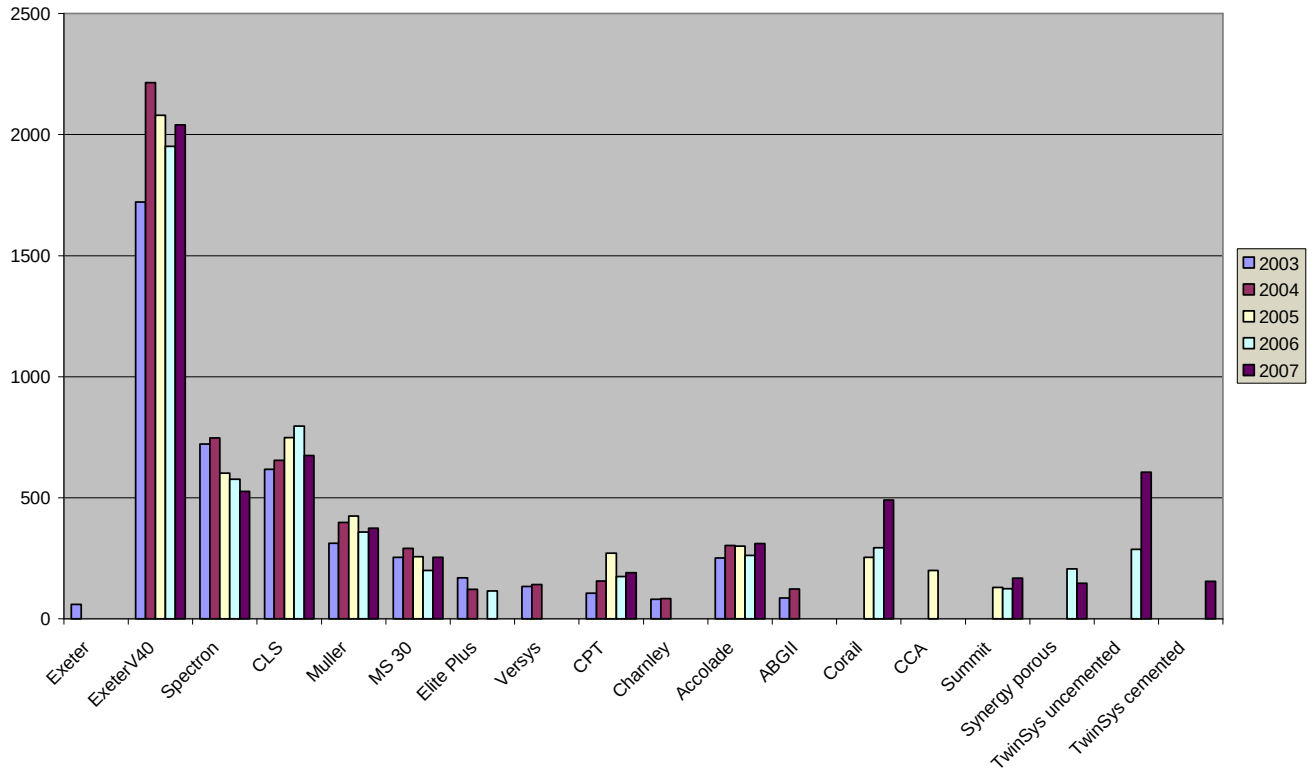
The twinsys uncemented continues its upward march. The synergy porous has been supplanted by the summit.

**Top 10 acetabular components used in 2007**

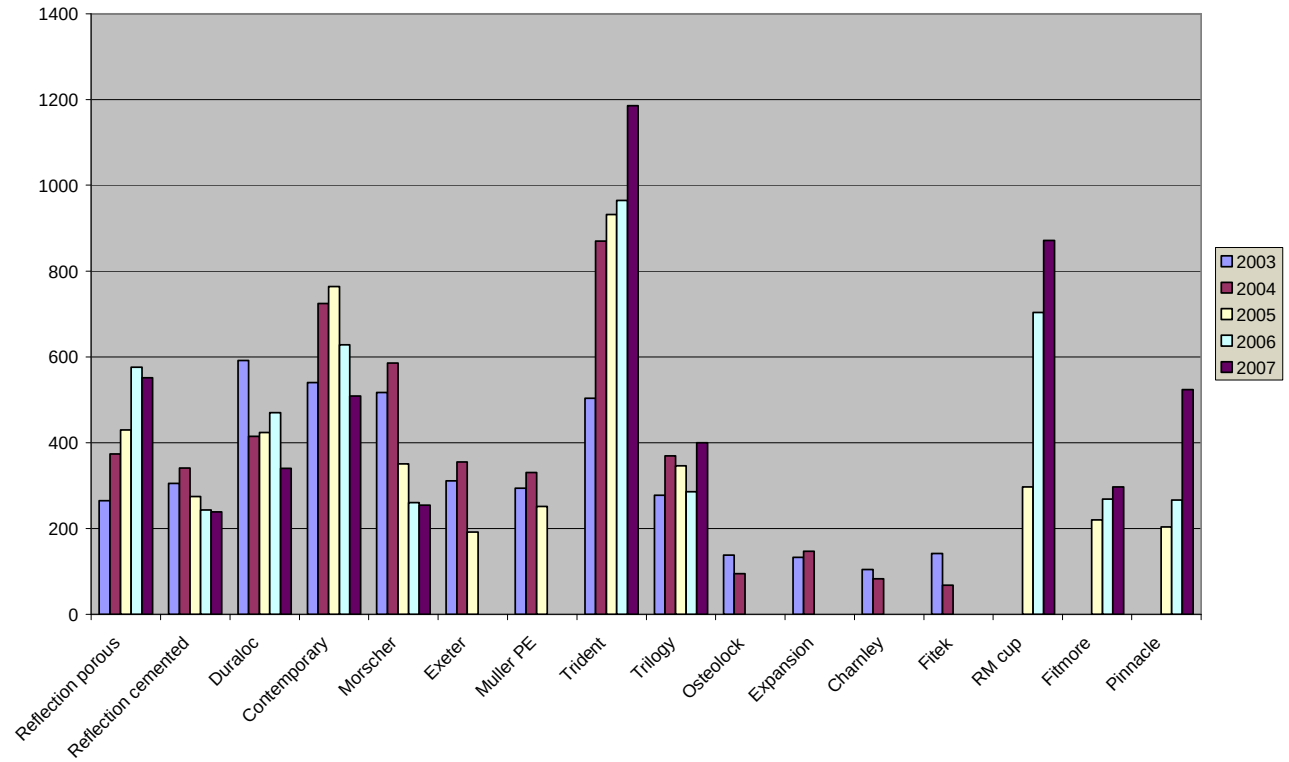
| | |
|---|---|
| Trident | 1186 |
| RM cup | 872 |
| Reflection porous | 552 |
| Pinnacle | 524 |
| Contemporary | 509 |
| Trilogy | 400 |
| Duraloc | 340 |
| Fitmore | 297 |
| Morscher | 255 |
| Reflection cemented | 239 |

The top 10 remain the same as 2006 but the pinnacle cup has moved up several places.

## MOST USED FEMORAL COMPONENTS 5 YEARS 2003 – 2007




## MOST USED ACETABULAR COMPONENTS 5 YEARS 2003-2007



## Surgeon and hospital workload

### Surgeons

In 2007 180 surgeons performed 6,952 total hip replacements, an average of 39 procedures per surgeon.

25 surgeons performed less than 10 procedures and 38 performed more than 50.
An extra 528 hip arthroplasties were performed in 2007 compared to 2006 by the same number of surgeons which increased the average per surgeon from 36 to 39. There was a slight fall in those doing less than 10 and, surprisingly, greater than 50 in 2007

### Hospitals

In 2007 primary hip replacement was performed in 50 hospitals, 26 public and 24 private.
The average number of total hip replacements per hospital was 139, an increase of 10 over last year.

### 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 nine-year period January 1999 – December 2007, there were 7,360 revision hip procedures registered. This is an additional 973 compared to last year's report.

The average age for a revision hip replacement was 69.71 years, with a range of 17.52 – 97.72 years.

### Revision hips

| | Female | Male |
|---|---|---|
| Number | 3613 | 3747 |
| Percentage | 49.10 | 50.90 |
| Mean age | 69.73 | 69.70 |
| Maximum age | 97.72 | 94.87 |
| Minimum age | 17.52 | 25.68 |
| Standard dev. | 12.37 | 10.78 |

The percentage of revision hips to primary hips is 13% i.e. for every 100 hip arthroplasties 13 were revision procedures.

### REVISION OF REGISTERED PRIMARY HIP ARTHROPLASTIES

This section analyses data for revisions of primary hip procedures for the nine-year period.

There were 1178 revisions of the 48,858 primary conventional hip replacements (2.4%) and 7 revisions of the 517 resurfacing hip replacements (1.4%), a total of 1185.

### Time to revision for conventional hips

| | |
|---|---|
| Mean | 847 days |
| Maximum | 3177 days |
| Minimum | 0 days |
| Standard deviation | 820 days |

### Reason for revision

| | |
|---|---|
| Dislocation | 448 |
| Loosening acetabular comp. | 235 |
| Loosening femoral component | 179 |
| Deep infection | 176 |
| Pain | 107 |
| Fracture femur | 90 |
| Wear polyethylene | 22 |
| Osteolysis | 13 |
| Implant breakage | 10 |
| Malposition of components | 5 |
| Wear acetabulum | 8 |
| Tumour | 4 |
| Subsidence of prostheses | 4 |
| Fracture ceramic head | 3 |
| Other | 20 |

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

The percentages for the 4 main reasons for revision are;

| | |
|---|---|
| Dislocation | 38% |
| Loosening acetabular comp. | 20% |
| Deep infection | 15% |
| Loosening femoral component | 15% |

### Analysis by time of the 4 main reasons for revision

Dislocation n = 448

| | |
|---|---|
| < 6 months | 202 |
| 6 months – 1 year | 48 |
| >1 – 2 years | 78 |
| >2 – 3 years | 45 |
| >3 – 4 years | 31 |
| >4 – 5 years | 17 |
| >5 – 6 years | 13 |
| >6 – 7 years | 6 |
| >7 – 8 years | 7 |
| >8 – 9 years | 1 |

Loosening acetabular component n = 235

| | |
|---|---|
| < 6 months | 37 |
| 6 months – 1 year | 17 |
| >1 – 2 years | 34 |
| > 2 – 3 years | 30 |
| >3 – 4 years | 27 |
| > 4 – 5 years | 21 |
| > 5 – 6 years | 20 |
| > 6 – 7 years | 32 |
| >7 – 8 years | 12 |
| >8 – 9 years | 5 |

Loosening femoral component n = 179

| | |
|---|---|
| < 6 months | 16 |
| 6 months – 1 year | 13 |
| >1 – 2 years | 27 |
| > 2 – 3 years | 23 |
| >3 – 4 years | 19 |
| > 4 – 5 years | 19 |
| > 5 – 6 years | 26 |
| > 6 – 7 years | 24 |
| >7 – 8 years | 10 |
| >8 – 9 years | 2 |
| | |

Deep infection n = 176

| | |
|---|---|
| < 6 months | 34 |
| 6 months – 1 year | 25 |
| >1 – 2 years | 38 |
| > 2 – 3 years | 33 |
| >3 – 4 years | 17 |
| > 4 – 5 years | 15 |
| > 5 – 6 years | 4 |
| > 6 – 7 years | 7 |
| >7 – 8 years | 2 |
| >8 – 9 years | 1 |

**Statistical note**
In the table 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 place.

**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.

**All primary total hip arthroplasties**

| | Total | Observed Component Years | Number Revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| **All patients** | 48858 | 203858.3 | 1178 | 0.57 | 0.55, 0.61 |

**Resurfacing Hip Arthroplasties**

| | Total | Observed Component Years | Number Revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| **All patients** | 517 | 945.57 | 7 | 0.74 | 0.30, 1.53 |

There is no significant difference between the revision rates for conventional and resurfacing hips

**Revision versus Hip Prosthesis Matchings**

| Femoral component | Acetabular component | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|---|
| ABGII | Trident | 333 | 853 | 6 | 0.70 | 0.26, 1.53 |
| Accolade | Trident | 1310 | 3762 | 27 | 0.72 | 0.47, 1.04 |
| CCA | CCB | 476 | 1627 | 7 | 0.43 | 0.17, 0.89 |
| Charnley | Charnley | 747 | 4149 | 15 | 0.36 | 0.20, 0.60 |
| CLS | Fitmore | 591 | 1596 | 14 | 0.88 | 0.48, 1.47 |
| CLS | Duraloc | 657 | 3467 | 26 | 0.75 | 0.49, 1.10 |
| CLS | CLS Expansion | 1046 | 5312 | 36 | 0.68 | 0.47, 0.94 |
| CLS | Morscher | 1556 | 7380 | 45 | 0.61 | 0.45, 0.82 |
| CLS | Fitek | 643 | 3692 | 8 | 0.22 | 0.09, 0.43 |
| Corail | Pinnacle | 519 | 953 | 8 | 0.84 | 0.36, 1.65 |
| Corail | Duraloc | 375 | 1107 | 5 | 0.45 | 0.15, 1.05 |
| CPT | Trilogy | 339 | 891 | 9 | 1.01 | 0.46, 1.92 |
| CPT | ZCA | 461 | 2372 | 14 | 0.59 | 0.32, 0.99 |
| Elite Plus | Duraloc | 606 | 2581 | 18 | 0.70 | 0.41, 1.10 |
| Elite Plus | Charnley | 332 | 2215 | 12 | 0.54 | 0.28, 0.95 |
| Elite Plus | Elite Plus LPW | 282 | 1417 | 5 | 0.35 | 0.12, 0.82 |
| Exeter | Duraloc | 552 | 3885 | 29 | 0.75 | 0.50, 1.07 |
| Exeter | Osteolock | 836 | 5598 | 31 | 0.55 | 0.38, 0.79 |
| Exeter | Contemporary | 1550 | 10536 | 56 | 0.53 | 0.40, 0.69 |
| Exeter | Exeter | 1326 | 8651 | 45 | 0.52 | 0.38, 0.70 |
| Exeter | Morscher | 551 | 3889 | 18 | 0.46 | 0.27, 0.73 |
| Exeter V40 | Morscher | 558 | 1852 | 12 | 0.65 | 0.33, 1.13 |
| Exeter V40 | Duraloc | 860 | 2820 | 17 | 0.60 | 0.35, 0.97 |
| Exeter V40 | Trident | 2508 | 6431 | 37 | 0.58 | 0.41, 0.79 |
| Exeter V40 | Osteolock | 269 | 1225 | 7 | 0.57 | 0.23, 1.18 |
| Exeter V40 | Contemporary | 3206 | 9439 | 51 | 0.54 | 0.40, 0.71 |
| Exeter V40 | Trilogy | 830 | 2452 | 10 | 0.41 | 0.20, 0.75 |
| Exeter V40 | Exeter | 1274 | 4547 | 18 | 0.4 | 0.24, 0.63 |
| MS 30 | Morscher | 746 | 3755 | 22 | 0.59 | 0.37, 0.89 |
| MS 30 | Muller PE cup | 450 | 2129 | 10 | 0.47 | 0.23, 0.86 |
| MS 30 | Fitmore | 333 | 747 | 2 | 0.27 | 0.03, 0.97 |
| Muller | RM cup | 1003 | 4222 | 25 | 0.59 | 0.38, 0.87 |
| Muller | Weber | 406 | 1549 | 6 | 0.39 | 0.14, 0.84 |
| Muller | Muller PE cup | 1802 | 9138 | 25 | 0.27 | 0.18, 0.40 |
| Spectron | Duraloc | 1154 | 6285 | 55 | 0.88 | 0.66, 1.14 |
| Spectron | Reflection cemented | 2717 | 13899 | 79 | 0.57 | 0.45, 0.71 |
| Spectron | Reflection porous | 1748 | 6478 | 35 | 0.54 | 0.38, 0.75 |
| Summit | Pinnacle | 357 | 823 | 5 | 0.61 | 0.20, 1.42 |
| Synergy Porous | Reflection Porous | 567 | 1529 | 10 | 0.65 | 0.31, 1.20 |
| TwinSys uncemented | RM cup | 621 | 791 | 4 | 0.51 | 0.14, 1.30 |
| Versys | Trilogy | 271 | 1582 | 7 | 0.44 | 0.18, 0.91 |
| Versys cemented | ZCA | 335 | 1669 | 9 | 0.54 | 0.25, 1.02 |

There are 605 hip prosthesis matchings in the Registry. The table above contains the analysis of the 42 matchings 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 Spectron/Duraloc has a revision rate statistically significantly higher than the overall rate of 0.57/100 ocys @ the 95% confidence interval.

**Femoral Components sorted on revision rate/ 100 component years**

| Femur Prosthesis | No. Ops. | Observed comp. Yrs | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Trabecular Metal Stem | 78 | 100.78 | 2 | 1.98 | 0.24, 7.17 |
| DSP Thrust Plate | 104 | 833.47 | 12 | 1.44 | 0.74, 2.52 |
| C-Stem | 277 | 1059.617 | 14 | 1.32 | 0.72, 2.22 |
| Furlong | 56 | 194.508 | 2 | 1.03 | 0.12, 3.71 |
| Prodigy | 149 | 887.354 | 9 | 1.014 | 0.46, 1.93 |
| CBC Stem | 322 | 699.176 | 7 | 1.00 | 0.40, 2.06 |
| Contemporary | 71 | 502.119 | 5 | 0.99 | 0.32, 2.32 |
| Wagner cone stem | 135 | 706.979 | 7 | 0.99 | 0.40, 2.04 |
| Modular Taperloc | 56 | 106.694 | 1 | 0.94 | 0.02, 5.22 |
| CPCS | 56 | 213.78 | 2 | 0.93 | 0.11, 3.38 |
| S-Rom | 416 | 1644.602 | 14 | 0.85 | 0.47, 1.43 |
| ABGII | 660 | 2333.574 | 19 | 0.81 | 0.50, 1.27 |
| ABG | 189 | 1534.092 | 12 | 0.78 | 0.40, 1.37 |
| Summit | 581 | 1320.397 | 10 | 0.76 | 0.36, 1.39 |
| CCA | 834 | 3185.61 | 24 | 0.75 | 0.48, 1.12 |
| Accolade | 1494 | 4295.622 | 29 | 0.68 | 0.45, 0.97 |
| CLS | 5770 | 25174.478 | 168 | 0.67 | 0.57, 0.78 |
| Versys | 310 | 1722.653 | 11 | 0.64 | 0.31, 1.14 |
| TwinSys stem uncemented | 915 | 1103.406 | 7 | 0.63 | 0.26, 1.31 |
| Friendly | 83 | 158.231 | 1 | 0.63 | 0.02, 3.52 |
| CPT | 1325 | 5137.577 | 32 | 0.62 | 0.43, 0.88 |
| Corail | 1315 | 2893.64 | 18 | 0.62 | 0.37, 0.98 |
| Spectron | 6420 | 30540.98 | 187 | 0.61 | 0.53, 0.71 |
| Mallory-Head | 225 | 842.601 | 5 | 0.59 | 0.19, 1.38 |
| Elite plus | 1351 | 6893.407 | 39 | 0.57 | 0.40, 0.77 |
| Versys cemented | 585 | 2834.423 | 15 | 0.53 | 0.30, 0.87 |
| Synergy Porous | 694 | 1903.288 | 10 | 0.52 | 0.25, 0.97 |
| Exeter | 5748 | 38706.376 | 199 | 0.51 | 0.45, 0.59 |
| Exeter V40 | 10902 | 32402.738 | 160 | 0.49 | 0.42, 0.58 |
| MS 30 | 2102 | 9196.561 | 45 | 0.49 | 0.36, 0.65 |
| ML MMA | 75 | 415.307 | 2 | 0.48 | 0.06, 1.74 |
| Omnifit | 201 | 857.678 | 4 | 0.46 | 0.13, 1.19 |
| Muller | 3564 | 16365.799 | 67 | 0.41 | 0.33, 0.52 |
| Charnley | 805 | 4464.32 | 16 | 0.36 | 0.20, 0.58 |
| TwinSys stem cemented | 287 | 385.399 | 0 | 0.00 | 0.00, 0.96 |
| Charnley Modular | 60 | 68.879 | 0 | 0.00 | 0.00, 5.36 |
| AML | 55 | 358.281 | 0 | 0.00 | 0.00, 1.03 |
| emoral Stem Press Fit | 53 | 59.515 | 0 | 0.00 | 0.00, 6.20 |

The C Stem and DSP Thrust Plate have revision rates statistically significantly higher than the average overall rate of 0.57/100 ocys @ the 95% confidence interval

**Acetabular components sorted on revision rate/100 component years**

| Acetabular Prosthesis | No. Ops. | Sum comp. Yrs | Events | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Artek | 72 | 432.64 | 14 | 3.24 | 1.77, 5.43 |
| Durom | 170 | 306.59 | 4 | 1.30 | 0.36, 3.34 |
| Trabecular Metal Shell | 52 | 88.23 | 1 | 1.13 | 0.03, 6.32 |
| Furlong cup | 60 | 192.27 | 2 | 1.04 | 0.13, 3.76 |
| Pinnacle | 1307 | 2867.47 | 25 | 0.87 | 0.56, 1.29 |
| ABGII | 175 | 1244.11 | 10 | 0.80 | 0.39, 1.48 |
| Selexys TPS | 241 | 260.87 | 2 | 0.77 | 0.09, 2.77 |
| Weill ring | 108 | 654.25 | 5 | 0.76 | 0.25, 1.78 |
| ASR | 222 | 262.88 | 2 | 0.76 | 0.09, 2.75 |
| Allofit | 144 | 264.345 | 2 | 0.76 | 0.09, 2.73 |
| Duraloc | 5437 | 27001.48 | 195 | 0.72 | 0.62, 0.83 |
| CLS Expansion | 1407 | 7093.46 | 49 | 0.69 | 0.51, 0.91 |
| Fitmore | 1083 | 2821.94 | 19 | 0.67 | 0.41, 1.05 |
| M2A | 157 | 447.38 | 3 | 0.67 | 0.14, 1.96 |
| Delta-PF Cup | 365 | 792.90 | 5 | 0.63 | 0.20, 1.47 |
| Trident | 4876 | 13608.56 | 85 | 0.62 | 0.50, 0.77 |
| Ultima | 233 | 963.8 | 6 | 0.62 | 0.23, 1.36 |
| Monoblock Acetabular Cup | 409 | 1137.06 | 7 | 0.62 | 0.24, 1.27 |
| RM cup | 2716 | 7281.23 | 44 | 0.60 | 0.44, 0.81 |
| Osteolock | 1130 | 6969.35 | 42 | 0.60 | 0.43, 0.81 |
| Reflection porous | 2790 | 9303.65 | 54 | 0.58 | 0.44, 0.76 |
| ZCA | 899 | 4429.86 | 25 | 0.56 | 0.37, 0.83 |
| Morscher | 3893 | 19553.96 | 110 | 0.56 | 0.46, 0.68 |
| Reflection cemented | 3094 | 14991.81 | 84 | 0.56 | 0.45, 0.69 |
| Contemporary | 5090 | 21689.31 | 121 | 0.56 | 0.46, 0.67 |
| Elite Plus Ogee | 229 | 925.24 | 5 | 0.54 | 0.18, 1.26 |
| Elite Plus LPW | 311 | 1511.77 | 8 | 0.53 | 0.23, 1.04 |
| Expansion Shell | 84 | 189.64 | 1 | 0.53 | 0.01, 2.93 |
| Trilogy | 2271 | 8328.49 | 43 | 0.51 | 0.37, 0.70 |
| Exeter | 2625 | 13305.55 | 64 | 0.49 | 0.37, 0.61 |
| Charnley | 1154 | 6713.03 | 32 | 0.47 | 0.33, 0.68 |
| Fitek | 1136 | 6566.08 | 27 | 0.41 | 0.28, 0.60 |
| CCB | 594 | 1793.32 | 7 | 0.39 | 0.16, 0.80 |
| Weber | 531 | 2073.60 | 8 | 0.39 | 0.17, 0.77 |
| Muller PE cup | 2725 | 13500.85 | 42 | 0.31 | 0.23, 0.42 |
| Bio-clad poly | 184 | 973.05 | 3 | 0.30 | 0.06, 0.90 |
| Biomex acet shell porous | 112 | 687.82 | 2 | 0.29 | 0.03, 1.05 |
| Mallory-Head | 196 | 727.10 | 1 | 0.14 | 0.00, 0.77 |
| BHR Acetabular Cup | 79 | 124.89 | 0 | 0.00 | 0.00, 2.95 |
| Recap Resurfacing Acetabular S | 77 | 134.14 | 0 | 0.00 | 0.00, 2.75 |

The Duraloc and Artek cups have revision rates statistically significantly higher than the average overall rate of 0.57/100 ocys @ the 95% confidence interval.

**Revision vs arthroplasty fixation**

| Fixation | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Cemented | 17333 | 81659 | 395 | 0.48 | 0.44, 0.53 |
| Uncemented | 13700 | 49530 | 353 | 0.71 | 0.64, 0.79 |
| Hybrid | 17825 | 72669 | 430 | 0.59 | 0.54, 0.65 |

**Revision vs age groups**

| Age | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| <55 | 7397 | 32884 | 249 | 0.75 | 0.67, 0.86 |
| 55-64 | 12115 | 51963 | 327 | 0.63 | 0.56, 0.70 |
| 65-74 | 16189 | 68404 | 362 | 0.53 | 0.48, 0.59 |
| >74 | 13157 | 50608 | 240 | 0.47 | 0.42, 0.54 |

**Revision by age groups vs fixation**

| Age | Fixation | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|---|
| <55 | Cemented | 527 | 3036 | 41 | 1.35 | 0.97, 1.83 |
| | Uncemented | 4791 | 19575 | 129 | 0.66 | 0.55, 0.78 |
| | Hybrid | 2079 | 10273 | 79 | 0.77 | 0.61, 0.96 |
| 55-64 | Cemented | 1881 | 10354 | 68 | 0.66 | 0.51, 0.83 |
| | Uncemented | 5392 | 19753 | 149 | 0.75 | 0.64, 0.89 |
| | Hybrid | 4842 | 21855 | 110 | 0.50 | 0.41, 0.61 |
| 65-74 | Cemented | 6503 | 32272 | 147 | 0.46 | 0.38, 0.54 |
| | Uncemented | 2730 | 8318 | 56 | 0.67 | 0.51, 0.87 |
| | Hybrid | 6956 | 27814 | 159 | 0.57 | 0.49, 0.67 |
| >74 | Cemented | 8422 | 35997 | 139 | 0.39 | 0.32, 0.46 |
| | Uncemented | 787 | 1883 | 19 | 1.01 | 0.61, 1.58 |
| | Hybrid | 3948 | 12727 | 82 | 0.64 | 0.51, 0.80 |

**Revision by fixation vs age groups**

| Cemented | N | Observed component Yrs | Number revised | Rate/100 component years | Rate/100 component years | Exact 95% confidence interval | P Values CvsU | CvsH | UvsH |
|---|---|---|---|---|---|---|---|---|---|
| LT55 | 527 | 3036 | 41 | 1.35 | 0.97 | 1.83 | <.001 | .009 | .203 |
| 55_64 | 1881 | 10354 | 68 | 0.66 | 0.51 | 0.83 | .623 | .068 | .005 |
| 65_74 | 6503 | 32272 | 147 | 0.46 | 0.38 | 0.54 | .055 | .097 | .603 |
| GE75 | 8422 | 35997 | 139 | 0.39 | 0.32 | 0.46 | .002 | .003 | .210 |
| **Uncemented** | | | | | | | | | |
| LT55 | 4791 | 19575 | 129 | 0.66 | 0.55 | 0.78 | | | |
| 55_64 | 5392 | 19753 | 149 | 0.75 | 0.64 | 0.89 | | | |
| 65_74 | 27 | 8318 | 56 | 0.67 | 0.51 | 0.87 | | | |
| GE75 | 7 | 1883 | 19 | 1.01 | 0.61 | 1.58 | | | |

| Hybrid | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LT55 | 20 | 10273 | 79 | 0.77 | 0.61 | 0.96 | | | |
| 55_64 | 48 | 21855 | 110 | 0.50 | 0.41 | 0.61 | | | |
| 65_74 | 69 | 27814 | 159 | 0.57 | 0.49 | 0.67 | | | |
| GE75 | 39 | 12727 | 82 | 0.64 | 0.51 | 0.80 | | | |

p Values demonstrate that; for under 55 age group the revision rate for uncemented and hybrid hips is significantly lower than for fully cemented; for 55-64, hybrid hips have a significantly lower revision rate than uncemented but not for cemented: for 65 to 74 there is no significant difference among the three fixation groups and for greater than 74 cemented hips have a significantly lower revision rate than either hybrid or uncemented.

**Revision vs approach**

| Approach | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Anterior | 2579 | 11561 | 65 | 0.56 | 0.43, 0.72 |
| Posterior | 29608 | 120304 | 741 | 0.62 | 0.57, 0.66 |
| Lateral | 14102 | 55561 | 280 | 0.50 | 0.45, 0.57 |
| Trochanteric | 107 | 475 | 3 | 0.63 | 0.13, 1.84 |

**Revision vs ASA**

| ASA class | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| 1 | 2725 | 4522 | 30 | 0.66 | 0.45, 0.95 |
| 2 | 9309 | 15040 | 97 | 0.65 | 0.52, 0.79 |
| 3 | 3640 | 5627 | 48 | 0.85 | 0.63, 1.13 |
| 4 | 139 | 203 | 2 | 0.99 | 0.12, 3.56 |

**Revision by ASA : Public vs Private Hospital**

| Public/Private | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Public | 8536 | 13579 | 109 | 0.80 | 0.66, 0.97 |
| Private | 7277 | 11813 | 68 | 0.58 | 0.45, 0.73 |

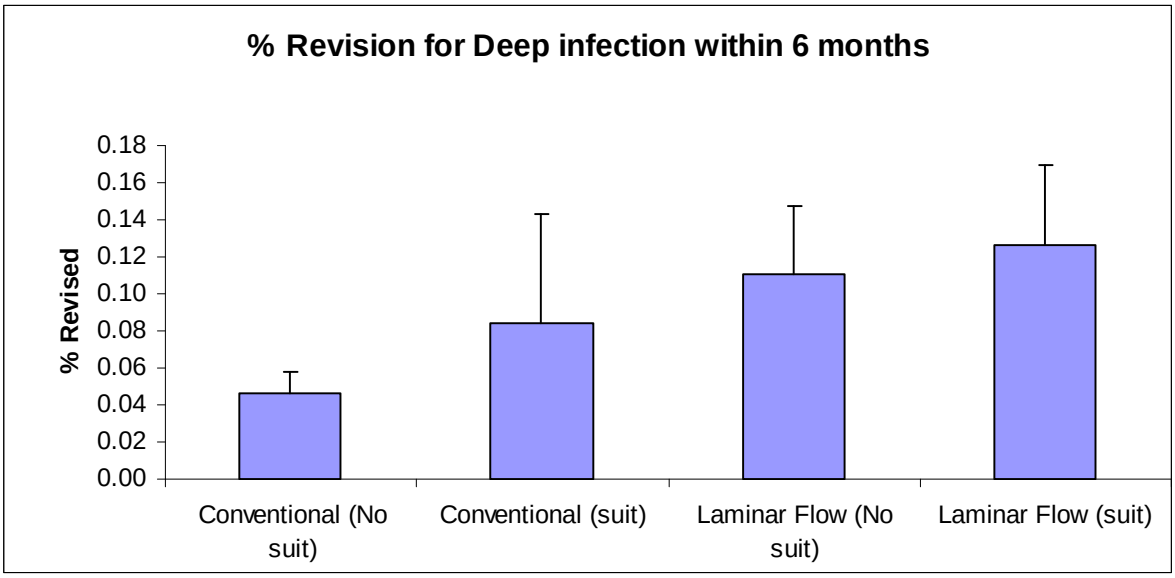
**Surgeon annual workload vs revision**

| Operations per annum | Number of operations | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| <10 | 499 | 2210 | 23 | 1.00 | 0.66, 1.56 |
| 10-25 | 4854 | 19596 | 128 | 0.65 | 0.55, 0.78 |
| 25-50 | 24822 | 102635 | 622 | 0.60 | 0.56, 0.66 |
| 50-75 | 9042 | 38763 | 204 | 0.53 | 0.46, 0.60 |
| 75-100 | 4244 | 17359 | 84 | 0.48 | 0.39, 0.60 |
| >100 | 5380 | 23219 | 116 | 0.50 | 0.41, 0.59 |

The p value for those doing < than 10 arthroplasties per year is significant especially when compared to those doing greater than 25 per year

**Revision for Infection within first six months versus theatre type**

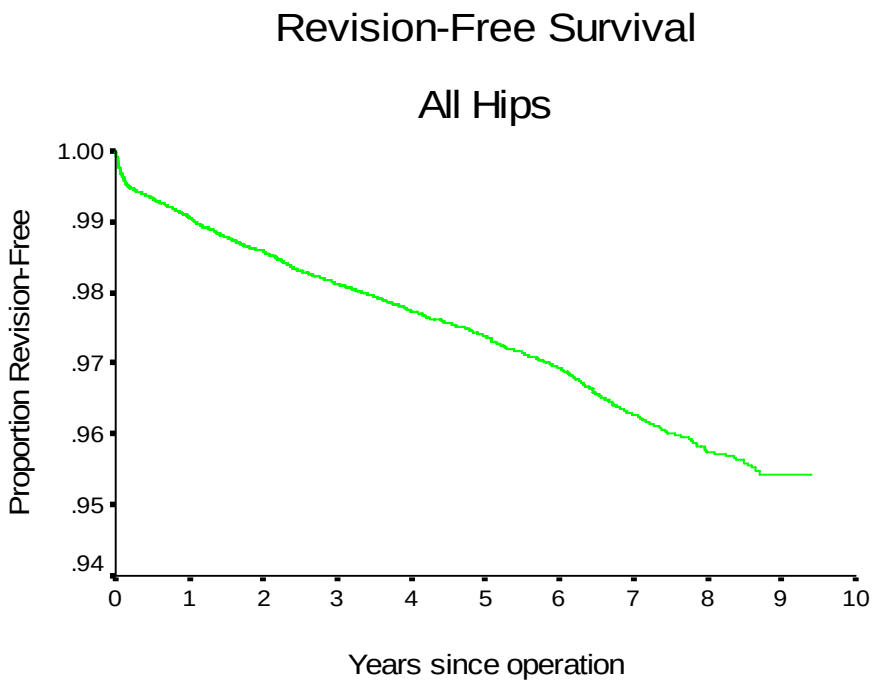
| | Number of operations | Number revised | % Revised | Exact 95% confidence interval |
|---|---|---|---|---|
| Conventional (No suit) | 30420 | 14 | 0.05 | 0.03, 0.07 |
| Conventional (suit) | 2384 | 2 | 0.08 | 0.00, 0.20 |
| Laminar Flow (No suit) | 8114 | 9 | 0.11 | 0.04, 0.18 |
| Laminar Flow (suit) | 7098 | 9 | 0.12 | 0.04, 0.20 |



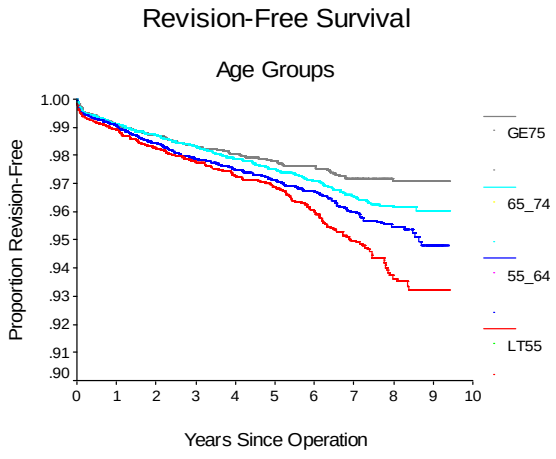

There is a significant difference between conventional (no suit) & laminar flow theatres (p = 0.03)

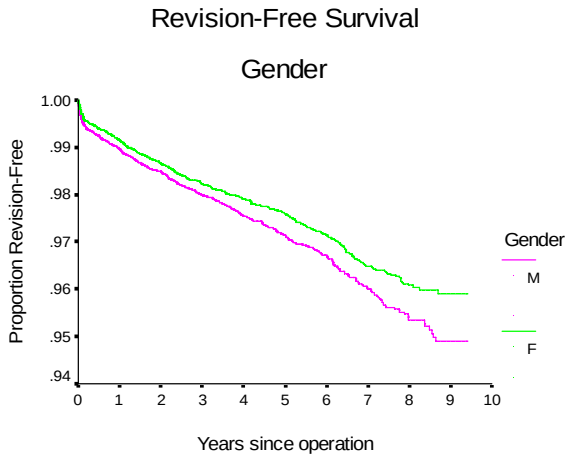
**Kaplan Meier Curves**

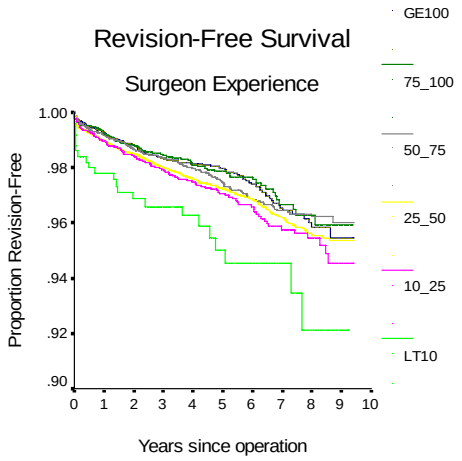
The following Kaplan Meier survival analyses are for years 1999 to 2007 with deceased patients censored at time of death.

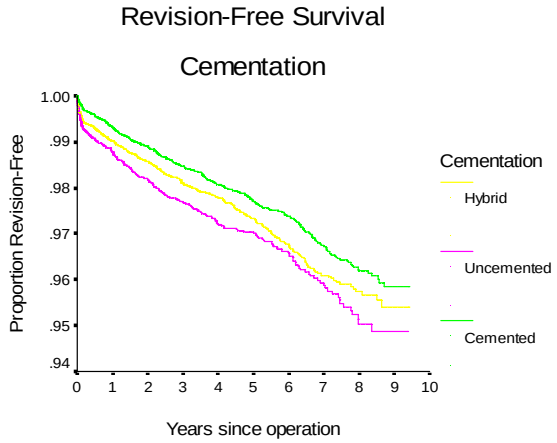


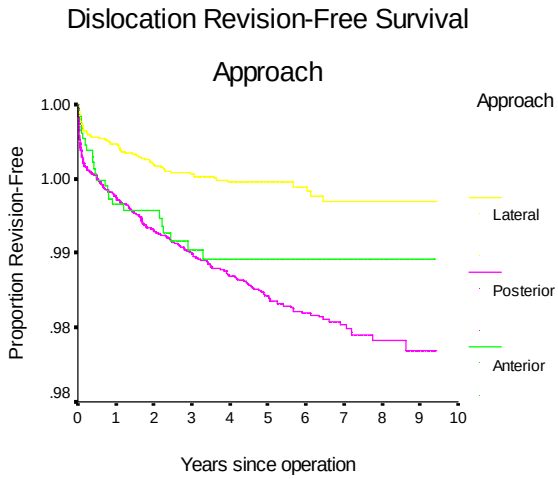

| Years | % Survival |
|---|---|
| 1 | 99.05 |
| 2 | 98.57 |
| 3 | 98.12 |
| 4 | 97.74 |
| 5 | 97.38 |
| 6 | 96.95 |
| 7 | 96.27 |
| 8 | 95.73 |
| 9 | 95.44 |






**Re-revision of conventional hips**
Analysis was undertaken of 3 groups of hip re-revisions.

There were126 registered conventional hip replacements that had been revised twice, 23 that had been revised three times and 5 that had been revised four times.

**Second revision**
Time between the first and second revisions averaged 443 days, with a range of 2 – 2984 and a standard deviation of 513. This compares to an average of 847 days between the primary and first revision.

**Reason for revision**

| | |
|---|---|
| Dislocation | 45 |
| Deep infection | 34 |
| Loosening acetabular | 20 |
| Loosening femoral | 14 |
| Pain | 12 |
| Fracture femur | 8 |
| Implant breakage | 4 |
| Bone graft dissolution | 1 |
| Iatrogenic pelvic diss. | 1 |
| Wear acetabular component | 1 |
| Instability | 1 |

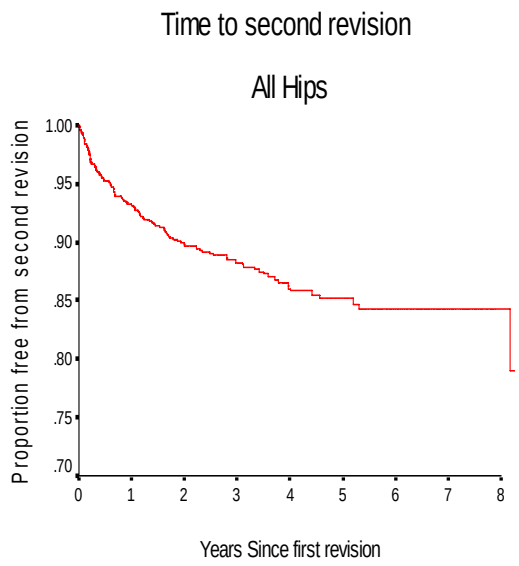
**Revision**

| | |
|---|---|
| Change of acetabular | 50 |
| Change of head | 50 |
| Change of liner | 36 |
| Change of femoral | 35 |
| Change of all | 29 |

**Third revision**
The average time between second and third revisions for the 23 arthroplasties was 421 days with a range of 13 – 1665 and a standard deviation of 391.

**Fourth revision**
The average time between the third and fourth revisions for the 5 arthroplasties was 322 days with a range of 40 – 679 and a standard deviation of 268.

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




The Kaplan Meier graph shows that survival following the first revision is poorer (84% at five years) than for a primary arthroplasty

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

**Questionnaires at six months post surgery**
At six months post surgery a random selection of patients are sent the Oxford-12 questionnaire in order to achieve a response rate of 20% of total which is deemed to be ample to provide powerful statistical analysis.

This year 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 which has been recommended by the original authors. (see appendix one)
This system 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 nine- year period, and as at July 2008, there were 17,657 primary hip questionnaire responses registered at six months post surgery.
The mean hip score was 40.76 (standard deviation 7.45, range 48 – 0)

| | | |
|---|---|---|
| Scoring | > 41 | 10335 |
| Scoring | 34 -41 | 4673 |
| Scoring | 27 -33 | 1612 |
| Scoring | < 27 | 1037 |

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 3429 individual patients.
At six months post surgery, 87% of these patients achieved an excellent or good score and had a mean of 41.48.

At five-year post surgery, 89% of these patients achieved an excellent or good score and had a mean of 42.59.

**Six month scores pre & post revision**
The group of patients who had six-month primary scores and subsequent revision scores were also analysed. The number with both these scores was 282.
At six months post surgery, 70% of this group achieved an excellent or good score and had a mean of 36.18.
The revision scores for this group had a mean of 35.93 and 65% achieved an excellent or good score.

**Analysis of the individual questions at six months and 5 years post surgery**
Analysis of the individual questions showed that the most frequent difficulties were: limping (Q10), putting on socks (Q4) and pain in the operated hip (Q1)

Percentage scoring 0 or 1(worst categories) for each question (n=17657) at six-months, and at five-years post surgery (n = 3429)

| | | % 6/12 | % 5 yrs |
|---|---|---|---|
| 1 | Moderate or severe pain from the operated hip | 6.1 | 6.1 |
| 2 | Only able to walk around the house or unable to walk before pain becomes severe | 4.2 | 2.6 |
| 3 | Extreme difficulty or impossible to get in and out of a car or public transport | 2.0 | 1.9 |
| 4 | Extreme difficulty or impossible to put on a pair of socks | 8.9 | 5.7 |
| 5 | Extreme difficulty or impossible to do the household shopping on your own | 3.7 | 3.0 |
| 6 | Extreme difficulty or impossible to wash and dry yourself | 1.8 | 1.2 |
| 7 | Pain interfering greatly or totally with your work | 3.9 | 3.3 |
| 8 | Very painful or unbearable to stand up from a chair after a meal | 2.0 | 1.4 |
| 9 | Sudden severe pain most or all of the time | 1.3 | 1.1 |
| 10 | Limping most or every day | 13.1 | 9.2 |
| 11 | Extreme difficulty or | 3.6 | 3.6 |

| | | | |
|---|---|---|---|
| | impossible to climb a flight of stairs | | |
| 12 | Pain from your hip in bed most or every nights | 4.6 | 2.7 |

As noted in previous years there is little significant change between the 6 month and 5 year scores which means the 6 month score is indicative of the medium term outcome

## 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.

Each of three different statistical methodologies demonstrated the relationship

**Six month score and revision arthroplasty**

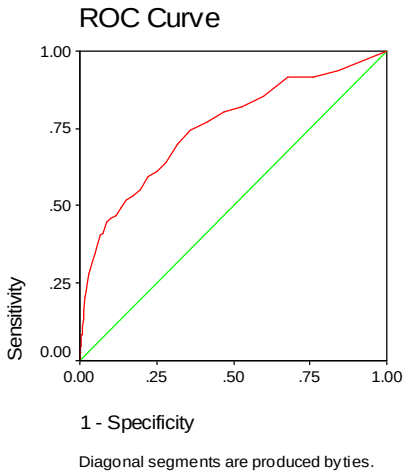
1. Logistic regression. For every 1 unit decrease in the Oxford score the risk of revision within two years increases by 9.7%.

2. By plotting the patients scores in groups of 5, except at the range extremes, against the proportion of hips revised for that same group it demonstrates that there is an incremental increase in risk during the first 2 years related to the oxford score. A patient with a score below 20 has 42 times the risk of a revision within 2 years compared to a person with a score greater than 45

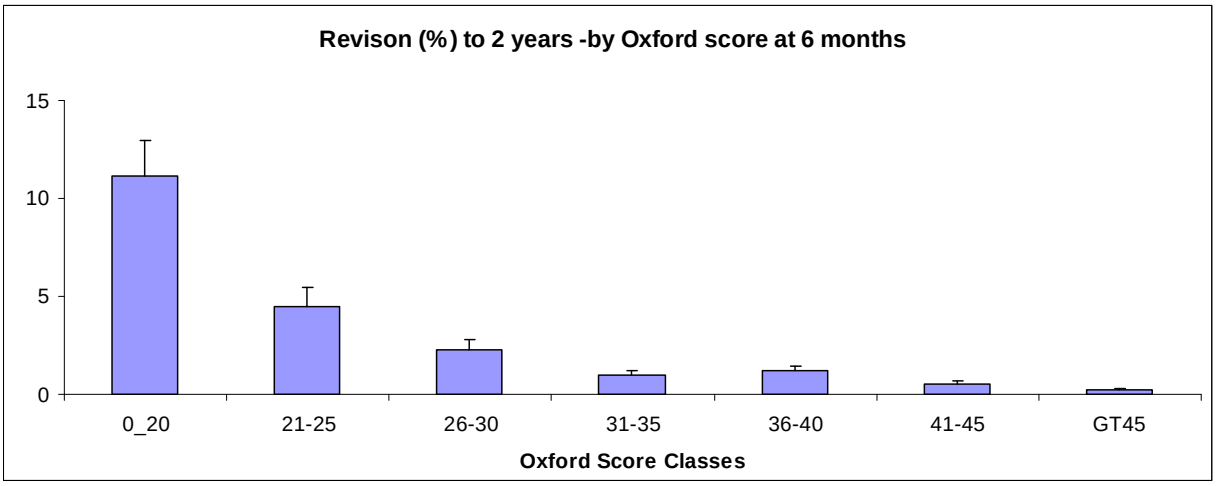
3 A ROC analysis has demonstrated that a patient with a score less or equal to 39 has 5 times the risk of needing a revision within 2 years compared to a person with a score greater than 39.

Alternatively the ROC analysis predicted 70% of the revisions within 2 years.

ROC Curve at six months versus revision within two years




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.



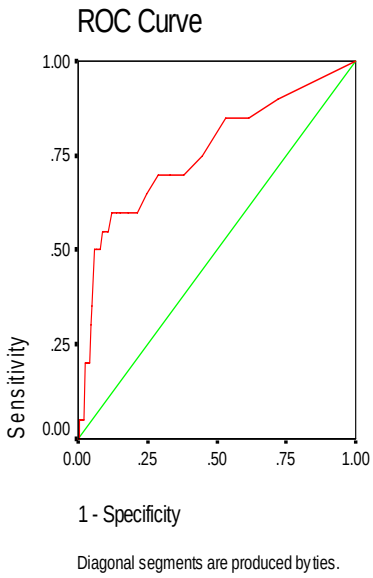

A person with an oxford score of greater than 45 has a 0.26% risk of revision within 2 years compared with an 11% risk with a score less than 20.

**Five Year Score and Revision Arthroplasty**

1 Logistic regression. For every 1 unit decrease in the Oxford score at five years the risk of revision within the following two years increases by 9.8%.

2 The ROC curve analysis has demonstrated that a person with a 5 year score =< 41 has 6 times the risk of having a revision within 2 years compared to a person with a score > 41.
Alternatively the ROC analysis predicted 70% of the revisions within 2 years of the questionnaire date.

**ROC Curve at 5 years versus revision within 2 years**




Although the 5 year results reinforce the relationship between the oxford score and revision within 2 years the 5 year numbers are significantly smaller than at 6 months.

# KNEE ARTHROPLASTY

## PRIMARY KNEE ARTHROPLASTY

The nine-year report analyses data for the period January 1999 – December 2007. There were 34,458 primary knee procedures registered, an additional 5,751 compared to last year's report.
This includes 89 patello-femoral prostheses with 25 registered in 2007.

| | |
|---|---|
| 1999 | 2429 |
| 2000 | 3014 |
| 2001 | 3058 |
| 2002 | 2893 |
| 2003 | 3040 |
| 2004 | 4097 |
| 2005 | 5024 |
| 2006 | 5152 |
| 2007 | 5751 |

There has been an 11.6% increase in registrations during 2007 compared to 2006. Overall there has been a 137% increase in annual registrations since 1999 which is double the increase for hips.
The ratio of hips to knees has reduced from 60:40 to 55:45

## DATA ANALYSIS

### Age and Sex Distribution

The average age for a knee replacement was 68.94 years, with a range of 35.19 – 94.71 years.

**All knee arthroplasty**

| | Female | Male |
|---|---|---|
| Number | 17926 | 16532 |
| Percentage | 52.02 | 47.98 |
| Mean age | 69.23 | 68.43 |
| Maximum age | 100.49 | 98.68 |
| Minimum age | 13.57 | 8.19 |
| Standard dev. | 10.02 | 9.43 |

**Conventional knee arthroplasty**

| | Female | Male |
|---|---|---|
| Number | 17857 | 16512 |
| Percentage | 51.96 | 48.04 |
| Mean age | 69.25 | 68.44 |
| Maximum age | 100.49 | 98.68 |
| Minimum age | 13.57 | 8.19 |
| Standard dev. | 10.00 | 9.43 |

**Patello-femoral arthroplasty**

| | Female | Male |
|---|---|---|
| Number | 69 | 20 |
| Percentage | 77.53 | 24.47 |
| Mean age | 62.82 | 62.21 |
| Maximum age | 85.78 | 78.62 |
| Minimum age | 31.96 | 34.38 |
| Standard dev. | 11.78 | 10.31 |

Although numbers are still very small there was a 36% increase in registrations during 2007

**Previous operation**

| | |
|---|---|
| None | 28646 |
| Menisectomy | 3416 |
| Osteotomy | 712 |
| Arthroscopy/debridement | 631 |
| Ligament reconstruction | 329 |
| Internal fixation for juxtarticular fracture | 238 |
| Patellectomy | 144 |
| Synovectomy | 79 |
| Removal of loose body | 27 |
| Other | 62 |

**Diagnosis**

| | |
|---|---|
| Osteoarthritis | 31950 |
| Rheumatoid arthritis | 1139 |
| Post fracture | 391 |
| Other inflammatory | 338 |
| Post ligament disruption /reconstruction | 213 |
| Avascular necrosis | 129 |
| Tumour | 36 |
| Other | 52 |

**Approach**

| | |
|---|---|
| Medial parapatellar | 30855 |
| Other | 1004 |
| Lateral parapatellar | 670 |
| Image guided surgery | 1191 |
| Minimally invasive surgery | 61 |

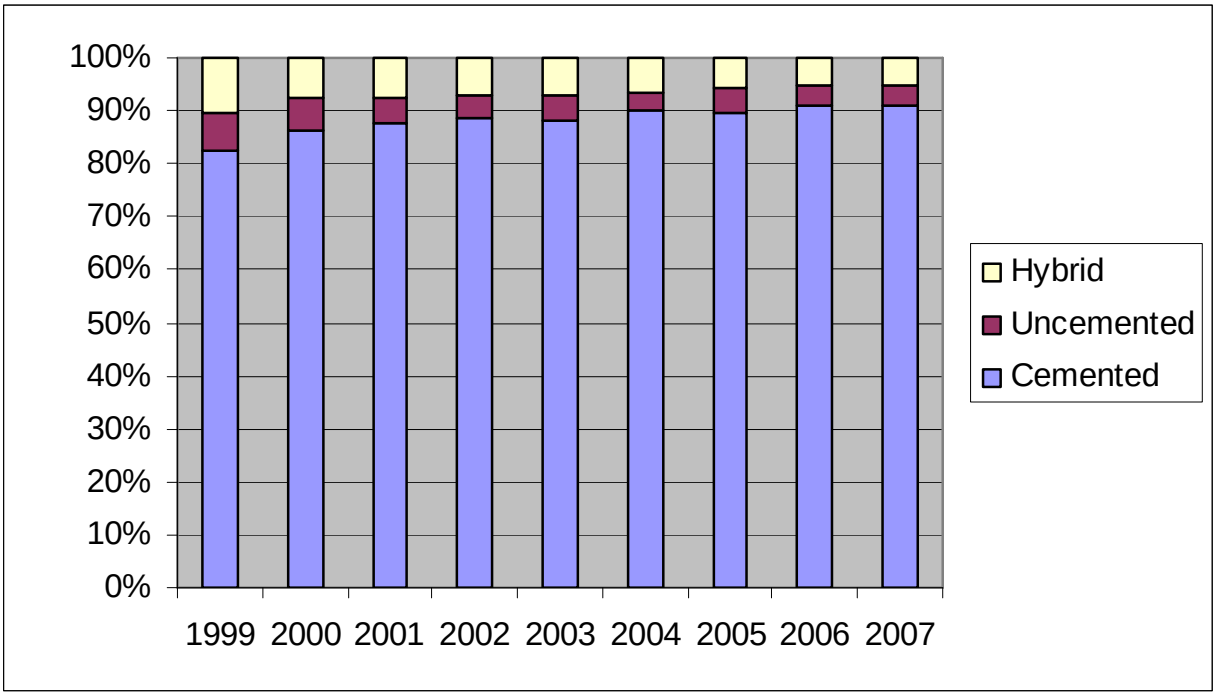
Image guided surgery was added to the updated forms at the beginning of 2005 and continues to increase in popularity with a 110% increase in its use during 2007 and was used for 11% of knee arthroplasties.

**Bone graft**

| | |
|---|---|
| Femoral autograft | 35 |
| Femoral allograft | 7 |
| Femoral synthetic | 1 |
| Tibial autograft | 30 |
| Tibial allograft | 8 |

**Cement**

| | | |
|---|---|---|
| Femur cemented | 30701 | 89% |
| Antibiotic in cement | 19115 | 62% |
| Tibia cemented | 32741 | 95% |
| Antibiotic in cement | 19934 | 61% |




The percentage of uncemented knees has dropped from 6.80% to 3.7% and for hybrid knees from 10.6% to 5.4% over the 9 year period.

**Systemic antibiotic prophylaxis**

| | | |
|---|---|---|
| Patient number receiving at least one systemic antibiotic | 32516 | 94% |

A cephalosporin was used in 91% of arthroplasties.

**Operating theatre**

| | |
|---|---|
| Conventional | 21625 |
| Laminar flow | 12457 |
| Space suits | 8268 |

**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 disease that is a constant threat to life |

For the three-year period 2005 – 2007 there were 12,961 (81%) primary knee procedures with the ASA class recorded

| ASA | Number | % |
|---|---|---|
| 1 | 1376 | 10 |
| 2 | 8220 | 63 |
| 3 | 3293 | 25 |
| 4 | 72 | 1 |

**Operative time (skin to skin)**

| | |
|---|---|
| Mean | 85 minutes |
| Standard deviation | 26 minutes |
| Minimum | 24 minutes |
| Maximum | 420 minutes |

**Surgeon grade**

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the three-year period 2005 – 2007.

| | |
|---|---|
| Consultant | 13986 |
| Advanced trainee supervised | 1091 |
| Basic trainee | 423 |
| Advanced trainee unsupervised | 256 |

The number of supervised advanced trainee procedures remained unchanged but there was a 226% increase of unsupervised advanced trainee procedures during 2007.

**Prosthesis usage**

Patello-femoral

| | |
|---|---|
| Avon-patello | 82 |
| LCS PFJ | 5 |
| Mod 3 | 1 |
| Themis | 1 |

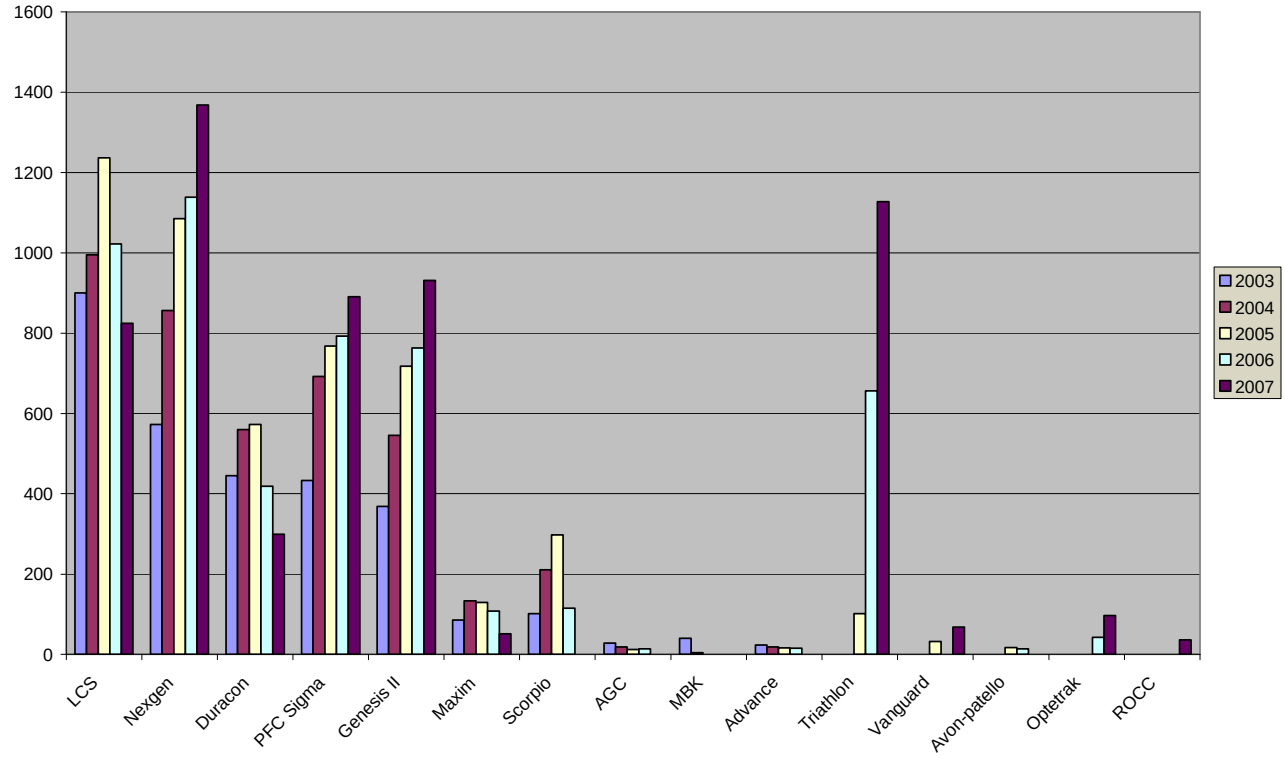
There are 89 patello-femoral procedures registered to 33 surgeons. Avon- patello is still the most frequently used prosthesis at 92% of the total.

**Top 10 knee prostheses used in 2007**

| | |
|---|---|
| Nexgen | 1368 |
| Triathlon | 1127 |
| Genesis II | 931 |
| PFC Sigma | 891 |
| LCS | 824 |
| Duracon | 299 |
| Optetrak | 97 |
| Vanguard | 68 |
| Maxim | 51 |
| ROCC | 36 |

The LCS lost ground during 2007 at the expense of triathlon and genesis II. The vanguard and ROCC displaced scorpio and advance from the top 10 of 2006.

**MOST USED KNEE PROSTHESES 2003 – 2007**




The triathlon continues its rapid rise in popularity and nexgen, pfc sigma and genesis 2 continue their steady gains.

**Patellar resurfacing**
24,150 (70%) of the conventional knee procedures were registered with the patella not resurfaced and 10219 (30%) were resurfaced.

**Surgeon and hospital workload**

**Surgeons**
In 2007, 180 surgeons performed 5,751 total knee replacements, an average of 32 procedures per surgeon.
23 surgeons performed less than 10 procedures and 56 performed more than 40.
In 2006 the average number per surgeon was 30 but in 2007 the number doing > 40 increased from 43 to 56 which accounts for the extra 600 procedures registered in 2007.

**Hospitals**
In 2007 primary knee replacement was performed in 49 hospitals. 25 were public hospitals and 24 were private.
For 2007 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 nine-year period January 1999 – December 2007, there were 2,883 revision knee procedures registered. This is an additional 384 compared to last year's report.

The average age for a female with a revision knee replacement was 70.43 and a male was 69.91 years.

**Revision knees**

| | Female | Male |
|---|---|---|
| Number | 1390 | 1493 |
| Percentage | 48.21 | 51.79 |
| Mean age | 70.43 | 69.91 |
| Maximum age | 95.79 | 98.39 |
| Minimum age | 15.44 | 15.49 |
| Standard dev. | 10.70 | 9.90 |

The percentage of revision knees to primary knees is 8% i.e. for every 100 knee arthroplasties 8 will be revision procedures.

**REVISION OF REGISTERED PRIMARY KNEE ARTHROPLASTY**
This section analyses data for revisions of the primary knee procedures for the nine-year period.

There were 650 revisions of the 34,369 primary conventional knee replacements (1.9%) and 3 revisions of the 89 patello-femoral prostheses (3.4%), a total of 653.

**Time to revision**

| | |
|---|---|
| Mean | 802 days |
| Maximum | 3235 days |
| Minimum | 1 day |
| Standard deviation | 649 days |

**Reason for revision**

| | |
|---|---|
| Pain | 211 |
| Deep infection | 164 |
| Primary patellar comp. | 157 |
| Loosening tibial component | 138 |
| Loosening femoral component | 75 |
| Instability | 52 |
| Stiffness | 25 |
| Dislocation component | 21 |
| Wear component | 13 |
| Fracture tibia | 12 |
| Loosening patellar | 10 |
| Malalignment | 10 |
| Fracture femur | 9 |
| Implant breakage | 8 |
| Osteolysis | 3 |
| Other | 27 |

**Analysis by time of the 4 main reasons for revision**

Pain n = 211

| | |
|---|---|
| < 6 months | 11 |
| 6 months – 1 year | 40 |
| >1 – 2 years | 72 |
| >2 – 3 years | 37 |
| >3 – 4 years | 27 |
| >4 – 5 years | 14 |
| >5 – 6 years | 4 |
| >6 – 7 years | 4 |
| >7 – 8 years | 1 |
| >8 – 9 years | 1 |

Deep infection n = 164

| | |
|---|---|
| < 6 months | 37 |
| 6 months – 1 year | 35 |
| >1 – 2 years | 46 |
| >2 – 3 years | 16 |
| >3 – 4 years | 14 |
| >4 – 5 years | 5 |

| | |
|---|---|
| >5 – 6 years | 3 |
| >6 – 7 years | 4 |
| >7 – 8 years | 3 |
| >8 – 9 years | 1 |

Addition of patellar component n = 157

| | |
|---|---|
| < 6 months | 6 |
| 6 months – 1 year | 36 |
| >1 – 2 years | 57 |
| >2 – 3 years | 29 |
| >3 – 4 years | 15 |
| >4 – 5 years | 5 |
| >5 – 6 years | 4 |
| >6 – 7 years | 3 |
| >7 – 8 years | 1 |
| >8 – 9 years | 1 |

Loosening tibial component n = 138

| | |
|---|---|
| < 6 months | 6 |
| 6 months – 1 year | 14 |
| >1 – 2 years | 26 |
| >2 – 3 years | 29 |
| >3 – 4 years | 22 |
| >4 – 5 years | 16 |
| >5 – 6 years | 10 |
| >6 – 7 years | 9 |
| >7 – 8 years | 6 |

**Patellar resurfacing**

As noted previously, in 70 % ( 24,150) of the 34,369 conventional primary knees, the patella was not resurfaced and in 30% (10,219) it was.

Of the group that was not resurfaced 108 (0.44%) had the patella later resurfaced as the only revision procedure and a further 48 had the patella resurfaced as part of other component revision

**Statistical note**

In the table 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 place.

**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.

**All primary total Knee Arthroplasties**

| | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| All patients | 34369 | 134356 | 650 | 0.48 | 0.45, 0.52 |

**Knee Prostheses versus Revision**

| Knee prosthesis | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| AGC cemented | 372 | 2237 | 6 | 0.27 | 0.10, 0.58 |
| Duracon cemented | 3269 | 14525 | 41 | 0.28 | 0.20, 0.38 |
| Duracon uncemented | 704 | 3669 | 11 | 0.3 | 0.15, 0.54 |
| Genesis II cemented | 4283 | 14242 | 65 | 0.46 | 0.35, 0.58 |
| Insall/Burstein | 249 | 1772 | 30 | 1.69 | 1.14, 2.42 |
| LCS cemented | 6664 | 31611 | 158 | 0.50 | 0.42, 0.58 |
| LCS uncemented | 2347 | 9843 | 90 | 0.91 | 0.74, 1.12 |
| Maxim | 819 | 3613 | 6 | 0.17 | 0.06, 0.36 |

| | | | | | |
|---|---|---|---|---|---|
| MBK cemented | 222 | 1358 | 9 | 0.66 | 0.30, 1.26 |
| Nexgen cemented | 3205 | 14614 | 50 | 0.34 | 0.25, 0.45 |
| Nexgen LPS cemented | 1903 | 7143 | 41 | 0.57 | 0.42, 0.78 |
| Nexgen LPS-Flex cemented | 1756 | 3697 | 24 | 0.65 | 0.41, 0.97 |
| Nexgen uncemented | 306 | 1524 | 7 | 0.46 | 0.19, 0.95 |
| PFC Sigma cemented | 4524 | 15769 | 65 | 0.41 | 0.32, 0.53 |
| Scorpio | 842 | 2985 | 22 | 0.74 | 0.46, 1.12 |
| Triathlon cemented | 1855 | 2454 | 7 | 0.29 | 0.11, 0.59 |

The above table contains analyses of knee prostheses that have a minimum of 200 registered procedures and 1000 observed component years.

The LCS uncemented prosthesis has a revision rate statistically significantly higher than the average overall rate of 0.48/100 ocys @ the 95% confidence interval.

**Revision Rates vs Fixation**

| Fixation | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Cemented | 30546 | 117916 | 532 | 0.45 | 0.41, 0.49 |
| Uncemented | 1558 | 6557 | 68 | 1.04 | 0.81, 1.31 |
| Hybrid | 2265 | 9884 | 50 | 0.51 | 0.38, 0.67 |

There is a significantly higher revision rate(p= <0.001) for uncemented knees when compared to cemented & hybrid knees

**Revision vs Age Bands**

| Age | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| <55 | 2757 | 10873 | 102 | 0.94 | 0.76, 1.14 |
| 55-64 | 8796 | 34194 | 225 | 0.66 | 0.57, 0.75 |
| 65-74 | 12863 | 51265 | 227 | 0.44 | 0.39, 0.50 |
| >74 | 9953 | 38026 | 96 | 0.25 | 0.20, 0.31 |

The revision rate is significantly lower for each successive age band.

**Revision by Age Groups vs Fixation**

| Age | Fixation | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|---|
| <55 | Cemented | 2167 | 8412 | 67 | 0.80 | 0.62, 1.01 |
| | Uncemented | 365 | 1538 | 29 | 1.89 | 1.26, 2.71 |
| | Hybrid | 225 | 923 | 6 | 0.65 | 0.24, 1.41 |
| 55-64 | Cemented | 7570 | 28934 | 177 | 0.61 | 0.53, 0.71 |
| | Uncemented | 572 | 2344 | 25 | 1.07 | 0.69, 1.57 |
| | Hybrid | 654 | 2915 | 23 | 0.79 | 0.50, 1.84 |
| 65-74 | Cemented | 11637 | 45856 | 202 | 0.44 | 0.38, 0.51 |
| | Uncemented | 418 | 1773 | 10 | 0.56 | 0.27, 1.04 |
| | Hybrid | 808 | 3636 | 15 | 0.41 | 0.23, 0.68 |
| >74 | Cemented | 9172 | 34714 | 86 | 0.25 | 0.20, 0.31 |
| | Uncemented | 203 | 902 | 4 | 0.44 | 0.12, 1.14 |
| | Hybrid | 578 | 2409 | 6 | 0.25 | 0.09, 0.54 |

**Revision by Fixation vs Age Groups**

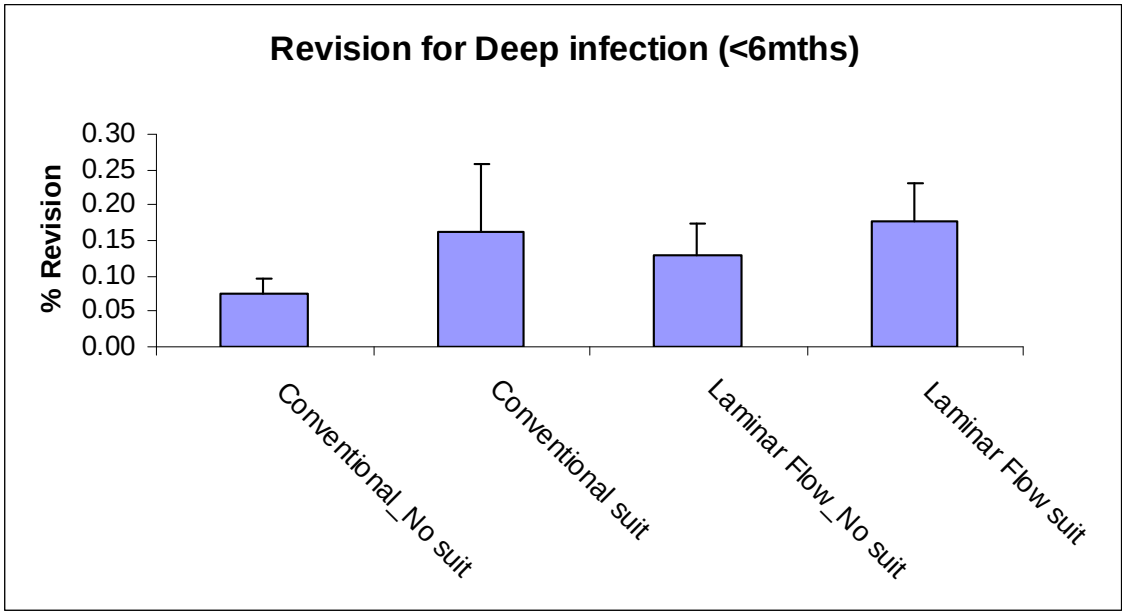
| | Cemented | Total | Observed Component Years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|---|
| **Age Grps** | LT55 | 2167 | 8411.7 | 67 | 0.80 | 0.62 1.02 |
| | 55_64 | 7570 | 28934.4 | 177 | 0.61 | 0.53 0.71 |
| | 65_74 | 11637 | 45855.5 | 202 | 0.44 | 0.40 0.51 |
| | GE75 | 9172 | 34714.3 | 86 | 0.25 | 0.20 0.31 |
| | **Uncemented** | | | | | |
| **Age Grps** | LT55 | 365 | 1537.6 | 29 | 1.89 | 1.26 2.71 |
| | 55_64 | 572 | 2343.9 | 25 | 1.07 | 0.69 1.57 |
| | 65_74 | 418 | 1773.26 | 10 | 0.56 | 0.27 1.04 |
| | GE75 | 203 | 901.9 | 4 | 0.44 | 0.12 1.14 |
| | **Hybrid** | | | | | |
| **Age Grps** | LT55 | 225 | 923.42 | 6 | 0.65 | 0.24 1.41 |
| | 55_64 | 654 | 2915.24 | 23 | 0.79 | 0.50 1.19 |
| | 65_74 | 808 | 3635.76 | 15 | 0.41 | 0.23 0.68 |
| | GE75 | 578 | 2409.26 | 6 | 0.25 | 0.09 0.54 |

**Revision vs Approach**

| Approach | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Medial | 30771 | 114259 | 554 | 0.49 | 0.45, 0.53 |
| Lateral | 1001 | 2919 | 15 | 0.51 | 0.29, 0.85 |
| Other | 670 | 4549 | 19 | 0.42 | 0.25, 0.65 |

**Revision for deep infection within the first six months vs theatre type**

| | Number of joints | Number revised | %Revision. | Exact 95% confidence interval |
|---|---|---|---|---|
| Conventional (No Suit) | 19665 | 15 | 0.08 | 0.04, 0.12 |
| Conventional (Suit) | 1839 | 3 | 0.16 | 0.00, 0.35 |
| Laminar Flow (Suit) | 6190 | 8 | 0.12 | 0.28, 0.21 |
| Laminar Flow (No Suit) | 6227 | 11 | 0.18 | 0.07, 0.29 |




There are no significant differences among the various theatre environments

**Revision vs ASA**

| ASA class | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| 1 | 1376 | 2250 | 13 | 0.58 | 0.31, 0.99 |
| 2 | 8220 | 13311 | 56 | 0.42 | 0.32, 0.55 |
| 3 | 3293 | 5264 | 23 | 0.44 | 0.28, 0.66 |
| 4 | 72 | 121 | 1 | 0.82 | 0.02, 4.59 |

**Revision by ASA; Public vs Private**

| Public Private | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Public | 7045 | 11519 | 53 | 0.46 | 0.35, 0.60 |
| Private | 5916 | 9427 | 40 | 0.42 | 0.30, 0.58 |

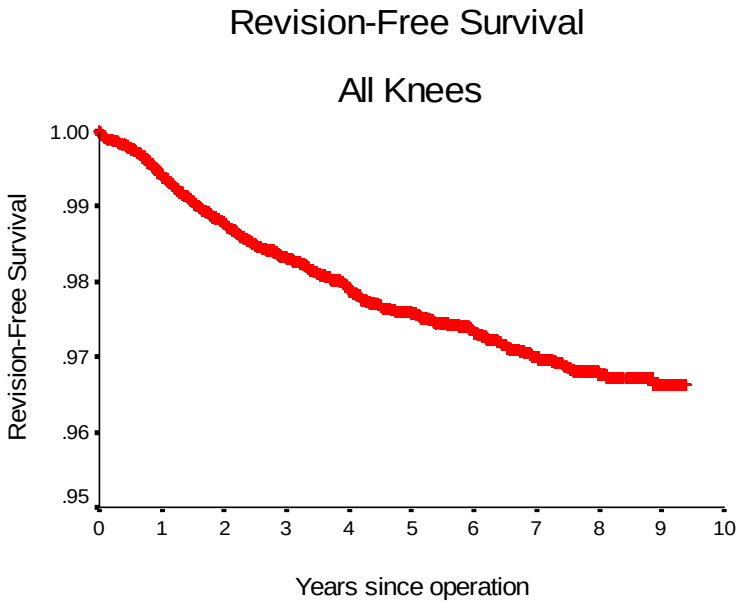
**Revision vs Surgeon Annual Workload**

| Operations per annum | Number of operations | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| <10 | 850 | 3531 | 22 | 0.62 | 0.39, 0.94 |
| 10-25 | 9580 | 39123 | 206 | 0.53 | 0.46, 0.60 |
| 25-50 | 17650 | 67831 | 308 | 0.45 | 0.40, 0.51 |
| 50-75 | 4034 | 15407 | 77 | 0.50 | 0.39, 0.62 |
| 75-100 | 2200 | 8380 | 37 | 0.44 | 0.31, 0.61 |

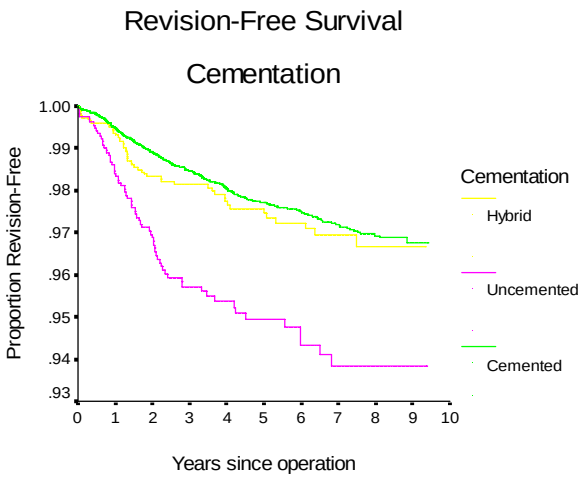
There are no significant differences among differences in revision rates among the annual knee workload categories.

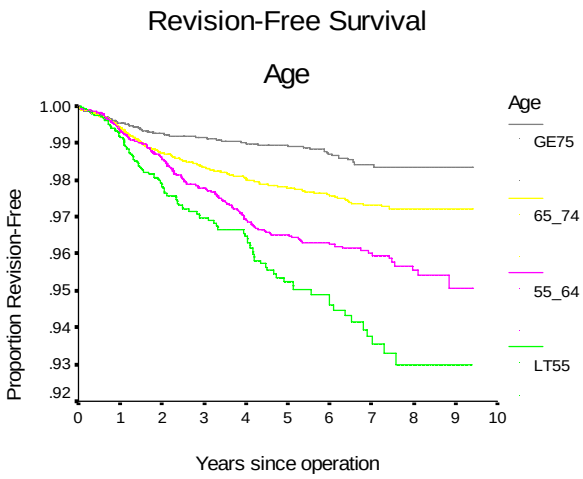
**Kaplan Meier Curves**

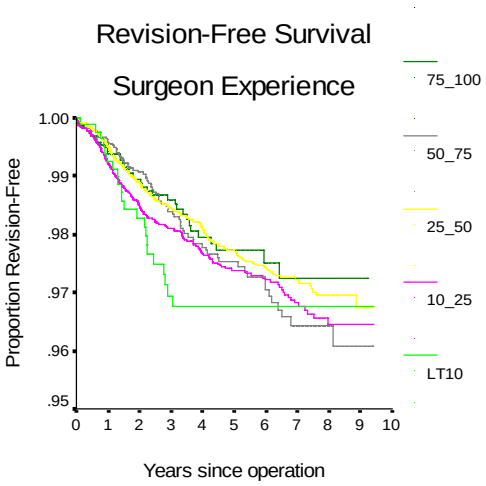
The following Kaplan Meier survival analyses are for years 1999 to 2007 with deceased patients censored at time of death

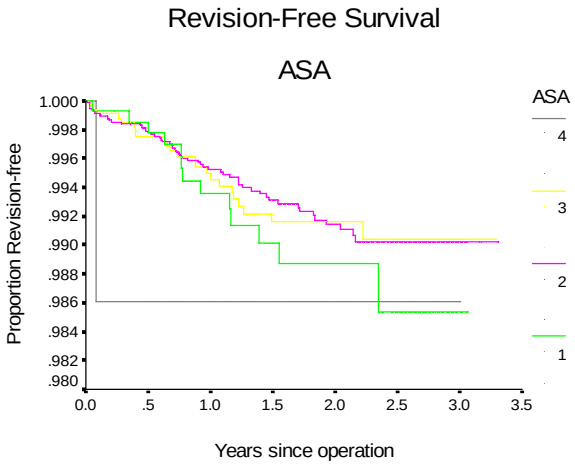



| Years | % Survival |
|---|---|
| 1 | 99.41 |
| 2 | 98.77 |
| 3 | 98.31 |
| 4 | 97.90 |
| 5 | 97.58 |
| 6 | 97.31 |
| 7 | 97.01 |
| 8 | 96.76 |
| 9 | 96.63 |






**Knee re-revisions**
Analysis was undertaken of 2 groups of re-revisions.

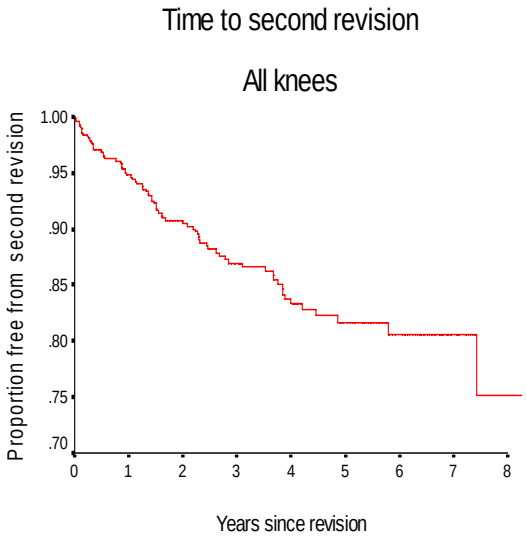
There were 79 registered primary knee revisions that had been revised twice and 8 that had been revised 3 times. None had been revised 4 times.

**Second revision**
Time between the first and second revision for the 79 knee arthroplasties averaged 623 days, with a range of 2–2709 and a standard deviation of 546 days.
This compares to an average of 802 days between primary and first revision arthroplasty.

**Reason for revision**

| | |
|---|---|
| Deep infection | 30 |
| Loosening tibial component | 17 |
| Pain | 17 |
| Loosening femoral component | 10 |
| Instability | 10 |
| Dislocation | 5 |
| Stiffness | 2 |
| Patellar fracture | 2 |

**Third revision**
The average time between 2nd and 3rd revisions for the 8 arthroplasties was 513 days, with a range of 70 – 1277.




The KM graph confirms that survival following the first revision is poorer (82% at 6 years) than for a primary arthroplasty.

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

**Questionnaires at six months post surgery**
At six months post surgery a random selection of patients are sent the Oxford-12 questionnaire in order to achieve a response rate of 20% of total which is deemed to be ample to provide powerful statistical analysis.

This year the new scoring system as recommended by the original authors has been adopted. (see appendix one)

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 which has been recommended by the original authors. (see appendix one)

This system groups each score into four categories;

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 nine-year period and as at July 2008, there were 13,597 primary knee questionnaire responses registered at six months post surgery.
The mean knee score was 36.97 (standard deviation 8.35, range 48 – 0)

| | | |
|---|---|---|
| Scoring | > 41 | 3779 |
| Scoring | 34 – 41 | 3830 |
| Scoring | 27 – 33 | 2374 |
| Scoring | < 27 | 1337 |

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 at 5-years post surgery.
This dataset represents sequential Oxford hip scores for 3275 individual patients.

At six months post surgery, 74% of these patients achieved an excellent or good score and had a mean of 37.60.
At five years post surgery, 81% of these patients achieved an excellent or good score and had a mean of 39.40.

**Six month scores pre & post revision**
The group of patients who had six-month primary scores and subsequent revision scores were also analysed. The number with both these scores was 253.
At six months post surgery, 39% of this group achieved an excellent or good score and a mean of 28.55.
The revision scores for this group had a mean of 29.75 and again only 39% achieved an excellent or good score.

**Analysis of the individual questions at six months and five years post surgery**
Analysis of the individual questions showed that the most frequent difficulty was kneeling (Q4).

Percentage scoring 0 or 1(worst categories) for each question out of the group of 13,597 primary knee responses at six months and 3,275 at five-years.

| | | % 6/12 | % 5 yrs |
|---|---|---|---|
| 1 | Moderate or severe pain from the operated knee | 13.6 | 9.1 |
| 2 | Only able to walk around the house or unable to walk before pain becomes severe | 5.9 | 4.5 |
| 3 | Extreme difficulty or impossible to get in and out of a car or public transport | 4.8 | 4.6 |
| 4 | Extreme difficulty or impossible to kneel down and get up afterwards | 43.6 | 42.6 |
| 5 | Extreme difficulty or impossible to do the household shopping on your own | 4.3 | 5.4 |
| 6 | Extreme difficulty or impossible to wash and dry yourself | 1.3 | 1.9 |
| 7 | Pain interfering greatly or totally with your work | 5.9 | 4.8 |
| 8 | Very painful or unbearable to stand up from a chair after a meal | 3.9 | 2.2 |
| 9 | Most of the time or always | 2.4 | 1.9 |

| | | | |
|---|---|---|---|
| | feeling that the knee might suddenly “give way” | | |
| 10 | Limping most or every day | 12.3 | 9.2 |
| 11 | Extreme difficulty or impossible to climb a flight of stairs | 8.1 | 7.8 |
| 12 | Pain from your knee in bed most or every nights | 9.9 | 4.8 |

As noted in previous years there is little significant change between the 6 month and 5 year scores which means the 6 month score is indicative of the medium term outcome.

**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.

Each of three different statistical methodologies demonstrated the relationship

**Six month score and revision arthroplasty**

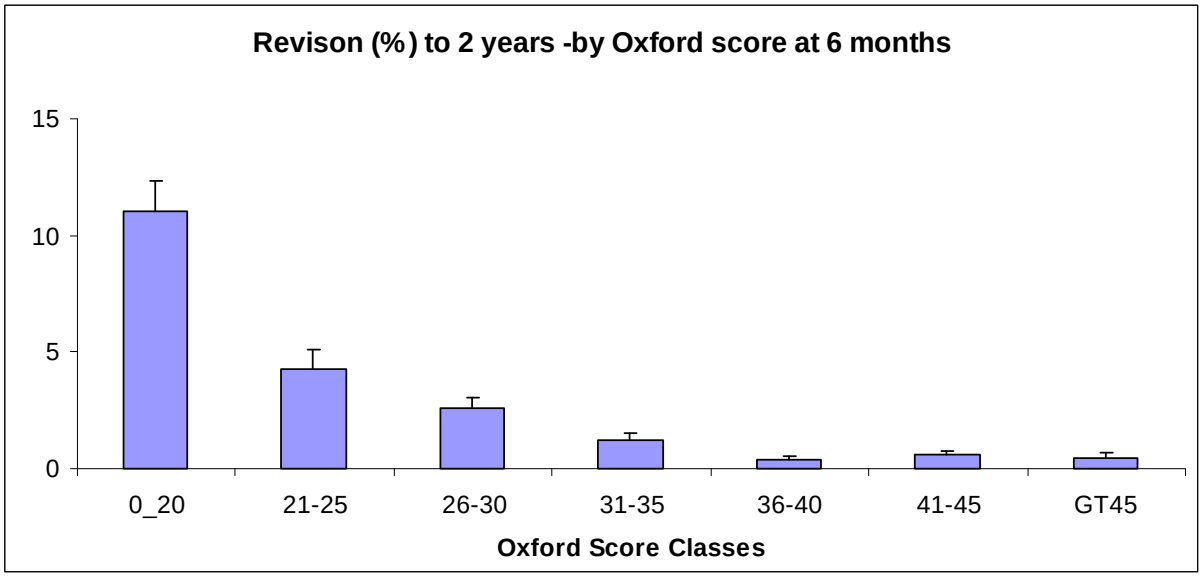
1. Logistic regression. For every 1 unit decrease in the Oxford score the risk of revision within two years increases by 10.4%.

2. By plotting the patients scores in groups of 5, except at the range extremes, against the proportion of knees revised for that same group it demonstrates that there is an incremental increase in risk during the first 2 years related to the oxford score. A patient with a score below 20 has 30 times the risk of a revision within 2 years compared to a person with a score 36 to 40

3. A ROC analysis has demonstrated that a patient with a score greater than 31 has 8 times the risk of needing a revision within 2 years compared to a person with a score less than or equal to 31.

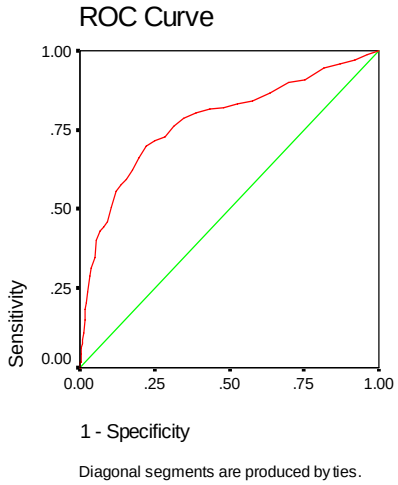
Alternatively the ROC analysis predicted 70% of the revisions within 2 years

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.




A person with an oxford score of 36 – 40 has a 0.39% risk of revision within two years compared to a 11.01% risk with a score of 20 or less.

**ROC curve at six months versus revision within two years**



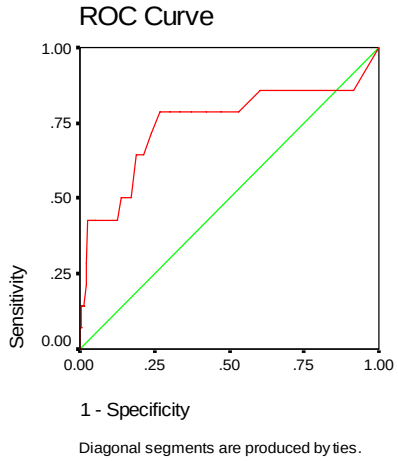

**Five year score and revision arthroplasty**

1 Logistic regression. For every 1 unit decrease in the Oxford score at five years the risk of revision within the following two years increases by 9.5%.

2 The ROC curve analysis has demonstrated that a person with a 5 year score =< 35 has10 times the risk of having a revision within 2 years compared to a person with a score >35.

Alternatively the ROC analysis correctly predicted 80% of the revisions

**ROC curve at 5 years versus revision within two years**




Although the 5 year results reinforce the relationship between the oxford score and revision within 2 years the 5 year numbers are significantly smaller than those at 6 months.

# UNICOMPARTMENTAL KNEE ARTHROPLASTY

## PRIMARY UNICOMPARTMENTAL KNEE ARTHROPLASTY

The **eight**-year report analyses data for the period January 2000 – December 2007. There were 4,284 unicompartmental knee procedures registered, an additional 574 compared to last year's report.

| | |
|---|---|
| 2000 | 340 |
| 2001 | 430 |
| 2002 | 533 |
| 2003 | 630 |
| 2004 | 634 |
| 2005 | 558 |
| 2006 | 585 |
| 2007 | 574 |

## DATA ANALYSIS

### Age and sex distribution

The average age for a unicompartmental knee replacement was 66.47 years, with a range of 35.19 – 94.71 years.

| | Female | Male |
|---|---|---|
| Number | 2054 | 2230 |
| Percentage | 47.95 | 52.05 |
| Mean age | 66.33 | 66.60 |
| Maximum age | 94.71 | 93.42 |
| Minimum age | 35.19 | 35.24 |
| Standard dev. | 10.24 | 8.96 |

### Previous operation

| | |
|---|---|
| None | 3353 |
| Menisectomy | 661 |
| Arthroscopy/debridement | 213 |
| Ligament reconstruction | 12 |
| Osteotomy | 13 |
| Internal fixation | 9 |
| Arthrotomy | 2 |
| Synovectomy | 1 |
| Other | 10 |

### Diagnosis

| | |
|---|---|
| Osteoarthritis | 4155 |
| Avascular necrosis | 36 |
| Post ligament disruption | 16 |
| Other inflammatory | 15 |
| Post fracture | 11 |
| Rheumatoid arthritis | 10 |
| Other | 4 |

### Approach

| | |
|---|---|
| Medial | 3499 |
| Minimally invasive surgery | 794 |
| Other | 162 |
| Lateral | 95 |
| Image guided surgery | 7 |

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

The minimally invasive approach was used in 32% of arthroplasties in 2007 which is similar to previous years.

### Cement

| | | |
|---|---|---|
| Femur cemented | 4073 | 95% |
| Antibiotic in cement | 2350 | 58% |
| Tibia cemented | 4092 | 96% |
| Antibiotic in cement | 2361 | 58% |

### Systemic antibiotic prophylaxis

| | | |
|---|---|---|
| Patient number receiving at least one systemic antibiotic | 4114 | 96% |

### Operating theatre

| | |
|---|---|
| Conventional | 3339 |
| Space suits | 920 |
| Laminar flow | 870 |

### ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the three year period 2005 – 2007, there was 1448/1717 (84%) 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 |
|---|---|
| 1 | 269 |
| 2 | 960 |
| 3 | 211 |
| 4 | 8 |

**Operative time (skin to skin)**

| | |
|---|---|
| Mean | 82 minutes |
| Standard deviation | 24 minutes |
| Minimum | 24 minutes |
| Maximum | 200 minutes |

**Surgeon grade**

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the three year period 2005 – 2007.

| | |
|---|---|
| Consultant | 1615 |
| Advanced trainee supervised | 75 |
| Basic trainee | 8 |
| Advanced trainee unsupervised | 7 |

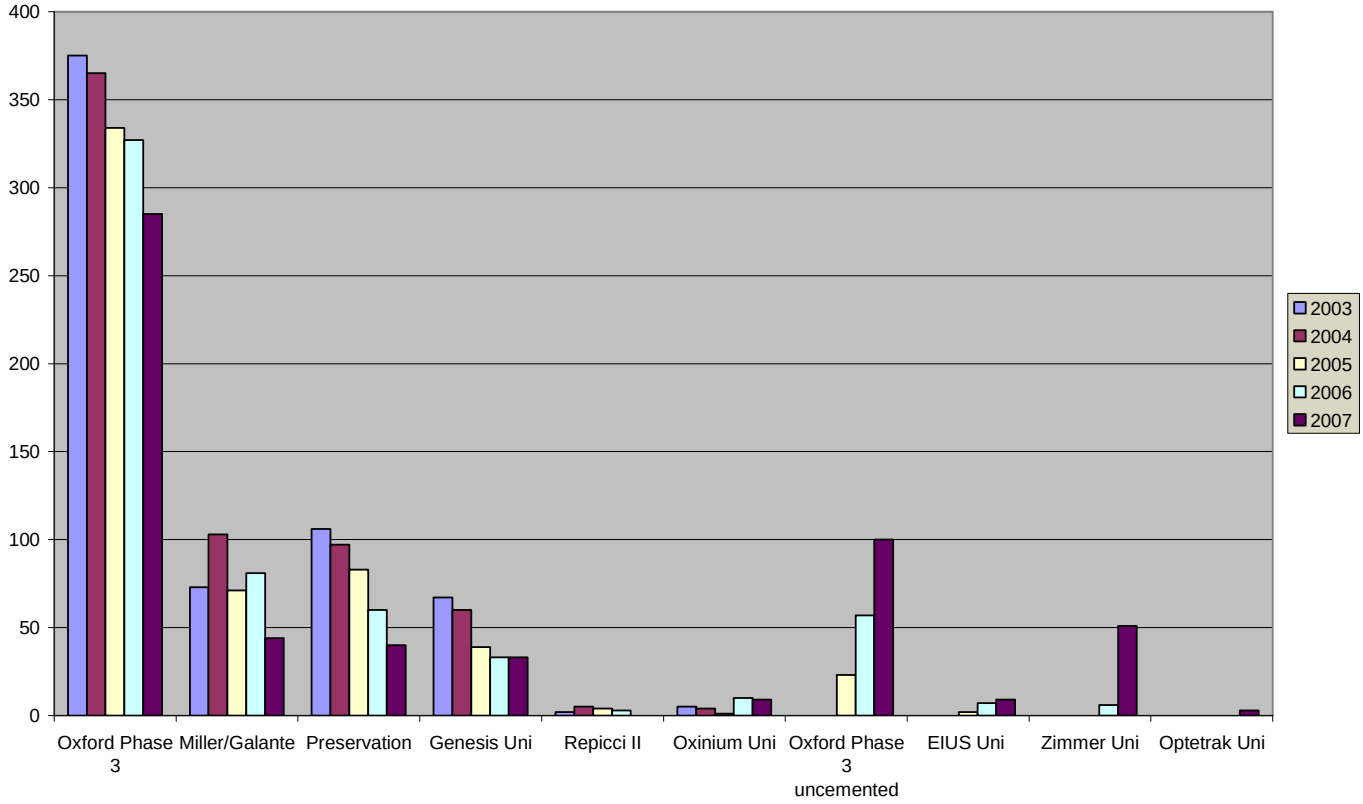
**Prosthesis usage**

**Unicompartmental knee prostheses used in 2007**

| | |
|---|---|
| Oxford Phase 3 | 285 |
| Oxford Phase 3 uncemented | 81 |
| Zimmer Uni | 60 |
| Miller/Galante | 57 |
| Preservation | 33 |
| Genesis Uni | 10 |
| Oxinium Uni | 7 |
| EIUS Uni | 6 |
| Optetrak Uni | 3 |

The Oxford Phase 3 is still by far the most popular but the uncemented version along with the Zimmer Uni have made big gains at the expense of the others when compared to 2006.

**MOST USED UNICOMPARTMENTAL PROSTHESES 2003 - 2007**




**Surgeon and hospital workload**

**Surgeons**

In 2007, 79 surgeons performed 574 unicompartmental knee replacements, an average of 7 procedures per surgeon.

36 surgeons performed less than 5 procedures and 7 performed more than 15 procedures.

**Hospitals**
In 2007 unicompartmental knee replacement was performed in 39 hospitals. 18 were public and 21 were private.
For 2007 the average number of unicompartmental knee replacements per hospital was 15.

**REVISION OF REGISTERED UNICOMPARTMENTAL KNEE ARTHROPLASTY**
This section analyses the data for revision of unicompartmental knee replacement over the eight-year period.

There were 236 revisions of the 4284 registered unicompartmental knee replacements (5.51%).
A further 18 had a second revision and 2 a third revision.
205 of the 236 (87%) were revised to total knee replacements.

**Time to revision**

| | |
|---|---|
| Mean | 777 days |
| Maximum | 2765 days |
| Minimum | 10 days |
| Standard deviation | 571 days |

**Reason for revision**

| | |
|---|---|
| Pain | 109 |
| Loosening tibial component | 54 |
| Loosening femoral component | 35 |
| Bearing dislocation | 18 |
| Progression of disease | 16 |
| Deep infection | 13 |
| Fracture tibia | 9 |
| Wear tibial | 6 |
| Impingement | 3 |
| Implant breakage | 2 |
| Instability | 2 |
| Fracture femur | 1 |
| Other | 7 |

Pain accounted, at least in part, for 46% of revisions and deep infection for 5.5%. It is likely that progression of disease is under reported as some revised for pain would have been due to progression of disease.

**Analysis by time of the 3 main reasons for revision**

Pain n = 109

| | |
|---|---|
| < 6 months | 6 |
| 6 months – 1 year | 18 |
| > 1 – 2 years | 42 |
| > 2 – 3 years | 18 |
| >3 – 4 years | 9 |
| > 4 – 5 years | 11 |
| >5 – 6 years | 4 |
| >6 – 7 years | 0 |
| >7 – 8 years | 1 |

Loosening tibial component n = 54

| | |
|---|---|
| < 6 months | 6 |
| 6 months – 1 year | 8 |
| > 1 – 2 years | 24 |
| > 2 – 3 years | 5 |
| >3 – 4 years | 6 |
| > 4 – 5 years | 3 |
| >5 – 6 years | 2 |
| >6 – 7 years | 0 |
| >7 – 8 years | 0 |

Loosening femoral component n = 35

| | |
|---|---|
| < 6 months | 0 |
| 6 months – 1 year | 7 |
| > 1 – 2 years | 15 |
| > 2 – 3 years | 4 |
| >3 – 4 years | 7 |
| > 4 – 5 years | 1 |
| >5 – 6 years | 0 |
| >6 – 7 years | 0 |
| >7 – 8 years | 1 |

**Statistical note**
In the table 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 place.

**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.

**All Primary Unicompartmental arthroplasties**

| Uni Compartmental | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| All patients | 4284 | 16369 | 236 | 1.44 | 1.26, 1.64 |

**Unicompartmental Prostheses vs revision**

| Unicompartmental knees | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| EIUS | 18 | 26 | 0 | 0.00 | 0.00, 14.16 |
| Genesis | 268 | 950 | 18 | 1.89 | 1.12, 2.99 |
| LCS Uni | 6 | 36 | 2 | 5.55 | 0.67, 20.04 |
| Miller/Galante | 587 | 2464 | 30 | 1.22 | 0.82, 1.74 |
| Optetrak Uni | 3 | 2 | 0 | 0.00 | 0.00, 226.83 |
| Oxford Phase 3 | 2620 | 10570 | 148 | 1.40 | 1.18, 1.64 |
| Oxford Phase 3 uncemented | 181 | 261 | 1 | 0.38 | 0.01, 2.13 |
| Oxinium Uni | 29 | 59 | 6 | 10.2 | 3.75, 22.22 |
| Preservation | 419 | 1387 | 24 | 1.73 | 1.11, 2.57 |
| Repicci II | 96 | 562 | 7 | 1.25 | 0.50, 2.57 |
| Zimmer Uni | 57 | 52 | 0 | 0.00 | 0.00, 7.07 |

**Revision vs Age Bands**

| Age | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| <55 | 513 | 1914 | 33 | 1.73 | 1.19, 2.42 |
| 55-64 | 1445 | 5507 | 102 | 1.85 | 1.51, 2.25 |
| 65-74 | 1449 | 5664 | 64 | 1.13 | 0.87, 1.44 |
| >74 | 877 | 3294 | 37 | 1.13 | 0.79, 1.55 |

There is a significantly higher ($p<0.05$) revision rate in the 55-64 compared to the 65-74 age group.

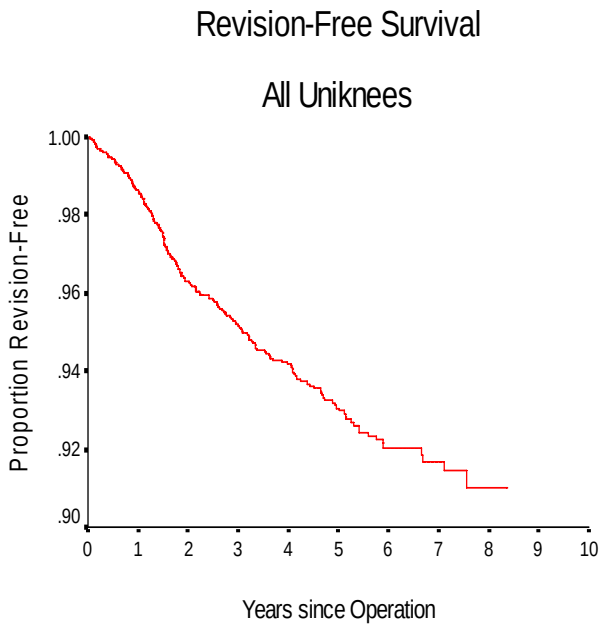
**Revision vs Surgeon Annual Workload**

| Operations per annum | Number of operations | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| < 10 | 2344 | 9076 | 157 | 1.73 | 1.47, 2.02 |
| >=10 | 1928 | 7248 | 78 | 1.08 | 0.85, 1.34 |

Those performing <10 per year have a significantly higher ($p<0.05$) revision rate

**Kaplan Meier Curves**

The following Kaplan Meier survival analyses are for years 2000 to 2007 with deceased patients censored at time of death.




| Years | % Survival |
|---|---|
| 1 | 98.58 |
| 2 | 96.30 |
| 3 | 95.20 |
| 4 | 94.18 |
| 5 | 93.05 |
| 6 | 92.03 |

**Numbers are too few for accurate % survival beyond 6 years**

**Survival following revision of Unicompartmental Knees to Total Knees or another Unicompartmental arthroplasty**

| Revised to | Observed component years | Number re-revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|
| Total Knee 205 | 559.4 | 11 | 1.97 | 0.99, 3.52 |
| Uni Knee 31 | 105.0 | 7 | 6.67 | 2.68, 13.70 |

When compared to the primary total knee arthroplasty revision rate of 0.48 (CI 0.45, 0.52), there is a statistically significant increased revision rate ($p<0.05$) 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.

**PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS POST SURGERY**

**Questionnaire at six months post surgery**

At six-month post surgery all patients are sent the Oxford-12 questionnaire.

This year 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, which has been recommended by the original authors. (See appendix one)

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 eight-year period and as at July 2008, there were 3024 unicompartmental knee questionnaire responses registered at six months post surgery. The mean unicompartmental knee score was 38.75 (standard deviation 7.79, range 3 – 48)

| | |
|---|---|
| Scoring > 41 | 1404 |
| Scoring 34 - 41 | 977 |
| Scoring 27 - 33 | 400 |
| Scoring < 27 | 243 |

At six months post surgery, 79% had an excellent or good score.

**Questionnaires at five years post surgery**
All 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 361.

At six months post surgery, 85% of patients had achieved an excellent or good score and had a mean of 39.60.

At five years post surgery, 86 % of patients had achieved an excellent or good score and had a mean of 41.02.

**Six month scores pre & post revision**
The group of patients who had six-month scores and subsequent revision scores was also analysed. The number with both these scores was 124.
At six months post surgery, 39% of this group achieved an excellent or good score. The mean was 29.70.
The revision scores for this group had a mean of 31.98 and 44% achieved an excellent or good score.

**Analysis of the individual questions at six-months and 5 years post surgery**

Analysis of the individual questions showed that the most frequent difficulties were kneeling (Q4) and pain in the operated knee (Q1).
Percentage scoring 0 or 1 for each question out of the group of 3024 at six-month post surgery and 361 at five-years.

| | | | |
|---|---|---|---|
| 1 | Moderate or severe pain from the operated knee | 11.7 | 9.5 |
| 2 | Only able to walk around the house or unable to walk before pain becomes severe | 3.6 | 3.3 |
| 3 | Extreme difficulty or impossible to get in and out of a car or public transport | 1.9 | 1.0 |
| 4 | Extreme difficulty or impossible to kneel down and get up afterwards | 33.7 | 26.4 |
| 5 | Extreme difficulty or impossible to do the household shopping on your own | 1.6 | 1.5 |
| 6 | Extreme difficulty or impossible to wash and dry yourself | 0.4 | 0.3 |
| 7 | Pain interfering greatly or totally with your work | 3.5 | 2.3 |
| 8 | Very painful or unbearable to stand up from a chair after a meal | 3.6 | 0.8 |
| 9 | Most of the time or always feeling that the knee might suddenly “give way" | 1.7 | 1.0 |

| | | | |
|---|---|---|---|
| 10 | Limping most or every day | 10.1 | 5.5 |
| 11 | Extreme difficulty or impossible to climb a flight of stairs | 4.1 | 3.8 |
| 12 | Pain from your knee in bed most or every nights | 7.9 | 3.5 |

There has been little improvement over the 5 years apart from questions 8, 10, and 12

**Oxford 12 Score as a Predictor of Unicompartmental Knee Arthroplasty Revision**

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

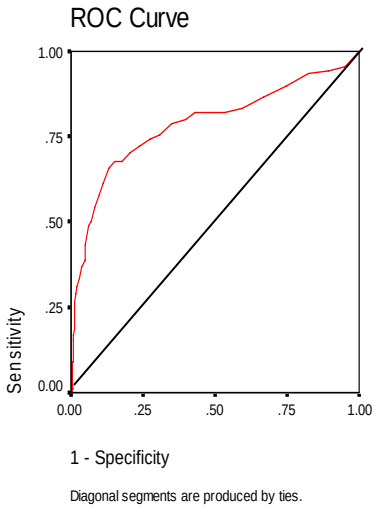
Two different statistical methodologies demonstrated the relationship.

1. By plotting the patients scores in groups of 5, except at the range extremes, against the proportion of knees revised for that same group it demonstrates that there is an incremental increase in risk during the first 2 years related to the oxford score. A patient with a score below 20 has 29 times the risk of a revision within 2 years compared to a person with a score between 41 and 45

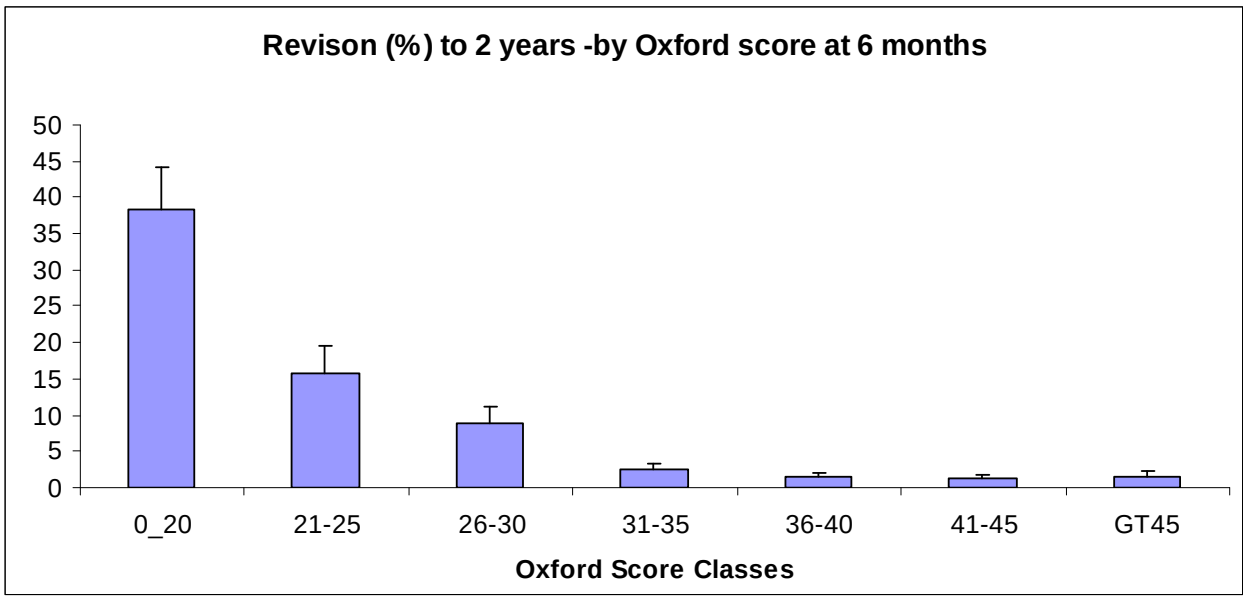
2 "A ROC analysis" has demonstrated that a patient with a score greater than 31 has 12 times the risk of needing a revision within 2 years compared to a person with a score less than or equal to 31.

Alternatively the ROC analysis predicted 68% of the revisions within 2 years.

**A ROC curve at six months versus revision within two years**




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.




A person with an oxford score 41-45 has a1.34% risk of revision within two years compared to a 38.36% risk of revision with a score 20 or less

# ANKLE ARTHROPLASTY

## PRIMARY ANKLE ARTHROPLASTY

The **eight- year** report analyses data for the period January 2000 – December 2007. There are 377 primary ankle procedures registered, an additional 79 compared to last year's report.

| | |
|---|---|
| 2000 | 17 |
| 2001 | 28 |
| 2002 | 28 |
| 2003 | 26 |
| 2004 | 48 |
| 2005 | 70 |
| 2006 | 81 |
| 2007 | 79 |

## DATA ANALYSIS

### Age and sex distribution

| | Female | Male |
|---|---|---|
| Number | 139 | 238 |
| Percentage | 36.87 | 63.13 |
| Mean age | 63.10 | 65.97 |
| Maximum age | 81.80 | 88.38 |
| Minimum age | 32.51 | 41.10 |
| Standard dev. | 9.42 | 8.58 |

The average age for an ankle replacement is 64.92years, with a range of 32.51 – 88.38 years.

### Previous operation

| | |
|---|---|
| None | 297 |
| Internal fixation for juxtarticular fracture | 36 |
| Arthroscopy/debridement | 18 |
| Arthrodesis | 15 |
| Osteotomy | 7 |
| Reconstruction/repair | 2 |
| Other | 2 |

### Diagnosis

| | |
|---|---|
| Osteoarthritis | 273 |
| Post trauma | 68 |
| Rheumatoid arthritis | 41 |
| Other inflammatory | 4 |
| Other | 5 |

### Approach

| | |
|---|---|
| Anterior | 334 |
| Anterolateral | 25 |
| Other | 6 |

### Bone graft

| | |
|---|---|
| Tibia autograft | 24 |
| Tibia allograft | 1 |
| Talus autograft | 5 |
| Talus allograft | 1 |

### Cement

| | |
|---|---|
| Tibia cemented | 11 |
| Antibiotic in cement | 7 |
| Talus cemented | 6 |
| Antibiotic in cement | 3 |

### Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic 361 (96%)

### Operating theatre

| | |
|---|---|
| Conventional | 244 |
| Laminar flow | 130 |
| Space suits | 37 |

### ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the three-year period 2005 -2007, there were 152 (66%) 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 | 39 |
| 2 | 88 |
| 3 | 24 |
| 4 | 1 |

### Operative time (skin to skin)

| | |
|---|---|
| Mean | 131 minutes |
| Standard deviation | 39 minutes |
| Minimum | 30 minutes |
| Maximum | 275 minutes |

### Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised.

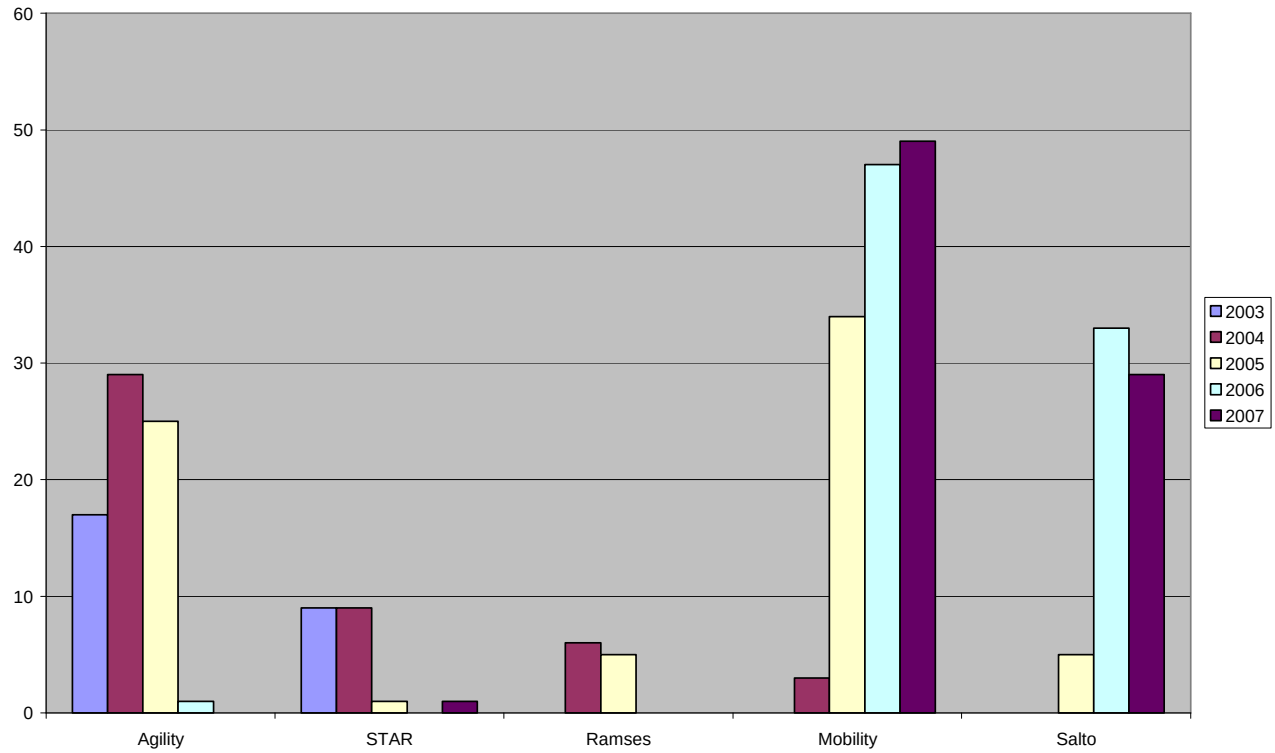
The following figures are for the three-year period 2005 -2007.

| | |
|---|---|
| Consultant | 226 |
| Advanced trainee supervised | 3 |

**Prosthesis usage**
Ankle prostheses used in 2007

| | |
|---|---|
| Mobility | 49 |
| Salto | 29 |
| STAR | 1 |

**MOST USED ANKLE PROSTHESES 2003-2007**




## Surgeon and hospital workload

### Surgeons
In 2007, 12 surgeons performed 79 primary ankle procedures, an average of 6 procedures per surgeon. 2 surgeons performed more than 20 procedures and 5 performed 1 procedure.

### Hospitals
In 2007 primary ankle replacement was performed in 14 hospitals. 7 were public and 7 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 eight-year period January 2000– December 2007, there were 26 revision ankle procedures registered.

The average age for an ankle revision was 64.5 years, with a range of 42.15 – 78.98.

| | Female | Male |
|---|---|---|
| Number | 7 | 19 |
| Percentage | 26.92 | 73.08 |
| Mean | 60.11 | 66.25 |
| Maximum age | 78.98 | 76.56 |
| Minimum age | 42.15 | 51.71 |
| Standard dev. | 14.28 | 7.12 |

## REVISION OF REGISTERED PRIMARY ANKLE ARTHROPLASTY

This section analyses data for revisions of primary ankle procedures for the eight-year period.

There were 15 revisions of the primary group of 377 (3.98%) and 1 re-revision giving 16 revisions in total.

**Time to revision**

| | |
|---|---|
| Mean | 988 days |
| Maximum | 1969 days |
| Minimum | 21 days |
| Standard deviation | 671 days |

**Reason for revision**

| | |
|---|---|
| Loosening talar component | 8 |
| Pain | 8 |
| Loosening tibial component | 2 |
| Deep infection | 1 |
| Other | 4 |

**Analysis by time of the 2 main reasons for revision**

Loosening talar component n = 8

| | |
|---|---|
| < 6 months | 1 |
| >2 – 3 years | 1 |
| >3 – 4 years | 3 |
| >4 – 5 years | 1 |
| 5 – 6 years | 2 |

Pain n = 8

| | |
|---|---|
| 6 months – 1 year | 1 |
| >1 – 2 years | 3 |
| >3 – 4 years | 2 |
| 4 – 5 years | 1 |
| 5 – 6 years | 1 |

**Statistical note**

In the table 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 place.

**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.

**All Primary Ankle arthroplasties**

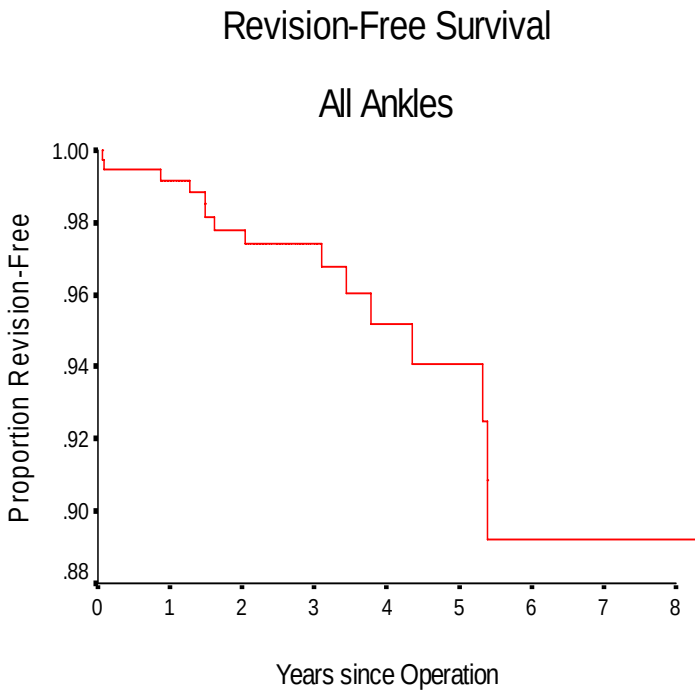
| Uni Compartmental | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| All patients | 227 | 820 | 9 | 1.10 | 0.50, 2.08 |

**Revision vs ankle prostheses**

| Ankles | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Agility | 119 | 563 | 6 | 1.07 | 0.39, 2.32 |
| Mobility | 133 | 233 | 3 | 1.29 | 0.27, 3.76 |
| Ramses | 11 | 36 | 1 | 2.81 | 0.07, 15.65 |
| Salto | 67 | 103 | 0 | 0.00 | 0.00, 3.39 |
| STAR | 47 | 220 | 5 | 2.27 | 0.74, 5.29 |

## KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for 8 years to 2007 with deceased patients censored at time of death.




| Years | % Survival |
|---|---|
| 1 | 99.18 |
| 2 | 97.8 |
| 3 | 96.75 |
| 4 | 95.2 |
| 5 | 94.1 |
| 6 | 89.2 |

Numbers are too few to give an accurate yearly revision % beyond 6 years.

## PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS POST SURGERY

At six months post surgery patients are sent a non-validated questionnaire modelled on the Oxford hip score.

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.

This year we have grouped the questionnaire responses based on the scoring system published by Kalairajah et al (see appendix one)
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 eight-year period and as at July 2008, there were 305 primary ankle questionnaire responses registered at six months post surgery.
The mean primary ankle score was 33.05 (standard deviation 9.95, range 2 – 48)

| | | |
|---|---|---|
| Scoring | > 41 | 75 |
| Scoring | 34 - 41 | 95 |
| Scoring | 27 - 33 | 56 |
| Scoring | < 27 | 79 |

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

**Analysis of the individual questions**
Analysis of the individual questions showed that the main problems were with limping (Q6) and swelling of the foot (Q10).

Percentage scoring 0 or 1 for each question (n =05)

| | | |
|---|---|---|
| 1 | Moderate or severe pain from the operated ankle | 24.3 |
| 2 | Only able to walk around the house or unable to walk before the pain becomes severe | 8.2 |
| 3 | Extreme difficulty or impossible to walk on uneven ground | 15.7 |
| 4 | Most of the time or always have to use an orthotic | 23.3 |
| 5 | Pain greatly or totally interferes with usual work | 20.7 |
| 6 | Limping most or every day | 34.1 |
| 7 | Extreme difficulty or impossible to climb a flight of stairs | 7.5 |
| 8 | Pain from your ankle in bed most or every nights | 6.9 |
| 9 | Pain from your ankle greatly or totally interferes with usual recreational activities | 24.3 |
| 10 | Have swelling of your foot most or all of the time | 33.8 |
| 11 | Very painful or unbearable to stand up from a chair after a meal | 5.6 |
| 12 | Sudden severe pain from your ankle most or every day | 7.2 |

**Complication data from the questionnaires**

**Revision ankle questionnaire responses**
There were 12 revision ankle responses with only 4 achieving an excellent or good score. This group includes all revision ankle responses. The mean revision ankle score was 26.83 (standard deviation 14.93, range 8–48). There was no complication data reported.

**Relationship of Oxford score to early revision**
There insufficient numbers for analysis

# SHOULDER ARTHROPLASTY

## PRIMARY SHOULDER ARTHROPLASTY

The **eight-year** report analyses data for the period January 2000–December 2007. There are 2041 primary shoulder procedures registered, an additional 400 compared to last year's report.

| | |
|---|---|
| 2000 | 122 |
| 2001 | 162 |
| 2002 | 193 |
| 2003 | 225 |
| 2004 | 280 |
| 2005 | 293 |
| 2006 | 366 |
| 2007 | 400 |

Shoulder numbers have continued their steady annual increase with 9.2% for 2007

Of the 2041 shoulder registrations, 1175 (58%) are total shoulder arthroplasties, of which 247 are reverse shoulders and 47 resurfacing shoulders. The remaining 866(42%) are hemi arthroplasties,

## DATA ANALYSIS

### Age and sex distribution

| | Female | Male |
|---|---|---|
| Number | 1330 | 711 |
| Percentage | 66.54 | 33.46 |
| Mean age | 71.69 | 67.32 |
| Maximum age | 97.71 | 90.48 |
| Minimum age | 15.63 | 21.83 |
| Standard dev. | 10.14 | 10.81 |

The average age for a shoulder replacement was 70.17 years, with a range of 15.63 – 97.71 years.

### Previous operation

| | |
|---|---|
| None | 1734 |
| Rotator cuff repair | 63 |
| Internal fixation for juxtarticular fracture | 56 |
| Previous stabilisation | 40 |
| Acromioplasty | 32 |
| Arthroscopy/debridement | 24 |
| Subacromial decompression | 6 |
| Other | 14 |

### Diagnosis

| | |
|---|---|
| Osteoarthritis | 1083 |
| Rheumatoid arthritis | 236 |
| Acute fracture prox. Humerus | 234 |
| Post old trauma | 167 |
| Cuff arthropathy | 237 |
| Avascular necrosis | 74 |
| Other inflammatory | 25 |
| Post recurrent dislocation | 19 |
| Tumour | 9 |
| Post dysplasia | 3 |
| Other | 10 |

### Approach

| | |
|---|---|
| Deltopectoral | 1856 |
| Deltoid split | 28 |
| Anterior | 17 |
| Superior | 10 |
| McKenzie | 6 |
| Lateral | 4 |
| Posterior | 3 |
| Trans deltoid | 3 |

### Bone graft

| | |
|---|---|
| Humeral autograft | 54 |
| Humeral allograft | 11 |
| Humeral synthetic | 2 |
| Glenoid autograft | 12 |
| Glenoid allograft | 2 |

### Cement

| | | |
|---|---|---|
| Humerus cemented | 862 | (42%) |
| Antibiotic in cement | 475 | (55%) |
| Glenoid cemented | 616 | (30%) |
| Antibiotic in cement | 385 | (64%) |

### Systemic antibiotic prophylaxis

| | | |
|---|---|---|
| Patient number receiving at least one systemic antibiotic | 1906 | (93%) |

### Operating theatre

| | |
|---|---|
| Conventional | 1464 |
| Laminar flow | 550 |
| Space suits | 195 |

### ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the three-year period 2005 – 2007 there were 884/1059 (83%) 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 |
|---|---|
| 1 | 88 |
| 2 | 476 |
| 3 | 314 |
| 4 | 6 |

**Operative time (skin to skin in minutes)**

| | Total | Hemi | Reverse | Resurf |
|---|---|---|---|---|
| Mean | 134 | 106 | 117 | 104 |
| Min | 35 | 30 | 62 | 49 |
| Max | 270 | 360 | 246 | 181 |

**Surgeon grade**

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised.

The following figures are for the three-year period 2005 – 2007.

| | |
|---|---|
| Consultant | 1023 |
| Advanced trainee supervised | 31 |
| Advanced trainee unsupervised | 2 |
| Basic trainee | 1 |

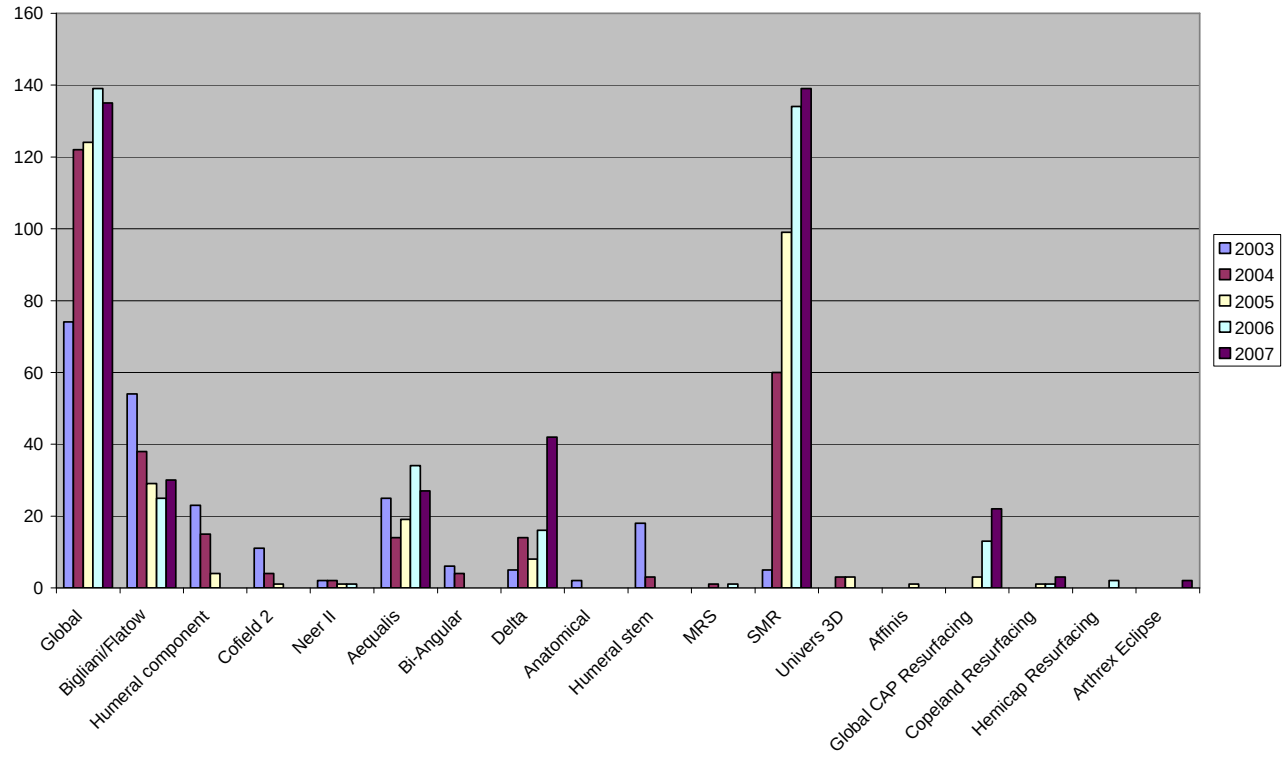
**Prosthesis usage**

Shoulder prostheses used in 2007

| | |
|---|---|
| SMR | 139 |
| Global | 135 |
| Delta | 42 |
| Bigliani/Flatow | 30 |
| Aequalis | 27 |
| Global CAP Resurfacing | 22 |
| Copeland Resurfacing | 3 |
| Arthrex Eclipse | 2 |

SMR & Global are still the clear top 2 but the others have made gains, especially the Delta.

**MOST USED SHOULDER PROSTHESES 2003 -2007**



**Surgeon and hospital workload**

**Surgeons**
In 2007, 60 surgeons performed 400 shoulder procedures, an average of 6 procedures per surgeon. 2 surgeons performed more than 30 procedures.

**Hospitals**
In 2007, shoulder replacement was performed in 43 hospitals. 24 were public and 19 were private.
For 2007 the average number of shoulder replacements per hospital was 9.

**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 or amputation, but not soft tissue procedures. A two or more staged procedure is registered as one revision.

**Data analysis**
For the eight-year period January 2000 – December 2007, there were 139 revision shoulder procedures registered. This is an additional 34 compared to last year's report.

The average age for a shoulder revision was 67.31 years with a range of 24.05 – 67.31 years.

| | Female | Male |
|---|---|---|
| Number | 78 | 61 |
| Percentage | 56.12 | 43.88 |
| Mean | 69.05 | 65.08 |
| Maximum age | 87.22 | 81.83 |
| Minimum age | 33.89 | 24.05 |
| Standard dev. | 11.99 | 11.93 |

**REVISION OF REGISTERED PRIMARY SHOULDER ARTHROPLASTY**
This section analyses data for revisions of primary shoulder procedures for the eight-year period.

There were 59 revisions of the primary group of 2041 (2.89%) and 6 re-revisions.

**Time to revision**

| | | |
|---|---|---|
| Mean | 505 | days |
| Maximum | 1788 | days |
| Minimum | 0 | days |
| Standard deviation | 483 | days |

**Reason for revision**

| | |
|---|---|
| Pain | 19 |
| Dislocation/instability anterior | 13 |
| Loosening glenoid | 7 |
| Deep infection | 5 |
| Wear glenoid | 4 |
| Cuff failure | 4 |
| Subacromial cuff impingement | 3 |
| Instability posterior | 2 |
| Fracture humerus | 1 |
| Other | 5 |

**Analysis by time for the 2 main reasons for revision**

Pain n = 19

| | |
|---|---|
| < 6 months | 1 |
| 6 months – 1 year | 5 |
| >1 – 2 years | 5 |
| >2 – 3 years | 3 |
| > 3 – 4 years | 2 |
| >4 – 5 years | 3 |

Dislocation n = 13

| | |
|---|---|
| < 6 months | 10 |
| 6 months – 1 year | 1 |
| >1 – 2 years | 2 |

**Statistical note**
In the table 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 place.

**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.

**All Total Shoulder Arthroplasties**

| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| **All patients** | 1994 | 6677.01 | 59 | 0.88 | 0.67 1.14 |

**Revision vs gender**

| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| F | 1314 | 4485.21 | 34 | 0.76 | 0.52 1.06 |
| M | 680 | 2191.80 | 25 | 1.14 | 0.74 1.68 |

**Revision vs Age Groups**

| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| LT55 | 147 | 533.83 | 9 | 1.69 | 0.77 3.20 |
| 55_64 | 368 | 1248.35 | 14 | 1.12 | 0.61 1.88 |
| 65_74 | 740 | 2472.52 | 22 | 0.89 | 0.56 1.34 |
| GE75 | 739 | 2422.31 | 14 | 0.58 | 0.32 0.97 |

**Revision vs prosthesis type**

| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Conventional Total | 881 | 2938.87 | 19 | 0.65 | 0.39 1.01 |
| Reverse | 247 | 409.43 | 9 | 2.20 | 1.01 4.17 |
| Hemis | 866 | 3328.71 | 31 | 0.93 | 0.63 1.32 |

**Revision vs Surgeon experience**

| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| <10 | 1102 | 3814.60 | 37 | 0.97 | 0.68 1.33 |
| >=10 | 858 | 2734.63 | 20 | 0.73 | 0.45 1.13 |

No statistical significant difference between the two groups

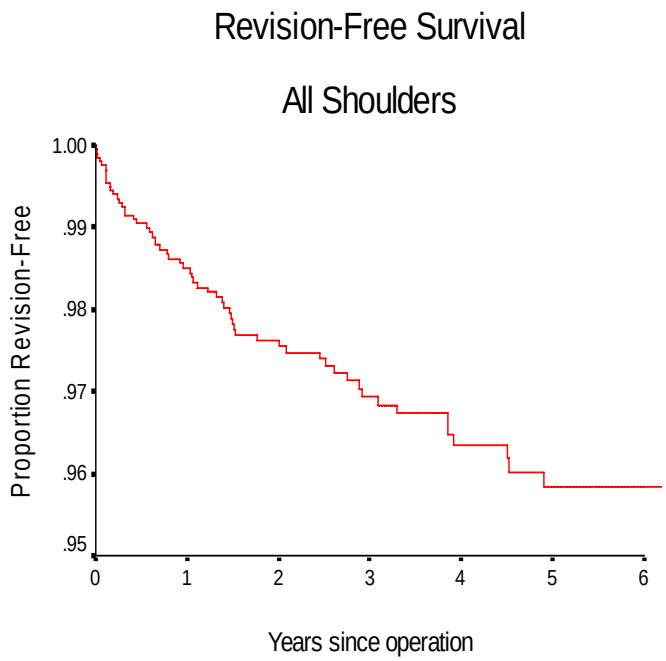
**Revision vs prosthesis Type**

| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Cofield 2 | 71 | 409.53 | 0 | 0 | 0.00 0.90 |
| Delta | 56 | 173.14 | 0 | 0 | 0.00 2.13 |
| Delta Xtend Reverse | 35 | 23.43 | 0 | 0 | 0.00 15.74 |
| Humeral stem | 41 | 221.65 | 0 | 0 | 0.00 1.66 |
| Neer II | 36 | 206.92 | 0 | 0 | 0.00 1.78 |
| Humeral component | 91 | 456.00 | 1 | 0.22 | 0.01 1.22 |
| Bigliani/Flatow | 263 | 1086.41 | 7 | 0.64 | 0.26 1.33 |
| Global | 749 | 2372.83 | 22 | 0.93 | 0.58 1.40 |
| Aequalis | 156 | 568.82 | 7 | 1.23 | 0.49 2.54 |
| Bi-Angular | 27 | 153.27 | 2 | 1.31 | 0.16 4.71 |
| SMR | 436 | 864.11 | 20 | 2.31 | 1.41 3.57 |

The SMR which was top of the prosthesis list for 2007 again has the highest revision rate per 100 component years and with an average follow-up time of just 2 years (global 3.2). ($p<0.05$)

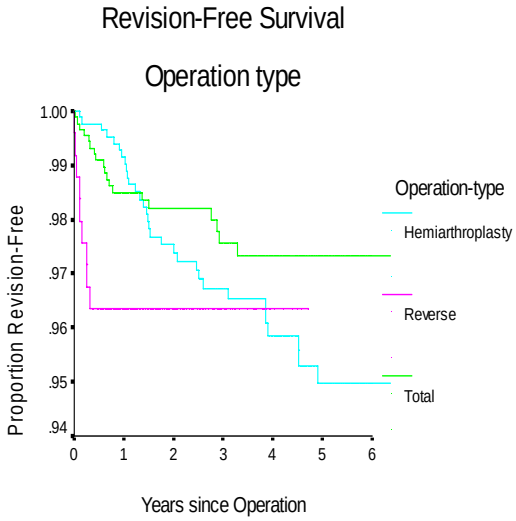
## KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for years 2000 to 2007 with deceased patients censored at time of death.




| Years | % Survival |
|---|---|
| 1 | 98.50 |
| 2 | 97.63 |
| 3 | 96.94 |
| 4 | 96.35 |
| 5 | 95.84 |

Numbers are too few for accurate % survival beyond 5 years



**PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS POST SURGERY** .

At six months post surgery patients are sent the Oxford 12 questionnaire.

The new scoring system has been adopted as recommended by the original authors for the Oxford 12

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.

This year we have grouped the questionnaire responses based on the scoring system published by Kalairajah et al, as recommended by the original authors. (see appendix one)

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 eight-year period and as at July 2008, there were 1434 shoulder questionnaire responses registered at six months post surgery.
The mean shoulder score was 35.64(standard deviation 9.9, range 3 – 48)

| | | |
|---|---|---|
| Scoring | > 41 | 495 |
| Scoring | 34 - 41 | 437 |
| Scoring | 27 - 33 | 237 |
| Scoring | <27 | 265 |

At six months post surgery, 65% 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 149 individual patients.
At six months post surgery, 93 of these patients achieved an excellent or good score and had a mean of 35.19.
At five years post surgery, 98 of these patients achieved an excellent or good score and had a mean of 36.62.

**Analysis of the individual questions**
Analysis of the individual questions showed that there were problems with pain (Q1 and Q2), brushing hair (Q7) and hanging clothes in a wardrobe (Q9).

Percentage scoring 0 or 1 for each question out of the group of 1434 at six-months and 149 at five-years.

| | | | |
|---|---|---|---|
| 1 | The worst pain from the shoulder is severe or unbearable | 17.3 | 16.8 |
| 2 | Usually have moderate or severe pain from the operated shoulder | 22.4 | 13.4 |
| 3 | Extreme difficulty or impossible to get in and out of a car or public transport | 3.4 | 4.0 |
| 4 | Extreme difficulty or impossible to use a knife and fork at the same time | 4.6 | 2.7 |
| 5 | Extreme difficulty or impossible to do the household shopping on your own | 7.7 | 8.1 |
| 6 | Extreme difficulty or impossible to carry a tray containing a plate of food across a room | 8.6 | 6.7 |
| 7 | Extreme difficulty or impossible to brush or comb hair with the operated arm | 18.9 | 18.1 |
| 8 | Extreme difficulty or impossible to dress yourself because of your operated shoulder | 7.7 | 4.0 |
| 9 | Extreme difficulty or impossible to hang clothes in a wardrobe using operated arm | 17.2 | 36.8 |
| 10 | Extreme difficulty or impossible to wash and dry under both arms | 10.0 | 7.4 |
| 11 | Pain from operated shoulder greatly or totally interfering with usual work | 13.5 | 16.8 |
| 12 | Pain from shoulder in bed most or every nights | 14.7 | 12.8 |

**Revision shoulder questionnaire responses**
There were 94 revision shoulder responses with 36% achieving an excellent or good score. This group includes all revision shoulder responses. The mean revision shoulder score was 28.57 (standard deviation 10.75, range 3 – 47).

# ELBOW ARTHROPLASTY

## PRIMARY ELBOW ARTHROPLASTY

The eight-year report analyses data for the period January 2000–December 2007. There were 191 primary elbow procedures registered, an additional 36 compared to last year's report.

| | |
|---|---|
| 2000 | 18 |
| 2001 | 29 |
| 2002 | 32 |
| 2003 | 23 |
| 2004 | 28 |
| 2005 | 30 |
| 2006 | 31 |
| 2007 | 36 |

## DATA ANALYSIS

### Age and sex distribution

The average age for an elbow replacement was 65.76 years, with range of 36.38 – 90.54 years.

| | Female | Male |
|---|---|---|
| Number | 175 | 52 |
| Percentage | 77.09 | 22.91 |
| Mean age | 65.91 | 65.23 |
| Maximum age | 90.54 | 87.87 |
| Minimum age | 36.38 | 41.62 |
| Standard dev. | 11.60 | 11.92 |

**Previous operation**

| | |
|---|---|
| None | 163 |
| Internal fixation for juxtarticular fracture | 8 |
| Synovectomy | 6 |
| Debridement | 4 |
| Nerve transposition | 3 |
| Osteotomy | 2 |
| Ligament reconstruction | 1 |
| Interposition arthroplasty | 1 |
| Other | 3 |

**Diagnosis**

| | |
|---|---|
| Rheumatoid arthritis | 135 |
| Post fracture | 54 |
| Osteoarthritis | 25 |
| Other inflammatory | 7 |
| Tumour | 4 |
| Post dislocation | 3 |
| Post ligament disruption | 1 |
| Other | 4 |

**Approach**

| | |
|---|---|
| Posterior | 146 |
| Medial | 46 |
| Lateral | 16 |

**Bone graft**

| | |
|---|---|
| Humeral autograft | 20 |
| Humeral allograft | 2 |
| Humeral synthetic | 1 |
| Ulnar autograft | 2 |

**Cement**

| | | |
|---|---|---|
| Humerus cemented | 205 | |
| Antibiotic in cement | 130 | (63%) |
| Ulna cemented | 201 | |
| Antibiotic in cement | 120 | (60%) |
| Radius cemented | 9 | |
| Antibiotic in cement | 8 | (89%) |

**Systemic antibiotic prophylaxis**

| | | |
|---|---|---|
| Patient number receiving at least one systemic antibiotic | 212 | (93%) |

**Operating theatre**

| | |
|---|---|
| Conventional | 183 |
| Laminar flow | 44 |
| Space suits | 18 |

**ASA Class**

This was introduced with the updated forms at the beginning of 2005.
For the three-year period 2005-2007, there were 78 (80%) 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 | 3 |
| 2 | 35 |
| 3 | 38 |
| 4 | 2 |

**Operative time (skin to skin)**

| | |
|---|---|
| Mean | 133 minutes |
| Standard deviation | 31 minutes |
| Minimum | 56 minutes |
| Maximum | 240 minutes |

**Surgeon grade**

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the three- year period 2005–2007.

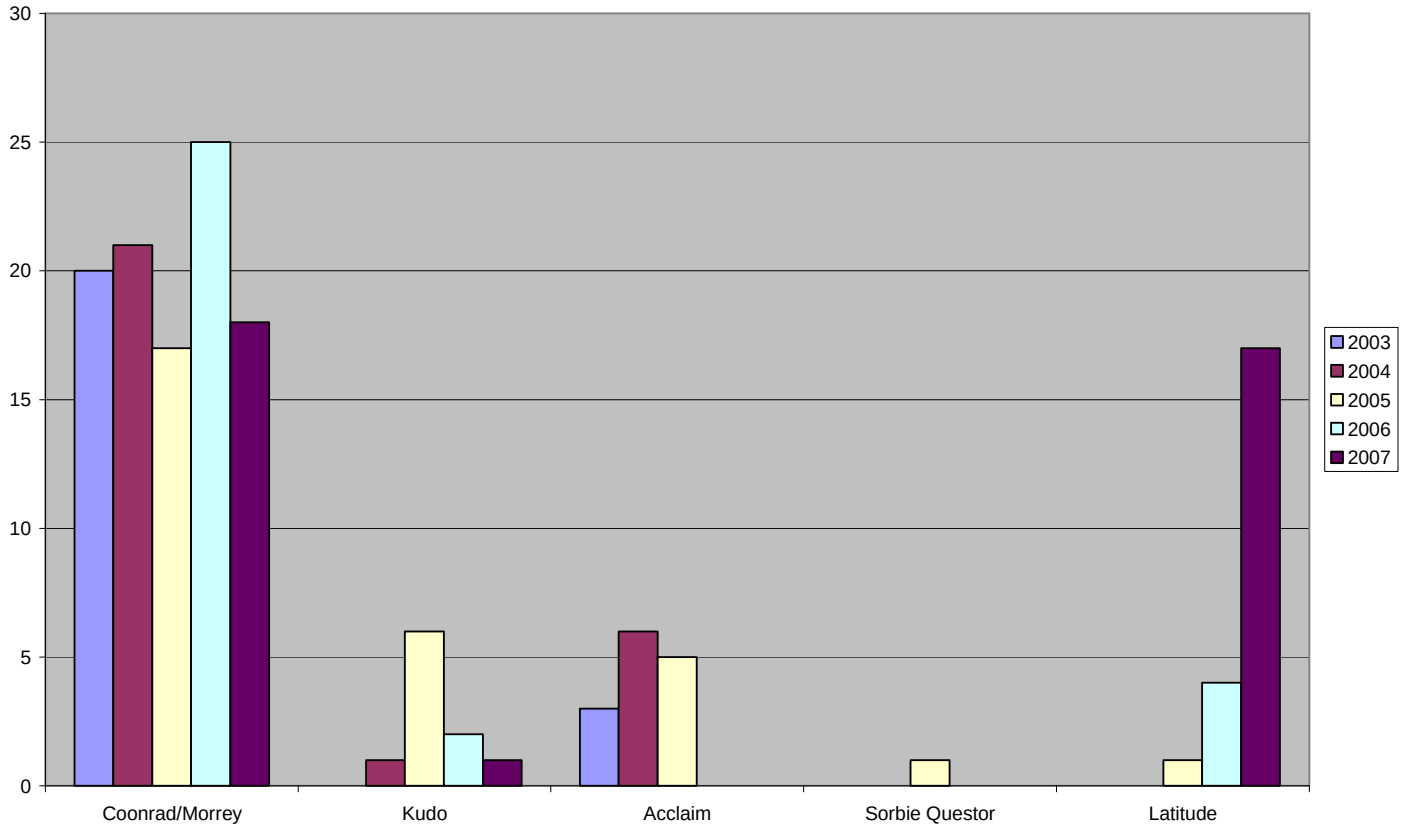
| | |
|---|---|
| Consultant | 96 |
| Advanced trainee supervised | 1 |

**Prosthesis usage**

**Elbow prostheses used in 2007**

| | |
|---|---|
| Coonrad/Morrey | 18 |
| Latitude | 17 |
| Kudo | 1 |

**MOST USED ELBOW PROSTHESES 2003 – 2007**




The latitude has become very popular over the last year.

**Surgeon and hospital workload**

In 2007, 18 surgeons performed 36 primary elbow procedures, an average of 2 procedures per surgeon.

**Hospitals**

In 2007, primary elbow replacement was performed in 15 hospitals. 10 were public and 5 were private.

For 2007 the average number of primary elbow replacements per hospital was 2.

**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 eight-year period January 2000 – December 2007, there were 36 revision elbow procedures registered. This is an additional 5 compared to last year's report.
The average age for a revision elbow replacement was 64.35 years, with a range of 42.23 – 88.95 years.

| | Female | Male |
|---|---|---|
| Number | 26 | 10 |
| Percentage | 72.22 | 27.78 |
| Mean | 63.97 | 65.36 |
| Maximum age | 88.95 | 80.37 |
| Minimum age | 42.23 | 50.73 |
| Standard dev. | 10.44 | 9.01 |

**REVISION OF REGISTERED PRIMARY ELBOW ARTHROPLASTY**
This section analyses data for revisions of primary elbow procedures for the eight-year period.

There were 9 revisions of the primary group of 227 (3.96%); 2 with a second and one with a third revision.

**Time to revision**

| | |
|---|---|
| Mean | 626 days |
| Maximum | 1180 days |
| Minimum | 62 days |
| Standard deviation | 354 days |

**Reason for revision**
Loosening ulnar component n = 2

| | |
|---|---|
| >2 – 3 years | 2 |

Deep infection n = 2

| | |
|---|---|
| >1 – 2 years | 1 |
| >2 – 3 years | 1 |

| | |
|---|---|
| >6 months – 1 year | 1 |
| >1 – 2 years | 1 |

Pain n = 2

Fracture humerus n = 1

| | |
|---|---|
| >6 months – 1 year | 1 |

Dislocation n = 1

| | |
|---|---|
| < 6 months | 1 |

Disassociation of components n = 1

| | |
|---|---|
| > 3 – 4 years | 1 |

**Statistical note**
In the table 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 place.

**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.

**All Total Elbow Arthroplasties**

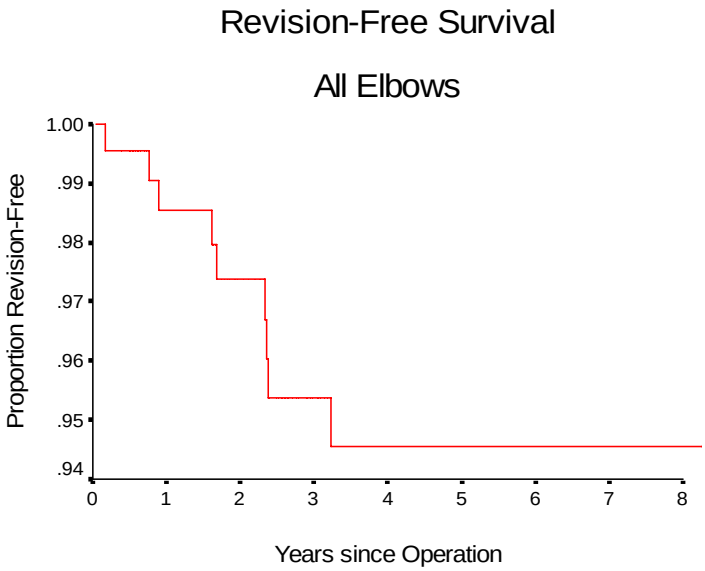
| | Total | Observed component years | Number revised | Rate/100-component-years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| **All patients** | 377 | 1155 | 15 | 1.30 | 0.73, 2.14 |

**Revision vs prosthesis**

| Elbows | Total | Observed component years | Number revised | Rate/100 component years | Exact 95% confidence interval |
|---|---|---|---|---|---|
| Acclaim | 16 | 55 | 2 | 3.61 | 0.44, 13.06 |
| Coonrad/Morrey | 169 | 662 | 5 | 0.76 | 0.25, 1.76 |
| Custom device | 1 | 8 | 0 | 0.00 | 0.00, 48.57 |
| Kudo | 18 | 70 | 2 | 2.86 | 0.35, 10.33 |
| Latitude | 22 | 23 | 0 | 0.00 | 0.00, 16.11 |
| Sorbie Questor | 1 | 3 | 0 | 0.00 | 0.00, 143.34 |

### KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for years 2000 to 2007 with deceased patients censored at time of death.




| Years | % Revision-free |
|---|---|
| 1 | 98.56 |
| 2 | 97.37 |
| 3 | 95.36 |

There are insufficient numbers for accurate survival analysis beyond 3 years

### PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX MONTHS POST SURGERY

At six months post surgery patients are sent a non validated questionnaire modelled on the Oxford 12 hip questionnaire.

The new scoring system has been adopted as recommended by the original authors for the Oxford 12

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.

This year we have grouped the questionnaire responses based on the scoring system published by Kalairajah et al. (see appendix one)

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 eight-year period and as at July 2008, there were 168 primary elbow responses registered at six months post surgery.
The mean primary elbow score was 37.13 (standard deviation 9.97, range 8 – 48)

| | |
|---|---|
| Scoring > 41 | 77 |
| Scoring 34 - 41 | 39 |
| Scoring 27 - 33 | 24 |
| Scoring < 27 | 28 |

At six months post surgery, 69% had an excellent or good score.

**Analysis of the individual questions**
Analysis of the individual questions showed that there were problems with carrying the household shopping (Q5), pain with work or recreational activities (Q11), carrying a tray of food (Q6) and moderate or severe pain from the operated elbow (Q8).

Percentage scoring 0 or 1 for each question (n = 168)

| | | |
|---|---|---|
| 1 | The worst pain from the shoulder is severe or unbearable | 11.3 |
| 2 | Extreme difficulty or impossible to dress yourself because of your operated elbow | 5.9 |
| 3 | Extreme difficulty or impossible to lift a teacup safely with your operated arm | 5.9 |
| 4 | Extreme difficulty or impossible to get your hand to your mouth | 4.2 |
| 5 | Extreme difficulty or impossible to carry the household shopping with your operated arm | 16.7 |
| 6 | Extreme difficulty or impossible to carry a tray containing a plate of food across a room | 13.1 |
| 7 | Extreme difficulty or impossible to brush or comb hair with the affected arm | 12.5 |
| 8 | Usually have moderate or severe pain from the operated elbow | 13.1 |
| 9 | Extreme difficulty or impossible to hang clothes in a wardrobe using operated arm | 10.1 |
| 10 | Extreme difficulty or impossible to wash and dry under both arms | 11.3 |
| 11 | Pain from operated elbow greatly or totally interfering with usual work or hobbies | 13.1 |
| 12 | Pain from elbow in bed most or every nights | 8.8 |

**Revision elbow questionnaire responses**
There were 21 revision elbow responses with 48% achieving an excellent or good score. This group includes all revision elbow responses. The mean revision elbow score was 34.10 (standard deviation 8.6, range 20–48).

**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

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**

# PROSTHESIS INVENTORY

| HIPS | | |
|---|---|---|
| | **Femoral Components** | **Acetabular Components** |
| **DE PUY** | Elite Plus | Charnley |
| | Summit | Duraloc |
| | Charnley | Pinnacle |
| | Corail | |
| | ASR | |
| **STRYKER** | Accolade | Trident |
| | Exeter | Exeter |
| | | Contemporary |
| **ZIMMER** | CCA | CCB |
| | CLS | CLS |
| | CPT | Fitek |
| | MS30 | Fitmore |
| | Versys | Morscher |
| | Muller | ZCA |
| | Duron | Osteolock |
| | | Trilogy |
| **SMITH & NEPHEW** | Spectron | Reflection |
| | Synergy Porous | |
| | BHR | |
| **MATHY'S** | Twinsys | RM |
| | | Weber |

| KNEES | | |
|---|---|---|
| **BIOMET** | AGC | |
| | Maxim | |
| **De Puy** | LCS | |
| | PFC Sigmar | |
| | LCS PFJ | |
| **Global Orthopaedics** | MBK | |
| **Smith & Nephew** | Genesis | |
| | Mod 3 | |
| **STRYKER** | Duracon | |
| | Scorpio | |
| | Triathlon | |
| | Avon Patello | |
| **ZIMMER** | Insall Burstein | |
| | Nexgen | |
| **ORTHOTEC** | Optetrak | |
| | Themis | |
| **ADVANCED SURGICAL TECHNOLOGIES** | Advance | |

| UNI COMPARTMENTAL KNEES | | |
|---|---|---|
| **BIOMET** | Oxford | |
| | Repicci II | |
| **Zimmer** | Miller/Galante | |
| | Zimmer Uni | |
| **De Puy** | Preservation | |
| | LCS | |
| **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** | MRS Humeral | |

| ANKLES | | |
|---|---|---|
| **DEPUY** | Agility | |
| | Mobility | |
| **Orthotec** | Ramses | |
| **REM Systems** | Salto | |
| **Link** | Star | |

| ELBOWS | | |
|---|---|---|
| **ZIMMER** | Coonrad/Morrey | |
| **DEPUY** | Acclaim | |
| **Biomet** | Kudo | |
| **REM Systems** | Latitude | |

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

# NATIONAL JOINT REGISTER
# PRIMARY REPLACEMENT HIP

**FREE PHONE 0800-274-989**

**TOTAL HIP ARTHROPLASTY ❑ RESURFACING ARTHROPLASTY ❑ 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***

**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**

# NATIONAL JOINT REGISTER
# REVISION HIP JOINT

**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 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**

❑ **Consultant** ❑ **Adv Trainee Supervised** ❑ **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**

# NATIONAL JOINT REGISTER
# PRIMARY REPLACEMENT KNEE

**FREE PHONE 0800-274-989**

**❑ TOTAL KNEE ARTHROPLASTY ❑ UNICOMPARTMENTAL ❑ PATELLOFEMORAL** **07.04.2005**

**Date: .....**

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

**Side:..... ****

*Tick Appropriate Boxes*

Patient Name:
Address:

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

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

# NATIONAL JOINT REGISTER
# REVISION KNEE JOINT

**FREE PHONE 0800-274-989**
**07.04.2005**

**Date: .....**

**Side:..... ****

**Patient Name:**
**Address:**

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

**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 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**

# NATIONAL JOINT REGISTER
# PRIMARY REPLACEMENT ANKLE

**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***

**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 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**

# NATIONAL JOINT REGISTER
# 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**

# NATIONAL JOINT REGISTER
# PRIMARY REPLACEMENT SHOULDER

**0800-274-989**

❑ **TOTAL SHOULDER ARTHROPLASTY** ❑ **HEMIARTHROPLASTY** ❑ **REVERSE SHOULDER**

**7.04.2005**

**Date: ……**

**Patient Name:**
**Address:**

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

***Attach Patient Label***

**Consultant: ……**
**[If different from patient label]**

**Side:…… ****

**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**
- ❑ **Post dysplasia**
- ❑ **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**

# NATIONAL JOINT REGISTER
# 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** ❑ **Synthetic**
❑**Autograft**

**BONE GRAFT - GLENOID**

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

**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**

# NATIONAL JOINT REGISTER
# PRIMARY REPLACEMENT ELBOW

**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***

**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 dislocation
- ❑ Post fracture
- ❑ Post ligament disruption
- ❑ Other: Name: .....

**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**

# NATIONAL 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**

**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**

# NATIONAL JOINT REGISTER
# 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**
- ❑ **L3/4**
- ❑ **L4/5**
- ❑ **L5/S1**

**Other .....**

**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 .....**

**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**
- ❑ **Retroperitoneal lateral abdominal wall incision**
- ❑ **Transperitoneal**
- ❑ **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**

# NATIONAL JOINT REGISTER
# 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**

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

# NATIONAL JOINT REGISTER
# 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**

**PRE OP PATIENT SCORE (NECK DISABILITY INDEX) .....**

- ❑ **C3/4** ❑ **C6/7**
- ❑ **C4/5** ❑ **C7/T1**
- ❑ **C5/6** **Other .....**

**PREVIOUS OPERATION**

- ❑ **Foreminotomy**
- ❑ **Adjacent Level Fusion**
- ❑ **Adjacent Level Disc Arthroplasty**
- ❑ **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**

# NATIONAL JOINT REGISTER
# REVISION CERVICAL DISC REPLACEMENT

**FREE PHONE 0800-274-989**
**14.08.2008**

**Date: .....**

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

**LEVEL OF REVISION**

❑ **C3/4** ❑ **C6/7**
❑ **C4/5** ❑ **C7/T1**
❑ **C5/6** ❑ **Other:**

**Patient Name:**
**Address:**

**DOB:** **NHI:**

***Attach Patient Label***

**Hospital: .....**

**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**

**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 up to 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 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 hip?
- 4 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

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**

**Left Right Please circle the SIDE on which you had your surgery performed**

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 up to 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 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 hip?
- 4 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

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 up to 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

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 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

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 up to 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 No days
- 3 Only 1 or 2 days
- 2 Some days
- 1 Most days
- 0 Every day

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.

**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:

……H

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 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

## 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

12 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

13 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

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 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

16 Have you had swelling of your foot?
- 4 None at all
- 3 Occasionally
- 2 Often
- 1 Most of the time
- 0 All the time

17 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.

## OSWESTRY DISABILITY INDEX QUESTIONNAIRE

**Patient Name:** ……. **Date of Birth:** …..……...

**Patient Address:** ……. **Operating Surgeon:** …….

……. ……. **Date of Surgery:** …….

Please answer **every section**. Mark **one box only** in each section that most closely describes you today.

**Section 1: Pain Intensity**

- ☐ I have no pain at the moment.
- ☐ The pain is very mild at the moment.
- ☐ The pain is moderate at the moment.
- ☐ The pain is fairly severe at the moment.
- ☐ The pain is very severe at the moment.
- ☐ The pain is the worst imaginable at the moment.

**Section 2: Personal Care (Washing, Dressing, etc)**

- ☐ I can look after myself normally, without causing extra pain.
- ☐ I can look after myself normally, but it is very painful.
- ☐ It is painful to look after myself and I am slow and careful.
- ☐ I need some help, but manage most of my personal care.
- ☐ I need help every day in most aspects of self care.
- ☐ I do not get dressed, I wash with difficulty and stay in bed.

**Section 3: Lifting**

- ☐ I can lift heavy weights without extra pain.
- ☐ I can lift heavy weights, but it gives extra pain.
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table.
- ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- ☐ I can lift only very light weights.
- ☐ I cannot lift or carry anything at all.

**Section 4: Walking**

- ☐ Pain does not prevent me walking any distance.
- ☐ Pain prevents me walking more than 1 mile.
- ☐ Pain prevents me walking more than ¼ of a mile.
- ☐ Pain prevents me walking more than 100 yards.
- ☐ I can only walk using a stick or crutches.
- ☐ I am in bed most of the time and have to crawl to the toilet.

**Section 5: Sitting**

- ☐ I can sit in any chair as long as I like.
- ☐ I can sit in my favourite chair as long as I like.
- ☐ Pain prevents me from sitting for more than 1 hour.
- ☐ Pain prevents me from sitting for more than ½ an hour.
- ☐ Pain prevents me from sitting for more than 10 minutes.
- ☐ Pain prevents me from sitting at all.

**Section 6: Standing**

- ☐ I can stand as long as I want without extra pain.
- ☐ I can stand as long as I want, but it gives me extra pain.
- ☐ Pain prevents me from standing for more than 1 hour.
- ☐ Pain prevents me from standing for more than ½ an hour.
- ☐ Pain prevents me from standing for more than 10 minutes.
- ☐ Pain prevents me from standing at all.

**Section 7: Sleeping**

- ☐ My sleep is never disturbed by pain.
- ☐ My sleep is occasionally disturbed by pain.
- ☐ Because of pain I have less than 6 hours sleep.
- ☐ Because of pain I have less than 4 hours sleep.
- ☐ Because of pain I have less than 2 hours sleep.
- ☐ Pain prevents me from sleeping at all.

**Section 8: Sex Life (if applicable)**

- ☐ My sex life is normal and causes no extra pain.
- ☐ My sex life is normal, but causes some extra pain.
- ☐ My sex life is nearly normal, but is very painful.
- ☐ My sex life is severely restricted by pain.
- ☐ My sex life is nearly absent because of pain.
- ☐ Pain prevents any sex life at all.

**Section 9: Social Life**

- ☐ My social life is normal and causes me no extra pain.
- ☐ My social life is normal, but increases the degree of pain.
- ☐ Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g. sport.
- ☐ Pain has restricted my social life and I do not go out as often.
- ☐ Pain has restricted social life to my home.
- ☐ I have no social life because of pain.

**Section 10: Travelling**

- ☐ I can travel anywhere without pain.
- ☐ I can travel anywhere, but it gives extra pain.
- ☐ Pain is bad but I manage journeys over 2 hours.
- ☐ Pain restricts me to journeys of less than 1 hour.
- ☐ Pain restricts me to short necessary journeys under 30 minutes.
- ☐ Pain prevents me from travelling, except to receive treatment.

## NECK DISABILITY INDEX (NDI) QUESTIONNAIRE

**Patient Name:** ……. **Date of Birth:** …..……...

**Patient Address:** ……. **Operating Surgeon:** …….

……. **Date of Surgery:** …….

Please answer **every section**. Mark **one box only** in each section that most closely describes you today.

**Section 1: Pain Intensity**

- ☐ I have no pain at the moment.
- ☐ The pain is very mild at the moment.
- ☐ The pain is moderate at the moment.
- ☐ The pain is fairly severe at the moment.
- ☐ The pain is very severe at the moment.
- ☐ The pain is the worst imaginable at the moment.

**Section 2: Personal Care (Washing, Dressing, etc)**

- ☐ I can look after myself normally, without causing extra pain.
- ☐ I can look after myself normally, but it causes extra pain.
- ☐ It is painful to look after myself and I am slow and careful.
- ☐ I need some help, but manage most of my personal care.
- ☐ I need help every day in most aspects of self care.
- ☐ I do not get dressed, I wash with difficulty and stay in bed.

**Section 3: Lifting**

- ☐ I can lift heavy weights without extra pain.
- ☐ I can lift heavy weights, but it gives extra pain.
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table.
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage light to medium weights if they are conveniently positioned.
- ☐ I can lift very light weights.
- ☐ I cannot lift or carry anything at all.

**Section 4: Reading**

- ☐ I can read as much as I want to with no pain in my neck.
- ☐ I can read as much as I want to with slight pain in my neck.
- ☐ I can read as much as I want to with moderate pain in my neck.
- ☐ I can't read as much as I want because of moderate pain in my neck.
- ☐ I can hardly read at all because of severe pain in my neck.
- ☐ I cannot read at all.

**Section 5: Headaches**

- ☐ I have no headaches at all.
- ☐ I have slight headaches which come infrequently.
- ☐ I have moderate headaches which come infrequently.
- ☐ I have moderate headaches which come frequently.
- ☐ I have severe headaches which come frequently.
- ☐ I have headaches almost all the time.

**Section 6: Concentration**

- ☐ I can concentrate fully when I want to, with no difficulty.
- ☐ I can concentrate fully when I want to, with slight difficulty.
- ☐ I have a fair degree of difficulty in concentrating when I want to.
- ☐ I have a lot of difficulty in concentrating when I want to.
- ☐ I have a great deal of difficulty in concentrating when I want to.
- ☐ I cannot concentrate at all.

**Section 7: Work**

- ☐ I can do as much work as I want to.
- ☐ I can only do my usual work, but no more.
- ☐ I can do most of my usual work, but no more.
- ☐ I cannot do my usual work.
- ☐ I can hardly do any work at all.
- ☐ I can't do any work at all.

**Section 8: Driving**

- ☐ I can drive my car without any neck pain.
- ☐ I can drive my car as long as I want, but with slight neck pain.
- ☐ I can drive my car as long as I want, but with moderate neck pain.
- ☐ I can't drive my car as long as I want because of moderate pain in my neck.
- ☐ I can hardly drive at all because of severe pain in my neck.
- ☐ I can't drive my car at all.

**Section 9: Sleeping**

- ☐ I have no trouble sleeping.
- ☐ My sleep is slightly disturbed (less than 1 hour sleepless).
- ☐ My sleep is mildly disturbed (1-2 hours sleepless).
- ☐ My sleep is moderately disturbed (2-3 hours sleepless).
- ☐ My sleep is greatly disturbed (3-5 hours sleepless).
- ☐ My sleep is completely disturbed (5-7 hours sleepless).

**Section 10: Recreation**

- ☐ I am able to engage in all my recreation activities, with no neck pain at all.
- ☐ I am able to engage in all my recreation activities, with some pain in my neck.
- ☐ I am able to engage in most, but not all, of my usual recreation activities because of pain in my neck.
- ☐ I am able to engage in only a few of my usual recreation activities because of pain in my neck.
- ☐ I can hardly do any recreation activities because of pain in my neck.
- ☐ I can't do any recreation activities at all.