NEW ZEALAND ORTHOPAEDIC ASSOCIATION

THE NEW ZEALAND JOINT REGISTRY

TEN YEAR REPORT

JANUARY 1999 TO DECEMBER 2008

REGISTRY BOARD

Alastair Rothwell	Chairman and Registry Supervisor
James Taylor	Deputy Chairman
Mark Wright	Orthopaedic Surgeon
Peter Devane	Orthopaedic Surgeon
Helen Tobin	Secretary NZOA Orthopaedic Surgeon
Paul Denham	Orthopaedic Industry Liaison Association
Alan Henwood	Arthritis New Zealand
Kim Miles	CEO New Zealand Orthopaedic Association
Toni Hobbs	Registry Coordinator
Statistician	Dr Chris Frampton

Email: toni.hobbs@cdhb.govt.nz
Tel: 0800-274-989
Website: www.cdhb.govt.nz/njr/

Date of Publication:
October 2009

CONTENTS

EDITORIAL COMMENT

It is our pleasure to present the ten year report of the New Zealand Orthopaedic Associations New Zealand Joint Registry. Ten years is an important milestone when we can pause and reflect on those early months and years when there was quite a lot of controversy over the need of a New Zealand Joint Registry when others existed in the Northern Hemisphere. Furthermore the difficulties in securing sufficient start up and ongoing funding threatened our early survival. There were also considerable frustrations in achieving nationwide ethical approval. Now almost 11 years on, the Registry and it s contributors can feel very proud of its achievements and the quality, quantity and versatility of the stored data on over 120,000 registered joint replacements. This is borne out by the increasing use of the Registry for audit and research projects. The number of publications in peer reviewed journals is increasing (see Appendix 2) and several of these are challenging some firmly held orthopaedic beliefs and should influence national and international orthopaedic arthroplasty practice.

For the individual surgeon registry data is becoming increasingly important for personal audit, peer review and continuing professional development requirements. In addition other agencies such as the Ministry of Health and the Accident Compensation Corporation have come to recognise the uniqueness and importance of the data base in the New Zealand health service. As always the over riding condition for the release of any data is the protection of patient and surgeon privacy unless prior permission has been obtained.

In this years report the format of previous years has been followed such that each arthroplasty section is self contained. This does however, result in a certain amount of intersection repetition. Included for the first time are sections on cervical and lumbar disc replacements.

The total number of registered joint arthroplasties at 31.12.2008 was 116,625 which had been performed on 88292 individual patients of which 8953 (10.14%) became deceased during the 10 year period. The number of observed component years contained within the Registry has now reached 416615 years. The increase of 15311 registered joints for 2008 compared to the 15253 increase in 2007 represents a overall annual gain of 0.3% which is the smallest on record. Primary hip arthroplasty increased by 0.6% and primary knee arthroplasty fell by 3% but interestingly there were significant gains in the more minor joint sections with a 35% increase for primary ankle arthroplasty ,14% for shoulders and 11% for elbows. As for the previous two years analysis of revision data has been confined to primary registered arthroplasties.

The annual percentage of uncemented hip arthroplasties continues to rise and in 2008 reached almost 50%. This rise is at the expense of fully cemented hips which last year fell to 16% of total compared to 56% in 1999. Hybrid arthroplasty remains static at just under 40%. However when the 3 types of hip fixation are analysed against the four age bands: under 55 years, 55-64 years, 65-74 years, and greater than 75 years, it shows that the uncemented arthroplasty has a statistically significantly higher revision rate in all except the under 55 age band. The data also shows that overall the hybrid hip has the lowest revision rate across the 4 age bands.

Revision rates for individual hip component matchings as well as for individual components for which there are a minimum of 250 primary procedures have also been calculated. Just one combination of the 50 analysed demonstrated a statistically significantly higher revision rate compared to the overall mean of 0.65 per 100 component years (95% confidence intervals; 0.61, 0.68) but the total number of this combination only increased by one in 2008. With regard to individual components, 2 popular femoral stems and 3 popular acetabulae have been identified as having statistically significant higher revision rates 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 affect its performance. Furthermore and perhaps most importantly the overall revision rate noted above and the ten year failure of just 5.76% are among the lowest of similar joint registries so that a prosthesis with a statistically significant higher revision rate in the New Zealand Registry may not 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 0.54 (95% confidence intervals; 0.50, 0.58) and the ten year failure of just 3.97% again among the lowest for Joint Registries. New Zealand surgeons can therefore be justifiably proud of these medium term trends. It is also interesting that none of the 10 year primary hip and knee arthroplasties were revised in 2008.

For the first time the revision rates of the various bearing surfaces used in primary hip arthroplasty ie metal on plastic, metal on metal, ceramic on plastic, ceramic on metal, ceramic on ceramic have been analysed and shows that the metal on plastic articulation has a significantly lower revision rate than the other combinations. The effect of

factors such as head size, cross-linked vs standard polyethylene, stainless steel vs chrome/cobolt, zirconia vs alumina etc will be discussed in next years report.

Although uncemented knee arthroplasty represents just 4.5% of all primary knee arthroplasties it has a statistically significantly higher revision rate than either fully cemented or hybrid in which the tibial component is cemented and the femoral component uncemented. Analyses have confirmed that it is loosening of the uncemented tibial component that is mainly responsible for the increased revision rate.

Image guidance continues to be increasingly used for primary knee arthroplasty and during 2008 was used in 13.7% of procedures. The same applies to the minimally invasive approach for the uni-compartmental knee arthroplasty and in 2008 was used in 37% of procedures.

Once again we have compared the deep infection revision rates within six months of the primary procedure for primary hip and knee arthroplasty against theatre environment. Six months was chosen as infection within this time period is highly likely to have been introduced at the time of surgery. This years analyses demonstrate that for primary hip arthroplasty there was four times the risk for revision for deep infection when the primary procedure is carried out in a laminar flow theatre with space suit as compared to a conventional theatre without a space suit. For primary knees the risk is 2.9 times greater. When the use of space suits versus deep infection is analysed the risk is almost 3 times greater when a space suit is used than when not used. These are very surprising results particularly as the use of laminar flow theatres and space suits is increasing year by year such that last year 49% of primary hips and 53% of primary knees were performed in laminar flow theatres and space suits were used for 42% of primary hips and 44% of primary knee arthroplasties. The numbers of revised infected arthroplasties however, are not large(46 primary hips, 50 primary knees) but an in depth investigation of these findings is already underway.

The number of primary ankle arthroplasties increased by 107 in 2008 and represented a 35% jump. This increased number was performed by the same number of surgeons(12) as in 2007. There is concern that not all revisions to an ankle arthrodesis are being captured by the Registry.

In the shoulder arthroplasty section, resurfacing has been added to the conventional total, reverse and hemi arthroplasty groups with respect to revision rates and Oxford scores. Although there is considerable variation in revision rates for the different prostheses there are no statistically significant differences either within or across the groups owing to very wide confidence intervals for several prostheses but the reverse group as a whole does have a significantly higher revision rate than the 3 other groups. Conventional total arthroplasty has a significantly better mean Oxford score than the other groups.

Oxford 12 Questionnaire

As noted in previous years the statistically significant relationship between the 6 month score and revision within 2 years for primary hips and knees including unicompartmental, has again been demonstrated. In addition the relationship between the 5 year score and revision within 2 years of that date demonstrates an apparently even more significant relationship although the numbers are not yet large enough to be certain of the statistical significance.

In terms of using the Oxford scores as a screening tool for arthroplasty follow up it is worth noting that 69% of hip, 79% of knee and 66% of unicompartmental revisions within 2 years would have been captured by monitoring the lowest 31%, 25% and 17% respectively of the Oxford scores.

The complication data collected with the Oxford questionnaires is statistically unreliable and therefore will no longer be analysed for the annual reports.

Alastair Rothwell	Toni Hobbs	Chris Frampton
Supervisor	Coordinator	Statistician

ACKNOWLEDGMENTS

The Registry is very appreciative of the support from the following

Canterbury District Health Board:
for the website and other facilities

New Zealand Health Information Service:
for audit compliance information

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

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

Christchurch Hospital
Christchurch 8140
Contact: Barbara Clark

Gisborne Hospital
Gisborne 4010
Contact: Jackie Dearman

Hawkes Bay Hospital
Hastings 4120
Contact: Jane Hurford-Bell

Kenepuru Hospital
Porirua 5240
Contact: Emma Brooks

Masterton Hospital
Masterton 5840
Contact: Sarah Duckett

Nelson Hospital
Nelson 7040
Contact: Pauline Manley or Anne Fryer

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

Southland Hospital
Invercargill 9812
Contact: Helen Powley

Tauranga Hospital
Tauranga 3143
Contact: Sue Clynes

Waikato Hospital
Hamilton 3204
Contact: Maria Ashurst or Helen Keen

Wanganui Hospital
Wanganui
Contact: Sue Slight

Burwood Hospital
Christchurch 8083
Contact: Diane Darley

Dunedin Hospital
Dunedin 9016
Contact: Jenni Taylor

Grey Base Hospital
Greymouth 7840
Contact: Anna Vorverk or Marg Wafer

Hutt Hospital
Lower Hutt 5040
Contact: Sonja Dowle or Ruby Boekholt

Manukau Surgery Centre
Auckland 2104
Contact: Amanda Ellis

Middlemore Hospital
Auckland 1640
Contact: Francine Gabriel

Northshore Hospital,
Waitemata DHB
Takapuna 0740
Contact: Chris Cavalier

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

Taranaki Base Hospital
New Plymouth 4342
Contact: Allison Tijsen

Timaru Hospital
Timaru 7940
Contact: Carol Campbell

Wairau Hospital
Blenheim 7240
Contact: Monette Johnston

Wellington Hospital
Newtown 6242
Contact: Rebecca Kay

Whakatane Hospital
Whakatane 3158
Contact: Karen Burke

Whangarei Area Hospital
Whangarei 0140
Contact: Helen Harris

Private Hospitals

Aorangi Hospital
Palmerston North 4410
Contact: Frances Clark

Ascot Integrated Hospital
Remuera 1050
Contact: Elizabeth Hollier

Belverdale Hospital
Wanganui 4500
Contact: Jane Young

Bidwill Trust Hospital
Timaru 7910
Contact: Kay Taylor

Boulcott Hospital
Lower Hutt 5040
Contact: Karen Hall

Bowen Hospital
Wellington 6035
Contact: Pam Kohnke

Braemar Private Hospital
Hamilton 3204
Contact: Allison Vince

Chelsea Hospital
Gisborne 4010
Contact: Jenny Long

Grace Hospital (Norfolk Southern Cross)
Tauranga 3112
Contact: Anne Heke

Kensington Hospital
Whangarei 0112
Contact: Sandy Brace

Manuka Street Trust Hospital
Nelson 7010
Contact: Sabine Mueller

Mercy Integrated Hospital
Auckland 1023
Contact: Yve Rutland

Mercy Hospital
Dunedin 9054
Contact: Liz Cadman

Ormiston Hospital
Auckland 2016
Contact: Bodelle Cross

Royston Hospital
Hastings 4122
Contact: Suzette Du Plessis

St Georges Hospital
Christchurch 8014
Contact: Steph May

Southern Cross Hospital, Brightside
Epsom 1023
Contact: Theresa Lambert

Southern Cross Hospital
Christchurch Central 8013
Contact: Diane Kennedy

Southern Cross Hospital
Hamilton East 3216
Contact: Cathy Wine

Southern Cross Hospital
Invercargill Central 9810
Contact: Maree Henderson

Southern Cross Hospital
New Plymouth 4310
Contact: Lorraine Parthemore

Southern Cross North Harbour
Wairau Valley 0627
Contact: Rita Redman

Southern Cross Hospital
Newtown
Wellington 6021
Contact: Marian Lee

Southern Cross QE
Rotorua 3015
Contact: Chris Mott

Wakefield Hospital
Wellington 6021
Newtown
Contact: Jan Kereopa

Southern Cross Hospital
Palmerston North 4410
Contact: Susan Wright

PROFILE OF THE AVERAGE NEW ZEALAND ORTHOPAEDIC SURGEON *

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

- 37 Total hip arthroplasties — with 66% using uncemented, 16% fully cemented and 38% hybrid prostheses: has a 94.24% survival at10 years and a revision rate of 0.65 per 100 component years; 0.38% have been revised for deep infection; 85% at 6 months and 88% at five years had an excellent or good Oxford score.
- 30 Total knee arthroplasties — with almost all cemented but only 10 with patellae resurfaced; has a 96.03% survival at 10 years and a revision rate of 0.54 per 100 component years; 0.52% 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 90.68% survival at 6 years and a revision rate of 1.51 per 100 component years; 0.3% have been revised for deep infection; 79% at six months and 87% at 5 years had an excellent or good Oxford score.
- 5 Shoulder arthroplasties — with a 60:40 split between total and hemi; has a 95.50% survival at 5 years and a revision rate of 0.98 per 100 component years; 0.4% have been revised for deep infection; 66% had an excellent or good Oxford score at 6 months.
- 6 Total ankle arthroplasties — mostly uncemented; 90.02% survival at 6 years and a revision rate of 1.3 per 100 component years; 0.4% revised for deep infection; 56% had excellent or good Oxford derived scores at 6 months.
- 2 Total elbow arthroplasties — most likely a cemented Coonrad/Morrey prosthesis; 93.73% survival at 4 years and a revision rate of 1.6 per 100 component years; 0.7% have been revised for deep infection; 70% had excellent or good Oxford derived scores at 6 months.

*** averages derived from the number of surgeons recorded performing the above procedures during 2008 and not from the total pool of orthopaedic surgeons**.

DEVELOPMENT AND IMPLEMENTATION OF THE NEW ZEALAND JOINT REGISTRY

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

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

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

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

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

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

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

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

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

Funding
Several sources of funding were investigated including contributions from the Ministry of Health, various funding agencies, medical insurance societies and an implant levy payable by surgeons and public hospitals to supplement a grant from the NZOA. In the early years the Registry had a “hand to mouth” existence relying on grants from the NZOA and Wishbone Trust until it received significant annual grants from the Accident Compensation Corporation. From 2002 funding became more reliable with the surgeons paying a

$10 levy, increased to $15 in 2008, for each joint registered from a private hospital, and the Ministry of Health agreeing to pay $72,000 a year as part of the Government Joint Initiative. Since 2005 the Southern Cross Hospitals have contributed $10,000 annually.

Ethical Approval

Application was made to the Canterbury Ethical Committee early in 1998; first for approval for hospital data collection without the need for patient consent and second for the patient generated outcomes using the Oxford 12 questionnaire plus the additional questions. The first part of the application was initially readily approved but the second part required several amendments to patient information and consent forms before approval was obtained.

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

Surgeon and Hospital Reports

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

Introduction of the Registry

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

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

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

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

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

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

DEVELOPMENTS SINCE THE INTRODUCTION OF THE REGISTRY

Inclusion of other joint replacement arthroplasties

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

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

Monitoring of Data Collection

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

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

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

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

Registered patient deaths are also obtained from the NZHIS.

DATA ENTRY BY SCANNING

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

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

Staffing

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

The 2008 Registry staff are Alastair Rothwell, Supervisor, Toni Hobbs, Coordinator, Pat Manning Secretary, Lynley Diggs, Anne McHugh and Jane Tope-Cobb data processors.

Use of Registry Data

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

Registry Board

This Board 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 2008

Numbers of procedures registered

	10 years	9 years	8 years	7 Years	6 Years	5 Years
Hips, primary	56383	49374	42421	35998	29680	23457
Hips, revision	8405	7360	6383	5487	4570	3641
Knees, primary	40068	34458	28705	23565	18537	14371
Knees, revision	3293	2883	2499	2149	1736	1419
Knees, unicompartmental	4826	4284	3709	3122	2565	1926
Shoulders, primary	2498	2044	1641	1275	982	693
Shoulders, revision	180	139	105	80	57	45
Elbows, primary	267	227	191	160	130	101
Elbows, revision	41	36	31	26	20	15
Ankles, primary	484	377	298	216	146	99
Ankles, revision	29	26	19	12	8	6
Lumbar Disc, primary	94	75	59	38	22	
Cervical Disc, primary	57	31				
TOTAL	**116625**	**101314**	**86061**	**72128**	**58,453**	**45,776**

BILATERAL JOINT REPLACEMENTS CARRIED OUT UNDER THE SAME ANAESTHETIC

Bilateral hips	1164 patients	(2328 hips)	4.0%	of primary hips
Bilateral knees	1792 patients	(3584 knees)	9.0 %	of primary knees
Bilateral Unicompartmental knees	390 patients	(780 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.

During the 10 year period 88292 individual patients were registered with a mortality rate of 10.14%.

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

HIP ARTHROPLASTY

PRIMARY HIP ARTHROPLASTY

The ten year report analyses data for the period January 1999 – December 2008. There were 56,383 primary hip procedures registered including 708 resurfacing arthroplasties. This is an additional 6,996 compared to last year's report.

1999	4117
2000	4721
2001	4934
2002	4830
2003	5059
2004	6029
2005	6317
2006	6427
2007	6953
2008	6996

There was a 0.6% increase in hip registrations for 2008, which is the smallest annual increase excepting the 2.1% decrease in 2002.
Overall there has been a 70% increase in annual registrations since 1999.

DATA ANALYSIS

Age and sex distribution

The average age for all patients with primary hip arthroplasty was 66.84 years, with a range of 15.43 – 100.13 years.

All hip arthroplasty

	Female	Male
Number	29670	26713
Percentage	52.62	47.38
Mean age	68.36	65.16
Maximum age	100.13	96.97
Minimum age	15.43	15.87
Standard dev.	11.73	11.52

Conventional hip arthroplasty

	Female	Male
Number	29501	26174
Percentage	52.99	47.01
Mean age	68.47	65.43
Maximum age	100.13	96.97
Minimum age	15.43	15.87
Standard dev.	11.66	11.41

Resurfacing hip arthroplasty

	Female	Male
Number	169	539
Percentage	23.87	76.13
Mean age	49.26	52.03
Maximum age	65.88	75.69
Minimum age	25.72	20.55
Standard dev.	7.55	8.62

A further 191 resurfacing hips were registered during 2008, which were just 3 more than for 2007. The male to female ratio is 3.2:1.

Previous operation

None	53504
Internal fixation	1230
Osteotomy	369
Internal fixation for SUFE	99
Arthroscopy/arthrotomy	57
Arthrodesis	54
Core decompression	42
Open reduction	36
Other	96

Diagnosis

Osteoarthritis	48364
Acute fracture NOF	2004
Avascular necrosis	1817
Developmental dysplasia	1558
Rheumatoid arthritis	931
Old fracture NOF	774
Other inflammatory	553
Tumour	259
Post acute dislocation	201
Fracture acetabulum	105
Other	155

Approach

Posterior	34767
Lateral	16134
Anterior	2929
Minimally invasive	1008
Trochanteric osteotomy	111
Image guided surgery	50

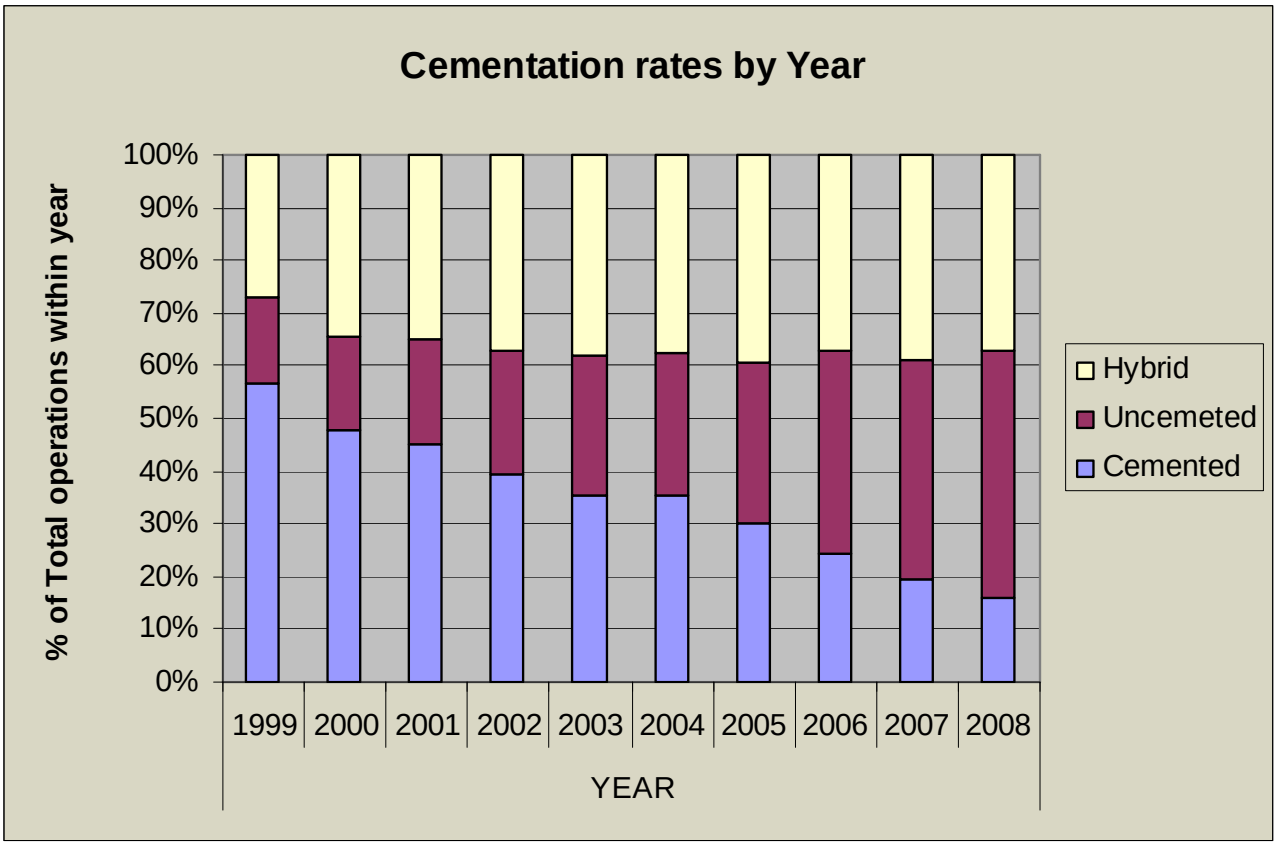
Image guided surgery was added to the updated forms at the beginning of 2005, but there has been little interest in the technique. In contrast the minimally invasive approach continues to gain in popularity and in 2008 accounted for 4.0% of approaches, up from 2.6% in 2007.

Bone graft

Femoral autograft	148
Femoral allograft	30
Femoral synthetic	2
Acetabular autograft	428
Acetabular allograft	70
Acetabular synthetic	2

Cement

Femur cemented	38958	(69%)
Antibiotic in cement	21827	(56%)
Acetabulum cemented	18956	(34%)
Antibiotic in cement	10565	(56%)



The proportion of uncemented hips continues to increase to almost 50% in 2008 at the expense of fully cemented hips which were just 16% of total compared to 56% in 1999.The hybrid remain static at just under 40%.

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic 53890 (96%)

A cephalosporin was used in 90% of patients.

Operating theatre

Conventional	36505
Laminar flow	18958
Space suits	13046

The number of hip arthroplasties being performed in laminar flow theatres continues to increase and in 2008 accounted for 49% of the total.
Space suits were used in 42% of arthroplasties.

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 four-year period 2005 -2008, there were 23,235 (87%) primary hip procedures with the ASA class recorded

ASA	Number	Percentage
1	4147	18
2	13619	59
3	5276	22
4	193	1

Operative time – skin to skin

Mean	81	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 four-year period 2005 – 2008.

Consultant	23076
Advanced trainee supervised	2018
Basic trainee	734
Advanced trainee unsupervised	690

There was no change in the number of supervised/unsupervised advanced trainee numbers for 2008.

Prosthesis usage

Resurfacing hips

	2004	2005	2006	2007	2008
BHR	7	101	132	156	173
ASR	10	38	37	29	14
Durom	4				
Adept				2	
Mitch				1	4
Total	21	139	169	188	191

The BHR is the most common resurfacing prosthesis used at 80% of the total.

Conventional primary hips

Top 10 femoral components used in 2008

Exeter V40	1922
TwinSys uncemented	822
Corail	757
CLS	590
Spectron	410
Muller	304
Accolade	288
MS 30	226
CPT	216
Summit	197

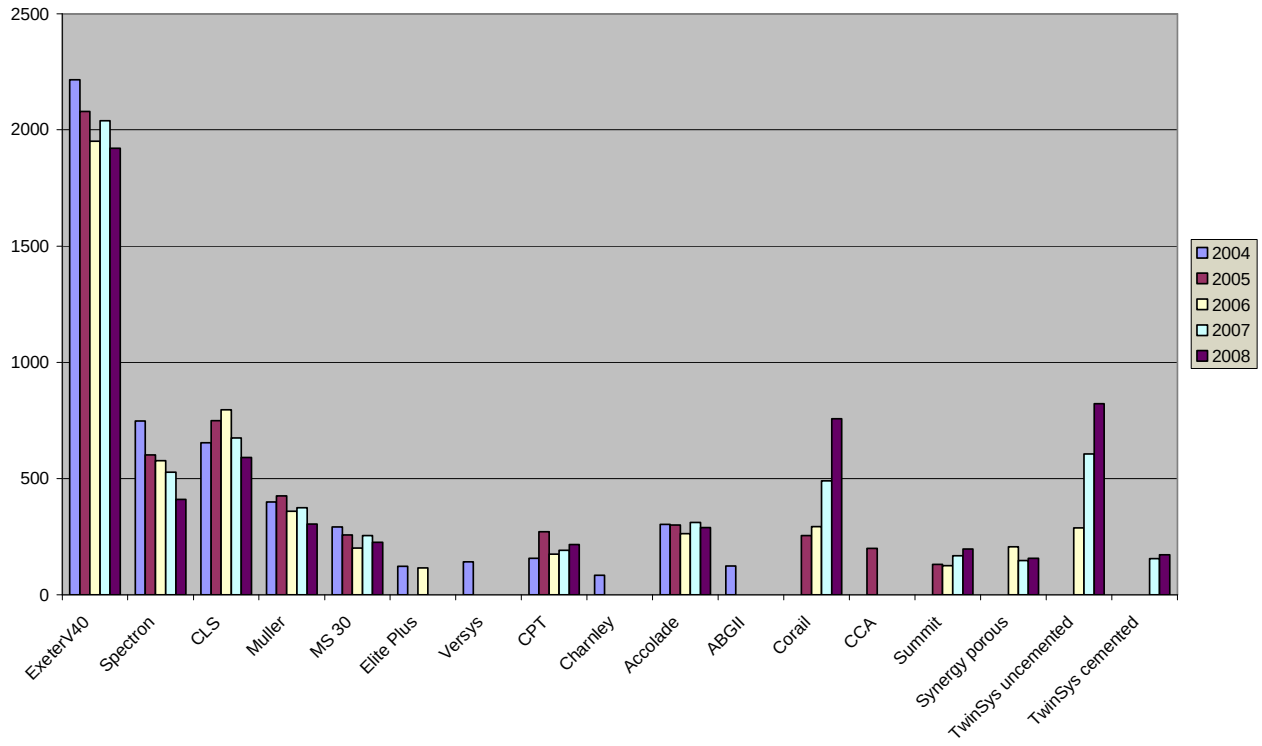
There was no change in the top 10, but the TwinSys and Corail move up although still well behind the Exeter V40.

Top 10 acetabular components used in 2008

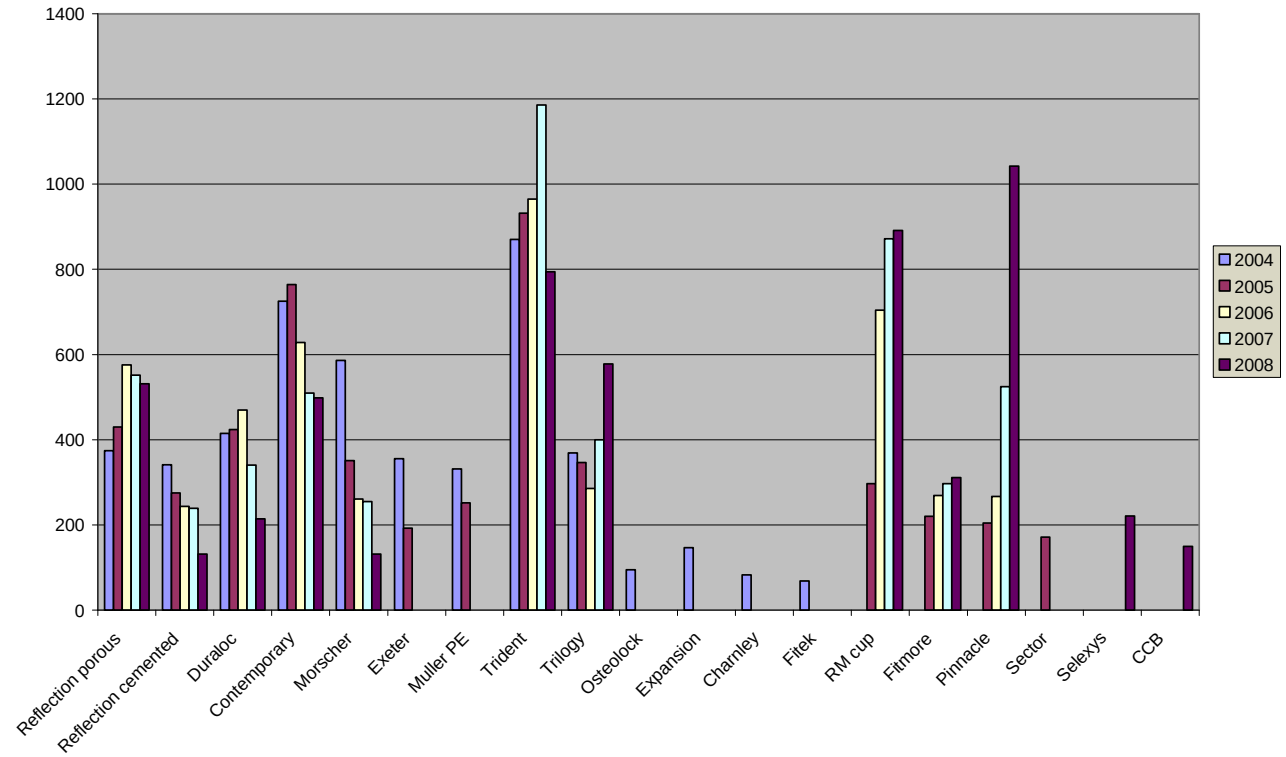
Pinnacle	1042
RM cup	891
Trident	794
Trilogy	578
Reflection porous	531
Contemporary	498
Fitmore	311
Selexys	221
Duraloc	214
CCB	132

The Pinnacle has continued its surge to the top with twice the number registered in 2008 than for 2007. Selexys and CCB have replaced Morscher and Reflection cemented.

MOST USED FEMORAL COMPONENTS 5 YEARS 2004- 2008



MOST USED ACETABULAR COMPONENTS 5 YEARS 2004 -2008



Surgeon and hospital workload

Surgeons
In 2008, 188 surgeons performed 6996 total hip replacements, an average of 37 procedures per surgeon.

29 surgeons performed less than 10 procedures and 45 performed more than 50.

Hospitals
In 2008 primary hip replacement was performed in 50 hospitals, 26 public and 24 private.

The average number of total hip replacements per hospital was 140.

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 ten year period January 1999 – December 2008, there were 8,405 revision hip procedures registered. This is an additional 1,043 compared to last year's report.

The average age for a revision hip replacement was 69.77 years, with a range of 17.52 – 97.72 years.

Revision hips

	Female	Male
Number	4100	4305
Percentage	48.78	51.22
Mean age	69.92	69.63
Maximum age	97.72	95.78
Minimum age	17.52	25.68
Standard dev.	12.28	10.82

The ratio of revision hips to primary hips remains at 1:7.7(13%.)

REVISION OF REGISTERED PRIMARY HIP ARTHROPLASTIES
This section analyses data for revisions of primary hip procedures for the ten year period.

There were 1,504 revisions of the 55,675 primary conventional hip replacements (2.7%) and 12 revisions of the 708 resurfacing hip replacements (1.7%), a total of 1516.

Time to revision for conventional hips

Mean	972	days
Maximum	3529	days
Minimum	0	days
Standard deviation	942	days

Reason for revision

Dislocation	528
Loosening acetabular comp.	321
Loosening femoral component	244
Deep infection	214
Pain	139
Fracture femur	135
Wear polyethylene	25
Implant breakage	29
Osteolysis	21
Wear acetabulum	10
Malposition of components	5
Tumour	4
Subsidence of prostheses	4
Other	29

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

The percentages for the 4 main reasons for revision are;

Dislocation	35%
Loosening acetabular comp.	21%
Deep infection	16%
Loosening femoral component	14%

Analysis by time of the 4 main reasons for revision
Dislocation n = 528

< 6 months	231
6 months – 1 year	56
2 years	85
3 years	49
4 years	36
5 years	21
6 years	20
7 years	12
8 years	7
9 years	10
10 years	1

Loosening acetabular component n = 321

< 6 months	45
6 months – 1 year	23
2 years	38
3 years	31
4 years	32
5 years	29
6 years	21
7 years	42
8 years	27
9 years	22
10 years	11

Loosening femoral component n = 244

< 6 months	19
6 months – 1 year	15
2 years	35
3 years	31
4 years	29
5 years	23
6 years	29
7 years	30
8 years	19
9 years	10
10 years	4

Revision for loosening of either component seems to have reached a peak at seven years and then dropped away. It will be interesting to see if this trend continues.

Deep infection n = 214

< 6 months	46
6 months – 1 year	27
2 years	46
3 years	37
4 years	19
5 years	16
6 years	4
7 years	8
8 years	6
9 years	5
10 years	-

Time to revision for resurfacing hips

N = 708 and revised n = 12

Mean	403 days
Maximum	796 days
Minimum	28 days
Standard deviation	278 days

Reason for revision

Fracture femur/neck of femur	6
Loosening acetabular comp.	1
Loosening femoral component	1
Deep infection	1
Pain	1
Subluxation	2
Avascular necrosis	1
Metal allergy	1

Statistical note

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

Observed component years

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

Statistical Significance

Where it is stated that a difference is significant the p value is 0.05 or less.

All Primary Hip Arthroplasties

	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
All patients	55675	232292.68	1504	0.65	0.62	0.68

Resurfacing Arthroplasty

	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
All patients	708	1326.07	12	0.90	0.47	1.59

There is no significant difference compared to total hip arthroplasty.

Revision versus hip Prosthesis Matchings sorted on revision rate/ 100 component years

Femoral Component	Acetabular component	Total	Observed Component Years	Number Revised	Rate/100-component-years	Exact 95% Confidence Interval	
Exeter V40	Contemporary	3689	11377.17	62	0.55	0.42	0.70
Exeter V40	Trident	3080	8105.29	47	0.58	0.43	0.77
Spectron	Reflection cemented	2786	15145.99	97	0.64	0.52	0.78
Spectron	Reflection porous	2035	7568.88	48	0.63	0.47	0.84
CLS	Morscher	1627	8272.31	53	0.64	0.48	0.84
Exeter	Contemporary	1550	11147.68	74	0.66	0.52	0.83
Accolade	Trident	1485	4585.97	41	0.89	0.64	1.21
Exeter V40	Exeter	1342	5216.94	22	0.42	0.26	0.64
Exeter	Exeter	1326	9141.43	53	0.58	0.43	0.76
Muller	Muller PE cup	1278	6222.67	21	0.34	0.21	0.52
Spectron	Duraloc	1155	6835.35	61	0.89	0.69	1.15
CLS	CLS Expansion	1123	5890.84	43	0.73	0.53	0.98
TwinSys stem uncemented	RM cup	1098	1371.79	13	0.95	0.50	1.62
Corail	Pinnacle	1039	1475.74	15	1.02	0.57	1.68
Exeter V40	Trilogy	1039	3012.51	13	0.43	0.23	0.74
Exeter V40	Duraloc	935	3330.21	20	0.60	0.37	0.93
Exeter	Osteolock	836	5977.94	35	0.59	0.41	0.81
Muller	RM cup	772	2109.50	13	0.61	0.33	1.05
MS 30	Morscher	770	4145.45	29	0.70	0.47	1.00
CLS	Fitmore	757	2004.15	20	0.99	0.61	1.54
Charnley	Charnley	757	4511.71	17	0.38	0.22	0.60
CLS	Duraloc	672	3815.75	33	0.86	0.60	1.21
Synergy Porous	Reflection porous	669	1903.93	13	0.68	0.36	1.17
CLS	Fitek	657	4061.39	9	0.22	0.10	0.42
Elite plus	Duraloc	608	2892.92	27	0.93	0.62	1.36
Exeter V40	Morscher	586	2170.30	15	0.69	0.39	1.14
Exeter	Duraloc	552	4155.93	32	0.77	0.53	1.09
Exeter	Morscher	551	4166.88	20	0.48	0.29	0.74

CCA	CCB	519	1872.25	7	0.37	0.15	0.77
CPT	ZCA	495	2587.05	15	0.58	0.32	0.96
Summit	Pinnacle	490	1084.58	9	0.83	0.38	1.58
SL monoblock	Muller PE cup	488	3080.05	8	0.26	0.11	0.51
MS 30	Fitmore	468	999.36	3	0.30	0.06	0.88
CPT	Trilogy	459	1131.11	12	1.06	0.55	1.85
MS 30	Muller PE cup	459	2324.84	11	0.47	0.24	0.85
TwinSys stem uncemented	Selexys TPS	447	494.93	7	1.41	0.57	2.91
Corail	Duraloc	440	1347.84	5	0.37	0.12	0.87
Muller	Weber	421	1678.86	7	0.42	0.17	0.88
Versys cemented	ZCA	359	1835.26	11	0.60	0.30	1.07
ABGII	Trident	341	1047.29	11	1.05	0.52	1.88
TwinSys stem cemented	RM cup	335	508.29	0	0	0	0.73
Elite plus	Charnley	332	2361.2	15	0.64	0.36	1.05
SL modular stem	RM cup	323	2412.05	18	0.75	0.44	1.18
Exeter V40	RM cup	314	560.68	5	0.89	0.29	2.08
Exeter V40	Reflection cemented	293	643.15	1	0.16	0.00	0.87
Elite plus	Elite Plus LPW	282	1542.88	7	0.45	0.18	0.93
Versys	Trilogy	272	1727.35	9	0.52	0.24	0.99
Exeter V40	Pinnacle	270	271.09	2	0.74	0.09	2.67
Exeter V40	Osteolock	269	1354.52	7	0.52	0.20	1.06
CLS	RM cup	252	593.22	7	1.18	0.47	2.43

There are 456 hip prosthesis matchings in the Registry. The table above contains the analysis of the 50 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 significantly higher than the overall rate of 0.65/100 ocys @ the 95% confidence interval.

Femoral Components sorted on revision rate/ 100 component years

Minimum of 50 implantations

Femur Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence interval	
Exeter V40	12826	39208.09	201	0.51	0.44	0.59
Spectron	6831	33849.63	227	0.67	0.59	0.77
CLS	6361	28597.11	212	0.74	0.64	0.85
Exeter	5748	41133.61	239	0.58	0.51	0.66
Muller	2862	11233.31	51	0.45	0.34	0.60
MS 30	2328	10367.50	56	0.54	0.41	0.70
Corail	2072	3971.55	28	0.71	0.47	1.02
Accolade	1787	5286.86	44	0.83	0.60	1.11
TwinSys stem uncemented	1738	2018.08	25	1.24	0.80	1.83
CPT	1541	5897.95	41	0.70	0.50	0.94
Elite plus	1353	7529.78	53	0.70	0.53	0.92
CCA	886	3593.75	26	0.72	0.47	1.06
Synergy Porous	850	2374.10	14	0.59	0.32	0.99

Charnley	815	4859.20	18	0.37	0.22	0.59
Summit	778	1746.64	17	0.97	0.57	1.56
ABGII	729	2735.48	26	0.95	0.62	1.39
Versys cemented	620	3125.15	18	0.58	0.34	0.91
SL monoblock	558	3594.13	11	0.31	0.15	0.55
S-Rom	487	1917.71	19	0.99	0.60	1.55
TwinSys stem cemented	459	625.95	0	0	0	0.59
SL modular stem	449	3391.58	22	0.65	0.41	0.98
CBC Stem	385	903.26	16	1.77	1.01	2.88
C-Stem	338	1229.38	14	1.14	0.62	1.91
Versys	313	1885.46	13	0.69	0.37	1.18
Mallory-Head	240	974.89	8	0.82	0.35	1.62
Omnifit	202	963.84	6	0.62	0.23	1.35
ABG	189	1632.80	13	0.80	0.42	1.36
Wagner cone stem	150	785.16	11	1.40	0.70	2.51
Prodigy	149	960.59	9	0.94	0.43	1.78
Friendly	116	219.83	1	0.45	0.01	2.53
Trabecular Metal Stem	110	160.26	4	2.50	0.68	6.39
DSP Thrust Plate	104	885.77	12	1.35	0.70	2.37
Charnley Modular	88	116.11	0	0	0	3.18
Femoral Stem Press Fit	84	107.49	1	0.93	0.02	5.18
AML MMA	75	456.32	2	0.44	0.05	1.58
Basis	75	153.79	1	0.65	0.02	3.62
Contemporary	71	528.32	5	0.95	0.31	2.20
C-Stem AMT	66	62.37	2	3.21	0.39	11.59
Furlong	66	229.16	4	1.75	0.48	4.47
Anthology Porous	64	33.11	1	3.02	0.08	16.83
CPCS	61	245.32	2	0.82	0.10	2.94
Modular Taperloc	59	139.76	1	0.72	0.02	3.99
AML	55	385.99	2	0.52	0.06	1.872

The CBC and Twinsys uncemented have significantly higher revision rates than the overall rate of 0.65/100 ocys @ the 95% confidence interval

Acetabular Components sorted on revision rate/ 100 component years

Minimum of 50 implantations

Acetabular Prosthesis	No. Ops.	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Trident	5673	16713.73	119	0.71	0.59	0.85
Duraloc	5652	29911.53	236	0.79	0.69	0.90
Contemporary	5590	24389.77	153	0.63	0.53	0.73
Morscher	4025	21690.23	131	0.60	0.50	0.71
RM cup	3609	9189.44	69	0.75	0.58	0.95
Reflection porous	3319	11098.55	72	0.65	0.51	0.81
Reflection cemented	3226	16458.81	102	0.62	0.51	0.75
Trilogy	2849	9823.91	63	0.64	0.49	0.82
Muller PE cup	2786	14731.76	49	0.33	0.24	0.44
Exeter	2693	14479.12	76	0.52	0.41	0.66
Pinnacle	2350	4079.31	40	0.98	0.70	1.34
CLS Expansion	1501	7860.73	60	0.76	0.58	0.98
Fitmore	1394	3574.84	28	0.78	0.52	1.13

Charnley	1177	7263.75	38	0.52	0.37	0.72
Fitek	1166	7206.59	29	0.40	0.27	0.58
Osteolock	1130	7489.09	47	0.63	0.46	0.83
ZCA	1003	4875.07	29	0.59	0.40	0.85
CCB	744	2153.35	7	0.33	0.13	0.67
Weber	555	2339.52	9	0.38	0.18	0.73
Monoblock Acetabular Cup	499	1408.74	10	0.71	0.34	1.31
Delta-PF Cup	489	1058.68	6	0.57	0.21	1.23
Selexys TPS	462	507.95	7	1.38	0.55	2.84
Elite Plus LPW	341	1667.75	10	0.60	0.29	1.10
ASR	339	456.18	9	1.97	0.90	3.74
Ultima	246	1093.39	6	0.55	0.20	1.19
Elite Plus Ogee	242	1036.68	5	0.48	0.16	1.13
Durom	222	431.10	5	1.16	0.38	2.71
Mallory-Head	197	835.57	3	0.36	0.07	1.05
Allofit	190	371.10	4	1.08	0.29	2.76
Bio-clad poly	190	1055.13	5	0.47	0.15	1.11
ABGII	175	1328.41	11	0.83	0.41	1.48
M2A	170	540.65	3	0.55	0.11	1.62
BHR Acetabular Cup	147	204.65	2	0.98	0.12	3.53
Trabecular Metal Shell	131	152.04	3	1.97	0.41	5.77
Expansion Shell	116	250.09	4	1.60	0.44	4.10
Biomex acet shell porous	112	748.66	3	0.40	0.08	1.17
Weill ring	108	714.01	5	0.70	0.23	1.63
Recap Resurfacing Acetabular S	87	186.23	0	0	0	1.99
R3 porous	80	30.69	1	3.26	0.08	18.16
Artek	72	461.19	17	3.69	2.15	5.90
Furlong cup	62	227.00	3	1.32	0.27	3.86
Expansion shell	59	124.20	3	2.42	0.50	7.06

The Artek, ASR, Duraloc and Pinnacle cups have significantly higher revision rates than the overall rate of 0.65/100 ocys @ the95% confidence interval.

Revision vs Bearing Surfaces

Femoral head	Acetab/liner	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Ceramic	Ceramic	2595	6835.72	57	0.83	0.63	1.08
Ceramic	Metal	60	29.82	0	0	0	12.37
Ceramic	Polyethylene	7301	27848.25	210	0.75	0.66	0.86
Metal	Metal	3484	12891.17	111	0.86	0.71	1.04
Metal	Polyethylene	37694	163416.65	974	0.60	0.56	0.63

The metal on polyethylene articulation has a significantly lower revision rate than the other articulations among which there are no significant differences.

Resurfacing Hip Prostheses sorted on revision rate/ 100 component years

Prosthesis	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
ASR	128	309.59	5	1.62	0.52	3.77
Adept	2	3.56	0	0	0	103.48
BHR	569	990.86	6	0.61	0.22	1.318
Durom	4	18.27	0	0	0	20.19
Mitch TRH Resurfacing Head	5	3.78	1	26.43	0.67	147.25

Although the ASR has a higher revision rate than the BHR it does not reach statistical significance.

Revision vs Age Bands

Age Bands	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
LT55	8417	37456.04	321	0.86	0.77	0.96
55_64	13835	59383.22	424	0.71	0.65	0.79
65_74	18443	78002.43	475	0.61	0.56	0.67
GE75	14980	57450.98	284	0.49	0.44	0.56

The < 55 age band have significantly higher revision rates those 65 or older.

Revision vs Gender

Revision vs Gender	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
F	29501	123002.95	712	0.58	0.54	0.62
M	26174	109289.73	792	0.72	0.68	0.78

Males have a significantly higher revision rate than females

Revision vs Arthroplasty Fixation

Cementation	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Cemented	18432	90311.15	480	0.53	0.49	0.58
Uncemented	16888	58630.43	496	0.85	0.77	0.92
Hybrid	20355	83351.09	528	0.63	0.58	0.70

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

Revision by Age Bands vs Arthroplasty Fixation

Cemented	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
LT55	545	3294.69	48	1.46	1.07	1.93
55_64	1968	11346.35	94	0.83	0.67	1.01
65_74	6853	35717.04	180	0.50	0.43	0.58
GE75	9066	39953.08	158	0.40	0.34	0.46

Uncemented	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
LT55	5636	22671.44	173	0.76	0.65	0.89
55_64	6522	23274.07	195	0.83	0.72	0.96
65_74	3593	10234.32	99	0.97	0.79	1.18
GE75	1137	2450.60	29	1.18	0.79	1.70

Hybrid	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
LT55	2236	11489.91	100	0.87	0.71	1.06
55_64	5345	24762.81	135	0.55	0.46	0.65
65_74	7997	32051.07	196	0.61	0.53	0.70
GE75	4777	15047.30	97	0.64	0.52	0.79

Revision by Arthroplasty Fixation vs Age Bands

	Cementation	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
LT55	**Cemented**	545	3294.69	48	1.46	1.07	1.93
	Uncemented	5636	22671.44	173	0.76	0.65	0.89
	Hybrid	2236	11489.91	100	0.87	0.71	1.06
55_64	**Cemented**	1968	11346.35	94	0.83	0.67	1.01
	Uncemented	6522	23274.07	195	0.84	0.72	0.96
	Hybrid	5345	24762.81	135	0.55	0.46	0.65
65_74	**Cemented**	6853	35717.04	180	0.50	0.43	0.58
	Uncemented	3593	10234.32	99	0.97	0.79	1.18
	Hybrid	7997	32051.07	196	0.61	0.53	0.70
GE75	**Cemented**	9066	39953.08	158	0.40	0.34	0.46
	Uncemented	1137	2450.60	29	1.18	0.79	1.70
	Hybrid	4777	15047.30	97	0.64	0.52	0.79

For the under 55 age band the revision rate for uncemented and hybrid group is significantly lower than for cemented hips; for age band 55 – 64 hybrid hips have a significantly lower revision rate than both cemented and uncemented hips, but there is no significant difference between the latter two; for the 65 – 74 age band both cemented and hybrid hips have significantly lower revision rates than uncemented and for the >74 age band cemented hips have a significantly lower revision rate than both hybrid and uncemented hips and in turn hybrid hips have a significantly lower revision rate than uncemented hips.
Overall the hybrid hip is demonstrating the lowest revision rate across all 4 age bands.

Revision vs Approach

Approach	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Anterior	2906	13291.83	83	0.624	0.50	0.77
Posterior	34156	138132.52	947	0.69	0.64	0.73
Lateral	15914	63557.69	362	0.57	0.51	0.63
Troch	114	531.86	4	0.75	0.20	1.93

There are no significant differences in the revision rates among the approaches

Revision for Dislocation vs Approach

Dislocation-free survival Approach	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Anterior	2906	13291.83	26	0.20	0.13	0.29
Posterior	34156	138132.52	391	0.28	0.64	0.73
Lateral	15914	63557.69	82	0.13	0.10	0.16
Troch	114	531.86	1	0.19	0.00	1.048

The posterior approach has a significantly higher revision rate for dislocation compared to the lateral and anterior approaches.

Revision vs Surgeon annual workload

Operations per Year	N	Sum comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
LT10	564	2526.39	29	1.15	0.77	1.65
10_25	5853	24061.09	185	0.77	0.66	0.89
25_50	28227	115717.05	763	0.66	0.61	0.71
50_75	10150	43646.09	270	0.62	0.55	0.70
75_100	4874	19914.911	109	0.55	0.45	0.66
GE100	5989	26349.37	147	0.56	0.47	0.66

Those surgeons performing <10 arthroplasties a year have significantly higher revision rate than those performing 25 or more per year.

Revision vs ASA status

ASA Class	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
1	3916	6691.10	53	0.79	0.59	1.04
2	13253	22237.78	184	0.83	0.71	0.96
3	5238	8353.71	90	1.08	0.87	1.32
4	193	292.29	3	1.03	0.21	3.00

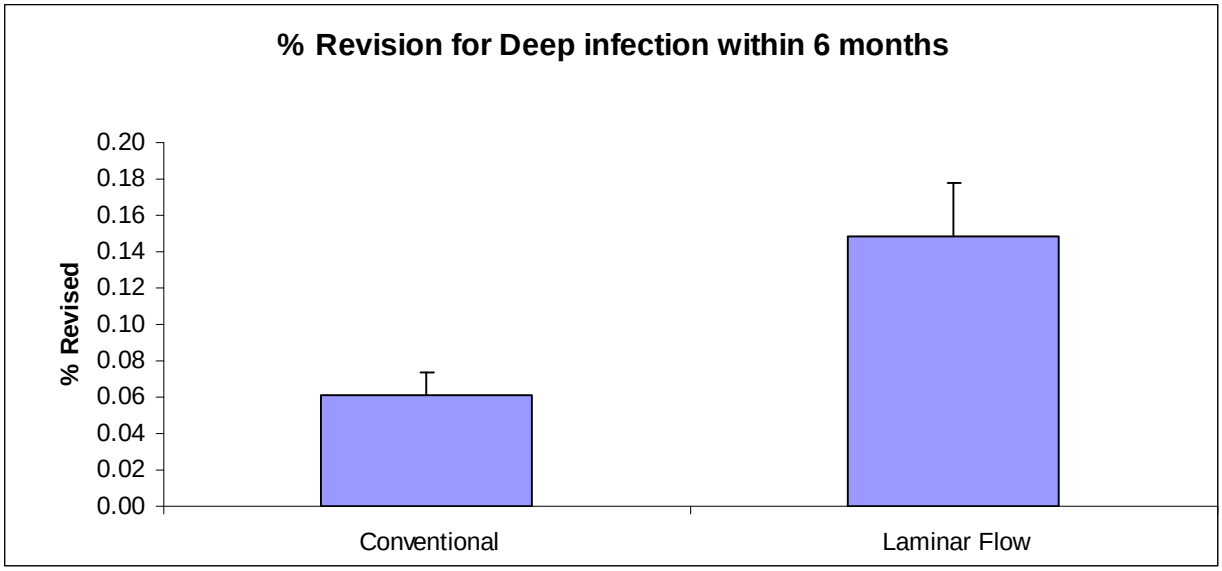
Revision vs ASA public private hospitals

	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Public	11873	19905.71	186	0.93	0.80	1.08
Private	10727	17669.16	144	0.81	0.69	0.96

There is no significant difference in revision rates among the ASA classes or between public and private hospitals.

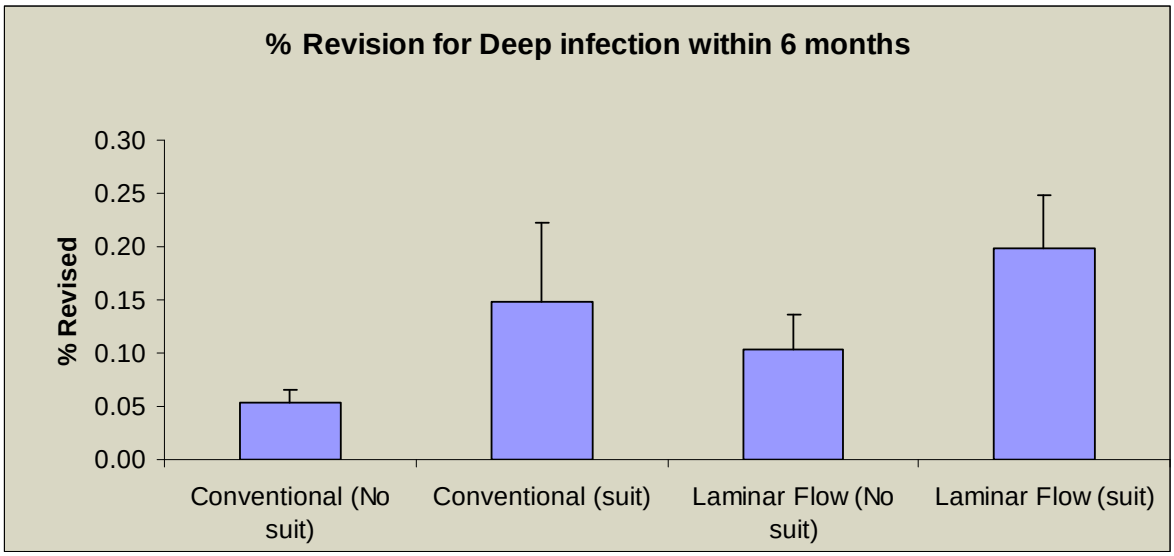
Revision for Deep Infection within 6 months vs Theatre Environment

Deep Infection Revision within 6 months of op.				
Theatre	**Total Number**	**Number Revised**	**%**	**SE**
Conventional	34635	21	0.06	0.01
Laminar	16850	25	0.16	0.03



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

	Total Number	Number Revised	%	SE
Conventional (No suit)	31939	17	0.05	0.01
Conventional (suit)	2696	4	0.15	0.07
Laminar Flow (No suit)	8772	9	0.10	0.03
Laminar Flow (suit)	8078	16	0.20	0.05



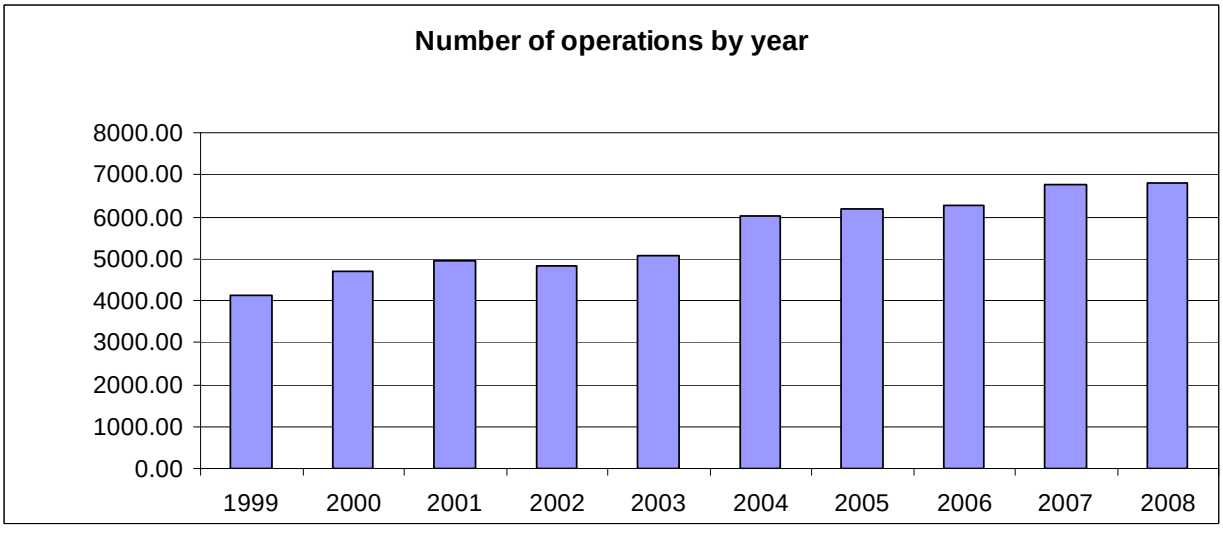
There is a significant difference in the revision rates between conventional/ no suit and laminar flow/suit environments. There is 4 times the risk for revision in the latter compared to the former environment.

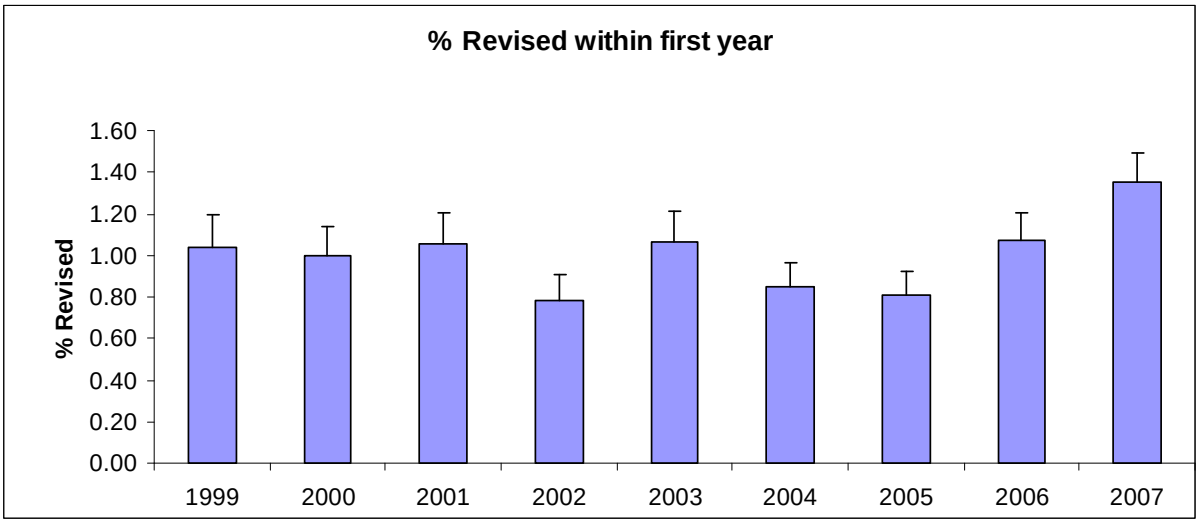
	Deep Infection Revision within 6 months of op.			
	Total Number	**Number Revised**	**%**	**SE**
No Suit	40711	26	0.06	0.01
Suit	10774	20	0.19	0.04

Furthermore there is a significant increase in revision rates when suits are used in either conventional or laminar flow theatres.
From the above data it would appear that the use of space suits increases the risk of deep infection threefold within the first 6 months following the arthroplasty

Percentage of hips revised in first year.

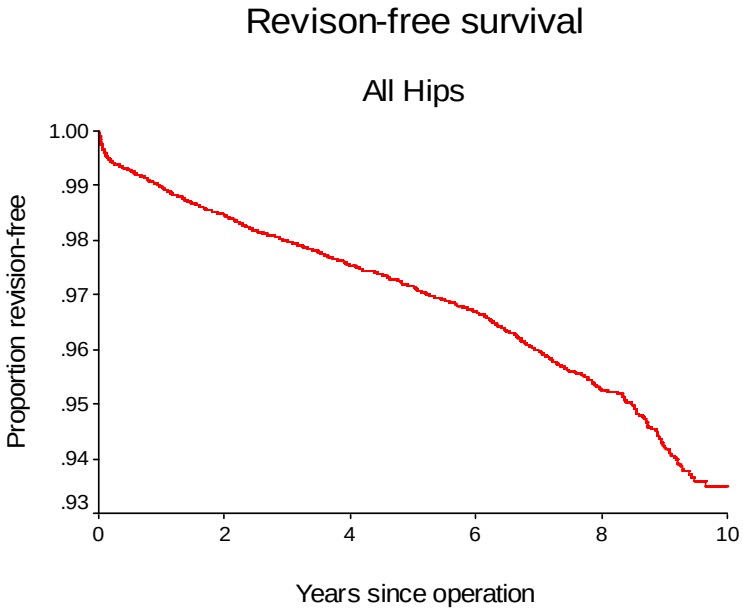
The following two bar graphs show that the % of hips revised in the first year has fluctuated over the 10 years but was the highest in 2007.




% Revised within first year
% Revised
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1999
2000
2001
2002
2003
2004
2005
2006
2007

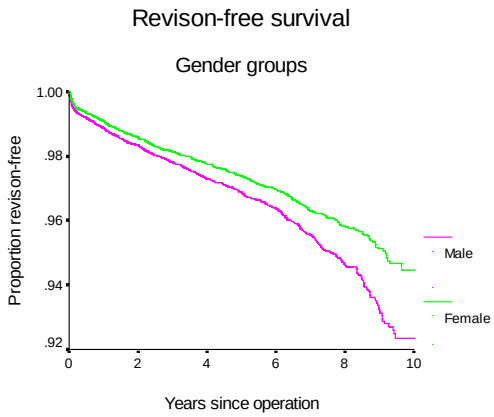
Kaplan Meier Curves

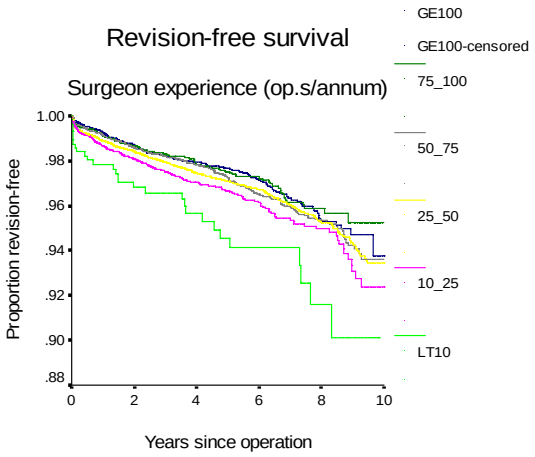
The following Kaplan Meier survival analyses are for the years 1999 – 2008 with deceased patients censored at time of death.

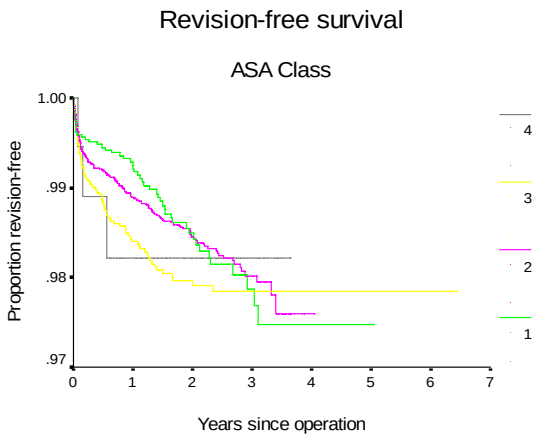


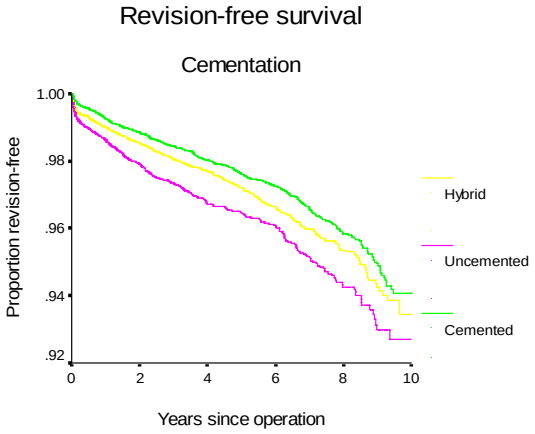
Years	% Revision-free
1	98.97
2	98.45
3	97.98
4	97.55
5	97.15
6	96.70
7	95.96
8	95.25
9	94.24

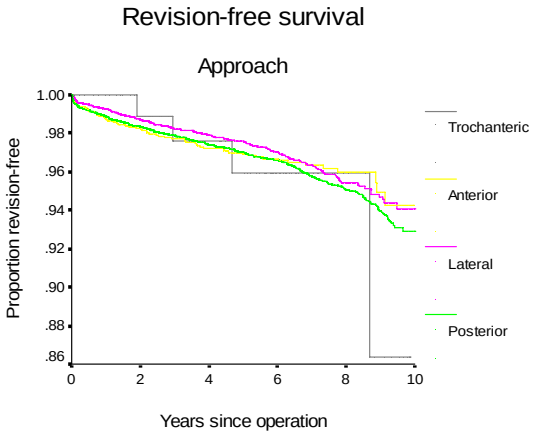
The KM analysis is to 9 yrs rather than 10 because no 10yr primary registered hips were revised in 2008











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

There were 171 registered conventional hip replacements that had been revised twice, 32 that had been revised three times and 5 that had been revised four times.

Second revision
Time between the first and second revisions averaged 485 days, with a range of 2 – 2984 and a standard deviation of 535. This compares to an average of 972 days between the primary and first revision.

Reason for revision

Dislocation	59
Deep infection	47
Loosening acetabular	25
Loosening femoral	20
Pain	18
Fracture femur	10
Implant breakage	4
Iatrogenic pelvic diss.	2
Wear acetabular component	2
Instability	2
Bone graft dissolution	1

Revision

Change of head	75
Change of acetabular	63
Change of liner	54
Change of all	46
Change of femoral	45

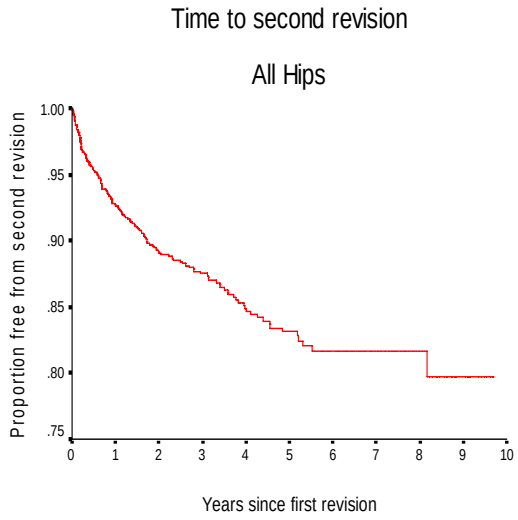
Third revision
The average time between second and third revisions for the 32 arthroplasties was 460 days with a range of 13 – 1665 and a standard deviation of 427.

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.

Re- revisions of resurfacing hip replacements

There have been 3 re-revisions.



The KM graph confirms that survival following the first revision is poorer than for 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 the total which is deemed to be ample to provide powerful statistical analysis.

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

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

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

This groups the scores into one of four categories;

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

For the ten year period, and as at August 2009, there were 19,030 primary hip questionnaire responses registered at six months post surgery.
The mean hip score was 40.73 (standard deviation 7.47, range 48 – 0)

Scoring	> 41	11107
Scoring	34 -41	5051
Scoring	27 -33	1735
Scoring	< 27	1137

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 5 years post surgery.

This dataset represents sequential Oxford hip scores for 4,092 individual patients.

At six months post surgery, 88% of this cohort of patients achieved an excellent or good score and had a mean of 41.57.

At five years post surgery, 89% of these patients achieved an excellent or good score and had a mean of 42.57.

Six-month scores pre and 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 398.
At six months post primary surgery, 75% of this group achieved an excellent or good score and a mean of 37.45.
The revision scores for this group had a mean of 35.99 and 65% had 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 common problem occurred with limping (Q10).

Percentage scoring 0 or 1 (worst categories) for each question (n=19,030) at six-months, and at five-years post surgery (n = 4,092)

		% 6/12	% 5 yrs
1	Moderate or severe pain from the operated hip	7.1	7.3
2	Only able to walk around the house or unable to walk before pain becomes severe	4.2	3.0
3	Extreme difficulty or impossible to get in and out of a car or public transport	1.9	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	3.6	2.8
6	Extreme difficulty or impossible to wash and dry yourself	1.9	1.2
7	Pain interfering greatly or totally with your work	3.9	3.2
8	Very painful or unbearable to stand up from a chair after a meal	1.9	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 impossible to climb a flight of stairs	3.6	3.5
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 six-month and five-year scores, which means the six-month score is indicative of the medium term outcome.

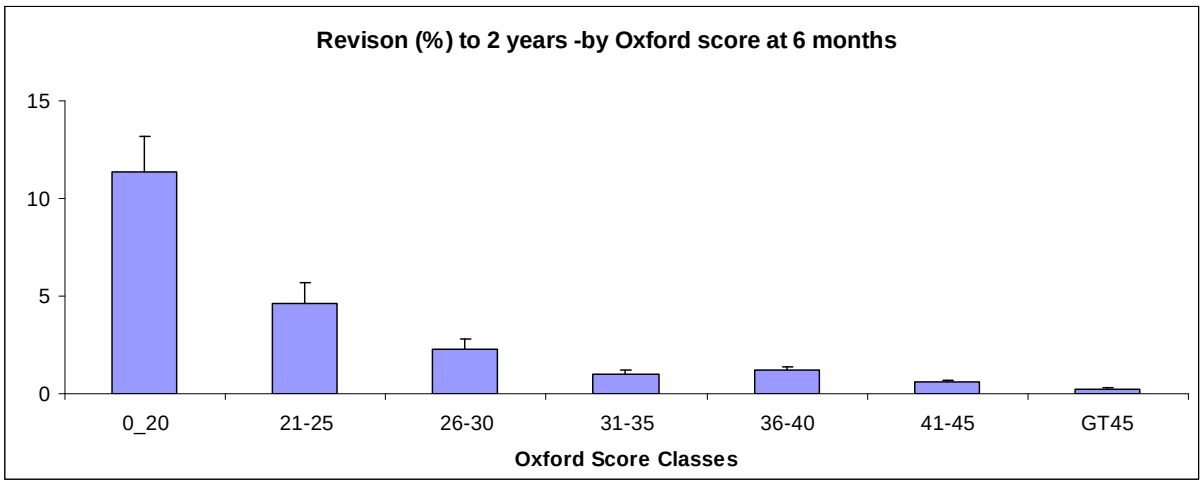
Revision hip questionnaire responses
There were 4,820 revision hip responses with 65% achieving an excellent or good score. This group includes all revision hip procedures. The mean revision hip score was 35.75 (standard deviation 9.55, range 48 – 1)

OXFORD 12 SCORE AS A PREDICTOR OF HIP ARTHROPLASTY REVISION

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

Six month score and revision arthroplasty

By plotting the patients 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 20 times the risk of a revision within 2 years of the questionnaire data compared to a person with a score 41 to 45

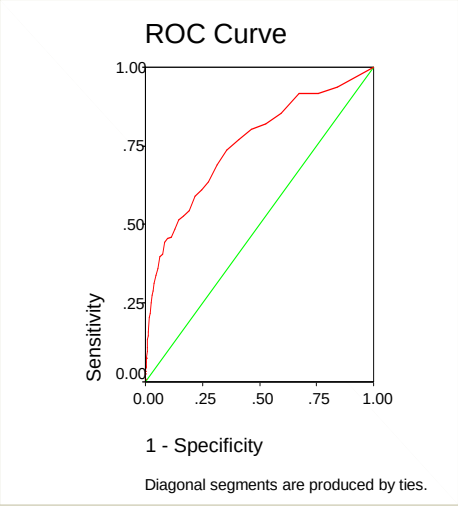


A person with an oxford score of 41-45 has a 0.57% risk of revision within 2 years compared with an 11.33% risk with a score less than 20.

A ROC analysis has demonstrated that a patient with a score less than or equal to 39.5 has 5.25 times the risk of needing a revision within 2 years compared to a person with a score greater than 31.5.

Alternatively the ROC analysis predicted 69% of the revisions within 2 years from just the lowest 31% of Oxford scores.

ROC curve at six months versus revision within two years



A receiver operating characteristic (ROC) curve is a graphical representation of the 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.

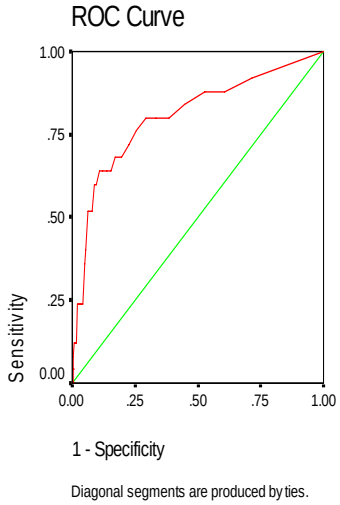
Five year score and revision arthroplasty

The ROC analysis at 5 years has demonstrated that a patient with a score less than or equal to 40.5 has11 times the risk of needing a revision within 2 years compared to a person with a score greater than 40.5.

Alternatively the ROC analysis predicted 76% of the revisions within 2 years from just the lowest 26% of Oxford scores

Although the 5 year results reinforce the relationship between the oxford score and revision within 2 years the 5 year numbers are still too small for statistical significance.

ROC curve at five years versus revision within two years



KNEE ARTHROPLASTY

PRIMARY KNEE ARTHROPLASTY

The ten year report analyses data for the period January 1999 – December 2008. There were 40,068 primary knee procedures registered, an additional 5,595 compared to last year's report.
This includes 98 patello-femoral prostheses with 8 registered in 2008.

1999	2429
2000	3015
2001	3058
2002	2893
2003	3046
2004	4098
2005	5024
2006	5152
2007	5758
2008	5595

There has been a 3% decrease in registrations during 2008 compared to 2007.

DATA ANALYSIS

Age and sex distribution

The average age for a knee replacement was 68.71 years, with a range of 8.19 – 100.49 years.

All knee arthroplasty

	Female	Male
Number	20693	19375
Percentage	51.65	48.35
Mean age	69.07	68.33
Maximum age	100.49	98.68
Minimum age	10.17	8.19
Standard dev.	9.99	9.41

Conventional knee arthroplasty

	Female	Male
Number	20620	19350
Percentage	51.59	48.41
Mean age	69.09	68.34
Maximum age	100.49	98.68
Minimum age	10.17	8.19
Standard dev.	9.98	9.41

Patello-femoral arthroplasty

	Female	Male
Number	73	25
Percentage	74.49	25.51
Mean age	63.35	61.43
Maximum age	85.78	78.62
Minimum age	32.93	34.38
Standard dev.	10.90	10.51

There was a 69% decrease in patello-femoral registrations during 2008.

Previous operation

None	33271
Menisectomy	4110
Osteotomy	792
Arthroscopy/debridement	666
Ligament reconstruction	421
Internal fixation for juxtarticular fracture	278
Patellectomy	169
Synovectomy	87
Removal of loose body	31
Other	71

Diagnosis

Osteoarthritis	37328
Rheumatoid arthritis	1252
Post fracture	440
Other inflammatory	390
Post ligament disruption /reconstruction	244
Avascular necrosis	151
Tumour	41
Other	66

Approach

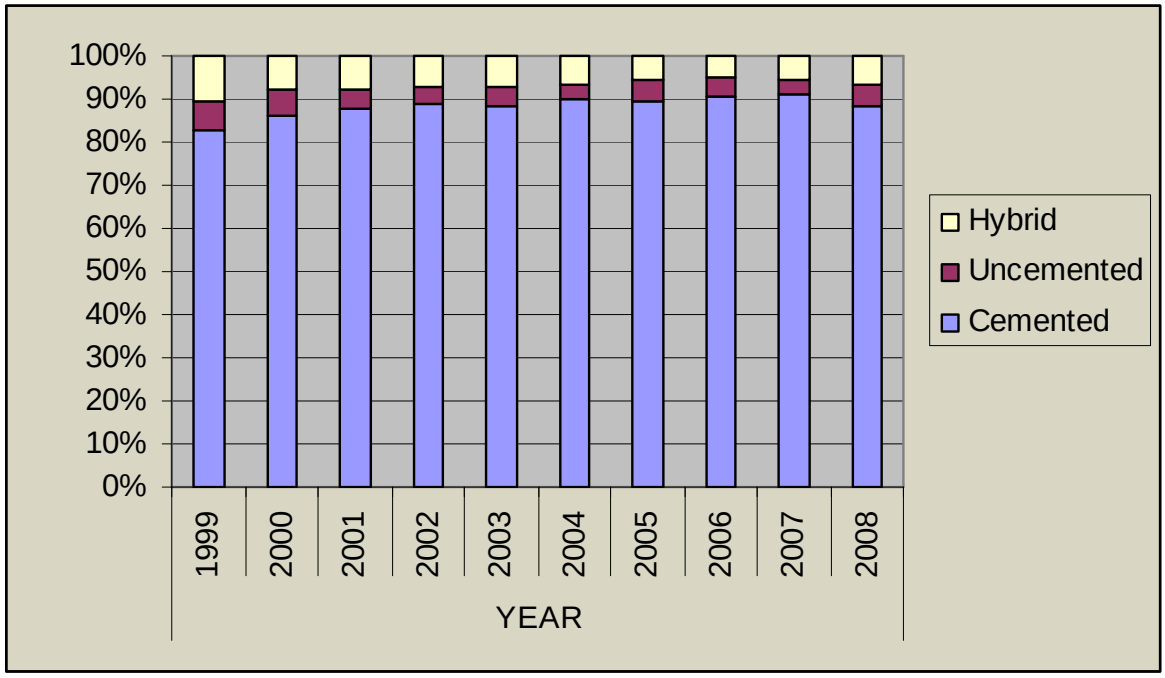
Medial parapatellar	36130
Other	1121
Lateral parapatellar	740
Image guided surgery	1957
Minimally invasive surgery	61

Image guided surgery was added to the updated forms at the beginning of 2005 and last year was used for 13.7% of arthroplasties.

Bone graft

Femoral autograft	55
Femoral allograft	8
Femoral synthetic	2
Tibial autograft	34
Tibial allograft	11

Prosthesis Fixation by Year



Cement

Femur cemented	35723	89%
Antibiotic in cement	23007	64%
Tibia cemented	38005	95%
Antibiotic in cement	24000	63%

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic37883 95%

A cephalosporin was used in 89% of arthroplasties.

Operating theatre

Conventional	24266
Laminar flow	15404
Space suits	10699

1n 2008, 53% of procedures were performed in laminar flow theatres and space suits were used in 44%.

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the four-year period 2005 – 2008 there were 18,492 (86%) primary knee procedures with the ASA class recorded.

Definitions

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

ASA	Number	Percentage
1	2055	11
2	11706	63
3	4639	25
4	92	1

Operative time (skin to skin)

Mean	84 minutes
Standard deviation	26 minutes
Minimum	24 minutes
Maximum	431 minutes

Surgeon grade
The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the four-year period 2005 – 2008.

Consultant	18910
Advanced trainee supervised	1536
Basic trainee	541
Advanced trainee unsupervised	379

Prosthesis usage

Patello-femoral prostheses

Avon-patello	90
LCS PFJ	6
Mod 3	1
Themis	1

There are 98 patello-femoral procedures registered to 36 surgeons. Avon- patello is the most common prosthesis at 92% of the total.

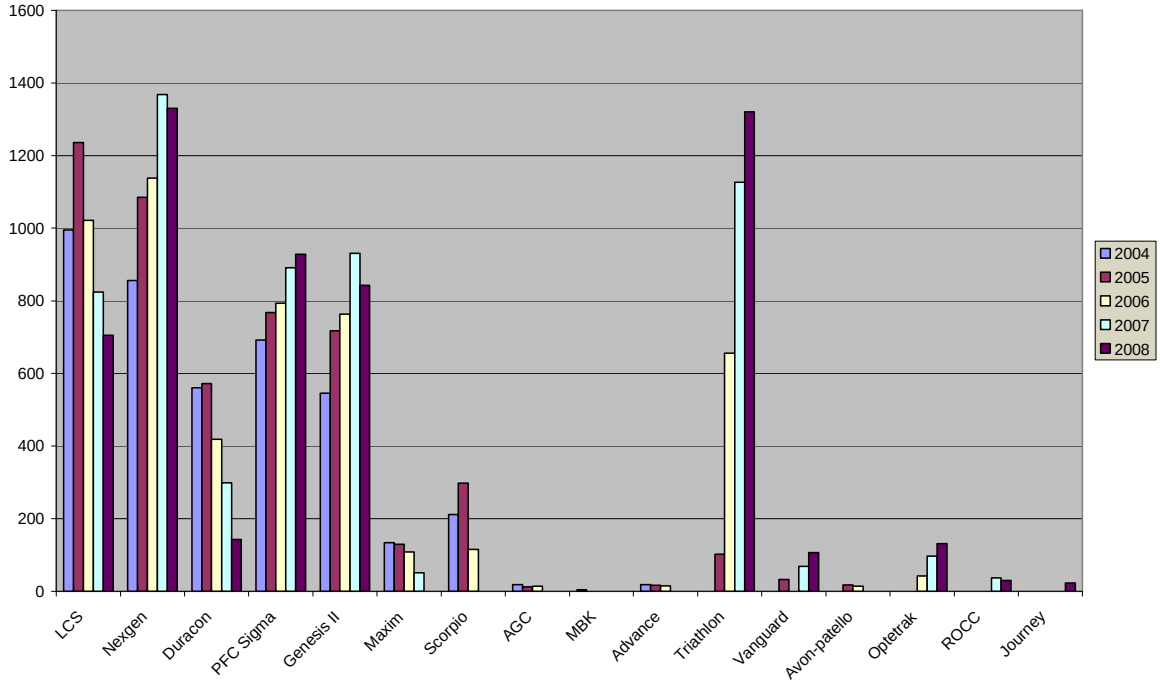
Conventional primary knees

Top 10 knee prostheses used in 2008

Nexgen	1330
Triathlon	1321
PFC Sigma	928
Genesis II	843
LCS	705
Duracon	142
Optetrak	131
Vanguard	106
ROCC	30
Journey	23

The Journey displaced the Maxim in 2008

MOST USED KNEE PROSTHESES 2004 - 2008



The triathlon continues its rapid rise in popularity

Patellar resurfacing
28,192 (71%) of the conventional knee procedures were registered with the patella not resurfaced and 11,778 (29%) resurfaced.

Surgeon and hospital workload

Surgeons
In 2008, 189 surgeons performed 5,595 total knee replacements, an average of 30 procedures per surgeon; 29 surgeons performed less than 10 procedures and 46 performed more than 40.

Hospitals
In 2008 primary knee replacement was performed in 49 hospitals. 25 were public hospitals and 24 were private.
For 2008 the average number of total knee replacements per hospital was 114.

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 ten year period January 1999 – December 2008, there were 3,293 revision knee procedures registered. This is an additional 384 compared to last year's report.

The average age for a revision knee replacement was 70.07 years, with a range of 10.57 – 98.39 years.

Revision knees

	Female	Male
Number	1593	1700
Percentage	48.38	51.62
Mean age	70.35	69.81
Maximum age	95.79	98.39
Minimum age	10.57	15.49
Standard dev.	10.77	10.07

The ratio of revision knees to primary knees remains at 1:12.5 (8%).

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

There were 835 revisions of the 39,970 primary conventional knee replacements (2.1%) and 5 revisions of the 98 patello-femoral replacements (5.1%), a total of 840.

This analysis includes the patello-femoral revisions.

Time to revision

Mean	849	days
Maximum	3473	days
Minimum	1	day
Standard deviation	719	days

Reason for revision

Pain	271
Deep infection	211
Primary patellar comp.	194
Loosening tibial component	180
Loosening femoral component	100
Instability	66
Stiffness	38
Dislocation component	27
Fracture tibia	14
Loosening patellar	14
Wear component	13
Malalignment	10
Fracture femur	10
Implant breakage	10
Osteolysis	5
Other	38

Analysis by time of the 5 main reasons for revision

Pain n = 271

< 6 months	16
6 months – 1 year	49
2 years	87
3 years	48
4 years	33
5 years	17
6 years	9
7 years	4
8 years	3
9 years	4
10 years	1

Deep infection n = 211

< 6 months	51
6 months – 1 year	46
2 years	53
3 years	21
4 years	19
5 years	7
6 years	4
7 years	6
8 years	2
9 years	2
10 years	-

Addition of patellar component n = 194

< 6 months	8
6 months – 1 year	40
2 years	70
3 years	37
4 years	21
5 years	7
6 years	5
7 years	3
8 years	1
9 years	2
10 years	-

Loosening tibial component n = 180

< 6 months	7
6 months – 1 year	16
2 years	30
3 years	36
4 years	30
5 years	22
6 years	14
7 years	10
8 years	10
9 years	2
10 years	3

Loosening femoral n = 100

< 6 months	1
6 months – 1 year	9
2 years	18
3 years	14
4 years	10
5 years	8
6 years	9
7 years	7
8 years	10
9 years	2
10 years	2

Patellar resurfacing

As noted previously, 71 %(28,192) of the 39,970 conventional primary knees registered were not resurfaced and 29% (11,778) were resurfaced. Of the group that was not resurfaced, 134(0.4%) had the patella later resurfaced as the only revision procedure and a further 60 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.

Statistical Significance

Where it is stated that a difference is significant the p value is 0.05 or less.

All Primary Total Knee Arthroplasties

All patients	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
	39970	155114.75	835	0.54	0.50	0.58

Revision rate of individual knee prostheses

Prosthesis	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Triathlon uncemented	78	64.86	2	3.08	0.37	11.14
Insall/Burstein	249	1863.75	33	1.77	1.22	2.49
Optetrak cemented	183	323.24	5	1.55	0.50	3.61
LCS Complete uncemented	1598	3853.77	42	1.09	0.79	1.47
Scorpio	849	3436.47	34	0.99	0.69	1.38
LCS uncemented	1090	7360.89	67	0.91	0.71	1.16
Vanguard (TM) CR	141	128.76	1	0.78	0.02	4.33
Nexgen LPS-Flex cemented	2315	4951.16	37	0.75	0.53	1.03
MBK cemented	222	1464.10	10	0.68	0.33	1.26
PFC Sigma uncemented	180	471.82	3	0.64	0.13	1.86
Nexgen LPS cemented	2090	8237.22	49	0.59	0.44	0.79
Advance cemented	157	875.83	5	0.57	0.19	1.33
Genesis II cemented	5123	16965.23	93	0.55	0.44	0.67
Nexgen uncemented	350	1701.56	9	0.53	0.24	1.00
LCS cemented	3575	24614.89	130	0.53	0.44	0.63
LCS Complete cemented	3452	10478.41	55	0.52	0.40	0.68
Triathlon cemented	3128	4140.76	20	0.48	0.30	0.75
Cruciate Retained uncemented	75	227.07	1	0.44	0.01	2.45
PFC Sigma cemented	5404	18618.92	80	0.43	0.34	0.53
Nexgen cemented	3665	16464.92	60	0.36	0.28	0.47
Duracon uncemented	736	4031.36	14	0.35	0.19	0.58
Duracon cemented	3379	16229.43	54	0.33	0.25	0.43
AGC cemented	375	2413.84	8	0.33	0.14	0.65
Maxim	819	4045.42	11	0.27	0.14	0.49
AMK cemented	95	746.52	1	0.13	0.00	0.75
Nexgen CR-Flex Cemented	133	122.71	0	0.00	0.00	3.00
Optetrak uncemented	123	131.07	0	0.00	0.00	2.81

The 2 LCS uncemented and the Scorpio prostheses have significantly higher revision rates than the overall rate of 0.54 /100 ocys @ the 95% confidence interval.

Revision vs Age Bands

Age Bands	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	3254	12619.00	131	1.04	0.87	1.23
55_64	10433	39863.96	283	0.71	0.63	0.80
65_74	14908	59089.67	295	0.50	0.44	0.56
GE75	11375	43542.10	126	0.29	0.24	0.34

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

Revision vs Gender

Sex	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
F	20621	81968.97	423	0.52	0.47	0.57
M	19349	73145.78	412	0.56	0.51	0.62

There is no significant difference in revision rates between males and females which is contrary to hip arthroplasty

Revision vs Arthroplasty Fixation

Cementation	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Cemented	35506	136424.32	690	0.51	0.47	0.54
Uncemented	1835	7485.81	83	1.11	0.88	1.37
Hybrid	2629	11204.61	62	0.55	0.42	0.71

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

Revision by Age Bands vs Arthroplasty Fixation

Cemented	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	2573	9807.07	85	0.87	0.69	1.07
55_64	8990	33846.11	229	0.68	0.59	0.77
65_74	13468	52955.36	264	0.50	0.44	0.56
GE75	10475	39815.77	112	0.28	0.23	0.34

The higher 2 age bands have significantly lower revision rates than the lower 2 age bands

Uncemented	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	399	1738.98	36	2.07	1.45	2.87
55_64	667	2703.24	29	1.07	0.72	1.54
65_74	522	2036.92	14	0.69	0.38	1.15
GE75	247	1006.67	4	0.40	0.11	1.02

The lowest age band has a significantly higher revision rate than the other 3 age bands

Hybrid	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	282	1072.95	10	0.93	0.45	1.71
55_64	776	3314.61	25	0.75	0.49	1.11
65_74	918	4097.39	17	0.41	0.24	0.66
GE75	653	2719.66	10	0.37	0.18	0.68

There is no significant difference among the age bands

Revision vs Approach

Approach	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Medial	36036	133112.97	723	0.54	0.50	0.58
Lateral	740	3296.11	18	0.55	0.32	0.86
Other	1116	5116.04	24	0.47	0.30	0.70

There is no significant difference among the 3 approaches

Revision vs Surgeon annual workload

Operations per Year	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT10	941	3531.21	23	0.65	0.41	0.98
10_25	9982	39123.37	234	0.60	0.52	0.68
25_50	20649	67830.48	407	0.60	0.54	0.66
50_75	5678	15406.66	122	0.79	0.66	0.95
75_100	2589	8380.33	48	0.57	0.42	0.76

There is no significant difference among the 5 groups

Revision vs ASA status

ASA Class	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
1	2042	3345.71	26	0.78	0.51	1.14
2	11669	19647.56	128	0.65	0.54	0.77
3	4631	7766.58	53	0.68	0.51	0.89
4	92	167.71	1	0.60	0.02	3.32

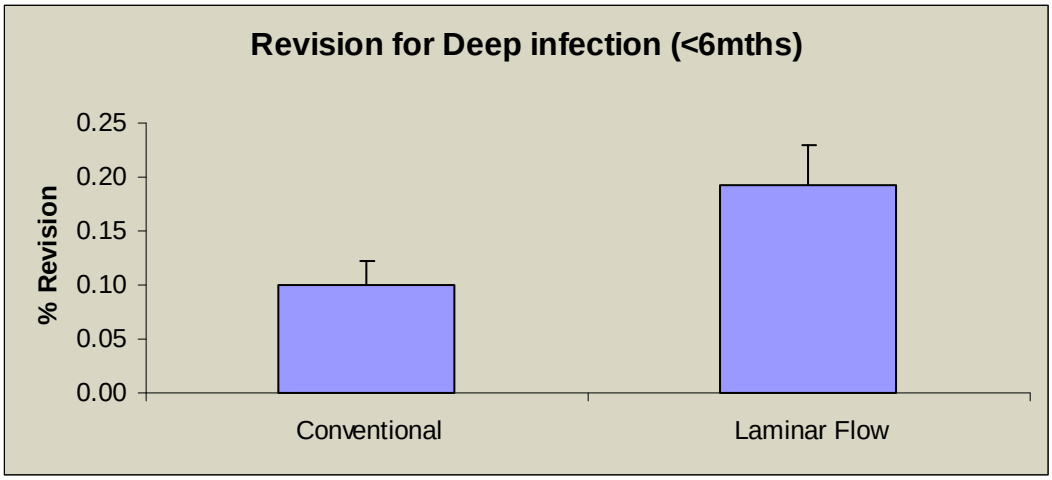
Revision vs ASA public/private hospitals

	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Public	9699	16806.95	113	0.67	0.55	0.81
Private	8735	14120.62	95	0.67	0.54	0.82

There is no significant difference in revision rates among the ASA classes or between public and private hospitals.

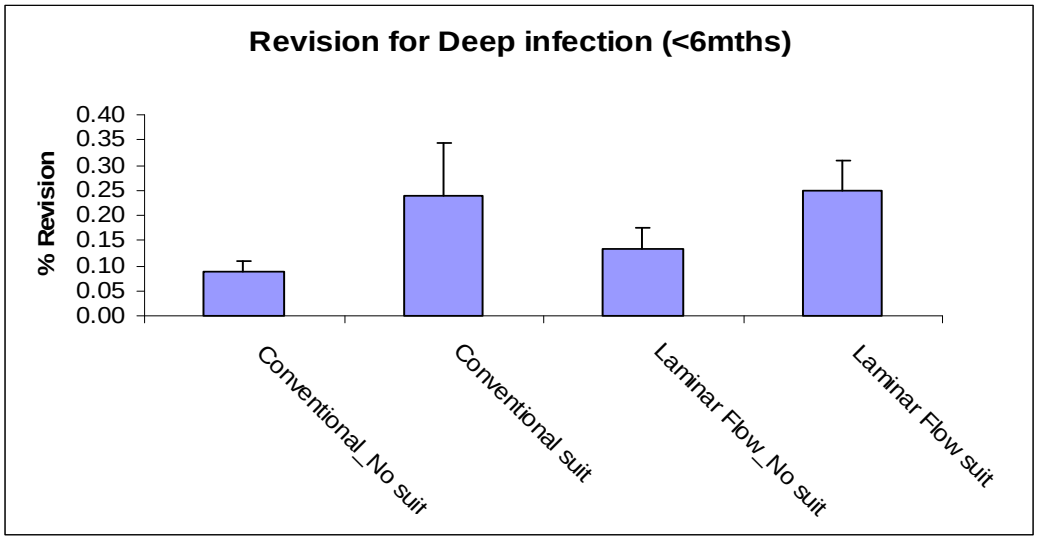
Revision for Deep infection within 6 months versus theatre environment

Theatre	Total Number	Number Revised	%	SE
Conventional	22863	23	0.10	0.02
Laminar Flow	13963	27	0.19	0.04



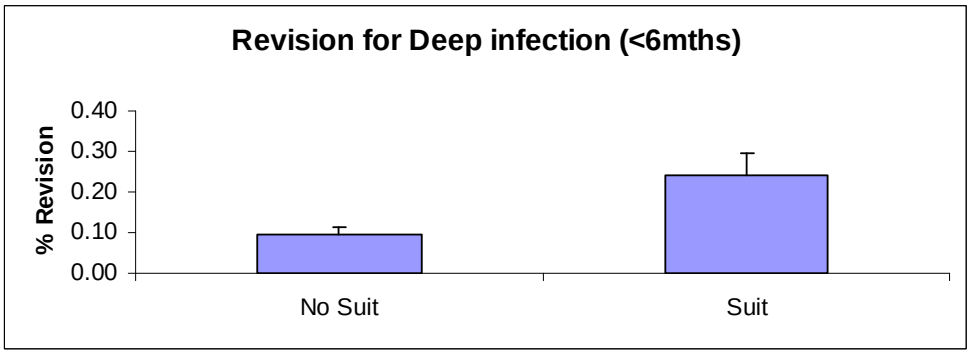
As with hip arthroplasty there is a significant difference in knee revision rates for deep infection within 6 months of surgery between conventional and laminar flow theatres.

Theatre/Suit	Total Number	Number Revised	%	SE
Conventional No suit	20753	18	0.09	0.02
Conventional suit	2110	5	0.24	0.11
Laminar Flow No suit	6786	9	0.13	0.04
Laminar Flow suit	7177	18	0.25	0.06



There is a significant difference in the revision rates between conventional/no suit and laminar flow/suit environments. There is 2.9 times the risk for revision in the latter compared to the former environment.

Theatre Suit	Total Number	Number Revised	%	SE
No Suit	27792	27	0.10	0.02
Suit	9471	23	0.24	0.05

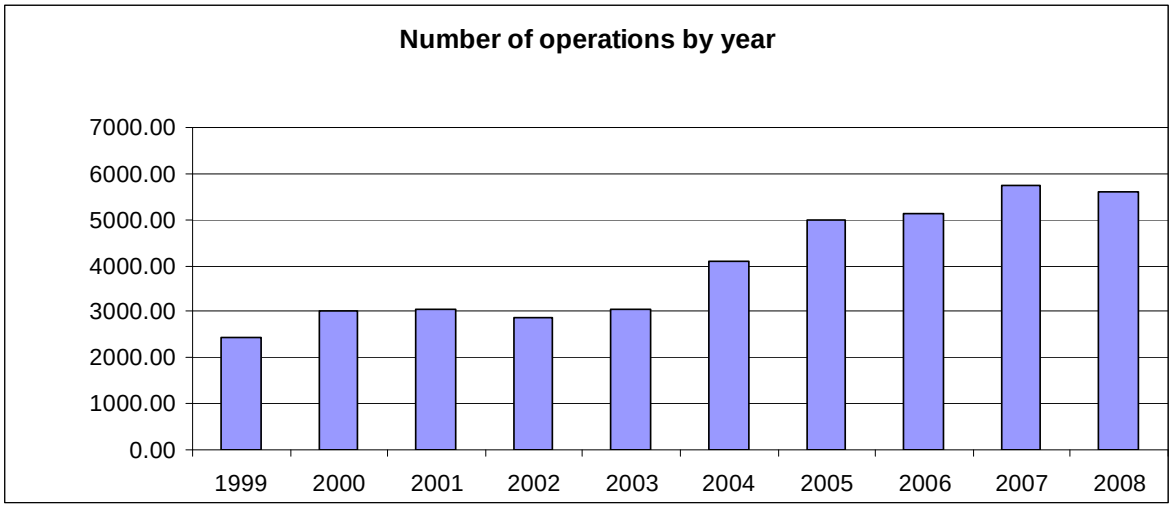


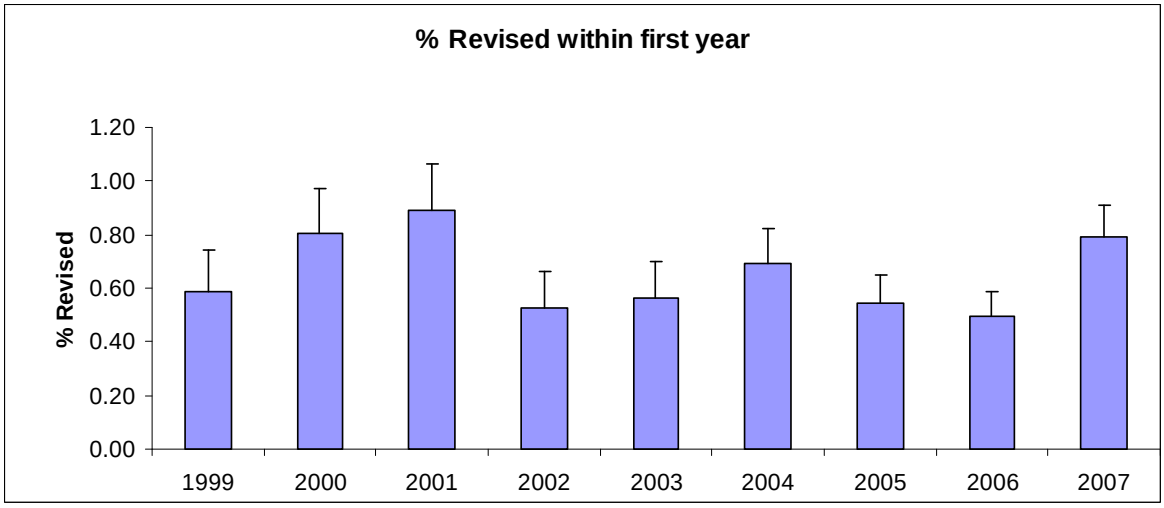
Furthermore there is a significant increase in revision rates when suits are used in either conventional or laminar flow theatres.

From the above data it would seem that, similar to hip arthroplasty, the use of space suits increases almost threefold the risk of deep infection within the first 6 months following the arthroplasty

Percentage of knees revised in first year.

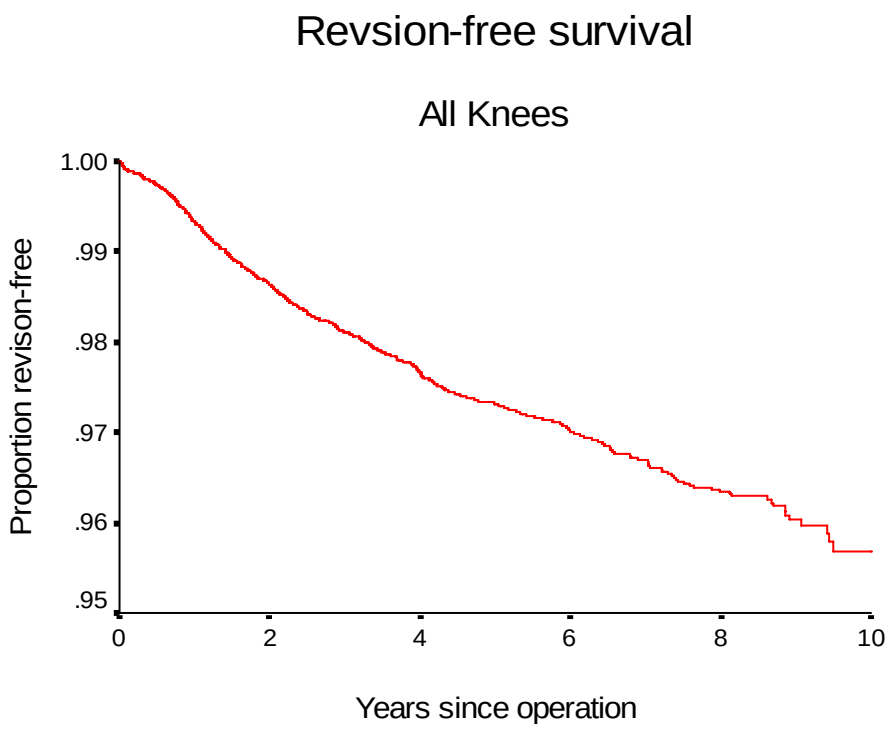
The following two bar graphs show that % of knees revised in the first year has fluctuated between 0.5% and 0.9%.





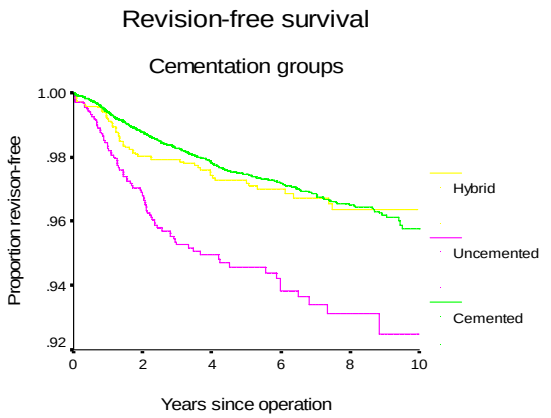
Kaplan Meier Curves

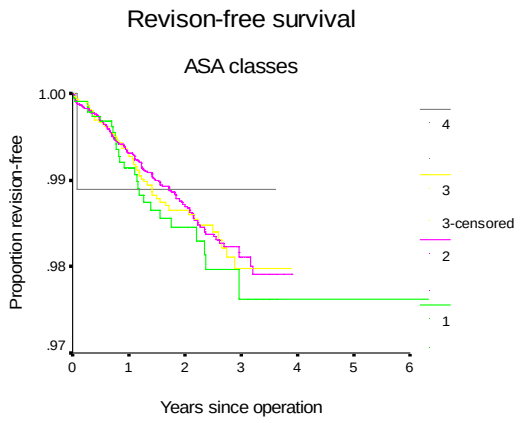
The following Kaplan Meier survival analyses are for years 1999 to 2008 with deceased patients censored at time of death.

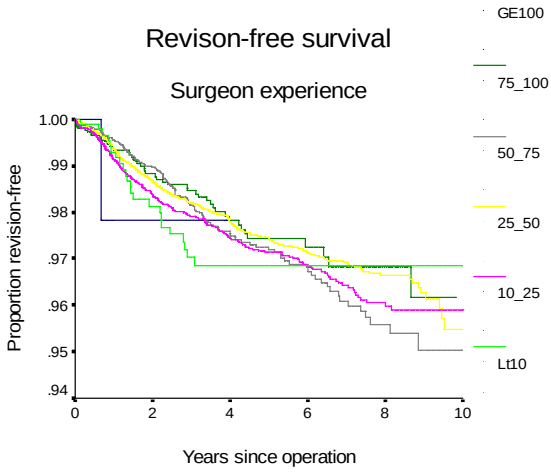


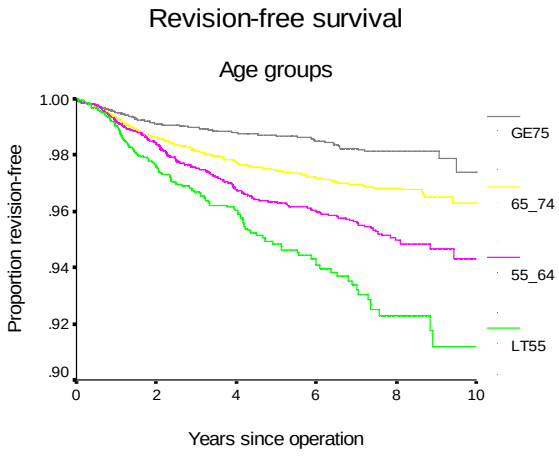
Years	% Revision-free
1	99.32
2	98.63
3	98.11
4	97.67
5	97.31
6	97.00
7	96.69
8	96.34
9	96.03

The KM analysis is to 9 yrs rather than 10 because no 10yr primary registered knees were revised in 2008









Knee re-revisions

Analysis was undertaken of re-revisions.
There were 99 registered primary knee revisions that had been revised twice, 15 that had been revised 3 times and 1 had been revised 4 times.

Second revision

Time between the first and second revision for the 99 knee arthroplasties averaged 626 days, with a range of 2 – 2746 and a standard deviation of 598 days.
This compares to an average of 849 days between primary and first revision arthroplasty.

Reason for revision

Deep infection	41
Pain	24
Loosening tibial component	21
Loosening femoral component	14
Instability	12
Dislocation	5
Stiffness	2
Patellar fracture	2
Loosening patellar component	2
Fracture femur	1
Other	6

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

Third revision
The average time between second and third revisions for the 15 knee arthroplasties was 541 days, with a range of 70 – 1277 and a standard deviation of 358 days.

Fourth revision
The time between third and fourth revision for the 1 patient was 119 days.

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 the total which is deemed to be ample to provide powerful statistical analysis.

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

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

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

This groups each score into one of four categories;

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

For the ten year period and as at August 2009, there were 14,793 primary knee questionnaire responses registered at six months post surgery.
The mean knee score was 37.01 (standard deviation 8.31, range 48 – 0)

Scoring > 41	5328
Scoring 34 – 41	5254
Scoring 27 – 33	2393
Scoring < 27	1818

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 five years post surgery.

This dataset represents sequential Oxford knee scores for 3,922 individual patients.

At six months post surgery, 75% of this cohort of patients had achieved an excellent or good score and had a mean of 37.74.

At five years post surgery, 81% of patients achieved an excellent or good score and had a mean of 39.63.

Six month scores pre and 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 270.

At six months post surgery, 42% of this group achieved an excellent or good score. The mean was 29.17.

The revision scores for this group had a mean of 30.64 and 42% 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 common persistent problem occurred with kneeling (Q4).

Percentage scoring 0 or 1(worst categories) for each question out of the group of 14,793 primary knee responses at six months and 3,922 at five-years.

		% 6/12	% 5 yrs
1	Moderate or severe pain from the operated knee	13.5	8.6
2	Only able to walk around the house or unable to walk before pain becomes severe	5.6	4.3
3	Extreme difficulty or impossible to get in and out of a car or public transport	4.7	4.3
4	Extreme difficulty or impossible to kneel down and get up afterwards	43.1	41.4
5	Extreme difficulty or impossible to do the household shopping on your own	4.2	4.8
6	Extreme difficulty or impossible to wash and dry yourself	1.3	1.7
7	Pain interfering greatly or totally with your work	5.7	4.4
8	Very painful or unbearable to stand up from a chair after a meal	3.9	2.1
9	Most of the time or always feeling that the knee might suddenly “give way”	2.3	1.8
10	Limping most or every day	12.1	8.7
11	Extreme difficulty or impossible to walk down a flight of stairs	7.9	7.3
12	Pain from your knee in bed most or every nights	9.9	4.5

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

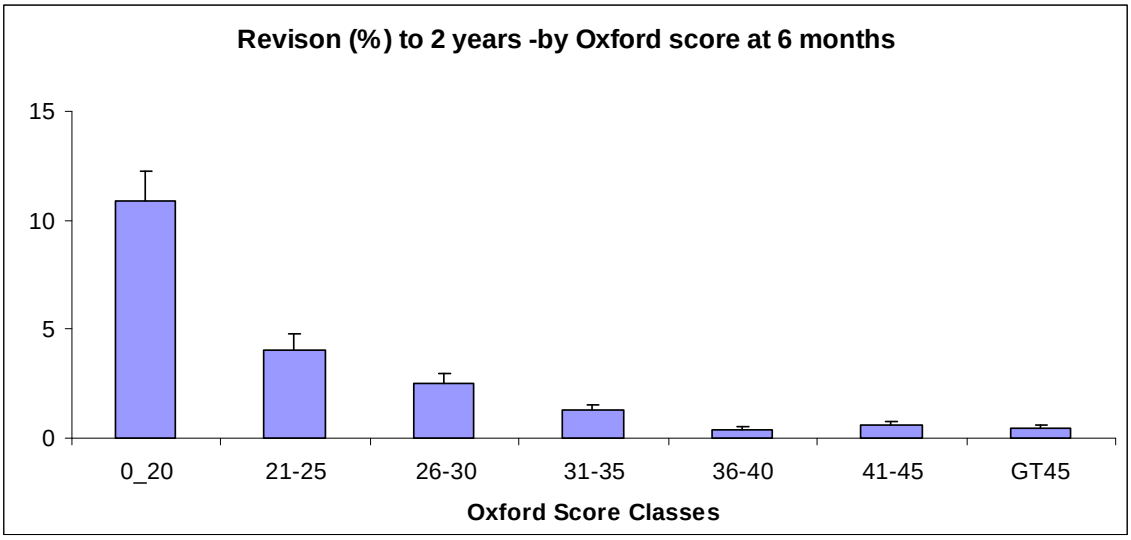
Revision knee questionnaire responses
There were 1,948 revision knee responses with 49% achieving an excellent or good score. This group includes all revision knee procedures. The mean revision knee score was 32.30 (standard deviation 10.30, range 48-3°

OXFORD 12 SCORE AS A PREDICTOR OF KNEE ARTHROPLASTY REVISION

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

Six month score and revision arthroplasty

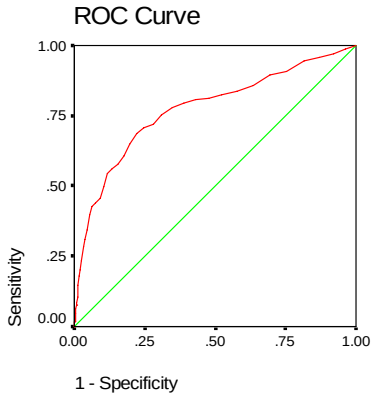
By plotting the patients scores in groups of 5, except at the range extremes, against the proportion of knees revised for that same group it demonstrates that there is an incremental increase in risk during the first 2 years related to the oxford score. A patient with a score below 20 has 30 times the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



A person with an oxford score of 36 – 40 has a 0.38% risk of revision within two years compared to a 10.90% risk with a score of 20 or less.

A ROC analysis has demonstrated that a patient with a score less than or equal to 31.5 has 7 times the risk of needing a revision within 2 years compared to a person with a score greater than 31.5. Alternatively the ROC analysis predicted 71% of the revisions within 2 years from just the lowest 25% of Oxford scores.

ROC curve at six months versus revision within two years



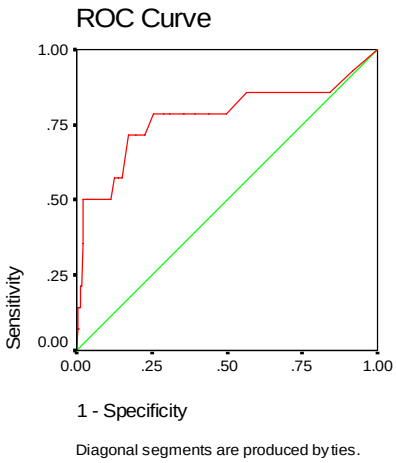
A receiver operating characteristic (ROC) curve is a graphical representation of the trade off between the false negative and false positive rates for every possible cut off. Equivalently, the ROC curve is the representation of the tradeoffs between sensitivity and specificity. The more the curve climbs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

Five year score and revision arthroplasty

The ROC analysis at 5 years has demonstrated that a patient with a score less than or equal to 35.5 has 11 times the risk of needing a revision within 2 years compared to a person with a score greater than 35.5. Alternatively the ROC analysis predicted 78.5% of the revisions within 2 years from just the lowest 25% of Oxford scores.

Although the 5 year results reinforce the relationship between the Oxford score and revision within 2 years the 5 year numbers are still too small for statistical significance.

ROC curve at five years versus revision within two years



UNICOMPARTMENTAL KNEE ARTHROPLASTY

PRIMARY UNICOMPARTMENTAL KNEE ARTHROPLASTY

The **nine**-year report analyses data for the period January 2000 – December 2008. There were 4,826 unicompartmental knee procedures registered, an additional 539 compared to last year's report.

2000	340
2001	430
2002	533
2003	633
2004	634
2005	558
2006	584
2007	575
2008	539

The annual number of unicompartmental knees has continued to decline from the highs of 2003/4

DATA ANALYSIS

Age and sex distribution

The average age for a unicompartmental knee replacement was 66.50 years, with a range of 33.05 – 94.71 years.

	Female	Male
Number	2300	2526
Percentage	47.66	52.34
Mean age	66.39	66.60
Maximum age	94.71	93.42
Minimum age	33.05	35.24
Standard dev.	10.23	8.98

Previous operation

None	3782
Meniscectomy	757
Arthroscopy/debridement	249
Osteotomy	20
Ligament reconstruction	18
Internal fixation	21
Arthrotomy	3
Synovectomy	1
Other	11

Diagnosis

Osteoarthritis	4685
Avascular necrosis	40
Post ligament disruption	18
Other inflammatory	18
Post fracture	12
Rheumatoid arthritis	13
Tumour	1
Other	8

Approach

Medial	3867
Minimally invasive surgery	974
Other	179
Lateral	110
Image guided surgery	7

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

The minimally invasive approach continues to be increasingly used and in 2008 was utilised in 37% of arthroplasties.

Cement

Femur cemented	4494	93%
Antibiotic in cement	2667	59%
Tibia cemented	4522	94%
Antibiotic in cement	2682	59%

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic	4630	96%

Operating theatre

Conventional	3637
Space suits	1132
Laminar flow	1112

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the four year period 2005 – 2008, there were 1,981 (88%) unicompartmental knee procedures with the ASA class recorded.

Definitions

ASA class 1:	A healthy patient
ASA class 2:	A patient with mild systemic disease
ASA class 3:	A patient with severe systemic disease that limits activity but is not incapacitating

ASA class 4: A patient with an incapacitating disease that is a constant threat to life

ASA	Number	Percentage
1	372	18
2	1303	66
3	297	15
4	9	1

Operative time (skin to skin)

Mean	81 minutes
Standard deviation	24 minutes
Minimum	24 minutes
Maximum	195 minutes

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised.
The following figures are for the four year period 2005 – 2008.

Consultant	2119
Advanced trainee supervised	106
Advanced trainee unsupervised	10
Basic trainee	8

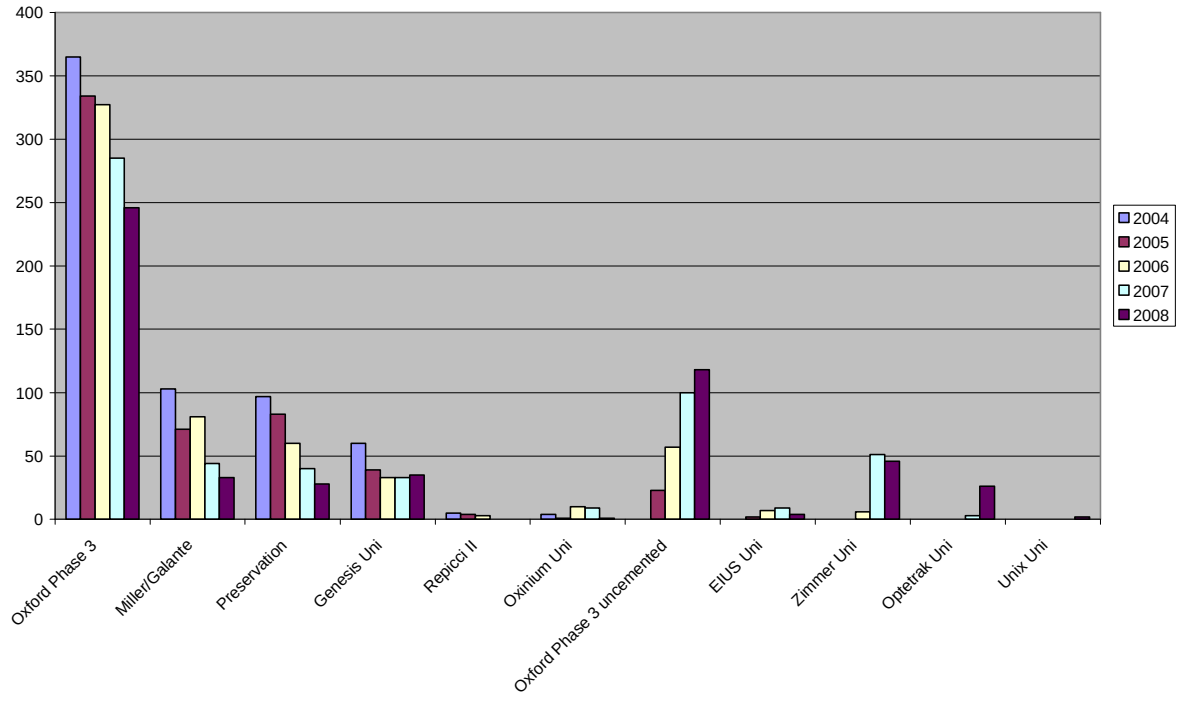
Prosthesis usage

Unicompartmental knee prostheses used in 2008

Oxford Phase 3	246
Oxford Phase 3 uncemented	118
Zimmer Uni	46
Genesis Uni	35
Miller/Galante	33
Preservation	28
Optetrak Uni	26
EIUS Uni	4
Unix Uni	2
Oxinium Uni	1

The main changes compared to 2007 have been significant increases in the Oxford uncemented and Optetrak unis at the expense of most of the others.

Most used unicompartmental prostheses 2004 – 2008



Surgeon and hospital workload

Surgeons
In 2008, 75 surgeons performed 539 unicompartmental knee replacements, an average of 7 procedures per surgeon. Over half of the surgeons (42) performed less than 5 procedures and 7 performed more than 15 procedures.

Hospitals
In 2008 unicompartmental knee replacement was performed in 36 hospitals. 18 were public and 18 were private.
For 2008 the average number of unicompartmental knee replacements per hospital was 15.

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

There were 284 revisions of the 4,826 registered unicompartmental knee replacements (5.89%) with 48 having been revised in 2008

A further 20 had had a second revision and 2 a third revision.

248 of the 284 (87%) were revised to total knee replacements. 36 (13%)were revised to unicompartmental replacements

Time to revision

Mean	883 days
Maximum	3016 days
Minimum	10 days
Standard deviation	683 days

Reason for revision

Pain	121
Loosening tibial component	69
Loosening femoral component	48
Progression of disease	22
Bearing dislocation	21
Deep infection	14
Fracture tibia	10
Wear tibial	6
Impingement	4
Instability	3
Implant breakage	2
Fracture femur	1
Other	10

Deep infection was the reason for 4.9% of revisions.

Analysis by time of the 3 main reasons for revision

Pain n = 121

< 6 months	7
6 months – 1 year	20
2 years	45
3 years	19
4 years	9
5 years	11
6 years	6
7 years	2
8 years	2
9 years	0

Loosening tibial component n = 69

< 6 months	6
6 months – 1 year	14
2 years	25
3 years	5
4 years	7
5 years	5
6 years	3
7 years	3
8 years	1
9 years	0

Loosening femoral component n = 48

< 6 months	0
6 months – 1 year	9
2 years	16
3 years	5
4 years	10
5 years	1
6 years	2
7 years	2
8 years	3
9 years	0

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.

Statistical Significance
Where it is stated that a difference is significant the p value is 0.05 or less.

All Primary Unicompartmental Knee Arthroplasties

	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
All patients	4826	18862.73	284	1.51	1.34	1.69

Revision rate of individual knee prostheses

	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Prosthesis						
EIUS Uni Knee	22	39.79	0	0	0	9.27
Genesis Uni	303	1109.03	20	1.80	1.10	2.79
LCS Uni	6	38.39	2	5.21	0.63	18.82
Miller/Galante	620	2786.10	32	1.15	0.79	1.62
Optetrak Unicondylar Cemented	29	17.38	0	0	0	21.22
Oxford Phase 3	2866	12041.26	178	1.48	1.27	1.71
Oxford Phase 3 uncemented	299	415.80	2	0.48	0.06	1.74
Oxinium Uni	30	72.07	7	9.71	3.90	20.01
Preservation	450	1626.63	34	2.09	1.45	2.92
Repicci II	96	607.98	8	1.32	0.57	2.59
Zimmer Unicompartmental Knee	103	107.47	1	0.93	0.02	5.18

Apart from the no longer used LCS and Oxinium Unis there is no significant difference in the revision rates among the various prostheses.

Revision vs Arthroplasty Fixation

Age Band	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Operation Type						
Cemented	4487	18273.84	278	1.52	1.35	1.711
Uncemented	297	502.75	5	0.99	0.32	2.32
Hybrid	42	86.14	1	1.16	0.03	6.47

Although the uncemented unis appear to have a significantly lower revision rate than cemented this is not statistically significant in view of the small number of ocys.

Revision vs Age Bands

	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	575	2216.04	44	1.99	1.44	2.67
55_64	1627	6351.34	119	1.87	1.55	2.24
65_74	1627	6531.53	80	1.22	0.97	1.52
GE75	997	3763.82	41	1.09	0.78	1.48

There is a significantly higher revision rate for the 55-64 age band when compared to the 65-74 & >75 age bands. Although the revision rate for the <55 age band is the highest it does not quite reach statistical significance.

Revision vs Gender

	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
M	2526	9938.10	144	1.45	1.22	1.71
F	2300	8924.63	140	1.57	1.32	1.85

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

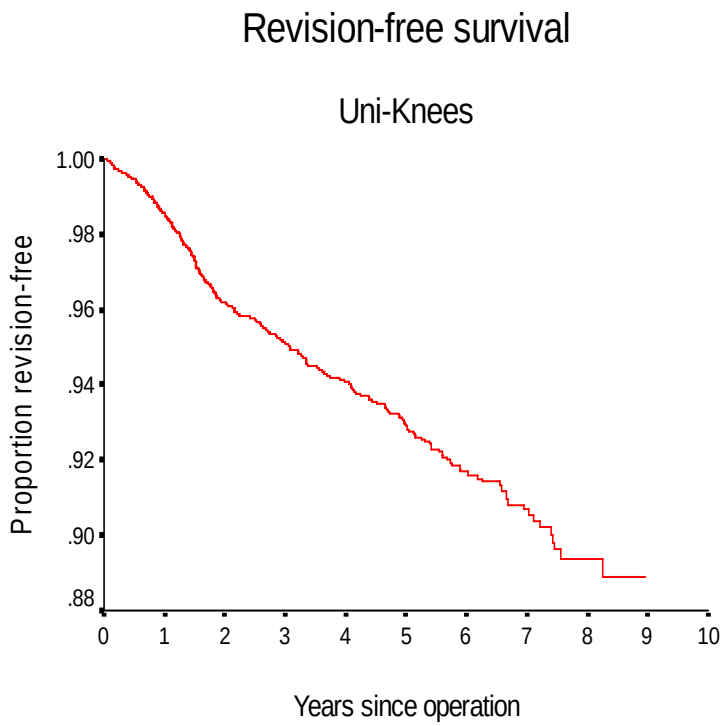
Revision vs Surgeon annual workload

	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
<10	2539	10268.99	180	1.75	1.51	2.03
>=10	2287	8593.74	104	1.21	0.99	1.47

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

Kaplan Meier Curves

The following Kaplan Meier survival analyses are for years 2000 to 2008 with deceased patients censored at time of death.



Numbers too few for accurate % survival beyond 7years

Years	% Revision-free
1	98.47
2	96.18
3	95.13
4	94.09
5	92.89
6	91.69
7	90.68

Revised to	Observed component years	Number re-revised	Rate/100 component years	Exact 95% confidence interval
Total Knee 205	695.2	13	1.87	0.99, 3.42
Uni Knee 31	119.3	7	5.87	2.38, 12.08

When compared to the primary total knee arthroplasty revision rate of 0.54 (C.I. 0.50, 0.58), there is a significantly increased revision rate when a unicompartmental arthroplasty is converted to a total knee arthroplasty. This statistic is even more significant following conversion of a unicompartmental to a further unicompartmental arthroplasty. Further evidence is that the average six month oxford score following conversion of a unicompartmental to total arthroplasty is similar to that for a revised primary total knee arthroplasty.

Patient based questionnaire outcomes at six-month post surgery

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

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

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

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

This groups each score into one of 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 August 2008, there were 3,382 unicompartmental knee questionnaire responses registered at six months post surgery.
The mean unicompartmental knee score was 38.85 (standard deviation 7.57, range 3 – 48)

Scoring > 41	1575
Scoring 34 - 41	1105
Scoring 27 - 33	442
Scoring < 27	260

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

Questionnaires at five years post surgery
Patients who had a six-month questionnaire registered, and who had not had revision surgery were sent a further questionnaire at five years post surgery.
This dataset represents sequential Oxford knee scores for individual patients.

The number of patients with six-month and five-year scores was 626.

At six months post surgery, 83% of this cohort of patients had achieved an excellent or good score and had a mean of 39.12.

At five years post surgery, 87 % of patients had achieved an excellent or good score and had a mean of 40.73.

Six-month scores pre and 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 139.
At six months post primary surgery, 42% of this group had achieved an excellent or good score. The mean was 30.60.
The revision scores for this group had a mean of 31.78 and 42% achieved an excellent or good score.

Analysis of the individual questions at six months post surgery
Analysis of the individual questions showed that the most common problem occurred with kneeling (Q4) and pain in the operated knee (Q1).

Percentage scoring 0 or 1 for each question out of the group of 3,382 at six months post surgery and 626 at five-years.

		% 6/12	% 5 yrs
1	Moderate or severe pain from the operated knee	11.1	8.9
2	Only able to walk around the house or unable to walk before pain becomes severe	3.5	2.9
3	Extreme difficulty or impossible to get in and out of a car or public transport	1.8	0.9
4	Extreme difficulty or impossible to kneel down and get up afterwards	32.8	28.4
5	Extreme difficulty or impossible to do the household shopping on your own	1.7	1.4
6	Extreme difficulty or impossible to wash and dry yourself	0.5	0.4
7	Pain interfering greatly or totally with your work	3.3	2.7
8	Very painful or unbearable to stand up from a chair after a meal	3.6	1.6
9	Most of the time or always feeling that the	1.7	1.4

	knee might suddenly "give way"		
10	Limping most or every day	9.5	5.6
11	Extreme difficulty or impossible to walk down a flight of stairs	4.0	3.0
12	Pain from your knee in bed most or every nights	7.8	3.7

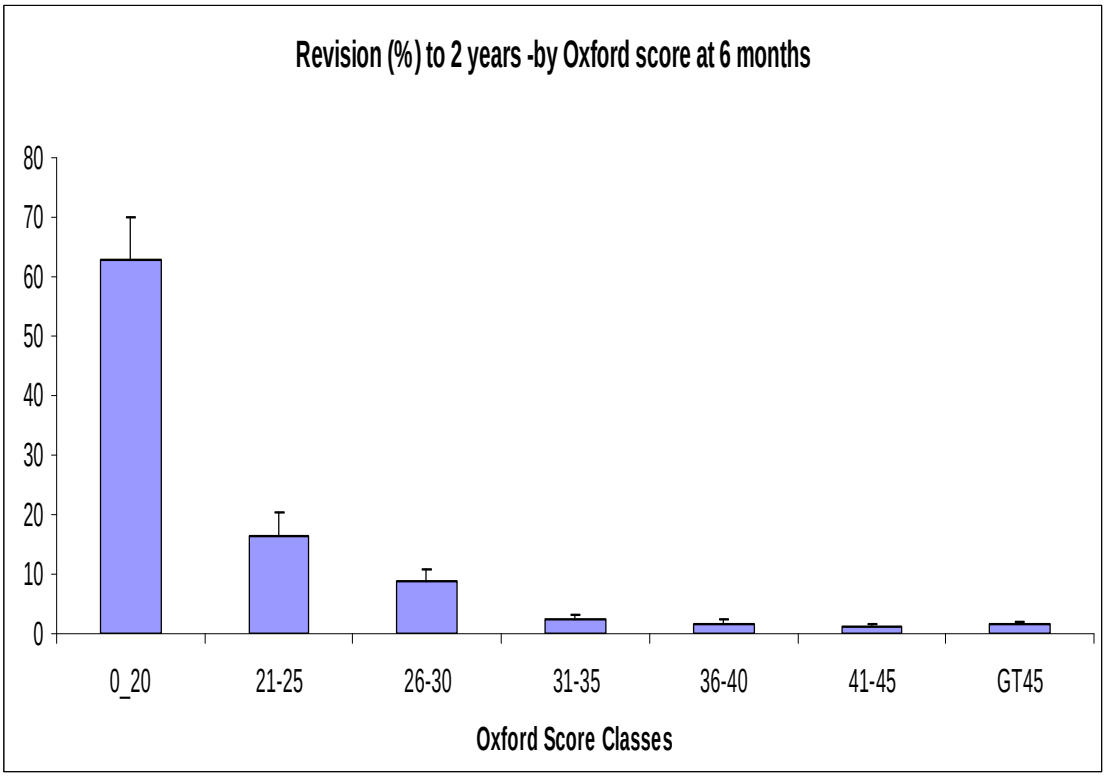
As noted in previous years there is little significant change between the six-month and five-year scores which means the six-month score is indicative of the medium term outcome.

OXFORD 12 SCORE AS A PREDICTOR OF KNEE ARTHROPLASTY REVISION

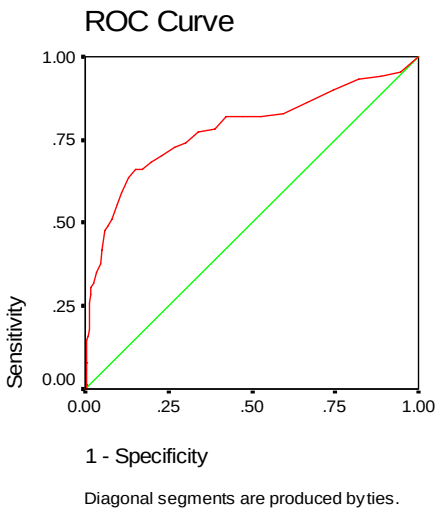
A statistically significant relationship has been confirmed between the Oxford scores at 6 months and arthroplasty revision within two years of the Oxford 12 questionnaire date.

By plotting the patients scores in groups of 5, except at the range extremes, against the proportion of unicompartmental 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 50 times the risk of a revision within 2 years compared to a person with a score 41-45

A ROC analysis has demonstrated that a patient with a score less than or equal to 31.5 has 11 times the risk of needing a revision within 2 years compared to a person with a score greater than 31.5. Alternatively the ROC analysis predicted 66% of the revisions within 2 years from just the lowest 17% of Oxford scores.



A person with an oxford score of 36 – 40 has a 1.7% risk of revision within two years compared to a 62.8% risk with a score of 20 or less.



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.

ANKLE ARTHROPLASTY

PRIMARY ANKLE ARTHROPLASTY

The **nine**- year report analyses data for the period January 2000 – December 2008. There were 484 primary ankle procedures registered, an additional 107 compared to last year's report and represents a 35% increase over 2007

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

DATA ANALYSIS

Age and sex distribution

	Female	Male
Number	183	301
Percentage	37.81	62.19
Mean age	63.23	66.24
Maximum age	85.44	88.38
Minimum age	32.51	35.62
Standard dev.	9.24	8.56

The average age for an ankle replacement was 65.10years, with a range of 32.51 – 88.38 years.

Previous operation

None	375
Internal fixation for juxtarticular fracture	49
Arthroscopy/debridement	20
Arthrodesis	20
Osteotomy	9
Reconstruction/repair	4
Other	3

Diagnosis

Osteoarthritis	351
Post trauma	85
Rheumatoid arthritis	51
Other inflammatory	5
Other	7

Approach

Anterior	427
Anterolateral	26
Other	7

Bone graft

Tibia autograft	27
Tibia allograft	2
Talus autograft	5
Talus allograft	1

Cement

Tibia cemented	1
Antibiotic in cement	7
Talus cemented	6
Antibiotic in cement	3

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic 462 (95%)

Operating theatre

Conventional	287
Laminar flow	194
Space suits	55

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the four-year period 2005 -2008, there were 254 (75%) 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	57
2	151
3	45
4	1

Operative time (skin to skin)

Mean	127 minutes
Standard deviation	37 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 four-year period 2005 -2008.

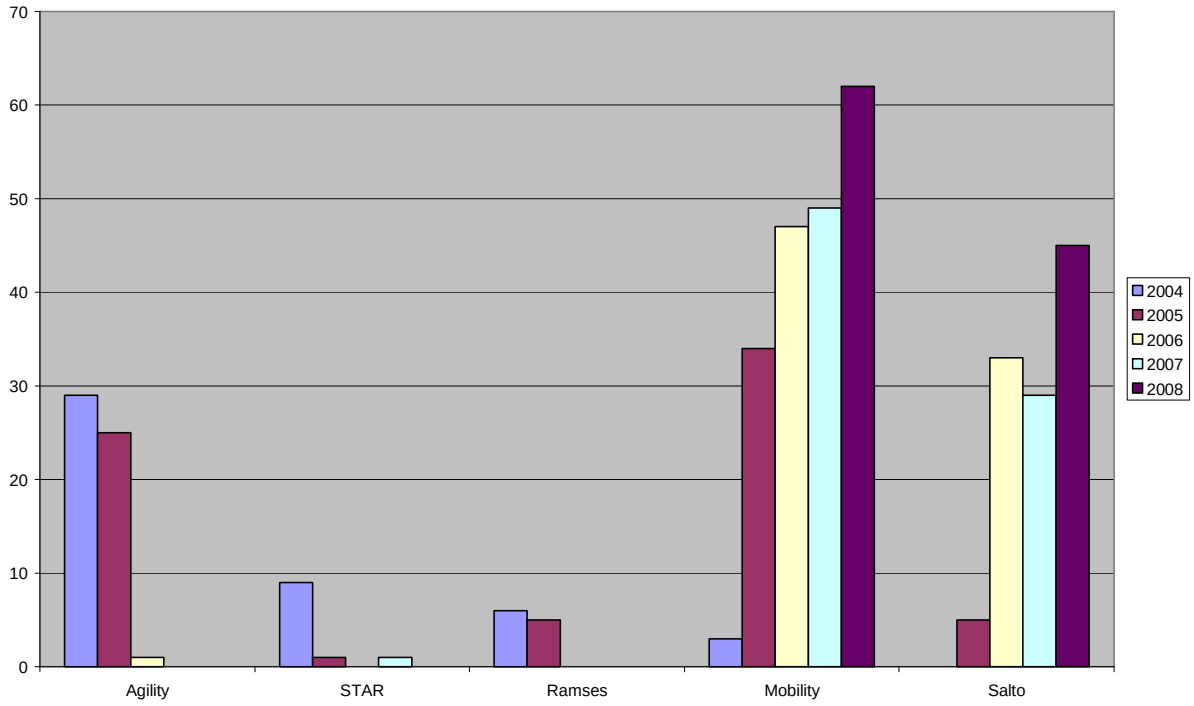
Consultant	332
Advanced trainee supervised	4

Prosthesis usage

Ankle prostheses used in 2008

Mobility	62
Salto	45

MOST USED ANKLE PROSTHESES 2004 – 2008



Surgeon and hospital workload

Surgeons

In 2008, 12 surgeons performed 107 primary ankle procedures, an average of 9 procedures per surgeon. 1 surgeon performed more than 20 procedures and 3 performed 1 procedure.

Hospitals

In 2008 primary ankle replacement was performed in 18 hospitals. 10 were private and 8 were public.

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 nine-year period January 2000– December 2008, there were 29 revision ankle procedures registered.

The average age for an ankle revision was 64.71 years, with a range of 42.15 – 78.98.

	Female	Male
Number	8	21
Percentage	27.59	72.41
Mean	60.30	66.39
Maximum age	78.98	76.56
Minimum age	42.15	51.71
Standard dev.	13.23	6.78

REVISION OF REGISTERED PRIMARY ANKLE ARTHROPLASTY

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

There were 18 revisions of the primary group of 484 (3.72%) and 1 re-revision giving 19 revisions in total.

Time to revision

Mean	924 days
Maximum	1969 days
Minimum	21 days
Standard deviation	679 days

Reason for revision

Loosening talar component	7
Pain	10
Loosening tibial component	2
Deep infection	2
Other	4

Analysis by time of the 2 main reasons for revision

Loosening talar component n = 7

< 6 months	1
3 years	1
4 years	1
5 years	2
6 years	2

Pain n = 10

6 months – 1 year	1
2 years	4
3 years	2
4 years	2
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.

Statistical Significance

Where it is stated that a difference is significant the p value is 0.05 or less

All primary ankle arthroplasties

All patients	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
	484	1408.67	18	1.28	0.76	2.02

Revision vs prosthesis type

Prosthesis	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Agility Tibial Shell	119	623.70	7	1.12	0.45	2.31
Mobility	195	337.34	5	1.48	0.48	3.46
Ramses	11	41.46	1	2.41	0.06	13.44
Salto	112	166.40	0	0	0	2.21
Scandinavian Total Ankle Repl.	47	239.77	5	2.09	0.68	4.87

There is no statistically significant difference in the revision rates among the prostheses

Revision vs gender

Gender	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Females	183	548.46	4	0.73	0.20	1.87
Males	301	860.21	14	1.63	0.89	2.73

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

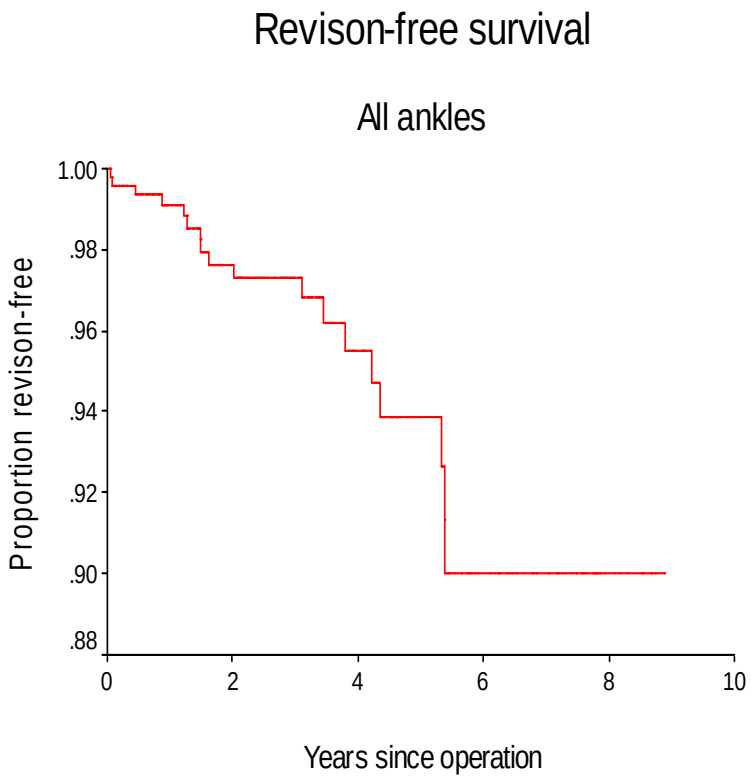
Revision vs age bands

Age Bands	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	60	193.49	3	1.55	0.32	4.53
55_64	174	536.11	8	1.49	0.64	2.94
65_74	182	513.60	6	1.17	0.43	2.54
GE75	68	165.46	1	0.60	0.02	3.37

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

KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses are for 9 years to 2008 with deceased patients censored at time of death.



Years	% Survival
1	99.1
2	97.65
3	97.31
4	95.53
5	93.88
6	90.02

There are insufficient numbers to give an accurate revision % beyond 6 years.

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX-MONTH POST SURGERY

At six months post surgery patients are sent a questionnaire which is modelled on the Oxford 12, but is not validated.

The same scoring system has been adopted as recommended by the original authors of the Oxford 12 hip and knee questionnaires.

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

We have grouped the questionnaire responses based on the scoring system published by Kalairajah et al, 2005(appendix1)
This groups each score into one of 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 August 2009, there were 391 primary ankle questionnaire responses registered at six months post surgery. The mean primary ankle score was 33.42 (standard deviation 9.64, range 2 – 48)

Scoring > 41	94
Scoring 34 - 41	125
Scoring 27 - 33	79
Scoring < 27	93

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 = 391)

1	Moderate or severe pain from the operated ankle	22.0
2	Only able to walk around the house or unable to walk before the pain becomes severe	7.4
3	Extreme difficulty or impossible to walk on uneven ground	14.1
4	Most of the time or always have to use an orthotic	23.8
5	Pain greatly or totally interferes with usual work	18.2
6	Limping most or every day	33.8
7	Extreme difficulty or impossible to climb a flight of stairs	6.4
8	Pain from your ankle in bed most or every nights	6.6
9	Pain from your ankle greatly or totally interferes with usual recreational activities	21.5
10	Have swelling of your foot most or all of the time	32.0
11	Very painful or unbearable to stand up from a chair after a meal	5.4
12	Sudden severe pain from your ankle most or every day	5.9

Revision ankle questionnaire responses
There were 14 revision ankle responses with only 5 (36%) achieving an excellent or good score. This group includes all revision ankle responses. The mean revision ankle score was 26.64 (standard deviation 13.85, range 8 – 48). There was no complication data reported.

SHOULDER ARTHROPLASTY

PRIMARY SHOULDER ARTHROPLASTY

The **nine**-year report analyses data for the period January 2000 – December 2008. There were 2498 primary shoulder procedures registered, an additional 457 compared to last year's report.

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

There was a 14 % increase in registrations for 2008 and continues the steady upward trend seen every year. There has been a 275% increase since 2000.

Of the 2498 shoulder registrations, 1038 (42%) are hemi arthroplasties, 961(38%) total shoulder arthroplasties, 426(17%) reverse shoulder arthroplasties and 73 (3%) resurfacing arthroplasties.

DATA ANALYSIS

Age and sex distribution

The average age for all patients with a shoulder arthroplasty was 70.19 years, with a range of 15.63 – 97.71 years.

All shoulder arthroplasty

	Female	Male
Number	1610	888
Percentage	64.45	35.55
Mean age	71.78	67.29
Maximum age	97.71	90.48
Minimum age	15.63	21.83
Standard dev.	10.28	10.63

Hemiarthroplasty

	Female	Male
Number	697	341
Percentage	67.15	32.85
Mean age	71.23	66.09
Maximum age	97.71	90.48
Minimum age	15.63	27.81
Standard dev.	11.18	11.79

Total shoulder arthroplasty

	Female	**Male**
Number	**620**	**341**
Percentage	64.52	35.48
Mean age	71.01	67.61
Maximum age	94.62	85.26
Minimum age	26.64	29.38
Standard dev.	9.40	8.18

Reverse shoulder arthroplasty

	Female	Male
Number	273	153
Percentage	64.08	35.92
Mean age	75.94	73.32
Maximum age	91.60	88.17
Minimum age	40.70	49.41
Standard dev.	7.44	7.72

Resurfacing arthroplasty

	Female	Male
Number	20	53
Percentage	27.40	72.60
Mean age	58.45	55.62
Maximum age	78.44	79.37
Minimum age	20.70	21.83
Standard dev.	15.28	12.26

Reverse arthroplasty patients have a higher mean age.

Previous operation

None	2120
Rotator cuff repair	84
Internal fixation for juxtarticular fracture	70
Previous stabilisation	52
Arthroscopy/debridement	39
Acromioplasty	37
Subacromial decompression	6
Other	16

Diagnosis

Osteoarthritis	1346
Cuff arthropathy	313
Acute fracture prox. humerus	277
Rheumatoid arthritis	266
Post old trauma	205
Avascular necrosis	91
Other inflammatory	30
Post recurrent dislocation	29
Tumour	11
Post dysplasia	3
Other	13

Approach

Deltopectoral	2257
Deltoid split	55
Trans deltoid	5
Posterior	3

Bone graft

Humeral autograft	62
Humeral allograft	13
Humeral synthetic	3
Glenoid autograft	15
Glenoid allograft	4

Cement

Humerus cemented	950	(39%)
Antibiotic in cement	541	(57%)
Glenoid cemented	748	(54%)
Antibiotic in cement	481	(64%)

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic	2321	(93%)

Operating theatre

Conventional	1698
Laminar flow	771
Space suits	308

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the four-year period 2005 – 2008 there were 1336 (88%) shoulder procedures with the ASA class recorded.

Definitions

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

ASA	Number	Percentage
1	146	11
2	712	53
3	464	35
4	14	1

Operative time (skin to skin in minutes)

	Total	Hemi	Reverse	Resurf
Mean	133	106	118	104
Min	53	30	54	49
Max	270	360	246	285
SDev	33	36	30	43

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised.
The following figures are for the four-year period 2005 – 2008.

Consultant	1456
Advanced trainee supervised	56
Advanced trainee unsupervised	3
Basic trainee	1

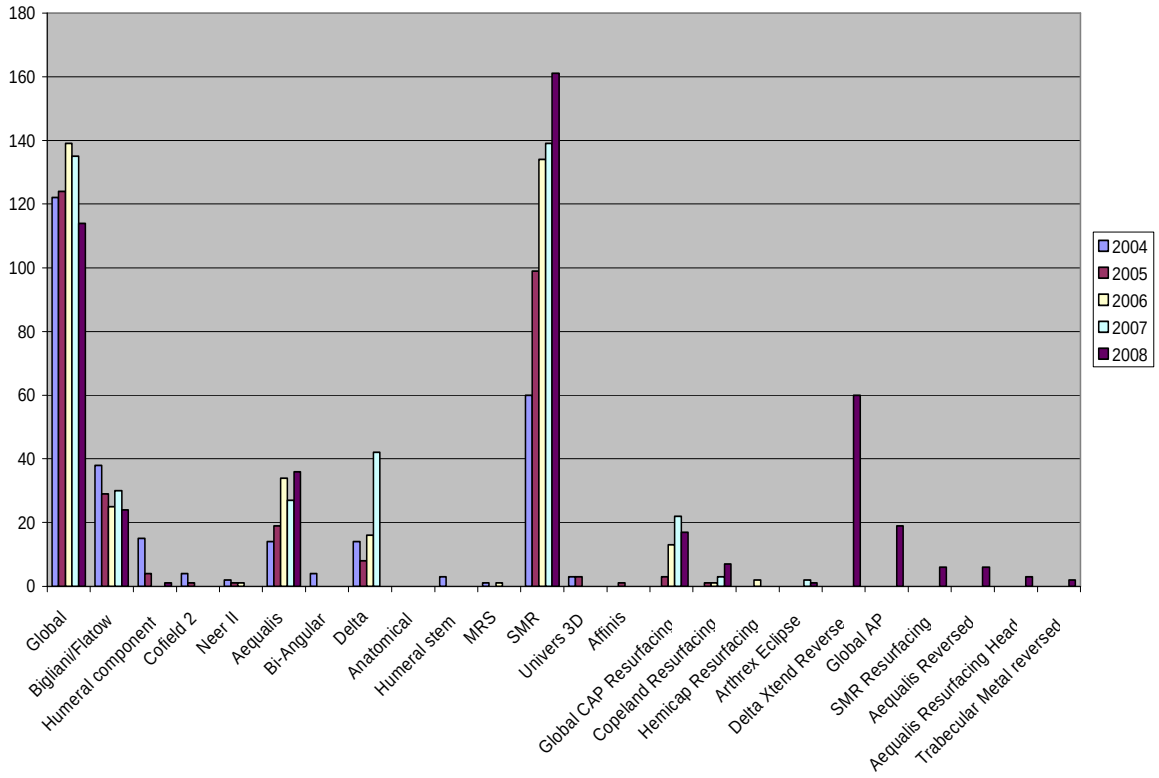
Prosthesis usage

Shoulder prostheses used in 2008.

SMR	161
Global	114
Delta Xtend Reverse	60
Aequalis	36
Bigliani/Flatow	24
Global AP	19
Global CAP Resurfacing	17
Copeland Resurfacing	7
SMR Resurfacing	6
Aequalis Reversed	6
Aequalis Resurfacing Head	3
Trabecular Metal Reverse	2
Humeral component	1
Arthrex Eclipse	1

Some of the above eg SMR, include total, hemi and reverse options.

MOST USED SHOULDER PROSTHESES 2003 -2007



The SMR continues to increase in popularity and 2008 saw the rise in prominence of resurfacing and reverse prostheses.

Surgeon and hospital workload

Surgeons
In 2008, 66 surgeons performed 457 shoulder procedures, an average of 7 procedures per surgeon. 1 surgeon performed more than 30 procedures and 20 surgeons performed 1 procedure.

Hospitals
In 2008, shoulder replacement was performed in 45 hospitals. 24 were public and 21 were private.
For 2008 the average number of shoulder replacements per hospital was 10.

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

Data analysis
For the nine-year period January 2000 – December 2008, there were 180 revision shoulder procedures registered. This is an additional 41 compared to last year's report.
The average age for a shoulder revision was 67.35 years with a range of 24.05 – 89.68 years.

	Female	Male
Number	100	80
Percentage	55.56	44.44
Mean	69.32	64.88
Maximum age	89.68	81.38
Minimum age	33.89	24.05
Standard dev.	12.05	11.23

REVISION OF PRIMARY SHOULDER ARTHROPLASTY

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

There were 78 revisions of the primary group of 2498 (3.12%). There were 8 procedures that had been revised twice and 1 that had been revised 3 times.

Time to revision

Mean	561	days
Maximum	3097	days
Minimum	0	days
Standard deviation	594	days

Reason for revision

Pain	25
Dislocation/instability anterior	18
Deep infection	10
Loosening glenoid	8
Wear glenoid	6
Cuff failure	4
Subacromial cuff impingement	4
Instability posterior	2
Fracture humerus	1
Loosening humeral	1
Other	8

Analysis by time for the 3 main reasons for revision

Pain n = 25

< 6 months	1
6 months – 1 year	5
2 years	8
3 years	5
4 years	2
5 years	4

Dislocation n = 18

< 6 months	13
6 months – 1 year	2
2 years	3

Deep infection n = 10

< 6 months	2
6 months – 1 year	2
2 years	3
3 years	3

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.

Statistical Significance

Where it is stated that a difference is significant the p value is 0.05 or less

All Total Shoulder Arthroplasties

All patients	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
	2498	7991	78	0.98	0.77	1.22

Revision vs Gender

Gender	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
F	1610	5321	43	0.81	0.58	1.09
M	888	2670	35	1.31	0.91	1.82

There is no significant difference between the two groups.

Revision vs Age Bands

Age Bands	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	197	661	12	1.82	0.94	3.17
55_64	476	1522	18	1.18	0.7	1.87
65_74	909	2943	29	0.99	0.66	1.42
GE75	916	2865	19	0.66	0.4	1.04

There is no significant difference among the 4 groups.

Revision vs Operation Category

Operation Category	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Total	961	3117	19	0.61	0.37	0.95
Reverse	426	799	15	1.88	1.05	3.1
Hemis	1038	3974	43	1.08	0.78	1.46
Resurfacing	73	102	1	0.98	0.02	5.48

The Reverse shoulder procedures have a significantly higher revision rate than conventional total arthroplasty.

Revision vs Surgeon annual workload

Consultant Number of ops/yr	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
<10	1383	4636	49	1.06	0.78	1.4
>=10	1115	3355	29	0.86	0.58	1.24

There is no significant difference between the two groups.

Revision rate of individual shoulder prostheses

Operation Type	Prosthesis	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Total	Aequalis	121	378.05	3	0.79	0.16	2.32
	Affinis	1	3.18	0	0	0	116.05
	Anatomical	8	48.59	0	0	0	7.59
	Bi-Angular	8	38.94	0	0	0	9.47
	Bigliani/Flatow	173	712.47	2	0.28	0.03	1.01
	Cofield 2	21	133.52	0	0	0	2.76
	Global	303	873.84	5	0.57	0.19	1.34
	Global AP	15	3.41	0	0	0	108.30
	Osteonics	49	257.77	1	0.39	0.01	2.16
	Sulzer Medica	27	161.56	0	0	0	2.28
	Neer 3	2	14.20	0	0	0	25.98
	Neer II	12	86.29	0	0	0	4.27
	SMR	208	381.09	8	2.10	0.91	4.14
	Univers 3D	5	17.17	0	0	0	21.49
Reverse	Aequalis Reversed	11	12.09	0	0	0	30.51

	Delta	55	199.22	1	0.50	0.01	2.80
	Delta Xtend Reverse	91	69.09	3	4.34	0.90	12.69
	SMR	267	517.77	11	2.12	1.06	3.80
	Trabecular Metal Reverse	2	0.35	0	0	0	1060.90
Hemi	Aequalis	71	285.74	5	1.75	0.57	4.08
	Anatomical	5	31.65	0	0	0	11.66
	Arthrex Eclipse	1	1.09	0	0	0	339.39
	Bi-Angular	19	126.63	2	1.58	0.19	5.71
	Bigliani/Flatow	114	526.51	5	0.95	0.31	2.22
	Bio-modular	1	7.14	1	14.00	0.35	78.03
	Cofield 2	50	309.05	0	0	0	1.19
	Delta	1	2.28	0	0	0	161.94
	Delta Xtend Reverse	4	2.14	0	0	0	172.52
	Global	560	1932.97	22	1.14	0.71	1.72
	Global AP	4	1.23	0	0	0	298.75
	Osteonics	43	236.57	1	0.42	0.01	2.36
	Sulzer Medica	14	83.39	0	0	0	4.42
	MRS Humeral	3	8.54	0	0	0	43.18
	Neer II	24	135.27	0	0	0	2.73
	Randelli	1	6.40	0	0	0	57.68
	SMR	122	273.78	7	2.56	1.03	5.27
	Univers 3D	1	3.64	0	0	0	101.30
Resurface							
	SMR Resurfacing	7	3.45	0	0	0	106.93
	Copeland Resurfacing	12	12.77	1	7.83	0.20	43.63
	Eclipse	2	2.29	0	0	0	161.36
	Global CAP Resurfacing	50	78.37	0	0	0	4.70
	Hemicap Resurfacing	2	4.79	0	0	0	77.04

Although there appear to be some prostheses with comparatively higher revision rates than the overall mean none are statistically significant owing to some wide CIs.

Cemented vs uncemented glenoids

	No Ops	Observed comp. Yrs	Number Revised	Rate/100-component-years	Exact 95% confidence levels	
Cemented	736	2644.67	13	0.49	0.26	0.84
Uncemented	225	471.90	6	1.27	0.47	2.77

Although the uncemented glenoid appears to have a much higher revision rate this is not statistically significant as the small number of total component years gives very wide C.I.s.

KAPLAN MEIER CURVES

The following Kaplan Meier survival analysis is for years 2001 to 2008 with decreased patients censored at time of death.

Years	% Revision-free
1	98.44
2	97.36
3	96.53
4	96.03
5	95.50

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

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX-MONTH 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(appendix 1).

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

We have grouped the questionnaire responses based on the scoring system published by Kalairajah et al, 2005 (appendix 1)
This groups each score into one of 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 August 2009, there were 1,725 shoulder questionnaire responses registered at six months post surgery.
The mean shoulder score was 35.85(standard deviation 9.8, range 3 – 48)

Scoring > 41	617
Scoring 34 - 41	523
Scoring 27 - 33	271
Scoring <27	314

At six months post surgery, 66% had an excellent or good score.

Oxford score at 6 months for the 4 types of arthroplasty

Estimates Dependent Variable: Score				
Operation Type	Mean	Std. Error	Exact 95% Confidence Interval	
Hemi	31.70	.353	30.98	32.37
Resurface	36.20	1.43	33.39	39.01
Reverse	34.88	.52	33.84	35.90
Totals	39.95	.33	39.30	40.60

Hemi vs resurface p=0.002, vs reverse p<0.001, vs totals p<0.001: i.e. Hemi worse than all others.

Resurface vs Reverse p=0.385, vs totals p=0.011 : resurface and reverse similar but both have poorer scores than Total.

Reverse vs totals p=<0.001.

Overall conventional total arthroplasty has significantly better scores than all the other groups and hemi arthroplasty is significantly worse.

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 1,725 at six-months and 222 at five-years.

		% 6/12	% 5 yrs
	The worst pain from the shoulder is severe or unbearable	17.5	14.9
2	Usually have moderate or severe pain from the operated shoulder	21.6	14.9
3	Extreme difficulty or impossible to get in and out of a car or public transport	3.2	3.2
4	Extreme difficulty or impossible to use a knife and fork at the same time	4.4	3.2
5	Extreme difficulty or impossible to do the household shopping on your own	7.2	7.7
6	Extreme difficulty or impossible to carry a tray containing a plate of food across a room	8.1	7.2
7	Extreme difficulty or impossible to brush or comb hair with the operated arm	18.5	18.0
8	Extreme difficulty or impossible to dress yourself because of your operated shoulder	7.3	4.5
9	Extreme difficulty or impossible to hang clothes in a wardrobe using operated arm	16.8	16.2
10	Extreme difficulty or impossible to wash and dry under both arms	9.7	8.1
11	Pain from operated shoulder greatly or totally interfering with usual work	13.3	17.1
12	Pain from shoulder in bed most or every nights	15.0	12.6

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

This dataset represents sequential Oxford shoulder scores for 222 individual patients.

At six months post surgery, 149 (67%) of this cohort of patients achieved an excellent or good score and had a mean of 36.22.

At five years post surgery, 148 (67%) of these patients achieved an excellent or good score and had a mean of 37.11.

Revision shoulder questionnaire responses
There were 116 revision shoulder responses with 39% achieving an excellent or good score. This group includes all revision shoulder responses. The mean revision shoulder score was 29.36(standard deviation 10.49, range 3 – 47).

ELBOW ARTHROPLASTY

PRIMARY ELBOW ARTHROPLASTY

The **nine**-year report analyses data for the period January 2000 – December 2008. There were 267 primary elbow procedures registered, an additional 40 compared to last year's report.

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

There has again been a slight increase in elbow arthroplasty numbers and since 2000 a 122% increase.

DATA ANALYSIS

Age and sex distribution

The average age for an elbow replacement was 65.43 years, with range of 36.38 – 90.54 years.

	Female	Male
Number	210	57
Percentage	78.65	21.35
Mean age	65.70	64.43
Maximum age	90.54	87.87
Minimum age	36.38	41.62
Standard dev.	11.46	12.17

Previous operation

None	227
Internal fixation for juxtarticular fracture	11
Synovectomy	7
Debridement	5
Nerve transposition	5
Osteotomy	2
Ligament reconstruction	1
Interposition arthroplasty	1
Other	4

Diagnosis

Rheumatoid arthritis	157
Post fracture	66
Osteoarthritis	29
Other inflammatory	8
Tumour	5
Post dislocation	4
Post ligament disruption	2
Other	5

Approach

Posterior	170
Medial	53
Lateral	20

Bone graft

Humeral autograft	23
Humeral allograft	2
Humeral synthetic	1
Ulnar autograft	2

Cement

Humerus cemented	248	
Antibiotic in cement	160	(65%)
Ulna cemented	239	
Antibiotic in cement	149	(62%)
Radius cemented	16	
Antibiotic in cement	15	(94%)

Systemic antibiotic prophylaxis

Patient number receiving at least one systemic antibiotic	247	(93%)

Operating theatre

Conventional	203
Laminar flow	63
Space suits	28

ASA Class

This was introduced with the updated forms at the beginning of 2005.
For the four-year period 2005 – 2008, there were 117 (85%) 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	4
2	50
3	60
4	2

Operative time (skin to skin)

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

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised.
The following figures are for the four- year period 2005 – 2008.

Consultant	134
Advanced trainee supervised	2
Advanced trainee unsupervised	2

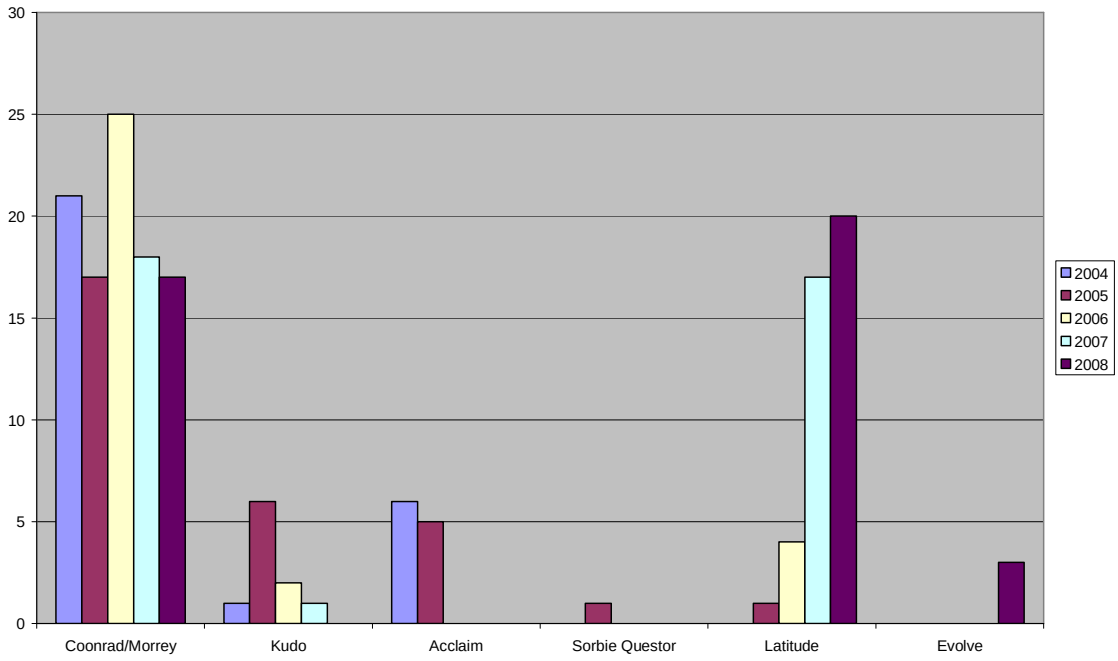
Prosthesis usage

Elbow prostheses used in 2008

Latitude	20
Coonrad/Morrey	17
Evolve	3

For the first time the Coonrad/Morrey has been pushed into second place. The Evolve makes its first appearance.

MOST USED ELBOW PROSTHESES 2004 - 2008



Surgeon and hospital workload

In 2008, 19 surgeons performed 40 primary elbow procedures, an average of 2 procedures per surgeon.

Hospitals

In 2008, primary elbow replacement was performed in 15 hospitals. 10 were public and 5 were private. For 2008 the average number of primary elbow replacements per hospital was 3.

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 nine-year period January 2000 – December 2008, there were 41 revision elbow procedures registered. This is an additional 5 compared to last year's report.
The average age for a revision elbow replacement was 64.38 years, with a range of 42.23 – 88.95 years.

	Female	Male
Number	29	12
Percentage	70.73	29.27
Mean	64.63	63.76
Maximum age	88.95	80.37
Minimum age	42.23	50.73
Standard dev.	10.35	8.97

REVISION OF REGISTERED PRIMARY ELBOW ARTHROPLASTIES

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

There were 11 revisions of the primary group of 267 (4.12%).
There were 3 that had been revised twice and 1 that had been revised 3 times.

Time to revision

Mean	691 days
Maximum	1180 days
Minimum	62 days
Standard deviation	353 days

Reason for revision

Loosening ulnar component	3
Loosening humeral component	2
Pain	2
Deep infection	2
Fracture humerus	1
Dislocations	1
Dissociation of components	1
Stiffness	1
Instability	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.

Statistical Significance

Where it is stated that a difference is significant the p value is 0.05 or less

All Primary Total Elbow Arthroplasties

All patients	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
	267	945.89	11	1.61	0.58	2.08

Revision vs Gender

Gender	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Females	210	778.53	6	0.77	0.28	1.68
Males	57	167.36	5	2.99	0.97	6.97

Despite higher revision rate for males, not statistically significant.

Revision vs Age Bands

Age Groups	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
LT55	51	193.68	2	1.03	0.13	3.73
55_64	77	281.02	6	2.14	0.78	4.65
65_74	75	234.31	1	0.43	0.01	2.38
GE75	64	236.89	2	0.84	0.10	3.05

No significant difference among the age bands.

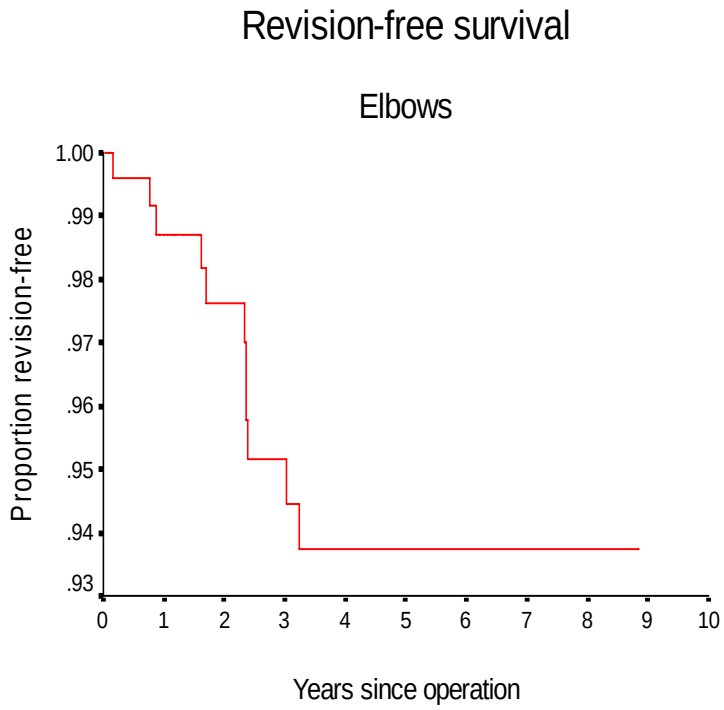
Revision rate of individual Elbow prostheses

Prosthesis	Total	Observed component years	Number revised	Rate/100 component years	Exact 95% confidence interval	
Acclaim	16	62.83	3	4.77	0.98	13.95
Coonrad/Morrey	186	749.24	6	0.80	0.29	1.74
Evolve Stem	3	1.58	0	0	0	233.10
Kudo	18	77.56	2	2.58	0.31	9.32
Latitude	42	43.34	0	0	0	8.51
Sorbie Questor	1	3.16	0	0	0	116.76

Although there are quite varying revision rates in the above tables none reach statistical significance due to the relatively small numbers and wide CIs

KAPLAN MEIER CURVES

The following Kaplan Meier survival analyses for the years 2001 to 2008 with deceased patients censored at time of death.



Years	% Revision-free
1	98.71
2	97.63
3	95.15
4	93.73

There are insufficient numbers to give an accurate revision % beyond 4 years.

PATIENT BASED QUESTIONNAIRE OUTCOMES AT SIX-MONTHS POST SURGERY

At six months post surgery patients are sent a questionnaire which is modelled on the Oxford 12, but is not validated.

The same scoring system has been adopted as recommended by the original authors of the Oxford 12 hip and knee questionnaires.

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

We have grouped the questionnaire responses based on the scoring system published by Kalairajah et al, 2005(appendix1)

This groups each score into one of 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 August 2009, there were 194 primary elbow responses registered at six months post surgery.
The mean primary elbow score was 37.15 (standard deviation 9.91, range 8 – 48)

Scoring > 41	89
Scoring 34 - 41	46
Scoring 27 - 33	26
Scoring < 27	33

At six months post surgery, 70% 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), brushing or combing hair (Q7) and pain (Q8).

Percentage scoring 0 or 1 for each question (n = 194)

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	6.2
3	Extreme difficulty or impossible to lift a teacup safely with your operated arm	5.2
4	Extreme difficulty or impossible to get your hand to your mouth	3.6
5	Extreme difficulty or impossible to carry the household shopping with your operated arm	16.5
6	Extreme difficulty or impossible to carry a tray containing a plate of food across a room	12.4
7	Extreme difficulty or impossible to brush or comb hair with the affected arm	13.4
8	Usually have moderate or severe pain from the operated elbow	13.4
9	Extreme difficulty or impossible to hang clothes in a wardrobe using operated arm	9.3
10	Extreme difficulty or impossible to wash and dry under both arms	12.4
11	Pain from operated elbow greatly or totally interfering with usual work or hobbies	12.9
12	Pain from elbow in bed most or every nights	7.7

Revision elbow questionnaire responses
There were 25 revision elbow responses with 48% achieving an excellent or good score. This group includes all revision elbow responses. The mean revision elbow score was 32.88 (standard deviation 10.23, range 8 – 48).

LUMBAR DISC REPLACEMENT

LUMBAR DISC REPLACEMENT

This report analyses data for the **seven**-year period January 2002 – December 2008. There were 94 primary lumbar disc replacements registered to 9 surgeons.

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

DATA ANALYSIS

The average age for a lumbar disc replacement was 39.93 years, with a range of 25.22 – 62.19 years.

	Female	Male
Number	46	48
Percentage	48.94	51.06
Mean age	40.40	39.49
Maximum age	62.19	60.71
Minimum age	25.22	27.19
Standard dev.	8.99	7.65

Disc replacement levels

L3/4	13
L4/5	66
L5/S1	23

Fusion levels

L3/4	1
L4/5	7
L5/S1	42

Previous operation

Discectomy	22
L3/4	0
L4/5	9
L5/S1	13
Fusion	8
L3/4	0
L4/5	2
L5/S1	8

Diagnosis

Degenerative disc disease	
L3/4	5
L4/5	34
L5/S1	61
Other	1
Annular tear MRI scan	
L3/4	8
L4/5	48
L5/S1	12
Other (L2/3)	1
Discogenic pain on discography	
L3/4	14
L4/5	66
L5/S1	51
Other (L2/3)	1

Approach

Retroperitoneal midline	85
Retroperitoneal lateral	2
Transperitoneal	1

Intraoperative complications

Damage to major veins	4
Subsidence	1

Systemic antibiotic prophylaxis

Patient number receiving systemic antibiotic prophylaxis	72	(77%)

Operating theatre

Conventional	59
Laminar flow	35
Spacesuits	2

Operative time (skin to skin)

Mean	146	minutes
Standard deviation	41	minutes
Minimum	77	minutes
Maximum	276	minutes

Surgeon grade

Consultant	94

Oswestry Disability Index

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

If more than one box is marked in each section, take the highest score.

If all 10 sections are completed, the score is calculated as follows:

Example: 16 (total scored)/50(total possible score) x 100 = 32%

If one section is missed (or not applicable) the score is calculated:

Example: 16 (total scored)/45(total possible score) x 100 = 35.5%

0 is the best score and 100 is the worst score.

Pre operative scores

Modified Roland and Morris	n = 80
Mean	14.26
Maximum	23
Minimum	1
Standard deviation	4.39

Oswestry Disability Index	n = 10
Mean	36.14
Maximum	68.00
Minimum	0.00
Standard deviation	27.73

Post operative score

Oswestry Disability Index	n = 2
Mean	4.00
Maximum	8.00
Minimum	0.00
Standard deviation	5.66

CERVICAL DISC REPLACEMENT

CERVICAL DISC REPLACEMENT

This report analyses data for the five-year period January 2004 – December 2008. There were 57 primary cervical disc replacements registered to 8 surgeons.

2004	1
2005	12
2006	9
2007	11
2008	24

DATA ANALYSIS

The average age for a cervical disc replacement was 44.29 years, with a range of 24.92 – 58.89 years.

	Female	Male
Number	24	33
Percentage	42.11	57.89
Mean age	45.21	43.63
Maximum age	56.88	58.89
Minimum age	30.14	24.92
Standard dev.	6.79	7.54

Disc replacement levels

C3/4	3
C4/5	5
C5/6	28
C6/7	30
C7T1	0

Previous operation

Foraminotomy	1
Adjacent level fusion	8
Adjacent level disc arthroplasty	0
Discectomy	3

Diagnosis

Acute disc prolapse	33
Chronic spondylosis	0
Neck pain	1
Degenerative disc disease	14
Myelopathy	2

Approach

Anterior right	28
Anterior left	0
Smith Robinson	1

Intra operative complications

There were no intra operative complications reported.

Systemic antibiotic prophylaxis

Patient number receiving systemic antibiotic prophylaxis	18 (32%)

Operating theatre

Laminar flow	36
Conventional	21
Spacesuits	0

Operative time (skin to skin)

Mean	139	minutes
Standard deviation	55	minutes
Minimum	68	minutes
Maximum	282	minutes

Surgeon grade

Consultant	57

Neck Disability Index Scoring

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

If more than one box is marked in each section, take the highest score.

If all 10 sections are completed, the score is calculated as follows:

Example: 16 (total scored)/50(total possible score) x 100 = 32%

If one section is missed (or not applicable) the score is calculated:

Example: 16 (total scored)/45(total possible score) x 100 = 35.5%

0 is the best score and 100 is the worst score.

Pre operative score

Neck Disability Index	n = 18
Mean	44.06
Maximum	87.00
Minimum	2.00
Standard deviation	20.78

Post operative score

Neck Disability Index	n = 16
Mean	21.82
Maximum	52.00
Minimum	0.00
Standard deviation	15.01

Appendix I

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

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

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

Appendix II

Publications in Peer Reviewed Journals

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

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

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

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

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

Accepted for Publication by J Bone Joint Surg. B.
An analysis of the Oxford hip and knee scores and their relationship to early joint revision
Data from the New Zealand Joint Registry
Rothwell AG, Hooper GJ, Hobbs A, Frampton C.

The survivorship and functional outcomes of unicompartmental knee replacements converted to total knee replacements: The New Zealand National Joint Registry
Andrew J Pearse, Gary J Hooper, Alastair G Rothwell, Chris Frampton.

Submitted to JBJS B
Osteotomy and unicompartmental knee replacement converted to total knee replacement – data from the New Zealand National Joint Registry
Andrew J Pearse, Gary J Hooper, Alastair G Rothwell, Chris Frampton

Appendix III

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 cemented	Reflection cemented
	Basis cemented	Polar cup cemented
	CPCS cemented	
	Synergy Porous	BHR porous
	BHR resurfacing	R3 porous

	Anthology Porous	Reflection porous
	Emperion Porous	Polar Cup uncemented
	SL Plus	EP Fit uncemented
	Polar Stem	
	SL Plus MIA	
	Echelon Porous	
MATHY'S	Twinsys	RM
		Weber
BIOMET	Bi-Metric X HA	Exceed ABT Exceed Ringloc X

KNEES		
BIOMET	AGC	
	Maxim Vanguard	
De Puy	LCS	
	PFC Sigmar	
	LCS PFJ	
Global Orthopaedics	MBK	
Smith & Nephew	Genesis II	
	Genesis II Oxinium	
	Journey BCS	
	Legion	
STRYKER	Duracon	
	Scorpio	
	Triathlon	
	Avon Patello	
ZIMMER	Insall Burstein	

	Nexgen	
ORTHOTEC	Optetrak	
	Themis	
ADVANCED SURGICAL TECHNOLOGIES	Advance	

UNI COMPARTMENTAL KNEES		
BIOMET	Oxford Cemented Oxford Cementless	
	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	Promos	

ANKLES		
DEPUY	Agility	
	Mobility	
Orthotec	Ramses	
REM Systems	Salto	
Link	Star	

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

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

NEW ZEALAND JOINT REGISTRY

Primary Replacement Hip

Free Phone 0800-274-989 Total Hip Arthroplasty ❑ Resurfacing Arthroplasty ❑ 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 ……

PREVIOUS OPERATION ON INDEX JOINT

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

DIAGNOSIS

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

APPROACH ❑ Image guided surgery ❑ Minimally invasive surgery

❑ Anterior ❑ Posterior ❑ Lateral ❑ Trochanteric osteotomy

FEMUR

Please do not fold bar-coded label

ACETABULUM

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - FEMUR

- ❑ Allograft
- ❑ Autograft ❑ Synthetic

BONE GRAFT - ACETABULUM

- ❑ Allograft
- ❑ Autograft ❑ Synthetic

FEMORAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ Femur ❑ Acetabulum ❑ Antibiotic brand: .....

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS

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

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

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

PRIMARY OPERATING SURGEON

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

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

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

NEW ZEALAND JOINT REGISTRY

Revision Hip Joint

Free Phone 0800-274-989 07.04.2005

Date: .....

Side:..... **

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

NEW ZEALAND JOINT REGISTRY

Primary Replacement Knee

Free Phone 0800-274-989 ❑ Total Knee Arthroplasty ❑ Unicompartmental ❑ Patellofemoral **07.04.2005**

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
- ❑ 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

NEW ZEALAND JOINT REGISTRY
Revision Knee Joint

Free Phone 0800-274-989 07.04.2005

Date: .....

Side:..... **

Patient Name:
Address:

d.o.b. NHI:

Attach Patient Label

Consultant: ……
[If different from patient label]

Hospital: .....

Town/City:……

Tick Appropriate Boxes

REASON FOR REVISION
- ❑ Loosening femoral component
- ❑ Loosening tibial component
- ❑ Loosening patellar component
- ❑ Pain
- ❑ Previous Unicompartmental
- ❑ Deep infection
- ❑ Fracture femur
- ❑ Fracture tibia
- ❑ Other details: ……..

Date Index Operation: …….

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

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

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

FEMUR

Please do not fold bar-coded label

TIBIA

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT – FEMUR
❑ Allograft
❑ Autograft ❑ Synthetic

BONE GRAFT – TIBIA
❑ Allograft
❑ Autograft ❑ Synthetic

PATELLA

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

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

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

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

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

PRIMARY OPERATING SURGEON
❑ Consultant ❑ Adv Trainee Supervised Year…….. ❑ Adv Trainee Unsupervised ❑ Basic Trainee

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

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

NEW ZEALAND JOINT REGISTRY

Primary Replacement Shoulder

0800-274-989 ❑ Total shoulder Arthroplasty ❑ Hemiarthroplasty ❑ Reverse Shoulder **06.05.2009**

Date: .....

Side:..... **

Tick Appropriate Boxes

Patient Name:
Address:

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

Attach Patient Label

Consultant: ……
[If different from patient label]

Hospital: .....

Town/City ……

PREVIOUS OPERATION ON INDEX JOINT

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

DIAGNOSIS

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

APPROACH

❑ Deltopectoral ❑ Other : specify

HUMERUS

Please do not fold bar-coded label

GLENOID

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - HUMERUS

❑ Allograft
❑ Autograft ❑ Synthetic

BONE GRAFT - GLENOID

❑ Allograft
❑ Autograft ❑ Synthetic

HUMERAL HEAD

Please do not fold bar-coded label

AUGMENTS

Please do not fold bar-coded label

STICK ALL LABELS ON REVERSE SIDE

CEMENT

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

❑**SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

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

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

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

PRIMARY OPERATING SURGEON

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

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

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

NEW ZEALAND JOINT REGISTRY
Revision Shoulder

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

Date: .....

Side:..... **

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

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

REVISION

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

APPROACH

- ❑ Deltopectoral
- ❑ Other: specify

HUMERUS

Please do not fold bar-coded labels

GLENOID

Please do not fold bar-coded labels

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - HUMERUS

- ❑Allograft
- ❑Autograft
- ❑ Synthetic

BONE GRAFT - GLENOID

- ❑Allograft
- ❑Autograft
- ❑ Synthetic

HUMERAL HEAD

Please do not fold bar-coded labels

AUGMENTS

Please do not fold bar-coded labels

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

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

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS

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

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

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

PRIMARY OPERATING SURGEON

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

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

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

NEW ZEALAND JOINT REGISTRY
Primary Replacement Ankle

Free Phone 0800-274-989 **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 ……

PREVIOUS OPERATION ON INDEX JOINT

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

DIAGNOSIS

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

APPROACH

❑ Anterior ❑ Anterio-lateral ❑ Other

TIBIA

Please do not fold bar-coded label

TALUS

Please do not fold bar-coded label

STICK EXTRA LABELS ON REVERSE SIDE

BONE GRAFT - TIBIA

❑ Allograft
❑ Autograft ❑ Synthetic

BONE GRAFT - TALUS

❑ Allograft
❑ Autograft ❑ Synthetic

AUGMENTS

Please do not fold bar-coded label

FUSION DISTAL TFJ

STICK ALL LABELS ON REVERSE SIDE

CEMENT

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

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS

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

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

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

PRIMARY OPERATING SURGEON

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

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

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

NEW ZEALAND JOINT REGISTRY
Revision Ankle Joint

Free Phone 0800-274-989 07.04.2005

Date: .....

Side:..... **

Patient Name:
Address:

d.o.b. NHI:

Attach Patient Label

Consultant: ……
[If different from patient label]

Hospital: .....

Town/City: ……..

Tick Appropriate Boxes

REASON FOR REVISION

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

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

REVISION

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

APPROACH

❑ Anterior ❑ Anterio-lateral ❑ Posterior

TIBIA

Please do not fold bar-coded label

TALUS

Please do not fold bar-coded label

STICK ALL LABELS ON REVERSE SIDE

BONE GRAFT - TIBIA

- ❑ Allograft
- ❑ Autograft ❑ Synthetic

BONE GRAFT - TALUS

- ❑ Allograft
- ❑ Autograft ❑ Synthetic

AUGUMENTS

Please do not fold bar-coded label

FUSION DISTAL TFJ

Yes ❑ No ❑

STICK EXTRA LABELS ON REVERSE SIDE

CEMENT

❑ Talus ❑ Tibia ❑ Antibiotic brand: ……..

❑ **SYSTEMIC ANTIBIOTIC PROPHYLAXIS**

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

OPERATING THEATRE

❑ Conventional ❑ Laminar flow or similar ❑ Space suits

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

PRIMARY OPERATING SURGEON

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

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

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

NEW ZEALAND JOINT REGISTRY
Primary Replacement Elbow

Free Phone 0800-274-989 07.04.2005

Date: .....

Patient Name:
Address:

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

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

Hospital: .....

Town/City: .....

Side:..... **

Tick Appropriate Boxes

PREVIOUS OPERATION ON INDEX JOINT

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

DIAGNOSIS

- ❑ Rheumatoid arthritis
- ❑ Osteoarthritis
- ❑ Other inflammatory
- ❑ Post 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

NEW ZEALAND JOINT REGISTRY
Revision Elbow Joint

Free Phone 0800-274-989 07.04.2005

Date: .....

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

Side:..... **

Patient Name:
Address:

d.o.b. NHI:

Attach 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

❑ Adv Trainee Unsupervised

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

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

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

NEW ZEALAND JOINT REGISTRY

Primary Cervical Disc Replacement

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

Date: .....

Patient Name:
Address:

DOB: **NHI:**

Attach Patient Label

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

Tick Appropriate Boxes **ACC** ☐ **ACC Claim No: ……**

LEVELS OF DISC REPLACEMENT

- ☐ C3/4
- ☐ C4/5
- ☐ C5/6
- ☐ C6/7
- ☐ C7/T1
- Other ……..

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

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

NEW ZEALAND JOINT REGISTRY

Primary Lumbar Disc Replacement

Free Phone 0800-274-989 14.08.2008

Date: .....

Patient Name:
Address:

d.o.b. NHI:

Attach Patient Label

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

Tick Appropriate Boxes ACC ACC Claim No. .....

DISC REPLACEMENT Levels	FUSION Levels	PRE OP PATIENT SCORE
		Modified Roland and Morris
❑ L3/4	❑ L3/4	Total number of "Yes" responses ……
❑ L4/5	❑ L4/5	*Oswestry Score*
❑ L5/S1	❑ L5/S1	Percentage score ……

Other ……

PREVIOUS OPERATION
❑ Discectomy ❑ L3/4 ❑ L4/5 ❑ L5/S1 ❑ Other ……
❑ Other …….. ❑ L3/4 ❑ L4/5 ❑ L5/S1

DIAGNOSIS

1. Degenerative Disc disease (plain x-ray changes present) ❑ L3/4 ❑ L4/5 ❑ L5/S1 ❑ Other ……
2. Annular tear MRI scan (normal plain x-ray) ❑ L3/4 ❑ L4/5 ❑ L5/S1 ❑ Other ……
3. Discogenic pain on discography ❑ L3/4 ❑ L4/5 ❑ L5/S1 ❑ Other ……

APPROACH
❑ Retroperitoneal midline abdominal wall incision ❑ Transperitoneal
❑ Retroperitoneal lateral abdominal wall incision ❑ Other ……..

IMPLANTS

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

Affix Supplier Label

Affix Supplier Label

STICK EXTRA LABELS ON REVERSE SIDE

INTRAOPERATIVE COMPLICATIONS
……
……

❑SYSTEMIC ANTIBIOTIC PROPHYLAXIS
Yes ❑ No ❑

OPERATIVE THEATRE
❑Conventional ❑ Laminar flow or similar ❑ Space suits

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

PRIMARY OPERATING SURGEON

❑ Consultant ❑ Adv Trainee Year…… ❑ Basic Trainee

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

NEW ZEALAND JOINT REGISTRY

Revision Lumbar Disc Replacement

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

Date: .....

Patient Name:
Address:

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

Attach Patient Label

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

Tick Appropriate Boxes

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

NEW ZEALAND JOINT REGISTRY

Revision Cervical Disc Replacement

Free Phone 0800-274-989 14.08.2008

Date: .....

Patient Name:
Address:

DOB: NHI:

Attach Patient Label

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

Hospital: .....

Town/City: ……

LEVEL OF REVISION

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

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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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 hip?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 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)
   1. No pain up to 30 minutes
   2 16 to 30 minutes
   3 5 to 15 minutes
   4 Around the house only
   5 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?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Have you been able to put on a pair of socks, stockings or tights?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you do the household shopping on your own?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Have you had any trouble with washing and drying yourself (all over) because of your operated on hip?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

7 How much has pain from your operated on hip interfered with your usual work (including housework)?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 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?
   1 Not at all painful
   2 Slightly painful
   3 Moderately painful
   4 Very painful
   5 Unbearable

9. Have you had any sudden, severe pain - 'shooting', 'stabbing' or 'spasms' - from the affected operated on hip?
   1 Rarely/never
   2 Sometimes or just at first
   3 Often, not just at first
   4 Most of the time
   5 All of the time

10. Have you been limping when walking, because of your operated on hip?
   1 No days
   2 Only 1 or 2 days
   3 Some days
   4 Most days
   5 Every day

11. Have you been able to climb a flight of stairs?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

12 Have you been troubled by pain from your operated on hip in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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 hip?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 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)
   1. No pain up to 30 minutes
   2 16 to 30 minutes
   3 5 to 15 minutes
   4 Around the house only
   5 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?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Have you been able to put on a pair of socks, stockings or tights?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you do the household shopping on your own?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Have you had any trouble with washing and drying yourself (all over) because of your operated on hip?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

7 How much has pain from your operated on hip interfered with your usual work (including housework)?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 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?
   1 Not at all painful
   2 Slightly painful
   3 Moderately painful
   4 Very painful
   5 Unbearable

9 Have you had any sudden, severe pain - 'shooting', 'stabbing' or 'spasms' - from the affected operated on hip?
   1 Rarely/never
   2 Sometimes or just at first
   3 Often, not just at first
   4 Most of the time
   5 All of the time

10 Have you been limping when walking, because of your operated on hip?
   1 No days
   2 Only 1 or 2 days
   3 Some days
   4 Most days
   5 Every day

11 Have you been able to climb a flight of stairs?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

12 Have you been troubled by pain from your operated on hip in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 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)
   1. No pain up to 30 minutes
   2 16 to 30 minutes
   3 5 to 15 minutes
   4 Around the house only
   5 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?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Could you kneel down and get up again afterwards on your operated knee?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you do the household shopping on your own?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Have you had any trouble with washing and drying yourself (all over) because of your operated on knee?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

7 How much has pain from your operated on knee interfered with your usual work (including housework)?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 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?
   1 Not at all painful
   2 Slightly painful
   3 Moderately painful
   4 Very painful
   5 Unbearable

9 Have you felt that your operated on knee might suddenly "give way" or let you down?
   1 Rarely/never
   2 Sometimes or just at first
   3 Often, not just at first
   4 Most of the time
   5 All of the time

10 Have you been limping when walking, because of your operated on knee?
   1 No days
   2 Only 1 or 2 days
   3 Some days
   4 Most days
   5 Every day

11 Could you walk down a flight of stairs?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

12 Have you been troubled by pain from your operated on knee in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 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)
   1. No pain up to 30 minutes
   2 16 to 30 minutes
   3 5 to 15 minutes
   4 Around the house only
   5 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?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Could you kneel down and get up again afterwards?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you do the household shopping on your own?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Have you had any trouble with washing and drying yourself (all over) because of your operated on knee?
   1 No trouble at all
   2 Very little trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

7 How much has pain from your operated on knee interfered with your usual work (including housework)?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 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?
   1 Not at all painful
   2 Slightly painful
   3 Moderately painful
   4 Very painful
   5 Unbearable

9 Have you felt that your operated on knee might suddenly "give way" or let you down?
   1 Rarely/never
   2 Sometimes or just at first
   3 Often, not just at first
   4 Most of the time
   5 All of the time

10 Have you been limping when walking, because of your operated on knee?
   1 No days
   2 Only 1 or 2 days
   3 Some days
   4 Most days
   5 Every day

11 Could you walk down a flight of stairs?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

12 Have you been troubled by pain from your operated on knee in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 Severe

2. For how long have you been able to walk before the pain from your operated on ankle becomes severe?
   1. No pain up to 30 minutes
   2 16 to 30 minutes
   3 5 to 15 minutes
   4 Around the house only
   5 Unable to walk at all because of severe pain.

3. Have you been able to walk on uneven ground?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 Extreme difficulty
   5 No impossible.

4. Have you had to use an orthotic (shoe insert), heel lift, or special shoes.
   1 Never
   2 Occasionally
   3 Often
   4 Most of the time
   5 Always

5. How much has pain from your ankle interfered with your usual work (including housework and hobbies)?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

6. Have you been limping when walking because of your operated on ankle?
   1 No days
   2 Only one or two days
   3 Some days
   4 Most days
   5 Every day

7 Have you been able to climb a flight of stairs.
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 Impossible

8. Have you been troubled by pain from your operated on ankle in bed at night?
   1 No nights
   2 Only one or two nights
   3 Some nights
   4 Most nights
   5 Every night

9. How much has pain from your operated on ankle interfered with your usual recreational activities?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

10 Have you had swelling of your foot
   1 None at all
   2 Occasionally
   3 Often
   4 Most of the time
   5 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.
   1 Not at all painful
   2 Slightly painful
   3 Moderately painful
   4 Very painful
   5 Unbearable

12 Have you had any sudden severe pain – shooting, stabbing or spasms from your operated on ankle?
   1 No days
   2 Only 1 or 2 days
   3 Some days
   4 Most days
   5 Every day

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	°	°	……..
The joint became infected?	°	°	……..

or for any other reason related to the artificial joint ……..……..

Hospital admitted to: ……..

I wish to receive a progress report on the study. **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed, try to answer the question from the joint replacement aspect alone.

REVISION ANKLE REPLACEMENT - QUESTIONNAIRE

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

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

……..…… **Date of Surgery:** ……

We would like you to score yourself on the following 12 questions. Each question is scored from 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 Severe

2. For how long have you been able to walk before the pain from your operated on ankle becomes severe?
   1. No pain up to 30 minutes
   2 16 to 30 minutes
   3 5 to 15 minutes
   4 Around the house only
   5 Unable to walk at all because of severe pain.

3. Have you been able to walk on uneven ground?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 Extreme difficulty
   5 No impossible.

4. Have you had to use an orthotic (shoe insert), heel lift, or special shoes.
   1 Never
   2 Occasionally
   3 Often
   4 Most of the time
   5 Always

5. How much has pain from your ankle interfered with your usual work (including housework and hobbies)?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

6. Have you been limping when walking because of your operated on ankle?
   1 No days
   2 Only one or two days
   3 Some days
   4 Most days
   5 Every day

7 Have you been able to climb a flight of stairs.
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 Impossible

8. Have you been troubled by pain from your operated on ankle in bed at night?
   1 No nights
   2 Only one or two nights
   3 Some nights
   4 Most nights
   5 Every night

9. How much has pain from your operated on ankle interfered with your usual recreational activities?
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

12 Have you had swelling of your foot
   1 None at all
   2 Occasionally
   3 Often
   4 Most of the time
   5 All the time

13 After a meal (sat at a table) how painful has it been for you to stand up from a chair because of your operated on ankle.
   1 Not at all painful
   2 Slightly painful
   3 Moderately painful
   4 Very painful
   5 Unbearable

12 Have you had any sudden severe pain – shooting, stabbing or spasms from your operated on ankle?
   1 No days
   2 Only 1 or 2 days
   3 Some days
   4 Most days
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Mild
   3 Moderate
   4 Severe
   5 Unbearable

2. How would you describe the pain you ***usually*** have from your operated on shoulder?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 Severe

3. Have you had any trouble getting in and out of a car or using public transport because of your operated on shoulder?
   1. No trouble at all
   2 A little bit of trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Have you been able to use a knife and fork at the same time?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you do the household shopping on your own?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Could you carry a tray containing a plate of food across a room?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

7 Could you brush/comb your hair with the operated on arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, Impossible

8. Have you had any trouble dressing yourself because of your operated on shoulder?
   1. No trouble at all
   2 A little bit of trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

9. Could you hang your clothes up in a wardrobe – using the operated on arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

14 Have you been able to wash and dry yourself under both arms?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

15 How much has pain from your operated on shoulder interfered with your usual work hobbies or recreational activities (including housework)?.
   1 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

12 Have you been troubled by pain from your operated on shoulder in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 Every night

Additional Information

Have you at any time been hospitalised because:

	Yes	No	Approx Date
The artificial joint dislocated?	°	°	……..
The joint became infected?	°	°	……..
or for any other reason related to the artificial joint ……..			
Hospital admitted to: ……..			

I wish to receive a progress report on the study. . **NB:** If there are reasons other than the operation which would stop you doing one of the tasks listed, try to answer the question from the joint replacement aspect alone.

REVISION SHOULDER REPLACEMENT - QUESTIONNAIRE

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

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

……..……. **Date of Surgery:** …….

We would like you to score yourself on the following 12 questions. Each question is scored from 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Mild
   3 Moderate
   6 Severe
   7 Unbearable

2. How would you describe the pain you ***usually*** have from your operated on shoulder?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 Severe

3. Have you had any trouble getting in and out of a car or using public transport because of your operated on shoulder?
   1. No trouble at all
   2 A little bit of trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Have you been able to use a knife and fork at the same time?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you do the household shopping on your own?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Could you carry a tray containing a plate of food across a room?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

7 Could you brush/comb your hair with the operated on arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, Impossible

8. Have you had any trouble dressing yourself because of your operated on shoulder?
   1. No trouble at all
   2 A little bit of trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

9. Could you hang your clothes up in a wardrobe – using the operated on arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

16 Have you been able to wash and dry yourself under both arms?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

17 How much has pain from your operated on shoulder interfered with your usual work hobbies or recreational activities (including housework)?.
   2 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

12 Have you been troubled by pain from your operated on shoulder in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   1 None
   2 Mild
   3 Moderate
   8 Severe
   9 Unbearable

2. Have you had any trouble dressing yourself because of your operated on elbow?
   1. No trouble at all
   2 A little bit of trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

3. Can you lift a teacup safely with your operated on arm?
   1. No trouble at all
   2 A little bit of trouble
   3 Moderate trouble
   4 Extreme difficulty
   5 Impossible to do

4. Have you been able to get your hand to your mouth?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

5. Could you carry the household shopping with your operated on arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

6. Could you carry a tray containing a plate of food across a room?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

7 Could you brush/comb your hair with the affected arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, Impossible

8. How would you describe the pain you ***usually*** have from your operated on elbow?
   1 None
   2 Very mild
   3 Mild
   4 Moderate
   5 Severe

9. Could you hang your clothes up in a wardrobe – using the operated on arm?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

18 Have you been able to wash and dry yourself under both arms?
   1 Yes, easily
   2 With little difficulty
   3 With moderate difficulty
   4 With extreme difficulty
   5 No, impossible

19 How much has pain from your operated on elbow interfered with your usual work hobbies or recreational activities (including hobbies and housework)?.
   3 Not at all
   2 A little bit
   3 Moderately
   4 Greatly
   5 Totally

12 Have you been troubled by pain from your operated on elbow in bed at night?
   1 No nights
   2 Only 1 or 2 nights
   3 Some nights
   4 Most nights
   5 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 1 to 5, from least to most difficulty or severity: 1 being the least difficult/severe and 5 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?
   - 1 None
   - 2 Mild
   - 3 Moderate
   - 10 Severe
   - 11 Unbearable

2. Have you had any trouble dressing yourself because of your operated on elbow?
   - 1. No trouble at all
   - 2 A little bit of trouble
   - 3 Moderate trouble
   - 4 Extreme difficulty
   - 5 Impossible to do

3. Can you lift a teacup safely with your operated on arm?
   - 1. No trouble at all
   - 2 A little bit of trouble
   - 3 Moderate trouble
   - 4 Extreme difficulty
   - 5 Impossible to do

4. Have you been able to get your hand to your mouth?
   - 1 Yes, easily
   - 2 With little difficulty
   - 3 With moderate difficulty
   - 4 With extreme difficulty
   - 5 No, impossible

5. Could you carry the household shopping with your operated on arm?
   - 1 Yes, easily
   - 2 With little difficulty
   - 3 With moderate difficulty
   - 4 With extreme difficulty
   - 5 No, impossible

6. Could you carry a tray containing a plate of food across a room?
   - 1 Yes, easily
   - 2 With little difficulty
   - 3 With moderate difficulty
   - 4 With extreme difficulty
   - 5 No, impossible

7 Could you brush/comb your hair with the affected arm?
   - 1 Yes, easily
   - 2 With little difficulty
   - 3 With moderate difficulty
   - 4 With extreme difficulty
   - 5 No, Impossible

8. How would you describe the pain you ***usually*** have from your operated on elbow?
   - 1 None
   - 2 Very mild
   - 3 Mild
   - 4 Moderate
   - 5 Severe

9. Could you hang your clothes up in a wardrobe – using the operated on arm?
   - 1 Yes, easily
   - 2 With little difficulty
   - 3 With moderate difficulty
   - 4 With extreme difficulty
   - 5 No, impossible

20 Have you been able to wash and dry yourself under both arms?
   - 1 Yes, easily
   - 2 With little difficulty
   - 3 With moderate difficulty
   - 4 With extreme difficulty
   - 5 No, impossible

21 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
   - 2 A little bit
   - 3 Moderately
   - 4 Greatly
   - 5 Totally

12 Have you been troubled by pain from your operated on elbow in bed at night?
   - 1 No nights
   - 2 Only 1 or 2 nights
   - 3 Some nights
   - 4 Most nights
   - 5 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.