# THE NEW ZEALAND JOINT REGISTRY

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#### EXAMPLES OF A ZOOMED AREAS



#### Top ten combinations used in 2021

Femur	Acetabulum	202
Corail	Pinnacle	1,625
Exeter V40	Trident	1,182
Exeter V40	Trident II Tritanium	493
C-Stem AMT	Pinnacle	269
Exeter V40	Pinnacle	256
Exeter V40	Exeter X3	249
Accolade II	Tritanium	235
Accolade II	Trident	226
Exeter V40	RM Pressfit cup	214
Polarstem uncemented	R3 porous	208

THA BEARING TYPE BY YEAR

## EDITORIAL COMMITTEE

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Final design

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

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## **EDITORIAL COMMENT**



The Registry Management Committee is pleased to present the twenty-five-year report of the New Zealand Orthopaedic Association's Joint Registry.

In this year's report the format of previous years has been followed such that each arthroplasty section is self-contained. Explanatory notes that would previously have appeared in every chapter, are presented at the beginning of the report.

Readers will note that we have changed the graphical presentation of the Kaplan Meier Survivorship curves in line with international registry practice to now show the cumulative revision rate and the remaining population at risk, rather than the ongoing survival.

The total number of registered joint arthroplasties at 31st of December 2023 was 422,699, which had been performed on 280,783 individual patients, of which 78,712 (28%) have now died during the twenty-five-year period. The number of observed component years (ocys) contained within the Registry is now over two million. The increase of 27,238 registered joint procedures including 25,071 primary arthroplasties for 2023 is a record but is consistent with year-on-year increases over the last decade, except for years with significant COVID interruption. As can be noted in the graph below, the volume of joint registrations has increased by over 50% in the past ten years and this ongoing growth is creating new challenges for the registry. The registry now has more accurate data on the proportion of procedures performed in public and privately funded settings which will continue to inform public debate and advocacy for the orthopaedic patient community.



Along with the progressive increase in the number of new arthroplasties, the size of the population continues to increase. The mean BMIs were 31.3 and 29.1 kg/m2 for knees and hips respectively. The number of morbidly obese (BMI>40) people receiving arthroplasties now exceeds 5% of all primary procedures. There are large numbers of revision procedures registered, for which the primary arthroplasty is lacking. In most cases is this is explained by the primary procedure having pre-dated the registry. As for previous years, analyses of revision data reported here have been confined to primary registered arthroplasties. With 25 years of data and a very high compliance of registration, we expect this number of revisions without registered primaries to continue to decrease, although there will always be some revisions that are on "imported" cases from overseas.

Ongoing efforts are being made to continually improve the quality of our data. Readers will be aware of previous concerns re the accuracy of hip approach data. This resulted in an extensive data cleaning exercise where recorded anterior approach cases prior to 2021 were reviewed and the approach only recorded in cases where it was able to be verified.

Similarly, because of ongoing concerns of data accuracy and appropriateness of form completion, data relating to surgeon attire is not being presented this year.

Along with our planned major platform upgrade, we are also hoping to pilot collection of pre-operative Oxford scores as well as trialling post operative data collection by phone app/survey, rather than the traditional and expensive mailout hard copy option. As well as enabling a much larger sample size, it should also result in significant administrative cost savings.

#### HIP ARTHROPLASTY

#### Numbers

There are now 190,445 recorded primary hip arthroplasties (PHA). In addition to Total Hip Arthroplasty (THA) and resurfacing hip arthroplasty (RHA) from October 2020 hip hemiarthroplasty (HHA) has also been included.

In 2023, more than 10,000 primary THA were registered for the first time. This represents a 14.6% increase in volume over 2022 and reverses the 3.4 % fall seen in 2022 over 2021 (which was possibly COVID-19 pandemic-related).

However, from 2017-2022 the annual registrations were reasonably static (despite the pandemic) at an annual average of 9,270. The 2023 registrations therefore represent a significant growth spike.

There were 1,374 HHA recorded and 190 RHA, representing approximately 10% and 1% of the volume of PHA, respectively.

#### Demographics

The distribution of age, gender, BMI, ASA grade and ethnicity of patients receiving PHA remains consistent since 2008, with a slight trend to fewer ASA 1 patients over this timeframe. Most patients (97.6%) have had no previous hip surgery and a predominant diagnosis of osteoarthritis (88%).

261 surgeons across 54 hospitals performed the above procedures, with an average of 40 procedures per surgeon. Compared to 2022 (280 surgeons, 52 hospitals, average 38 procedures), slightly fewer surgeons are doing 5% more surgeries per annum with 2 additional facilities performing PHA surgery.

#### Approaches

Of the surgical approaches, the posterior remains the predominant at 76%. However, there is an increasing number of anterior approach surgeries, with data from 2021-23 recording around 700 procedures per year compared to 300-350 per year from 2019-2020, and around 200 per year from 2014-18. Whilst this represents less than 1% of hip arthroplasty surgeries in the NJR, it is around 7% of the primary procedures performed in 2023.

#### Fixation

Cemented acetabular fixation continues to fall below 5% (407/10,548) despite excellent results. Femoral fixation is evenly split between cemented and uncemented with 44% of total (4,608/10,548) being hybrid THA and 51% (5,533/10,548) uncemented THA.

#### **Bearing/Articulation**

Polyethylene remains the predominant bearing surface, either as metal-polyethylene or ceramic-polyethylene combination, but with an ongoing trend to substitute metal heads with ceramic. 97% of polyethylene was highly cross-linked.

Ceramic-ceramic bearings continue to be used at a steady 7% of the total use.

The predominant head sizes used were 32 or 36 mm. 28 mm heads were used in 10% of surgeries. > 36 mm heads were used in only 2% of cases and mostly with metal-metal bearings.

#### Revision

The revision rate for hip primary hip arthroplasty is 0.65/ocys (0.64-0.67). The percentage of primary hips revised within one year from surgery is stable at 1.5%. However, 15% of failures are for aseptic component loosening and 36% for dislocation. Femoral periprosthetic fracture was the indication in be a focus for further improvement.

Infection as a cause for revision is constant at 32%, remaining an ongoing significant burden for patients and healthcare resources. Further analysis is being undertaken by the registry, but again it behoves all surgeons to strive for the highest standards in infection prevention.

Despite these early issues, outcomes remain extremely positive with survivorship curves allowing surgeons to reassure patients that they have a 95% chance of their implants surviving at 10 years, 90% at 15 years and 85% chance of remaining revision-free at 20 years (rounded figures).

#### PROMS

The Oxford score remains a powerful predictor of survival of a primary hip arthroplasty. Whether obtained at six months, 5, 10 or 15 years, a low Oxford score has a highly significant correlation with subsequent revision surgery within 2 years. Surgeons should consider regular follow-up for their patients using the Oxford score and recalling those patients within unexplained Poor or Fair score.

#### **KNEE ARTHROPLASTY**

Since 1999, 152,786 conventional total knee arthroplasties have been registered totalling 1,244,445 ocys. The overall revision rate trending lower, now at 0.44/100 ocys, (95% CI: 0.43-0.45). The number of TKA's implanted in 2023 was 9,777 - up markedly from 7,794 TKAs implanted in 2022. The decrease in 2022 (compared to 2021 - 8,605 TKAs) suggests many of the post-COVID issues impacting hospitals, such as lack of staff, improved in 2023.

There are 46 different knee prostheses in the Registry that have a minimum of 50 registrations. The Triathlon remains the most popular TKA prosthesis in 2023, closely followed by the Attune and Persona. The use of fully uncemented knee arthroplasty continues to increase, now representing 16% of all primary knee arthroplasties. They have a significantly higher revision rate than either fully cemented or hybrid in which the tibial component is cemented and the femoral component uncemented. This is true for all brands of implant, when the uncemented is compared to its cemented version. The analyses comparing revision rates and survival of fixed versus mobile bearing knees continue to show that there is similar longer- term survival for both versions. The use of mobile bearings continues to decline, almost all TKAs implanted in 2023 had a fixed bearing.

As in previous years, separate analyses for cruciate retaining (CR) versus posterior stabilised (PS) knee prostheses demonstrate that overall, there are significantly higher revision rates for posterior stabilised prostheses. This is also evident with KM survival graphs and seems to hold true across almost all brands that have both PS and CR versions. The use of PS versions continues to decrease but has stabilised in recent years to around 20% of TKAs.

Revision rate tables and survival curves are included for the five different BMI groupings and like hip arthroplasty, the morbidly obese (BMI > 40) group have statistically significant poorer prosthesis survival.

There are 975 registered patellofemoral prostheses, with 88 added in 2023, almost 705 used the Zimmer Gender components. There have been 120 revisions. The revision rate of 1.92/100 ocys is over four times that for total knee arthroplasty.

There were 1095 UKAs registered in 2023, 97% of which were medial UKA. The Oxford 3 Uncemented was the most common prosthesis, representing 66% of all registrations in 2023. The rate of revision for UKA is 1.10/100 ocys (95% Cl 1.04-1.15). In contrast to TKAs, females have a higher rate of UKA revision (1.21/100 ocys 95% Cl 1.13-1.29) than males (1.00/100 ocys, 95% Cl 0.93-1.08).

#### ANKLE ARTHROPLASTY

In 2023, 207 more primary ankle arthroplasties were registered. This is approximately 25% more than the previous report (166 registrations in 2022). It brings the total in the registry to 2,391 with 17,404.4 observed component years (ocys). The mean revision rate is 1.38/100 ocys. This year the Kaplan Meier survival curve has been replaced with a Cumulative Incidence of Revision graph with 95% confidence intervals out to approximately 17 years.

There have been some significant changes in implant usage in 2023. The supplier of the Salto and Salto Talaris implants indicated an imminent withdrawn from sale. The surgical community predominantly responded with a shift to the Vantage, which is new to New Zealand in 2023. There was also smaller increase in use of the Infinity. Simultaneously the Infinity underwent significant changes to a new backing surface and a modified polyethylene type.

The Inbone II was also registered as a primary implant for the first time in 2023. Usage of the Zimmer TM ankle remained stable amongst these other changes. The shifts in implant use in 2023 mean approximately three quarters of the implants registered in 2023 are in their first year of clinical use in New Zealand. The effects of these shifts will be interesting to observe in future reports.

#### SHOULDER ARTHROPLASTY

Shoulder arthroplasty has seen a significant increase in 2023 with an additional 398 cases on the previous year. This represents a 36% increase compared to 2022. The increase is almost entirely due to the increased utilisation of reverse shoulder arthroplasty rather than an increase across the various categories of arthroplasty. This highlights the ongoing trend of the past decade where total shoulder arthroplasty has remained stable in terms of numbers, hemiarthroplasty has decreased but there has been an exponential increase in reverse shoulder arthroplasty which now represents 77% of all shoulder arthroplasties performed. This is consistent with other joint registries which have seen similar increases in the utilisation of reverse shoulder arthroplasty over the past decade. The Australian Joint Registry in 2023 reported over 70% of shoulder arthroplasties performed Reverse Shoulder Arthroplasty.

The revision rates per component years continue to improve across all categories of shoulder arthroplasty. With the revision rate of reverse shoulder arthroplasty being the lowest of the different arthroplasty types and the increasing utilisation of reverse shoulder arthroplasty, there would be an expectation that the revision rate will continue to improve in the short term. With the changing indications for reverse shoulder arthroplasty away from low demand, elderly patients to a younger cohort who are more active, it is likely that there will come a point in the years ahead where the revision rate for reverse shoulder arthroplasty will reach a low point and start to increase. The revision rate for patients aged 55-64 undergoing reverse shoulder arthroplasty is 1.22 per 100 component years while those age 65-74 is 0.66 and decreases further to 0.43 in those age over 75 years. 19% of reverse shoulder arthroplasties in 2023 were performed in patients age less than 65 years. This is an area which the registry will continue to monitor.

The cumulative revision rate of all shoulder arthroplasty is 7% at 10 years and 13% at 20 years. After an initial increased revision rate for reverse shoulder arthroplasty over total shoulder arthroplasty in the first year, reverse shoulder arthroplasty outperforms total shoulder arthroplasty out to the twenty year mark. Some caution should be taken with the data beyond 15 years due to the low numbers of reverse shoulder arthroplasty cases still active in the registry. At 15 years, 133 cases of reverse shoulder arthroplasty remain active but by 18 years there are only 12 remaining.

Implants that are identified with revision rates outside the confidence intervals in the various categories of shoulder arthroplasty and with more than 50 cases registered, are the Global Unite hemiarthroplasty, Equinoxe reverse shoulder arthroplasty and SMR total shoulder. The Global Unite hemiarthroplasty has an improving revision rate over the past year. The Equinoxe Reverse still has relatively small component year figures but has an increasing revision rate. The SMR total shoulder arthroplasty revision rate has remained unchanged over the past year.

Glenoid loosening is the primary indication for revision with onethird occurring in the first two years. Factors that affect revision rate in shoulder arthroplasty include gender, ethnicity, and age.

#### ELBOW ARTHROPLASTY

The annual number of elbow arthroplasty has not significantly increased. The cumulative number for elbow arthroplasties due to trauma has surpassed rheumatoid arthritis. It would be interesting to see if this will impact the longevity. Of the 3 most commonly implanted prostheses, the Lattitude is the most common and also has the highest revision rate. The Coonrad-Morrey remain the best performing elbow prosthesis. The Nexel is not better but not significantly worse than the Coonrad-Morrey.

#### **OXFORD 12 QUESTIONNAIRE**

Six- month, five, ten, fifteen and twenty- year analyses of the individual score categories for primary hip and knee arthroplasties continue to demonstrate that the six-month score is indicative of the longer-term outcome. Similarly, hip and knee questionnaire scores six months post first revision arthroplasty, predict the second revision within two years.

John McKie – Supervisor Jinny Willis – Manager

Chris Frampton – Statistician

## **STATISTICAL TERMS/NOTES**

Throughout the report, there are two statistical terms readers may not be familiar with:

#### i) Observed component years

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

#### ii) 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 are expressed per 100 component years rather than per component year. Statisticians consider that this is a more accurate way of deriving a revision rate for comparison when analysing data with widely varying follow up times. It is also important to note the confidence intervals. The closer they are to the estimated revision rate/100 component years, the more precise the estimate is.

#### **Statistical Significance**

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

#### **Deceased Person's Data**

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

#### ASA CLASS

This was introduced with the updated forms at the beginning of 2005. The data are provided in each of the joint chapters. The categories are defined below.

#### 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

#### Ethnicity

Ethnicity data of patients and revision rates by ethnicity were presented in the annual NZJR report for the first time in last year's report. Ethnicity data is recorded for every entry in registry. At the point of data entry, the ethnicity associated with the NHI is retrieved from the Ministry of Health database. For a proportion of individuals, the ethnicity is entered as Not Recorded, meaning the patient has not been asked to provide the information, or has declined to provide the data. For the purpose of reporting revision rates by ethnicity, the rate is not reported for patients whose ethnicity is not recorded.

#### **Trainee Surgeons**

In all the analyses reported, consultants took responsibility for their registrar surgeon procedures.

#### **Bilateral Joint Replacements**

The following joint replacements were undertaken on the left and right side and carried out under the same anaesthetic:

#### **Bilateral Total Hips**



#### **Bilateral Total Knees**



#### (14,764 knees)

#### **Bilateral UKR**



#### **Bilateral Ankles**



**Bilateral Shoulders** 

O Patients

## DEVELOPMENT & IMPLEMENTATION OF THE NEW ZEALAND JOINT REGISTER



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

New Zealand surgeons had 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 these; 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 database for fundraising 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 that 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 new data forms were introduced at the beginning of December 2020.

In order to improve data accuracy, a surgeon signature box has been added.

A funding box has been added with the options ACC, Private, DHB and DHB outsourced.

A theatre number has been added, meaning that individual theatre ventilation can be analysed.

Robotic assisted has been added under Surgical Adjuncts for hip and knee and under Approach for ankles.

Bone graft has been deleted on all forms except revision shoulder.

Surgeon Attire is a new heading. Option 1 is Space Suits/Helmet Fan. Option 2 is Conventional Gown.

Revision forms have been changed to include re-operation.

There is now a Revision/Reoperation form for each joint.

The hip form now has 3 procedure sub types- total, resurfacing and hemiarthroplasty, a new sub type.

The knee form also has 3 procedure sub types- total, patellofemoral and unicompartmental.

In conclusion, the aim has been to minimise compromising legacy data, while deleting data points that have not been used in research projects over the past 20 years.

#### Database

When the Registry was set up originally in 1997, a Microsoft Access platform was used as the most suitable and appropriate platform. While the database has served the Registry's requirements initially, it is well and truly beyond the end of its usable life and a platform upgrade is now a matter of some urgency. After significant discussions with overseas registries, and the lessons we've learnt from our local experience, we are now actively engaged with the IT industry seeking a proposal fulfil our current and ongoing needs. At this stage it is unclear whether we have entered into a contract for this work by the end of the calendar year but hope to have much greater clarity by the end of the year.

#### **Patient Recorded Outcome Measures**

The NZ Registry was one of the first to collect patient recorded outcome measures with the use of the Oxford hip and knee scores. These questionnaires are sent out to registered arthroplasties six months and then every five years following surgery. Because of the large numbers involved, statistical advice was that a random sample of 20% of cases would provide valid results, and this continues to be our practice.

This data provides powerful predictive data on the risk of subsequent revision over the ensuing two years following survey.

#### Funding

The registry is principally funded by surgeons paying a levy , with small contributions from ACC, Health New Zealand and Southern Cross insurance. Fees are also charged for companies wanting anonymized implant data.

We strongly advocate a fixed percentage levy on all implants, to fund post market surveillance in perpetuity. To date we have made no progress with governmental agencies, and if the governmental doesn't insist on a levy, the implant companies are unwilling to contribute.

Until this or another significant funding source is found, we will continue to function on a shoestring.

#### **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 did delay the New Zealand-wide launch.

#### **Surgeon and Hospital Reports**

Since 2008, each surgeon receives an annual report of their revision rate and Oxford scores. This data has been presented graphically over the past five years with individual funnel plots and snail trails.

From 2025 we will also be presenting ethnicity data to inform health equity of outcomes and cultural safety discussions.

#### Introduction of the Registry

The National Joint Registry was introduced in a planned staged fashion.

#### Stage I: November 1997 to March 1998

The base administrative structure was established. The data forms and the database 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.

#### Inclusion of Other Joint Replacement Arthroplasties

At the request of the NZOA membership, the database for the Registry was expanded to include total hip arthroplasties for fractured neck of femur, unicompartmental arthroplasties for knees, and total joint arthroplasties 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 annual surgeon and hospital reports.

The validated Oxford questionnaire was available for the shoulder and derived, but not validated, questionnaires developed for the elbow and ankle joints.

In 2016 the Oxford Elbow Score (OES) and the Manchester-Oxford Foot Questionnaire were introduced replacing the former questionnaires that were not validated.

All patients receiving total arthroplasty of the above joints, as well as unicompartmental knee arthroplasties, are sent questionnaires with a response rate of 70 %. As for hips and knees, the questionnaires are sent out 6M post-surgery then at 5Y, 10Y and 15Y and 20Y.

#### **Monitoring of Data Collection**

The aim of the Registry is to achieve a minimum of 90% compliance for all hospitals undertaking joint arthroplasty 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 arthroplasty surgery to the NZ Health Information Service. 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. In addition, any change in the pattern of returns from private hospitals is checked.

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 February 2024 again demonstrated a New Zealand-wide public hospital compliance of > 95% when compared to NZHIS data.

Following the introduction of the South Island PICS system at the beginning of October 2018, the Registry lost the ability to search for nationwide NHI entries and was not able to access nationwide date of death registrations.

This has now been overcome, and the data entry staff now use the MOH HealthUI (Health User Interface) lookup system to check NHI entries and addresses.

Also, the Registry can now access the nationwide death files through the MOH'S Connected Health Network SFPT service with twice monthly updates.

Accurate date of death registrations is essential for both our statistical analyses and our monthly questionnaire mail outs.

#### **NZJR Staff**

The current staff are data entry (2.25 FTE), database administrator (1.0 FTE), Registry Manager (1.0 FTE), Registry Supervisor (0.2 FTE) and Statistician (0.04 FTE).

## **HIP ARTHROPLASTY**



### **PRIMARY HIP ARTHROPLASTY**

The **twenty-five-year** report analyses data for the period January 1999 – December 2023.

New data forms introduced in October 2020 now have 3 categories of hip arthroplasty. These are total hip arthroplasty (THA), resurfacing hip arthroplasty (RHA) and hemiarthroplasty (HHA). Hemiarthroplasty procedures have only been recorded in the registry since 2020.

#### Primary Hip Arthroplasty by Type - 1999 to 2023

Primary Hip Arthroplasty (PHA) Type	Ν
Total Hip Arthroplasty (THA)	184,157
Resurfacing Hip Arthroplasty (RHA)	2,486
Hip Hemiarthroplasty (HHA)	3,812
Total	190,455

TABLE 1.1

#### Primary Hip Arthroplasty by Type and Year

Year	THA	Resurfacing	Hemiarthroplasty
1998-2007	5,512	57	C
2008	6,813	191	C
2009	7,103	203	C
2010	7,183	185	C
2011	7,078	142	C
2012	7,391	102	C
2013	7,620	90	C
2014	8,259	89	C
2015	8,345	77	C
2016	8,675	70	C
2017	9,083	94	(
2018	9,068	118	(
2019	9,358	124	C
2020	9,366	122	79
2021	9,535	77	1,037
2022	9,207	130	1,303
2023	10,548	160	1,374

#### Number of Total Hip Arthroplasties by year



#### Number of Operations by Year



Hemiarthroplasty procedures have only been recorded in the registry since 2020. The numbers of procedures for 2020-2022 are included in the table above but have not been presented graphically.

#### Age of Primary Hip Arthroplasty Patients by Gender

	Female			
	Mean	Minimum	Maximum	N (%)
Hemiarthroplasty	84.2	35.0	106.0	2,541 (66.4)
Resurfacing hip	49.7	25.0	83.0	270 (89.2)
Total hip	68.1	11.0	100.0	98,982 (53.7)

#### TABLE 1.3

	Male			
	Mean	Minimum	Maximum	N (%)
Hemiarthroplasty	83.4	40.0	102.0	1286 (33.6)
Resurfacing hip	52.1	17.0	81.0	2220 (10.8)
Total hip	65.5	11.0	99.0	85,188 (46.3)

#### TABLE 1.4

Data form analysis includes new form and legacy data and is for Total Hip Arthroplasty.

#### **Body Mass Index of Primary Hip Arthroplasty Patients**

BMI data was added with the 2010 form update. For the fourteenyear period 2010 – 2023 there were 91,819 BMI registrations for primary hip arthroplasties. The average was 29.13 kg/m2 with a range of 13 – 66 and a standard deviation of 5.73.

**BMI by Year** 



ASA Class	N	%
1	22,050	14.8
2	88,968	59.7
3	36,818	24.7
4	1,289	0.9



#### ASA by Year



#### Ethnicity of Total Hip Arthroplasty Patients

Ethnicity	No. Operations	%
Asian	1,610	0.90
Euro/Other	161,050	89.8
Māori	14,709	8.2
Pacifica	2,009	1.1

TABLE 1.6

#### Prior Surgery in Total Hip Arthroplasty Patients

Previous Operation	Ν	%
None	185,835	97.6
Internal Fixation	3,406	1.8
Osteotomy	975	0.5
Arthrodesis	134	0.1
Hip Arthroscopy	124	0.1

TABLE 1.7

#### Indication for Total Hip Arthroplasty

Diagnosis	Ν	%
Osteoarthritis	162,572	88.3
Rheumatoid Arthritis	3,061	1.7
Other Inflammatory	1,241	0.7
Acute Fracture NOF	7,092	3.9
Old Fracture NOF	2,002	1.1
Avascular Necrosis	5,583	3.0
Developmental Dysplasia	3,640	2.0
Tumour	835	0.5
Post-acute dislocation	367	0.2

#### TABLE 1.8

#### Surgeons

In 2023, 261 surgeons performed 10,548 primary hip arthroplasties, an average of 40 procedures per surgeon.

34 surgeons performed less than 10 procedures and 112 performed more than 40 procedures.

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the 18-year period 2005 – 2023.

Surgeon grade	N
Consultant	168,367
Advanced trainee supervised	13,545
Advanced trainee unsupervised	4,075
Basic trainee	3,391

TABLE 1.9

#### Surgical Approach

Approach	Operations (N)
Posterior	127,973
Anterior*	2,100
Superior*	214
Lateral	37,847
Trans-trochanteric (osteotomy)	237

\* Data for 2021 - 2023 only.

#### TABLE 1.10

Adjuncts (2023)	N	%
Computer Navigation	356	1.8%
Adjunct Robot	17	0.1%

TABLE 1.11

#### Hospitals

In 2023, primary hip arthroplasty was performed in 54 hospitals, 27 public and 27 private.

#### Operative Time (Skin-to-Skin Minutes) by Cementation Type





#### **Prosthesis Usage**

#### Top Hip Femur Components in 2023

Femur	All Years	2023
Exeter V40	63,537	3,276
Corail	21,431	1,763
Accolade II	5,658	899
MS 30	6,895	492
C-Stem AMT	4,749	463
Optimys	1,015	375
Taperloc Complete	2,147	306
Echo Bi-Metric	1,925	276
TwinSys SS Stem Standard	1,854	266
Summit	3,623	227

#### Top 10 Acetabular components in 2023

Acetabulum	All Years	2023
Pinnacle	31,576	2,791
Trident II Tritanium	4,469	1,993
G7 acetabular shell	2,165	1,013
RM Pressfit cup	16,614	994
Trident	20,532	498
Acetabular Shell	1,365	383
Continuum TM	10,491	324
R3 porous	6,479	308
Trident II Clusterhole HA	489	299
Delta-TT	2,745	231

#### TABLE 1.13

#### Top ten combinations used in 2023

Femur	Acetabulum	All Years	2023
Corail	Pinnacle	18,350	1,679
Exeter V40	Trident II Tritanium	3,253	1,309
Accolade II	Trident II Tritanium	1,014	567
Exeter V40	Trident	15,048	436
C-Stem AMT	Pinnacle	3,930	374
Optimys	RM Pressfit cup	992	357
Exeter V40	Pinnacle	3,980	283
TwinSys SS Stem Standard	RM Pressfit cup	1,446	228
Echo Bi-Metric	G7 acetabular shell	576	219
Summit	Pinnacle	3,160	214

#### TABLE 1.12

TABLE 1.14

## - 16 -



- 17 -



### **Cementation rates by Year**





### Surface Type by Year



#### Polyethylene by Year



## Revision Hip Arthroplasty



Revision is defined by the Registry as a new operation in a previously replaced hip joint during which one of the components is exchanged, removed, manipulated, or added.

Procedures where all components are removed (e.g. Girdlestone or removal of components and insertion of a cement spacer for infection) are all recorded as revisions.

#### Data analysis

For the **twenty-five-year** period January 1999 – December 2023, there were 24,709 hip revision procedures registered. This is an additional 1,019 revisions added in 2023.

The average age for a hip revision was 70 years, with a range of 17 - 102 years.

#### Mean Age of Revision



#### **Revision of Registered Hip Arthroplasties**

This section analyses data for revisions of registered Total Hip Arthroplasties for the twenty-five-year period (n=12,349).

#### Total hip arthroplasty

Time to Revision from Primary Procedure	Days	(Equiv. Years)
Average	2,507	6.9
Maximum	9,009	24.7
Minimum	0	0

#### TABLE 1.15

## Revision THA procedures are categorised according to the table below –

Revision Procedure	Category
Change of all components	Major
Change of femoral component	Major
Change of acetabular shell	Major
Change of acetabular liner	Minor
Change of modular femoral head	Minor
Removal of components only	Major

#### TABLE 1.16

Re-operation only: no components added, exchanged or removed.

#### **Reasons for Revision of Total Hip Arthroplasty**





Total Hip Arthroplasty Revised within First Year



#### Reason for Revision of THA by Years since Operation

Years since operation	e Dislocation		Loos Aceta	ening bulum	Loos Fer	ning [ nur Inf		Deep Infection		Unexplained Pain		Fracture Femur	
	N	%	N	%	N	%	N	%	N	%	N	%	
0	813	39.4	206	10.3	143	8.8	715	48.7	98	7.9	389	28.3	
1	221	10.7	91	4.6	103	6.3	129	8.8	122	9.8	69	5.0	
2	165	8.0	91	4.6	97	6.0	109	7.4	106	8.5	66	4.8	
3	127	6.2	97	4.9	94	5.8	71	4.8	82	6.6	63	4.6	
4	90	4.4	81	4.1	82	5.0	48	3.3	80	6.4	78	5.7	
5	90	4.4	94	4.7	84	5.2	51	3.5	85	6.8	64	4.7	
6	80	3.9	105	5.3	107	6.6	39	2.7	74	6.0	57	4.1	
7	58	2.8	94	4.7	98	6.0	43	2.9	61	4.9	51	3.7	
8	71	3.4	112	5.6	97	6.0	44	3.0	71	5.7	62	4.5	
9	48	2.3	134	6.7	93	5.7	36	2.5	64	5.2	73	5.3	
10	44	2.1	100	5.0	103	6.3	28	1.9	66	5.3	60	4.4	
>10	256	12.4	788	39.5	529	32.5	155	10.6	332	26.8	342	24.9	
Total	2,063	100	1,993	100	1,630	100	1,468	100	1,241	100	1,374	100	

#### Reason for Revision of THA by Years since Operation



Indication for Revision (%) within First Year



#### Indication for Revision (%) beyond 10 Years



#### Reason for Revision of THA by Years since Operation

Years	Dislo	ocation	Loos Aceta	ening bulum	Loos Fer	Loosening Femur		Loosening Femur		Deep Unexplained Infection Pain		Deep Infection		Unexplained Pain		ained Fracture		Total
	N	%	N	%	N	%	N	%	N	%	N	%						
1998-2007	469	38.1	251	20.4	186	15.1	179	14.5	109	8.8	94	7.6	1232					
2008	82	24.3	92	27.3	67	19.9	37	11.0	35	10.4	41	12.2	337					
2009	84	22.5	111	29.7	76	20.3	38	10.2	40	10.7	43	11.5	374					
2010	88	21.4	108	26.2	79	19.2	50	12.1	69	16.7	45	10.9	412					
2011	106	20.4	119	22.9	90	17.3	45	8.7	107	20.6	53	10.2	519					
2012	92	17.2	130	24.3	89	16.6	46	8.6	97	18.1	52	9.7	536					
2013	95	15.8	134	22.3	103	17:1	61	10.1	110	18.3	56	9.3	602					
2014	87	15.4	108	19.1	97	17.1	62	11.0	75	13.3	72	12.7	566					
2015	103	16.4	129	20.5	103	16.4	89	14.2	102	16.2	79	12.6	628					
2016	105	16.9	110	17.7	96	15.5	81	13.0	84	13.5	89	14.3	621					
2017	104	16.6	116	18.6	101	16.2	84	13.4	107	17.1	96	15.4	625					
2018	102	16.2	114	18.1	99	15.7	97	15.4	91	14.4	86	13.7	630					
2019	131	18.5	125	17.7	107	15.1	127	18.0	94	13.3	112	15.8	707					
2020	84	14.9	103	18.3	89	15.8	106	18.9	53	9.4	117	20.8	562					
2021	100	16.8	82	13.8	82	13.8	122	20.5	31	5.2	114	19.2	594					
2022	111	20.5	78	14.4	67	12.4	104	19.2	19	3.5	116	21.4	541					
2023	120	19.3	83	13.3	99	15.9	139	22.3	18	2.9	109	17.5	623					

Major Reasons for Revision by Year of Implantation



#### Femur and Acetabulum Combinations by Numbers used in 2023 and Revision Rate



Procedures 2023
Rate/100-component-years

## Cumulative Incident Analyses



The following cumulative incidence analyses are for the **25 years 1999 – 2023** with deceased patients censored at time of death.



#### **Revision Rates**

	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component-years (95% Cl)
All patients	184,157	1,548,974.2	10,110	0.6527 (0.64-0.67)

#### **Revision by Gender**

Sex	N	Observed comp. years (ocys)	N. Revised	Rate/100-component-years (95% Cl)
F	98,974	828,966.3	4,849	0.58 (0.57-0.60)
М	85,182	720,005.1	5,261	0.73 (0.71-0.75)





#### **Revision by Age Group**

Age Groups	N	Observed comp. years (ocys)	N. Revised	Rate/100-component-years (95% CI)
<40	2,870	30,222.1	298	0.99 (0.88-1.10)
40-54	22,851	230,535.1	2,144	0.93 (0.89-0.97)
55-64	46,360	431,304.7	3,186	0.74 (0.71-0.76)
65-74	62,501	528,761.7	2,985	0.56 (0.54-0.59)
>=75	49,575	328,150.6	1,497	0.46 (0.43-0.48)



#### **Revision by Ethnicity**

Ethnicity	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% Cl)
Asian	1,610	11,322.9	46	0.41 (0.30 -0.54)
Euro/Other	161,050	1,354,361.2	9,008	0.67 (0.65-0.68)
Māori	14,709	112,564.7	839	0.75 (0.7-0.80)
Pacifica	2,009	14,994.6	95	0.63 (0.51-0.77)

#### **Revision by BMI**

ВМІ	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% Cl)
< 19	963	4,632.8	29	0.63 (0.42-0.90)
19 - 24	18,653	100,779.8	451	0.45 (0.41-0.49)
25 - 29	34,200	187,941.6	891	0.47 (0.44-0.51)
30 - 39	34,088	181,288.3	1,010	0.56 (0.52-0.59)
40+	3,915	19,373.8	170	0.88 (0.75-1.02)

#### TABLE 1.22



#### TABLE 1.24



#### **Revision by ASA**

ASA Class	Ν	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)
1	22,050	188,014.7	1,073	0.57 (0.54-0.61)
2	88,968	648,784.4	3,554	0.55 (0.53-0.57)
3	36,818	218,151.9	1,397	0.64 (0.61-0.67)
4	1,289	5,123.3	43	0.84 (0.60-1.12)

TABLE 1.23

#### Effect of Age and Cementation

	N	Observed comp. years (ocys)	N Revised	Rate/100- comp. years	Lower (95% Cl)	Upper (95% CI)				
Cemented										
<40	88	999.7	14	1.40	0.73	2.29				
40-54	752	9,015.0	174	1.93	1.65	2.24				
55-64	2,855	36,254.2	435	1.20	1.09	1.32				
65-74	10,047	116,694.8	797	0.68	0.64	0.73				
>=75	16,217	129,492.4	477	0.37	0.34	0.40				
Uncem	ented									
<40	2,255	23,435.5	222	0.95	0.83	1.08				
40-54	17,081	168,552.3	1,395	0.83	0.78	0.87				
55-64	28,224	242,959.2	1,682	0.69	0.66	0.73				
65-74	22,651	164,591.2	933	0.57	0.53	0.60				
>=75	8,899	50,604.4	338	0.67	0.60	0.74				
Hybrid										
<40	527	5,786.9	62	1.07	0.81	1.36				
40-54	5,018	52,967.7	575	1.09	1.00	1.18				
55-64	15,281	152,091.3	1,069	0.70	0.66	0.75				
65-74	29,803	247,475.7	1,255	0.51	0.48	0.54				
>=75	24,459	148,053.8	682	0.46	0.43	0.50				



#### **Revision Rate by Adjunct Use**

lmage guided	N	Obs. comp. years (ocys)	N Revised	Rate/ 100- comp. years	Lower (95% Cl)	Upper (95% CI)
Conventional	183,062	1,542,505.9	10,083	0.65	0.64	0.67
Computer Navigated	1,095	6,468.3	27	0.42	0.27	0.60

TABLE 1.26

## Revision Rate by Number of Procedures Performed per Year by Primary Surgeon

Operations per Year	N	Obs. comp. years (ocys)	N Revised	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
<10	3,043	26,210.8	209	0.80	0.69	0.91
10-24	19,316	171,497.7	1,242	0.72	0.68	0.77
25-49	73,021	623,958.5	4,251	0.68	0.66	0.70
50-74	44,160	347,217.0	2,132	0.61	0.59	0.64
75-99	25,501	192,946.1	1,060	0.55	0.52	0.58
>=100	19,116	187,144.0	1,216	0.65	0.61	0.69

#### TABLE 1.27

#### Revision Rate by Number of Procedures Performed per Year by Primary Surgeon



#### **Revision by Hospital Type**

Public/Private	N	Obs. comp. years (ocys)	N Revised	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
Public	92,772	782,003.2	5,035	0.64	0.63	0.66
Private	91,385	766,971.0	5,075	0.66	0.64	0.68

TABLE 1.28

#### **Revision by Bearing Surface**

Surfaces	N	Obs. comp. years (ocys)	N Revised	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
Ceramic-Ceramic (CC)	16,384	162,701.4	755	0.46	0.43	0.50
Ceramic -Metal (CM)	717	6,415.6	55	0.86	0.65	1.12
Ceramic -Poly (CP)	53,801	378,586.8	2,157	0.57	0.55	0.59
Metal-Metal (MM)	6,836	94,559.0	1,271	1.34	1.27	1.42
Metal-Poly (MP)	93,537	862,963.5	5,522	0.64	0.62	0.66

TABLE 1.29

#### **Revision by Head Size**

Head Size (mm)	Ν	Obs. comp. years (ocys)	N Revised	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
<=28	67,813	791,538.3	5,550	0.70	0.68	0.72
32	72,269	475,648.7	2,365	0.50	0.48	0.52
36	36,240	216,875.8	1,296	0.60	0.57	0.63
>36	4,337	39,055.3	714	1.83	1.70	1.97

#### Revision by Head Size and Bearing Surface

Size	Surfaces	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)	Lower (95% Cl)	Upper (95% Cl)
<32	сс	827	11,307.6	73	0.65	0.51	0.81
<32	СМ	253	845.1	10	1.18	0.57	2.18
<32	CP	13,286	158,546.8	1,066	0.67	0.63	0.71
<32	MM	3,695	54,578.1	407	0.75	0.68	0.82
<32	MP	48,084	557,186.0	3,918	0.70	0.68	0.73
32	сс	4,310	48,741.7	220	0.45	0.39	0.52
32	CP	24,877	145,907.0	671	0.46	0.43	0.50
32	MM	482	6,679.1	60	0.90	0.68	1.15
32	MP	38,693	268,873.3	1,366	0.51	0.48	0.54
36	CC	8,764	83,470.8	385	0.46	0.42	0.51
36	СМ	441	5,444.8	44	0.81	0.59	1.08
36	CP	15,075	72,393.4	399	0.55	0.50	0.61
36	MM	1,004	13,988.4	171	1.22	1.05	1.42
36	MP	6,704	36,477.1	237	0.65	0.57	0.74
>36	СС	2,438	18,972.1	77	0.41	0.32	0.50
>36	СМ	7	93.5	1	1.07	0.00	5.96
>36	CP	49	166.2	3	1.81	0.00	5.28
>36	MM	1,649	19,275.3	631	3.27	3.02	3.54
>36	MP	39	283.2	1	0.35	0.00	1.97

#### Revision by Bearing Surface and Age Group

Surfaces	Age Groups	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% Cl	Lower (95% CI)	Upper (95% CI)	Surfaces	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)	Lower (95% Cl)	Upper (95% Cl
Ceramic-Ceramic	<40	922	8,785.4	56	0.64	0.48	0.83	Ceramic- Ceramic	16,384	162,701.4	755	0.46	0.43	0.50
	40-54	5,380	55,048.0	298	0.54	0.48	0.61	Ceramic-	717	6,415.6	55	0.86	0.65	1.12
	55-64	6,509	66,754.6	260	0.39	0.34	0.44	Metal					 	
	65-74	3,156	29,421.7	129	0.44	0.37	0.52	Ceramic- Poly All	53,801	3/8,586.8	2,157	0.57	0.55	0.59
	>=75	417	2,691.7	12	0.45	0.23	0.78	Ceramic	7,752	104,981.3	866	0.82	0.77	0.88
Ceramic-Metal	<40	17	175.2	4	2.28	0.62	5.84	- PS	46.0.40	077 005 5	1.001	0.47	0.45	0.50
	40-54	203	2,231.4	19	0.85	0.51	1.33	Ceramic -PX	46,049	2/3,605.5	1,291	0.47	0.45	0.50
	55-64	280	2,687.9	22	0.82	0.51	1.24	Metal-Metal	6,836	94,559.0	1,271	1.34	1.27	1.42
	65-74	159	1,090.1	8	0.73	0.32	1.45	Metal-Poly All	Metal-Poly 93,537 All	862,963.5	5,522	0.64	0.62	0.66
	>=75	58	231.0	2	0.87	0.00	3.13	Metal - PS	37,925	431,111.9	3,409	0.79	0.76	0.82
Ceramic-Poly	<40	875	7,468.2	75	1.00	0.79	1.26	Metal - PX	55,612	431,851.5	2,113	0.49	0.47	0.5
	40-54	8,640	69,117.9	525	0.76	0.70	0.83	TABLE 1.33	LE 1.33					
	55-64	18,477	137,593.2	777	0.56	0.53	0.61	Cemented						
	65-74	18,276	123,578.4	573	0.46	0.43	0.50							
	>=75	7,533	40,829.1	207	0.51	0.44	0.58	Surfaces	N	Observed comp. years	N. Revised	Rate/100- component-	Lower (95%	Upper (95%
Metal-Metal	<40	435	7,477.6	87	1.16	0.93	1.44			(ocys)		years (95% CI)	CI)	CI
	40-54	2,519	39,731.4	536	1.35	1.24	1.47	Ceramic- Poly	1,022	9,094.7	71	0.78	0.61	0.98
	55-64	2,457	34,999.9	519	1.48	1.36	1.62	Metal-Metal	55	486.5	4	0.82	0.22	2.1
	65-74	908	9,759.9	108	1.11	0.90	1.33	Metal-Poly	27,086	263,406.4	1,709	0.65	0.62	0.68
	>=75	517	2,590.2	21	0.81	0.49	1.22	TABLE 1.34	1		1		I	
Metal-Poly	<40	419	5,611.6	62	1.10	0.84	1.41							
	40-54	4,841	59,142.4	700	1.18	1.10	1.27							
	55-64	15,622	178,821.2	1525	0.85	0.81	0.90							
	65-74	35,477	348,584.4	2056	0.59	0.56	0.62							
	>=75	37,178	270,803.9	1179	0.44	0.41	0.46							

#### UnCemented

#### Surfaces Ν Observed Rate/100-Lower Upper N. (95% Revised (95% comp. years componentyears (95% CI) CI) CI) (ocys) 12,711 128,292.6 626 0.49 0.45 0.53 Ceramic-Ceramic 594 51 0.63 1.11 Ceramic-6,050.5 0.84 Metal Ceramic-36,116 248,573.0 1,422 0.57 0.54 0.60 Poly Metal-Metal 5,485 81,786.7 1,146 1.40 1.32 1.48 0.65 Metal-Poly 19,108 173,718.8 1,203 0.69 0.73

TABLE 1.35

#### Hybrid

Surfaces	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)	Lower (95% Cl)	Upper (95% CI)
Ceramic- Ceramic	3,669	34,402.1	129	0.37	0.31	0.44
Ceramic- Metal	116	358.8	4	1.11	0.30	2.85
Ceramic- Poly	16,663	120,919.1	664	0.55	0.51	0.59
Metal-Metal	1,296	12,285.8	121	0.98	0.81	1.17
Metal-Poly	47,343	425,838.3	2,610	0.61	0.59	0.64

TABLE 1.36

#### Cement Status and Proportion of Revision-Free Cases by Years from Surgery

	A		Un-Ce	mented	Cemented		Hybrid	
Years	% Revision- free	N	% Revision- free	N	% Revision- free	N	% Revision- free	Ν
1	98.67	168,767	98.47	72,030	99.10	28,216	98.72	68,521
2	98.23	156,658	97.98	66,578	98.65	26,935	98.33	63,145
3	97.82	144,315	97.51	60,967	98.30	25,474	97.94	57,874
4	97.43	132,136	97.03	55,631	97.96	23,916	97.64	52,589
5	97.05	119,942	96.59	50,355	97.65	22,217	97.30	47,370
6	96.63	108,201	96.07	45,421	97.29	20,474	96.95	42,306
7	96.17	96,753	95.59	40,561	96.79	18,772	96.53	37,420
8	95.72	85,847	95.10	36,100	96.29	16,951	96.15	32,796
9	95.17	75,622	94.51	31,929	95.71	15,146	95.65	28,547
10	94.56	66,008	93.95	28,032	94.85	13,337	95.11	24,639
11	93.91	57,338	93.33	24,402	93.99	11,684	94.56	21,252
12	93.22	49,280	92.68	21,071	93.03	10,056	93.96	18,153
13	92.43	42,079	91.92	17,922	91.94	8,655	93.30	15,502
14	91.61	35,258	91.24	14,689	90.84	7,427	92.50	13,142
15	90.80	29,238	90.47	11,783	90.13	6,378	91.58	11,077
16	89.83	23,930	89.58	9,370	89.18	5,364	90.51	9,196
17	88.85	19,141	88.67	7,317	88.07	4,406	89.53	7,418
18	88.00	15,226	87.84	5,656	87.25	3,609	88.64	5,961
19	87.02	11,579	87.03	4,276	86.15	2,794	87.59	4,509
20	86.19	8,521	86.23	3,111	85.36	2,122	86.69	3,288
21	85.25	6,075	85.08	2,177	84.47	1,569	85.91	2,329
22	84.21	4,101	84.12	1,448	83.95	1,124	84.44	1,529

#### **Revision for Dislocation**

Approach	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% Cl)	Lower (95% Cl)	Upper (95% Cl)
Anterior	7,293	57,369.5	64	0.11	0.09	0.14
Posterior	127,973	1,023,949.5	1596	0.16	0.15	0.16
Lateral	37,847	371,031.3	282	0.08	0.07	0.09

TABLE 1.38

#### **Revision by Cement Status**

Cementation	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)	Lower (95% Cl)	Upper (95% Cl)
Cemented	29,959	292,456.1	1,897	0.65	0.62	0.68
Uncemented	79,110	650,142.7	4,570	0.70	0.68	0.72
Hybrid	75,088	606,375.4	3,643	0.60	0.58	0.62

TABLE 1.39



#### Proportion of cases that have been revised more than once



#### Revisions in Cases that have had a Prior Revision

	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% Cl)
Revised	10,110	62,866.9	1,619	2.58 (2.45-2.70)

TABLE 1.40

#### Classification of Re-Revisions as Major or Minor

	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
Minor	2,409	14,296.1	496	3.47
Major	7,643	48,218.6	1,108	2.30

## Patient Recorded Outcome Measures

Patient based questionnaire outcomes after primary hip arthroplasty at six months, five years, ten years, fifteen years and twenty years post-surgery

#### Questionnaires at six months post-surgery

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

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

The questionnaire responses are grouped according to the classification system published by Kalairajah et al, 2005 (see appendix 1).

This groups each score into four categories:

Category	Score	Interpretation
1	< 27	Poor
2	27-33	Fair
3	34-41	Good
4	>41	Excellent
4	>41	Excellent

#### TABLE 1.42

For the twenty-three-year period, there were 36,909 primary hip questionnaire responses registered six months post-surgery. The average hip score was 40.3 (standard deviation 7.6, range 0-48). At six months post-surgery, 84% had an excellent or good score.

Kalairajah Classification at 6 Months	N	%
Poor	2,341	6.6
Fair	3,476	9.8
Good	9,885	27.9
Excellent	19,753	55.7

TABLE 1.43

#### 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 hip scores for 14,238 individual patients.

At five years post-surgery, 89% of these patients achieved an excellent or good score and had an average of 42.4 (standard deviation 7.0, range 1 – 48).

Kalairajah Classification at 5 Years	N	%
Poor	612	4.5
Fair	879	6.5
Good	2,626	19.5
Excellent	9,338	69.4

TABLE 1.44

#### Questionnaires at ten years post-surgery

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

This dataset represents sequential Oxford hip scores for 10,303 individual patients.

At ten years post-surgery, 87% of these patients achieved an excellent or good score and had an average of 41.9 (standard deviation 7.4, range 2-48).

Kalairajah Classification at 10 Years	N	%
Poor	545	5.7
Fair	693	7.2
Good	1,936	20.1
Excellent	6,471	67.1

#### Questionnaires at fifteen 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 fifteen years post-surgery.

This dataset represents sequential Oxford hip scores for 4,428 individual patients.

At fifteen years post-surgery, 85% of these patients achieved an excellent or good score and had an average of 41.4 (standard deviation 8.0, range 0-48).

Kalairajah Classification at 15 Years	N	%
Poor	267	6.8
Fair	302	7.6
Good	827	20.9
Excellent	2,554	64.7

TABLE 1.46

#### Questionnaires at twenty 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 twenty years post-surgery.

This dataset represents sequential Oxford hip scores for 1,865 individual patients.

At twenty years post-surgery, 83% of these patients achieved an excellent or good score and had an average of 40.7 (standard deviation 8.6, range 4-48.)

Kalairajah Classification at 20 Years	N	%
Poor	127	8.6
Fair	131	8.9
Good	322	21.7
Excellent	899	60.7

**TABLE 1.47** 

#### Oxford Hip Score at 6 months post - Total Hip Arthroplasty vs BMI

BMI	Ν	Mean	SE
< 19	109	39.39	0.766
19 - 24	2,697	41.14	0.136
25 - 29	4,617	40.71	0.105
30 - 39	3,985	39.38	0.123
40+	369	37.04	0.450
Total	11,777	40.23	0.069

TABLE 1.48

#### Mean Oxford scores at 6 months and 5 years for Top 10 hip combinations with > 2000 registrations.



## Oxford 12 Score as a predictor of Hip Arthroplasty Revision

A statistically significant relationship has been confirmed between the Oxford scores at six months, five and ten- years' postsurgery and arthroplasty revision within two years of the Oxford 12 questionnaire date.

#### Six- month score and revision arthroplasty

By plotting the patients' six-month scores in the Kalairajah groupings against the proportion of hips revised for that same group it demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has 13 times the risk of a revision within two years compared to a person with a score >42.

## Risk of Revision within Two Years of the Six-month Score Date versus Kalairajah Score Group.

Kalairajah Classification at 6 months	Revision to 2 Years	N revised	%	Std error
Poor	2,341	111	4.74	0.44
Fair	3,476	47	1.35	0.20
Good	9,885	84	0.85	0.09
Excellent	19,753	73	0.37	0.04

TABLE 1.49

#### Revision (%) within 2 years by Oxford score at 6 months







Kalairajah Classification at 6 months	Revision 2 to 4 years	N revised	%	Std error
Poor	2,191	34	1.55	0.26
Fair	3,247	42	1.29	0.20
Good	9,246	75	0.81	0.09
Excellent	18,548	118	0.64	0.06

#### TABLE 1.50

#### Revison (%) 4 to 6 years by Oxford score at 6 months



#### Five-year score and revision arthroplasty

As with the six-month scores, plotting the patients' five-year scores in the Kalairajah groupings against the proportion of hips revised for that same group demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has 9 times the risk of a revision within two years compared to a person with a score >42.

Kalairajah Classification at 5 years	Revision to 2 Years	N revised	%	Std error
Poor	612	22	3.59	0.75
Fair	879	16	1.82	0.45
Good	2,626	20	0.76	0.17
Excellent	9,338	40	0.43	0.07

7 6 5 4 3 2 1 0 < 27 27-33 34-41 42+ Oxford Score Classes

Revision (%) to 2 years by Oxford score at 5 years

Revision risk versus Kalairajah Score Group within two to four years of the five-year score date.

Kalairajah Classification at 5 years	Revision 2 to 4 years	N revised between 2 and 4 years	%	Std error
Poor	554	7	1.26	0.47
Fair	813	10	1.23	0.39
Good	2,381	31	1.30	0.23
Excellent	8,560	53	0.62	0.08

**TABLE 1.52** 



#### Ten-year score and revision arthroplasty

As with the six-month and five-year scores, plotting the patients' ten-year scores in the Kalairajah groupings against the proportion of hips revised for that same group demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has 8 times the risk of a revision within two years compared to a person with a score >42.

Kalairajah Classification at 10 years	Revision to 2 Years	N revised	%	Std error
Poor	545	43	7.89	1.15
Fair	693	28	4.04	0.75
Good	1,936	32	1.65	0.29
Excellent	6,471	63	0.97	0.12

TABLE 1.53

#### Revison (%) to 2 years by Oxford score at 10 years



#### Fifteen-year score and revision arthroplasty

As with the six- month, five- year and ten- year scores, plotting the patients' fifteen- year scores in the Kalairajah groupings against the proportion of hips revised for that same group demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has 9 times the risk of a revision within two years compared to a person with a score >42.

Kalairajah Classification at 15 years	Revision to 2 Years	N revised	%	Std error
Poor	267	23	8.61	1.72
Fair	302	11	3.64	1.08
Good	827	25	3.02	0.60
Excellent	2,554	27	1.06	0.20

TABLE 1.54

Revison (%) to 2 years by Oxford score at 15 years



In view of the large number of six- month Oxford scores it is possible with statistical significance to further break down the score groupings to demonstrate an even more convincing relationship between score and risk of revision within two years.

Oxford Score at 6 months	<b>Revision to 2 Years</b>	N	%	Std
		revised		error
<= 15	418	38	9.09	1.41
16 - 20	514	28	5.45	1.00
21 - 25	1,097	39	3.56	0.56
26 - 30	1,998	33	1.65	0.29
31 - 35	3,512	36	1.03	0.17
36 - 40	6,288	61	0.97	0.12
41 - 45	11,305	56	0.50	0.07
46+	10,323	24	0.23	0.05

TABLE 1.55





Oxford Score at 5 years	<b>Revision to 2 Years</b>	N	%	Std
		revised		error
<= 15	93	8	8.60	2.91
16 - 20	169	7	4.14	1.53
21 - 25	269	4	1.49	0.74
26 - 30	511	11	2.15	0.64
31 - 35	873	9	1.03	0.34
36 - 40	1,700	14	0.82	0.22
41 - 45	3,848	23	0.60	0.12
46+	5,992	22	0.37	0.08

TABLE 1.56

### Revision (%) to 2 years by Oxford score at 5 years


# Prediction of second revision from six- month score following first revision

Plotting the patients' six-month scores, following their first revision in the Kalairajah groupings, against the proportion of hips revised for that same group, again demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has almost 8 times the risk of a revision within two years compared to a person with a score >42.

## Revision hip questionnaire responses

There were 12,421 revision hip responses. This group includes all revision hip procedures including revisions of primary arthroplasties performed prior to 1999. The average revision hip score was 34.70 (standard deviation 10.07, range 0-48).

Kalairajah grouping of Oxford Score at 2 years	Revision to 2 Years	N revised within 2 years	%	Std error
< 27	2,505	24	3.10	0.11
27-33	2,133	8	1.25	0.04
34-41	3,660	7	0.62	0.04
42+	3,771	6	0.48	0.03

TABLE 1.57

#### Re-Revison (%) within 2 years by Oxford score at Revision



#### All Matches > 50 procedure sorted by Femoral Component

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
ABG	ALL CUPS	214					
ABG	Duraloc	135	2,470.6	60	2.43	1.85	3.13
ABG	ABGII	79	1,393.7	23	1.65	1.02	2.43
ABGII	ALL CUPS	746					
ABGII	Duraloc	139	2,282.1	56	2.45	1.85	3.19
ABGII	RM Pressfit cup	91	619.0	9	1.45	0.66	2.76
ABGII	Trident	342	5,268.5	48	0.91	0.67	1.21
ABGII	Delta-PF	107	1,679.6	14	0.83	0.46	1.40
ABGII	Pinnacle	67	926.2	6	0.65	0.24	1.41
Accolade	ALL CUPS	2,313					
Accolade	Muller PE cup	114	1,408.8	12	0.85	0.44	1.49
Accolade	Trident	1,867	27,570.6	107	0.39	0.32	0.47
Accolade	Tritanium	152	1,719.8	5	0.29	0.09	0.68
Accolade	Pinnacle	180	2,271.6	4	0.18	0.05	0.45
Accolade II	ALL CUPS	5,497					
Accolade II	Trident II Tritanium	1,014	1,116.8	17	1.52	0.89	2.44
Accolade II	RM Pressfit cup	320	1,031.5	15	1.45	0.78	2.34
Accolade II	Continuum TM	350	993.6	14	1.41	0.73	2.30
Accolade II	Delta-TT	102	477.0	4	0.84	0.23	2.15
Accolade II	Fitmore	144	509.8	4	0.78	0.21	2.01
Accolade II	Trident II Clusterhole HA	170	144.8	1	0.69	0.02	3.85
Accolade II	Tritanium	1,579	8,713.3	57	0.65	0.50	0.85
Accolade II	Trident	1,729	8,693.3	46	0.53	0.39	0.71
Accolade II	G7 acetabular shell	89	38.4	0	0.00	0.00	9.62
Actis Duofix	Pinnacle	153	231.7	3	1.29	0.27	3.78
AML MMA stem	Duraloc	79	1,330.9	17	1.28	0.74	2.05

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
AML Standard Stem	Duraloc	52	886.3	9	1.02	0.46	1.93
Anthology Porous	ALL CUPS	161					
Anthology Porous	BHR	93	905.0	60	6.63	5.01	8.47
Anthology Porous	R3 porous	68	632.9	35	5.53	3.79	7.60
Avenir Muller Lateral Uncemented	ALL CUPS	654					
Avenir Muller Lateral Uncemented	G7 acetabular shell	54	86.5	1	1.16	0.03	6.44
Avenir Muller Lateral Uncemented	Continuum TM	182	1,734.9	15	0.86	0.48	1.43
Avenir Muller Lateral Uncemented	RM cup	105	1,187.5	5	0.42	0.11	0.92
Avenir Muller Lateral Uncemented	Fitmore	70	515.6	2	0.39	0.05	1.40
Avenir Muller Lateral Uncemented	Tritanium	91	994.6	3	0.30	0.06	0.88
Avenir Muller Lateral Uncemented	RM Pressfit cup	53	385.0	1	0.26	0.01	1.45
Avenir Muller Lateral Uncemented	Pinnacle	99	1,241.5	3	0.24	0.03	0.64
Basis	Reflection porous	108	1,153.5	2	0.17	0.02	0.63
СВС	ALL CUPS	687					
CBC	Expansys shell	183	2,309.0	31	1.34	0.91	1.91
CBC	RM Pressfit cup	445	4,466.3	30	0.67	0.45	0.96
CBC	Fitmore	59	858.0	5	0.58	0.19	1.36
CCA Straight Stem Lateral	ALL CUPS	997					
CCA Straight Stem Lateral	Contemporary	78	856.5	10	1.17	0.56	2.15
CCA Straight Stem Lateral	ССВ	784	7,245.5	39	0.54	0.38	0.73
CCA Straight Stem Lateral	RM Pressfit cup	135	1513.9	8	0.53	0.23	1.04
Charnley	ALL CUPS	764					
Charnley	Charnley Cup Ogee	303	4,353.3	33	0.76	0.52	1.06
Charnley	Charnley	461	6,100.2	29	0.48	0.31	0.67
CLS	ALL CUPS	10,420					
CLS	Artek	59	828.3	28	3.38	2.25	4.89

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
CLS	Durom	198	2,523.3	74	2.93	2.29	3.66
CLS	RM cup	114	1,536.1	20	1.30	0.80	2.01
CLS	Duraloc	713	11,169.1	141	1.26	1.06	1.49
CLS	Allofit	192	2,584.9	25	0.97	0.63	1.43
CLS	Fitek	66	1,427.5	13	0.91	0.48	1.56
CLS	CLS Expansion	1,263	19,408.6	166	0.86	0.73	1.00
CLS	Weill ring	118	2,231.2	19	0.85	0.51	1.33
CLS	RM Pressfit cup	691	6,489.9	43	0.66	0.48	0.89
CLS	Trident	165	2,371.7	15	0.63	0.35	1.04
CLS	Monoblock Acetabular Cup	80	1,145.1	7	0.61	0.25	1.26
CLS	Trilogy	784	7,196.3	41	0.57	0.41	0.77
CLS	Reflection porous	403	4,575.1	24	0.52	0.33	0.77
CLS	Tritanium	89	763.2	4	0.52	0.14	1.34
CLS	Morscher	1,700	29,358.1	147	0.50	0.42	0.59
CLS	Continuum TM	1,140	7,288.1	36	0.49	0.35	0.68
CLS	Fitmore	2,453	33,455.8	161	0.48	0.41	0.56
CLS	Trabecular Metal Shell	59	631.1	3	0.48	0.10	1.39
CLS	Pinnacle	133	1,101.4	4	0.36	0.10	0.93
Contemporary	Contemporary	71	1,000.1	12	1.20	0.62	2.10
Corail	ALL CUPS	21,170					
Corail	ASR	156	1,490.9	88	5.90	4.73	7.27
Corail	Trident II Tritanium	55	141.9	2	1.41	0.17	5.09
Corail	Duraloc	464	6,479.0	65	1.00	0.77	1.28
Corail	Fitmore	370	2,461.3	21	0.85	0.53	1.30
Corail	Trident	124	991.2	8	0.81	0.35	1.59
Corail	RM Pressfit cup	186	1,246.0	9	0.72	0.30	1.32

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Corail	Monoblock Acetabular Cup	95	1,311.6	9	0.69	0.31	1.30
Corail	G7 acetabular	104	520.4	3	0.58	0.12	1.68
Corail	Pinnacle	18,350	112,612.3	630	0.56	0.52	0.60
Corail	Continuum TM	340	2,616.0	13	0.50	0.25	0.83
Corail	Trilogy	263	1,939.1	7	0.36	0.15	0.74
Corail	Reflection porous	140	1,851.8	6	0.32	0.12	0.71
Corail	Ultima	135	1,331.2	4	0.30	0.08	0.77
Corail	Tritanium	175	1,611.8	4	0.25	0.07	0.64
Corail	Delta-PF	82	1,236.1	3	0.24	0.05	0.71
Corail	DeltaMotion	78	896.0	2	0.22	0.03	0.81
Corail	G7 acetabular shell	53	59.7	0	0.00	0.00	6.18
CPCS	R3 porous	400	2,275.4	9	0.40	0.18	0.75
CPT Femoral Stem	ALL CUPS	4,612					
CPT Femoral Stem	G7 acetabular shell	73	77.1	2	2.59	0.31	9.37
CPT Femoral Stem	G7 acetabular	122	525.5	11	2.09	1.05	3.75
CPT Femoral Stem	Tritanium	85	967.5	9	0.93	0.43	1.77
CPT Femoral Stem	Fitmore	195	1,763.9	15	0.85	0.48	1.40
CPT Femoral Stem	Trilogy	850	8,806.3	69	0.78	0.61	0.99
CPT Femoral Stem	Duraloc	212	2,771.8	20	0.72	0.43	1.09
CPT Femoral Stem	ZCA	563	6,410.6	44	0.69	0.50	0.92
CPT Femoral Stem	Monoblock Acetabular Cup	84	1,202.4	8	0.67	0.26	1.26
CPT Femoral Stem	Continuum TM	1974	12,570.9	78	0.62	0.49	0.77
CPT Femoral Stem	Trident	145	2,161.6	13	0.60	0.32	1.03
CPT Femoral Stem	Delta-TT	143	728.0	3	0.41	0.08	1.20
CPT Femoral Stem	Pinnacle	66	694.5	2	0.29	0.03	1.04
CPT Femoral Stem	ZCA all-poly cup	100	756.4	1	0.13	0.00	0.74

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
C-Stem	ALL CUPS	6,610					
C-Stem	Duraloc	53	731.6	6	0.82	0.30	1.78
C-Stem	Pinnacle	86	612.8	4	0.65	0.18	1.67
C-Stem	Elite Plus Ogee	55	582.4	2	0.34	0.04	1.24
C-Stem	Marathon cemented	94	662.4	2	0.30	0.04	1.09
C-Stem AMT	G7 acetabular shell	60	44.4	3	6.75	1.39	19.73
C-Stem AMT	RM Pressfit cup	152	985.2	8	0.81	0.32	1.53
C-Stem AMT	Marathon cemented	369	2,813.4	20	0.71	0.42	1.08
C-Stem AMT	Pinnacle	3930	20,842.6	142	0.68	0.57	0.80
Echo Bi-Metric	ALL CUPS						
Echo Bi-Metric	G7 acetabular shell	576	736.6	15	2.04	1.14	3.36
Echo Bi-Metric	Continuum TM	204	905.4	7	0.77	0.31	1.59
Echo Bi-Metric	G7 acetabular	1031	4,613.8	24	0.52	0.33	0.77
Echo Bi-Metric	Exceed ABT Ringloc-X	57	575.3	1	0.17	0.00	0.97
Elite plus	ALL CUPS	1,311					
Elite plus	Duraloc	614	8,377.4	133	1.59	1.33	1.88
Elite plus	Charnley	302	4,083.1	27	0.66	0.44	0.96
Elite plus	Elite Plus LPW	284	3,470.9	18	0.52	0.31	0.82
Elite plus	Elite Plus Ogee	111	1,160.6	6	0.52	0.19	1.13
Exeter V40	ALL CUPS	62,808					
Exeter V40	Trident II Clusterhole HA	306	229.5	5	2.18	0.71	5.08
Exeter V40	G7 acetabular shell	380	452.5	8	1.77	0.69	3.34
Exeter V40	Avantage cemented	52	153.7	2	1.30	0.07	4.70
Exeter V40	Duraloc	1606	23,148.2	279	1.21	1.07	1.35
Exeter V40	Trabecular Metal Shell	283	1,838.6	21	1.14	0.71	1.75
Exeter V40	Exeter	3012	35,585.7	242	0.68	0.60	0.77

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Exeter V40	Trident II Tritanium	3253	5,049.9	33	0.65	0.45	0.92
Exeter V40	Osteolock	1106	16,360.6	101	0.62	0.50	0.75
Exeter V40	Continuum TM	3186	22,684.1	139	0.61	0.51	0.72
Exeter V40	Contemporary	8302	85,618.5	520	0.61	0.56	0.66
Exeter V40	Bio-clad poly	253	2,625.4	15	0.57	0.31	0.92
Exeter V40	Delta-TT	411	2,159.7	12	0.56	0.29	0.97
Exeter V40	R3 porous	981	5,450.3	28	0.51	0.34	0.74
Exeter V40	G7 acetabular	390	1,566.9	8	0.51	0.22	1.01
Exeter V40	Muller PE cup	226	2,855.3	14	0.49	0.27	0.82
Exeter V40	Tritanium	3933	27,157.0	130	0.48	0.40	0.57
Exeter V40	Morscher	1209	19,129.6	91	0.48	0.38	0.58
Exeter V40	Exeter X3	3325	19,010.1	87	0.46	0.37	0.56
Exeter V40	CLS Expansion	217	2,899.3	13	0.45	0.23	0.74
Exeter V40	ССВ	614	4,795.1	20	0.42	0.25	0.64
Exeter V40	Reflection cemented	1077	8,976.5	37	0.41	0.29	0.57
Exeter V40	Pinnacle	3980	25,119.6	101	0.40	0.33	0.49
Exeter V40	Trident	15048	118,279.8	470	0.40	0.36	0.43
Exeter V40	ZCA	125	1,018.6	4	0.39	0.11	1.01
Exeter V40	Trilogy	3745	34,812.5	127	0.36	0.30	0.43
Exeter V40	Reflection porous	494	5,845.6	21	0.36	0.22	0.54
Exeter V40	RM Pressfit cup	3388	23,200.8	83	0.36	0.28	0.44
Exeter V40	Monoblock Acetabular Cup	136	2,153.7	7	0.33	0.12	0.64
Exeter V40	PolarCup cemented	107	336.0	1	0.30	0.01	1.66
Exeter V40	Polymax	85	460.7	1	0.22	0.01	1.21
Exeter V40	Weber	74	959.9	2	0.21	0.03	0.75
Exeter V40	Fitmore	1249	10,258.9	16	0.16	0.09	0.25

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Exeter V40	Trident PSL HA Cluster	145	136.5	0	0.00	0.00	2.70
Exeter V40	ZCA all-poly cup	110	702.4	0	0.00	0.00	0.53
Friendly	ALL CUPS	425					
Friendly	Delta-TT	70	668.9	7	1.05	0.42	2.16
Friendly	Mueller Cup	51	286.4	2	0.70	0.08	2.52
Friendly	Delta-PF	192	2,438.7	6	0.25	0.09	0.54
FTC HA Femoral Stem	DeltaMotion	112	1,494.8	4	0.27	0.07	0.69
Furlong	Furlong	66	1,021.5	8	0.78	0.34	1.54
Furlong Evolution Collared Ste	Delta-PF	130	137.6	0	0.00	0.00	2.68
H-Max	ALL CUPS	1,918					
H-Max C	Delta-TT	154	596.8	7	1.17	0.47	2.42
H-Max M	Delta-PF	71	764.2	10	1.31	0.63	2.41
H-Max M	Delta-TT	86	998.8	6	0.60	0.22	1.31
H-Max S	Delta-PF	374	1,849.0	13	0.70	0.37	1.20
H-Max S	Delta-TT	1166	7,124.7	47	0.66	0.48	0.88
H-Max S	Trident	67	356.4	1	0.28	0.01	1.56
M/L Taper	ALL CUPS						
M/L Taper	Delta-TT	64	581.5	6	1.03	0.38	2.25
M/L Taper	Continuum TM	1047	9,009.8	46	0.51	0.37	0.68
M/L Taper	Trilogy	215	2,743.0	14	0.51	0.28	0.86
M/L Taper	Trident	333	2,286.1	7	0.31	0.12	0.63
Mallory-Head	M2A	105	1,601.3	19	1.19	0.71	1.85
MasterSL	Delta-TT	131	601.7	8	1.33	0.57	2.62
Medacta Lateral Stem	Mpact	127	94.5	0	0.00	0.00	3.90
Metafix	Trinity	316	517.1	7	1.35	0.54	2.79
MS 30	ALL CUPS	6,858					

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
MS 30	G7 acetabular shell	221	549.3	9	1.64	0.75	3.11
MS 30	Duraloc	88	1,497.1	14	0.94	0.51	1.57
MS 30	Contemporary	128	1,366.4	12	0.88	0.45	1.53
MS 30	G7 acetabular shell	411	461.1	4	0.87	0.24	2.22
MS 30	Morscher	804	11,755.3	77	0.66	0.52	0.82
MS 30	RM Pressfit cup	90	964.4	5	0.52	0.14	1.14
MS 30	Pinnacle	305	790.8	3	0.38	0.05	1.01
MS 30	Muller PE cup	505	5,301.6	19	0.36	0.21	0.55
MS 30	Continuum TM	549	3,641.8	12	0.33	0.16	0.56
MS 30	Fitmore	2896	24,343.7	71	0.29	0.23	0.37
MS 30	Trilogy	449	3,460.0	7	0.20	0.07	0.40
MS 30	ZCA all-poly cup	96	821.6	1	0.12	0.00	0.68
Omnifit	Trident	149	2,301.4	14	0.61	0.32	0.99
Optimys	RM Pressfit cup	992	2,137.4	13	0.61	0.32	1.04
PLS	Delta-TT	53	349.3	1	0.29	0.01	1.60
Polarstem uncemented	ALL CUPS	3,117					
Polarstem uncemented	RM Pressfit cup	199	656.4	4	0.61	0.17	1.56
Polarstem uncemented	Reflection porous	335	3,340.6	17	0.51	0.30	0.81
Polarstem uncemented	R3 porous	2583	14,277.0	66	0.46	0.36	0.59
Prodigy	Duraloc	129	1,946.9	31	1.59	1.06	2.23
Quadra	ALL CUPS	872					
Quadra-C	Mpact	333	916.8	6	0.65	0.24	1.42
Quadra-H	Mpact	449	1,223.8	15	1.23	0.69	2.02
Quadra-P	Mpact	90	160.4	3	1.87	0.39	5.47
SL modular stem	ALL CUPS	911					
SL modular stem	RM cup	322	5,273.3	44	0.83	0.60	1.11

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
SL modular stem	Muller PE cup	110	1,559.7	3	0.19	0.04	0.56
SL monoblock	Muller PE cup	559	6,952.4	33	0.47	0.32	0.66
Spectron	ALL CUPS	8,030					
Spectron	Duraloc	1179	15,928.2	225	1.41	1.23	1.61
Spectron	Reflection cemented	2984	32,740.6	399	1.22	1.10	1.34
Spectron	Muller PE cup	67	706.8	8	1.13	0.49	2.23
Spectron	Morscher	211	3,201.0	35	1.09	0.76	1.52
Spectron	Reflection porous	2755	33,877.3	308	0.91	0.81	1.02
Spectron	Trident	78	1,083.2	6	0.55	0.18	1.14
Spectron	Biomex	68	1,208.2	6	0.50	0.18	1.08
Spectron	Fitmore	78	1,078.5	5	0.46	0.13	1.02
Spectron	Mallory-Head	152	2,196.2	9	0.41	0.19	0.78
Spectron	R3 porous	458	4,040.1	15	0.37	0.20	0.60
S-Rom	ALL CUPS	612					
S-Rom	ASR	130	956.0	97	10.15	8.23	12.38
S-Rom	Ultima	78	1,550.3	15	0.97	0.54	1.60
S-Rom	Pinnacle	404	5,290.9	43	0.81	0.59	1.09
Standard straight stem	ALL CUPS						
Standard straight stem	Weber	103	1,049.5	4	0.38	0.08	0.91
Standard straight stem	Muller PE cup	382	3,921.8	10	0.25	0.12	0.47
Standard straight stem	RM Pressfit cup	109	1,175.3	0	0.00	0.00	0.31
Std Femoral Stem	Mpact	333	278.5	0	0.00	0.00	1.32
Stemsys Cemented	ALL CUPS	594					
Stemsys Cemented	Delta-PF	62	261.6	0	0.00	0.00	1.41
Stemsys Cemented Lateralized	Delta-PF	56	301.9	0	0.00	0.00	1.22
Stemsys HAC	ALL CUPS	3,288					

Femur Prosthesis	Acetabular Prosthesis	Ν	Observed comp. Yrs.	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Stemsys HAC	Polymax	114	559.4	4	0.72	0.19	1.83
Stemsys HAC	Agilis Ti-por	444	3,237.4	20	0.62	0.38	0.95
Stemsys HAC	Fixa Ti Por	634	4,321.3	19	0.44	0.26	0.69
Stemsys HAC	RM Pressfit cup	115	1,007.2	3	0.30	0.06	0.87
Stemsys HAC	DeltaMotion	116	1,223.3	2	0.16	0.02	0.59
Stemsys HAC Collared	Delta-PF	156	740.2	3	0.41	0.08	1.18
Stemsys HAC Collared	DeltaMotion	225	1,368.2	3	0.22	0.05	0.64
Stemsys HAC Collared	RM Pressfit cup	151	758.1	1	0.13	0.00	0.73
Stemsys HAC Collared	Maxera Cup	108	281.0	0	0.00	0.00	1.31
Stemsys HAC Collared	Zimmer Maxera Cup	61	137.3	0	0.00	0.00	2.69
Stemsys HAC Offset	Fixa Ti Por	351	2,451.6	12	0.49	0.25	0.86
Stemsys HAC Offset	Agilis Ti-por	100	742.9	3	0.40	0.08	1.18
Stemsys HAC Offset	RM Pressfit cup	133	923.9	3	0.32	0.07	0.95
Stemsys HAC Offset	Delta-PF	438	2,657.5	8	0.30	0.13	0.59
Stemsys HAC Offset	DeltaMotion	57	498.1	1	0.20	0.01	1.12
Stemsys HAC Offset	Polymax	85	476.4	0	0.00	0.00	0.77
Summit	ALL CUPS	3,564					
Summit	ASR	88	949.6	41	4.32	3.10	5.86
Summit	Pinnacle	3160	25,402.1	150	0.59	0.50	0.69
Summit	Trilogy	215	2,085.7	8	0.38	0.17	0.76
Summit	Duraloc	101	1,583.0	6	0.38	0.14	0.82
Synergy Porous	ALL CUPS	3,417					
Synergy Porous	BHR	114	1,341.1	44	3.28	2.35	4.36
Synergy Porous	R3 porous	1859	16,008.4	69	0.43	0.34	0.55
Synergy Porous	Reflection porous	1271	17,089.1	63	0.37	0.28	0.47
Synergy Porous	Delta-PF	118	1,282.2	4	0.31	0.09	0.80

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component-	Lower 95% Cl	Upper 95% Cl
Synergy Porous	Continuum TM	55	395.5	0	0.00	0.00	0.93
Taperloc Complete	ALL CUPS	2,041					
Taperloc Complete	G7 acetabular shell	326	411.7	12	2.92	1.51	5.09
Taperloc Complete	RM Pressfit cup	523	1,941.1	15	0.77	0.41	1.24
Taperloc Complete	Continuum TM	289	1,240.1	7	0.56	0.23	1.16
Taperloc Complete	G7 acetabular	550	2,458.9	13	0.53	0.27	0.88
Taperloc Complete	Trident	162	401.2	2	0.50	0.06	1.80
Taperloc Complete	Delta-TT	191	669.9	3	0.45	0.09	1.31
Trabecular Metal Stem	ALL CUPS	611					
Trabecular Metal Stem	Continuum TM	537	4,400.2	22	0.50	0.30	0.74
Trabecular Metal Stem	Monoblock Acetabular Cup	74	1,158.5	3	0.26	0.04	0.69
Tri-Lock BPS	Pinnacle	197	949.5	4	0.42	0.09	1.08
TwinSys SS Stem Standard	ALL CUPS	1,753					
TwinSys SS Stem Standard	Pinnacle	127	395.3	5	1.26	0.41	2.95
TwinSys SS Stem Standard	ССВ	91	399.5	5	1.25	0.34	2.74
TwinSys SS Stem Standard	Continuum TM	89	421.6	2	0.47	0.06	1.71
TwinSys SS Stem Standard	RM Pressfit cup	1446	5,393.9	17	0.32	0.18	0.50
TwinSys Stem Standard	Selexys TPS	1285	15,811.2	170	1.08	0.92	1.25
TwinSys Stem Standard	Pinnacle	94	816.8	8	0.98	0.42	1.93
TwinSys Stem Standard	ССВ	412	3,220.0	25	0.78	0.50	1.15
TwinSys Stem Standard	RM cup	270	3,401.2	23	0.68	0.43	1.01
TwinSys Stem Standard	RM Pressfit cup	6744	59,310.0	353	0.60	0.53	0.66
TwinSys Stem Standard	Trilogy	213	2,664.6	14	0.53	0.27	0.86
TwinSys Stem Standard	Continuum TM	207	2,002.5	7	0.35	0.14	0.72
TwinSys Stem Standard	Delta-PF	402	4,899.3	10	0.20	0.10	0.38
TwinSys XS Stem HA uncemented	RM Pressfit cup	112	991.8	2	0.20	0.02	0.73

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs.	N Revised	Rate/100- component-	Lower 95% Cl	Upper 95% Cl
					years		
Versys	ALL CUPS	775					
Versys Fiber Metal Midcoat	Trilogy	254	4,429.5	20	0.45	0.28	0.70
Versys Heritage	ZCA	300	3,501.2	16	0.46	0.25	0.72
Versys Heritage	Trilogy	221	2,720.5	6	0.22	0.08	0.48
Wagner cone stem	ALL CUPS	254					
Wagner cone stem	Continuum TM	75	419.5	2	0.48	0.06	1.72
Wagner cone stem	Fitmore	79	1,135.8	5	0.44	0.12	0.96
Zimmer Lateral Straight Stem	ALL CUPS	2,474					
Zimmer Lateral Straight Stem	Trilogy	69	719.6	14	1.95	1.01	3.18
Zimmer Lateral Straight Stem	RM cup	534	6,560.7	52	0.79	0.59	1.03
Zimmer Lateral Straight Stem	Muller PE cup	770	8,128.7	45	0.55	0.40	0.74
Zimmer Lateral Straight Stem	Continuum TM	78	756.1	4	0.53	0.11	1.26
Zimmer Lateral Straight Stem	Weber	287	3,223.8	11	0.34	0.17	0.61
Zimmer Lateral Straight Stem	RM Pressfit cup	173	1,752.3	4	0.23	0.06	0.58
Zimmer Lateral Straight Stem	ZCA	98	969.8	1	0.10	0.00	0.57
Zimmer Lateral Straight Stem	ZCA all-poly cup	70	653.4	0	0.00	0.00	0.56
Zimmer Standard Straight Stem	RM cup	137	1,837.0	15	0.82	0.46	1.35
Zimmer Standard Straight Stem	Muller PE cup	258	2,664.6	13	0.49	0.25	0.81

TABLE 1.58

### All Matches > 50 procedures sorted by Acetabular Component

Acetabular	Femur	N	Observed	N	Rate/100-	Lower	Upper
Prosthesis	Prosthesis		comp.	Revised	component-	95% CI	95% CI
			Yrs		years		
ABGII	ABG	79	1,393.7	23	1.65	1.02	2.43
Agilis Ti-por	All Femurs						
Agilis Ti-por	Stemsys HAC	444	3,237.4	20	0.62	0.38	0.95

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Agilis Ti-por	Stemsys HAC Offset	100	742.9	3	0.40	0.08	1.18
Allofit	CLS	192	2,584.9	25	0.97	0.63	1.43
Artek	CLS	59	828.3	28	3.38	2.25	4.89
ASR	All Femurs	374					
ASR	S-Rom	130	956.0	97	10.15	8.23	12.38
ASR	Corail	156	1,490.9	88	5.90	4.73	7.27
ASR	Summit	88	949.6	41	4.32	3.10	5.86
Avantage	Exeter V40	52	153.7	2	1.30	0.07	4.70
BHR	All Femurs	207					
BHR	Anthology Porous	93	905.0	60	6.63	5.01	8.47
BHR	Synergy Porous	114	1,341.1	44	3.28	2.35	4.36
Bio-clad poly	Exeter V40	253	2,625.4	15	0.57	0.31	0.92
Biomex	Spectron	68	1,208.2	6	0.50	0.18	1.08
ССВ	All Femurs	1,901					
ССВ	TwinSys SS Stem Standard	91	399.5	5	1.25	0.34	2.74
ССВ	TwinSys Stem Standard	412	3,220.0	25	0.78	0.50	1.15
ССВ	CCA Straight Stem Lateral	784	7,245.5	39	0.54	0.38	0.73
ССВ	Exeter V40	614	4,795.1	20	0.42	0.25	0.64
Charnley	All Femurs	1,066					
Charnley	Elite plus	302	4,083.1	27	0.66	0.44	0.96
Charnley	Charnley	461	6,100.2	29	0.48	0.31	0.67
Charnley Ogee	Charnley	303	4,353.3	33	0.76	0.52	1.06
CLS Expansion	All Femurs	1,480					
CLS Expansion	CLS	1263	19,408.6	166	0.86	0.73	1.00
CLS Expansion	Exeter V40	217	2,899.3	13	0.45	0.23	0.74
Contemporary	All Femurs	8,569					

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Contemporary	Contemporary	71	1,000.1	12	1.20	0.62	2.10
Contemporary	CCA Straight Stem Lateral	78	856.5	10	1.17	0.56	2.15
Contemporary	MS 30	128	1,366.4	12	0.88	0.45	1.53
Contemporary	Exeter V40	8302	85,618.5	520	0.61	0.56	0.66
Continuum TM	All Femurs	10,302					
Continuum TM	Accolade II	350	993.6	14	1.41	0.73	2.30
Continuum TM	Avenir Muller Lateral Uncemented	182	1,734.9	15	0.86	0.48	1.43
Continuum TM	Echo Bi-Metric	204	905.4	7	0.77	0.31	1.59
Continuum TM	CPT Femoral Stem	1974	12,570.9	78	0.62	0.49	0.77
Continuum TM	Exeter V40	3186	22,684.1	139	0.61	0.51	0.72
Continuum TM	Taperloc Complete	289	1,240.1	7	0.56	0.23	1.16
Continuum TM	Zimmer Lateral Straight Stem	78	756.1	4	0.53	0.11	1.26
Continuum TM	M/L Taper	1047	9,009.8	46	0.51	0.37	0.68
Continuum TM	Trabecular Metal Stem	537	4,400.2	22	0.50	0.30	0.74
Continuum TM	Corail	340	2,616.0	13	0.50	0.25	0.83
Continuum TM	CLS	1140	7,288.1	36	0.49	0.35	0.68
Continuum TM	Wagner cone stem	75	419.5	2	0.48	0.06	1.72
Continuum TM	TwinSys SS Stem Standard	89	421.6	2	0.47	0.06	1.71
Continuum TM	TwinSys Stem Standard	207	2,002.5	7	0.35	0.14	0.72
Continuum TM	MS 30	549	3,641.8	12	0.33	0.16	0.56
Continuum TM	Synergy Porous	55	395.5	0	0.00	0.00	0.93
DeltaMotion	All Femurs	588					
DeltaMotion	FTC HA Femoral Stem	112	1,494.8	4	0.27	0.07	0.69
DeltaMotion	Corail	78	896.0	2	0.22	0.03	0.81
DeltaMotion	Stemsys HAC Collared	225	1,368.2	3	0.22	0.05	0.64
DeltaMotion	Stemsys HAC Offset	57	498.1	1	0.20	0.01	1.12

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
DeltaMotion	Stemsys HAC	116	1,223.3	2	0.16	0.02	0.59
Delta-PF	All Femurs	2,188					
Delta-PF	H-Max M	71	764.2	10	1.31	0.63	2.41
Delta-PF	ABGII	107	1,679.6	14	0.83	0.46	1.40
Delta-PF	H-Max S	374	1,849.0	13	0.70	0.37	1.20
Delta-PF	Stemsys HAC Collared	156	740.2	3	0.41	0.08	1.18
Delta-PF	Synergy Porous	118	1,282.2	4	0.31	0.09	0.80
Delta-PF	Stemsys HAC Offset	438	2,657.5	8	0.30	0.13	0.59
Delta-PF	Friendly	192	2,438.7	6	0.25	0.09	0.54
Delta-PF	Corail	82	1,236.1	3	0.24	0.05	0.71
Delta-PF	TwinSys Stem Standard	402	4,899.3	10	0.20	0.10	0.38
Delta-PF	Furlong Evolution Collared Ste	130	137.6	0	0.00	0.00	2.68
Delta-PF	Stemsys Cemented	62	261.6	0	0.00	0.00	1.41
Delta-PF	Stemsys Cemented Lateralized	56	301.9	0	0.00	0.00	1.22
Delta-TT	All Femurs	2,571					
Delta-TT	MasterSL	131	601.7	8	1.33	0.57	2.62
Delta-TT	H-Max C	154	596.8	7	1.17	0.47	2.42
Delta-TT	Friendly	70	668.9	7	1.05	0.42	2.16
Delta-TT	M/L Taper	64	581.5	6	1.03	0.38	2.25
Delta-TT	Accolade II	102	477.0	4	0.84	0.23	2.15
Delta-TT	H-Max S	1166	7,124.7	47	0.66	0.48	0.88
Delta-TT	H-Max M	86	998.8	6	0.60	0.22	1.31
Delta-TT	Exeter V40	411	2,159.7	12	0.56	0.29	0.97
Delta-TT	Taperloc Complete	191	669.9	3	0.45	0.09	1.31
Delta-TT	CPT Femoral Stem	143	728.0	3	0.41	0.08	1.20
Delta-TT	PLS	53	349.3	1	0.29	0.01	1.60

Acetabular Prosthesis	Femur Prosthesis	Ν	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Duraloc	All Femurs	5,574					
Duraloc	ABGII	139	2,282.1	56	2.45	1.85	3.19
Duraloc	ABG	135	2,470.6	60	2.43	1.85	3.13
Duraloc	Prodigy	129	1,946.9	31	1.59	1.06	2.23
Duraloc	Elite plus	614	8,377.4	133	1.59	1.33	1.88
Duraloc	Spectron	1179	15,928.2	225	1.41	1.23	1.61
Duraloc	AML MMA stem	79	1,330.9	17	1.28	0.74	2.05
Duraloc	CLS	713	11,169.1	141	1.26	1.06	1.49
Duraloc	Exeter V40	1606	23,148.2	279	1.21	1.07	1.35
Duraloc	AML Standard Stem	52	886.3	9	1.02	0.46	1.93
Duraloc	Corail	464	6,479.0	65	1.00	0.77	1.28
Duraloc	MS 30	88	1,497.1	14	0.94	0.51	1.57
Duraloc	C-Stem	53	731.6	6	0.82	0.30	1.78
Duraloc	CPT Femoral Stem	212	2,771.8	20	0.72	0.43	1.09
Duraloc	Summit	101	1,583.0	6	0.38	0.14	0.82
Durom	CLS	198	2,523.3	74	2.93	2.29	3.66
Elite Plus	All Femurs	450					
Elite Plus LPW	Elite plus	284	3,470.9	18	0.52	0.31	0.82
Elite Plus Ogee	Elite plus	111	1,160.6	6	0.52	0.19	1.13
Elite Plus Ogee	C-Stem	55	582.4	2	0.34	0.04	1.24
Exceed ABT Ringloc-X	Echo Bi-Metric	57	575.3	1	0.17	0.00	0.97
Exeter	Exeter V40	3,012	35,585.7	242	0.68	0.60	0.77
Exeter X3	Exeter V40	3,325	19,010.1	87	0.46	0.37	0.56
Expansys shell	СВС	183	2,309.0	31	1.34	0.91	1.91
Fitek	CLS	66	1,427.5	13	0.91	0.48	1.56
Fitmore	All Femurs	7,593					

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Fitmore	Corail	370	2,461.3	21	0.85	0.53	1.30
Fitmore	CPT Femoral Stem	195	1,763.9	15	0.85	0.48	1.40
Fitmore	Accolade II	144	509.8	4	0.78	0.21	2.01
Fitmore	СВС	59	858.0	5	0.58	0.19	1.36
Fitmore	CLS	2453	33,455.8	161	0.48	0.41	0.56
Fitmore	Spectron	78	1,078.5	5	0.46	0.13	1.02
Fitmore	Wagner cone stem	79	1,135.8	5	0.44	0.12	0.96
Fitmore	Avenir Muller Lateral Uncemented	70	515.6	2	0.39	0.05	1.40
Fitmore	MS 30	2896	24,343.7	71	0.29	0.23	0.37
Fitmore	Exeter V40	1249	10,258.9	16	0.16	0.09	0.25
Fixa Ti Por	All Femurs	985					
Fixa Ti Por	Stemsys HAC Offset	351	2,451.6	12	0.49	0.25	0.86
Fixa Ti Por	Stemsys HAC	634	4,321.3	19	0.44	0.26	0.69
Furlong	Furlong	66	1,021.5	8	0.78	0.34	1.54
G7 Shell	All Femurs	4,440					
G7 Shell	CPT Femoral Stem	122	525.5	11	2.09	1.05	3.75
G7 Shell	MS 30	221	549.3	9	1.64	0.75	3.11
G7 Shell	Corail	104	520.4	3	0.58	0.12	1.68
G7 Shell	Taperloc Complete	550	2,458.9	13	0.53	0.27	0.88
G7 Shell	Echo Bi-Metric	1031	4,613.8	24	0.52	0.33	0.77
G7 Shell	Exeter V40	390	1,566.9	8	0.51	0.22	1.01
G7 Shell	C-Stem AMT	60	44.4	3	6.75	1.39	19.73
G7 Shell	Taperloc Complete	326	411.7	12	2.92	1.51	5.09
G7 Shell	CPT Femoral Stem	73	77.1	2	2.59	0.31	9.37
G7 Shell	Echo Bi-Metric	576	736.6	15	2.04	1.14	3.36
G7 Shell	Exeter V40	380	452.5	8	1.77	0.69	3.34

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
G7 Shell	Avenir Complete Cementless	54	86.5	1	1.16	0.03	6.44
G7 Shell	MS 30	411	461.1	4	0.87	0.24	2.22
G7 Shell	Accolade II	89	38.4	0	0.00	0.00	9.62
G7 Shell	Corail	53	59.7	0	0.00	0.00	6.18
M2A	Mallory-Head	105	1,601.3	19	1.19	0.71	1.85
Mallory-Head	Spectron	152	2,196.2	9	0.41	0.19	0.78
Marathon	All Femurs	463					
Marathon	C-Stem AMT	369	2,813.4	20	0.71	0.42	1.08
Marathon	C-Stem	94	662.4	2	0.30	0.04	1.09
Maxera Cup	Stemsys HAC Collared	108	281.0	0	0.00	0.00	1.31
Monoblock	All Femurs	469					
Monoblock	Corail	95	1,311.6	9	0.69	0.31	1.30
Monoblock	CPT Femoral Stem	84	1,202.4	8	0.67	0.26	1.26
Monoblock	CLS	80	1,145.1	7	0.61	0.25	1.26
Monoblock	Exeter V40	136	2,153.7	7	0.33	0.12	0.64
Monoblock	Trabecular Metal Stem	74	1,158.5	3	0.26	0.04	0.69
Morscher	All Femurs	3,924					
Morscher	Spectron	211	3,201.0	35	1.09	0.76	1.52
Morscher	MS 30	804	11,755.3	77	0.66	0.52	0.82
Morscher	CLS	1,700	29,358.1	147	0.50	0.42	0.59
Morscher	Exeter V40	1,209	19,129.6	91	0.48	0.38	0.58
MPact	All Femurs	1,332					
MPact	Quadra-P	90	160.4	3	1.87	0.39	5.47
MPact	Quadra-H	449	1,223.8	15	1.23	0.69	2.02
MPact	Quadra-C	333	916.8	6	0.65	0.24	1.42
MPact	Medacta Lateral Stem	127	94.5	0	0.00	0.00	3.90

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. _Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
MPact	Std Femoral Stem	333	278.5	0	0.00	0.00	1.32
Mueller Cup	Friendly	51	286.4	2	0.70	0.08	2.52
Muller PE	All Femurs	2,991					
Muller PE	Spectron	67	706.8	8	1.13	0.49	2.23
Muller PE	Accolade	114	1,408.8	12	0.85	0.44	1.49
Muller PE	Zimmer Lateral Straight Stem	770	8,128.7	45	0.55	0.40	0.74
Muller PE	Exeter V40	226	2,855.3	14	0.49	0.27	0.82
Muller PE	Zimmer Standard Straight Stem	258	2,664.6	13	0.49	0.25	0.81
Muller PE	SL monoblock	559	6,952.4	33	0.47	0.32	0.66
Muller PE	MS 30	505	5,301.6	19	0.36	0.21	0.55
Muller PE	Standard straight stem	382	3,921.8	10	0.25	0.12	0.47
Muller PE	SL modular stem	110	1,559.7	3	0.19	0.04	0.56
Osteolock	Exeter V40	1106	16,360.6	101	0.62	0.50	0.75
Pinnacle	All Femurs	31,331					
Pinnacle	Actis Duofix	153	231.7	3	1.29	0.27	3.78
Pinnacle	TwinSys SS Stem Standard	127	395.3	5	1.26	0.41	2.95
Pinnacle	TwinSys Stem Standard	94	816.8	8	0.98	0.42	1.93
Pinnacle	S-Rom	404	5,290.9	43	0.81	0.59	1.09
Pinnacle	C-Stem AMT	3930	20,842.6	142	0.68	0.57	0.80
Pinnacle	C-Stem	86	612.8	4	0.65	0.18	1.67
Pinnacle	ABGII	67	926.2	6	0.65	0.24	1.41
Pinnacle	Summit	3160	25,402.1	150	0.59	0.50	0.69
Pinnacle	Corail	18350	112,612.3	630	0.56	0.52	0.60
Pinnacle	Tri-Lock BPS	197	949.5	4	0.42	0.09	1.08
Pinnacle	Exeter V40	3980	25,119.6	101	0.40	0.33	0.49
Pinnacle	MS 30	305	790.8	3	0.38	0.05	1.01

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Pinnacle	CLS	133	1,101.4	4	0.36	0.10	0.93
Pinnacle	CPT Femoral Stem	66	694.5	2	0.29	0.03	1.04
Pinnacle	Avenir Muller Lateral Uncemented	99	1,241.5	3	0.24	0.03	0.64
Pinnacle	Accolade	180	2,271.6	4	0.18	0.05	0.45
PolarCup cemented	Exeter V40	107	336.0	1	0.30	0.01	1.66
Polymax	All Femurs	284					
Polymax	Stemsys HAC	114	559.4	4	0.72	0.19	1.83
Polymax	Exeter V40	85	460.7	1	0.22	0.01	1.21
Polymax	Stemsys HAC Offset	85	476.4	0	0.00	0.00	0.77
R3 porous	All Femurs	6,349					
R3 porous	Anthology Porous	68	632.9	35	5.53	3.79	7.60
R3 porous	Exeter V40	981	5,450.3	28	0.51	0.34	0.74
R3 porous	Polarstem uncemented	2583	14,277.0	66	0.46	0.36	0.59
R3 porous	Synergy Porous	1859	16,008.4	69	0.43	0.34	0.55
R3 porous	CPCS	400	2,275.4	9	0.40	0.18	0.75
R3 porous	Spectron	458	4,040.1	15	0.37	0.20	0.60
Reflection	All Femurs	9,567					
Reflection cemented	Spectron	2984	32,740.6	399	1.22	1.10	1.34
Reflection cemented	Exeter V40	1077	8,976.5	37	0.41	0.29	0.57
Reflection porous	Spectron	2755	33,877.3	308	0.91	0.81	1.02
Reflection porous	CLS	403	4,575.1	24	0.52	0.33	0.77
Reflection porous	Polarstem uncemented	335	3,340.6	17	0.51	0.30	0.81
Reflection porous	Synergy Porous	1271	17,089.1	63	0.37	0.28	0.47
Reflection porous	Exeter V40	494	5,845.6	21	0.36	0.22	0.54
Reflection porous	Corail	140	1,851.8	6	0.32	0.12	0.71
Reflection porous	Basis	108	1,153.5	2	0.17	0.02	0.63

Acetabular Prosthesis	Femur Prosthesis	Ν	Observed comp. _Yrs	N Revised	Rate/100- component- y <u>ears</u>	Lower 95% Cl	Upper 95% Cl
RM cup	All Femurs	1,482					
RM cup	CLS	114	1,536.1	20	1.30	0.80	2.01
RM cup	SL modular stem	322	5,273.3	44	0.83	0.60	1.11
RM cup	Zimmer Standard Straight Stem	137	1,837.0	15	0.82	0.46	1.35
RM cup	Zimmer Lateral Straight Stem	534	6,560.7	52	0.79	0.59	1.03
RM cup	TwinSys Stem Standard	270	3,401.2	23	0.68	0.43	1.01
RM cup	Avenir Muller Lateral Uncemented	105	1,187.5	5	0.42	0.11	0.92
RM Pressfit	All Femurs	16,248					
RM Pressfit	Accolade II	320	1,031.5	15	1.45	0.78	2.34
RM Pressfit	ABGII	91	619.0	9	1.45	0.66	2.76
RM Pressfit	C-Stem AMT	152	985.2	8	0.81	0.32	1.53
RM Pressfit	Taperloc Complete	523	1,941.1	15	0.77	0.41	1.24
RM Pressfit	Corail	186	1,246.0	9	0.72	0.30	1.32
RM Pressfit	CBC	445	4,466.3	30	0.67	0.45	0.96
RM Pressfit	CLS	691	6,489.9	43	0.66	0.48	0.89
RM Pressfit	Polarstem uncemented	199	656.4	4	0.61	0.17	1.56
RM Pressfit	Optimys	992	2,137.4	13	0.61	0.32	1.04
RM Pressfit	TwinSys Stem Standard	6744	59,310.0	353	0.60	0.53	0.66
RM Pressfit	CCA Straight Stem Lateral	135	1,513.9	8	0.53	0.23	1.04
RM Pressfit	MS 30	90	964.4	5	0.52	0.14	1.14
RM Pressfit	Exeter V40	3388	23,200.8	83	0.36	0.28	0.44
RM Pressfit	Stemsys HAC Offset	133	923.9	3	0.32	0.07	0.95
RM Pressfit	TwinSys SS Stem Standard	1446	5,393.9	17	0.32	0.18	0.50
RM Pressfit	Stemsys HAC	115	1,007.2	3	0.30	0.06	0.87
RM Pressfit	Avenir Muller Lateral Uncemented	53	385.0	1	0.26	0.01	1.45
RM Pressfit	Zimmer Lateral Straight Stem	173	1,752.3	4	0.23	0.06	0.58

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
RM Pressfit	TwinSys XS Stem HA uncemented	112	991.8	2	0.20	0.02	0.73
RM Pressfit	Stemsys HAC Collared	151	758.1	1	0.13	0.00	0.73
RM Pressfit	Standard straight stem	109	1,175.3	0	0.00	0.00	0.31
Selexys TPS	TwinSys Stem Standard	1285	1,5811.2	170	1.08	0.92	1.25
Trabecular Metal Shell	All Femurs	342					
Trabecular Metal Shell	Exeter V40	283	1,838.6	21	1.14	0.71	1.75
Trabecular Metal Shell	CLS	59	631.1	3	0.48	0.10	1.39
Trident	All Femurs	20,209					
Trident	ABGII	342	5,268.5	48	0.91	0.67	1.21
Trident	Corail	124	991.2	8	0.81	0.35	1.59
Trident	CLS	165	2,371.7	15	0.63	0.35	1.04
Trident	Omnifit	149	2,301.4	14	0.61	0.32	0.99
Trident	CPT Femoral Stem	145	2,161.6	13	0.60	0.32	1.03
Trident	Spectron	78	1,083.2	6	0.55	0.18	1.14
Trident	Accolade II	1729	8,693.3	46	0.53	0.39	0.71
Trident	Taperloc Complete	162	401.2	2	0.50	0.06	1.80
Trident	Exeter V40	15048	118,279.8	470	0.40	0.36	0.43
Trident	Accolade	1867	27,570.6	107	0.39	0.32	0.47
Trident	M/L Taper	333	2,286.1	7	0.31	0.12	0.63
Trident	H-Max S	67	356.4	1	0.28	0.01	1.56
Trident II Clusterhole	All Femurs	476					
Trident II Clusterhole	Exeter V40	306	229.5	5	2.18	0.71	5.08
Trident II Clusterhole	Accolade II	170	144.8	1	0.69	0.02	3.85
Trident II Tritanium	All Femurs	4,322					
Trident II Tritanium	Accolade II	1014	1,116.8	17	1.52	0.89	2.44
Trident II Tritanium	Corail	55	141.9	2	1.41	0.17	5.09

Acetabular Prosthesis	Femur Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Trident II Tritanium	Exeter V40	3253	5,049.9	33	0.65	0.45	0.92
Trident PSL HA Cluster	Exeter V40	145	136.5	0	0.00	0.00	2.70
Trilogy	All Femurs	7,278					
Trilogy	Zimmer Lateral Straight Stem	69	719.6	14	1.95	1.01	3.18
Trilogy	CPT Femoral Stem	850	8,806.3	69	0.78	0.61	0.99
Trilogy	CLS	784	7,196.3	41	0.57	0.41	0.77
Trilogy	TwinSys Stem Standard	213	2,664.6	14	0.53	0.27	0.86
Trilogy	M/L Taper	215	2,743.0	14	0.51	0.28	0.86
Trilogy	Versys Fiber Metal Midcoat	254	4,429.5	20	0.45	0.28	0.70
Trilogy	Summit	215	2,085.7	8	0.38	0.17	0.76
Trilogy	Exeter V40	3745	34,812.5	127	0.36	0.30	0.43
Trilogy	Corail	263	1,939.1	7	0.36	0.15	0.74
Trilogy	Versys Heritage	221	2,720.5	6	0.22	0.08	0.48
Trilogy	MS 30	449	3,460.0	7	0.20	0.07	0.40
Trinity	Metafix	316	517.1	7	1.35	0.54	2.79
Tritanium	All Femurs	6,104					
Tritanium	CPT Femoral Stem	85	967.5	9	0.93	0.43	1.77
Tritanium	Accolade II	1579	8,713.3	57	0.65	0.50	0.85
Tritanium	CLS	89	763.2	4	0.52	0.14	1.34
Tritanium	Exeter V40	3933	27,157.0	130	0.48	0.40	0.57
Tritanium	Avenir Muller Lateral Uncemented	91	994.6	3	0.30	0.06	0.88
Tritanium	Accolade	152	1,719.8	5	0.29	0.09	0.68
Tritanium	Corail	175	1,611.8	4	0.25	0.07	0.64
Ultima	All Femurs	213					
Ultima	S-Rom	78	1,550.3	15	0.97	0.54	1.60
Ultima	Corail	135	1,331.2	4	0.30	0.08	0.77

Acetabular	Femur	N	Observed	N	Rate/100-	Lower	Upper
Prosthesis	Prosthesis		comp.	Revised	component-	95% CI	95% CI
			Yrs		years		1
Weber	All Femurs	464					
Weber	Standard straight stem	103	1,049.5	4	0.38	0.08	0.91
Weber	Zimmer Lateral Straight Stem	287	3,223.8	11	0.34	0.17	0.61
Weber	Exeter V40	74	959.9	2	0.21	0.03	0.75
Weill ring	CLS	118	2,231.2	19	0.85	0.51	1.33
ZCA	All Femurs	1,086					
ZCA	CPT Femoral Stem	563	6,410.6	44	0.69	0.50	0.92
ZCA	Versys Heritage	300	3,501.2	16	0.46	0.25	0.72
ZCA	Exeter V40	125	1,018.6	4	0.39	0.11	1.01
ZCA	Zimmer Lateral Straight Stem	98	969.8	1	0.10	0.00	0.57
ZCA all-poly	All Femurs	376					
ZCA all-poly	CPT Femoral Stem	100	756.4	1	0.13	0.00	0.74
ZCA all-poly	MS 30	96	821.6	1	0.12	0.00	0.68
ZCA all-poly	Exeter V40	110	702.4	0	0.00	0.00	0.53
ZCA all-poly	Zimmer Lateral Straight Stem	70	653.4	0	0.00	0.00	0.56
Zimmer Maxera	Stemsys HAC Collared	61	137.3	0	0.00	0.00	2.69

TABLE 1.59

#### All Matches > 50 procedures sorted by Revision Rate

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
C-Stem AMT	G7 acetabular shell	60	44.4	3	6.75	1.39	19.73	40
Anthology Porous	BHR Acetabular Cup	93	905.0	60	6.63	5.01	8.47	0
Corail	ASR	156	1,490.9	88	5.90	4.73	7.27	0
Anthology Porous	R3 porous	68	632.9	35	5.53	3.79	7.60	0

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
Summit	ASR	88	949.6	41	4.32	3.10	5.86	0
CLS	Artek	59	828.3	28	3.38	2.25	4.89	0
Synergy Porous	BHR Acetabular Cup	114	1,341.1	44	3.28	2.35	4.36	0
CLS	Durom	198	2,523.3	74	2.93	2.29	3.66	0
Taperloc Complete	G7 acetabular shell	326	411.7	12	2.92	1.51	5.09	137
CPT Femoral Stem	G7 acetabular shell	73	77.1	2	2.59	0.31	9.37	36
ABGII	Duraloc	139	2,282.1	56	2.45	1.85	3.19	0
ABG	Duraloc	135	2,470.6	60	2.43	1.85	3.13	0
Exeter V40	Trident II Clusterhole HA	306	229.5	5	2.18	0.71	5.08	200
CPT Femoral Stem	G7 acetabular	122	525.5	11	2.09	1.05	3.75	4
Echo Bi-Metric	G7 acetabular shell	576	736.6	15	2.04	1.14	3.36	219
Zimmer Lateral Straight Stem	Trilogy	69	719.6	14	1.95	1.01	3.18	0
Quadra-P	Acetabular Shell	90	160.4	3	1.87	0.39	5.47	25
Exeter V40	G7 acetabular shell	380	452.5	8	1.77	0.69	3.34	182
ABG	ABGII	79	1,393.7	23	1.65	1.02	2.43	0
MS 30	G7 acetabular	221	549.3	9	1.64	0.75	3.11	42
Prodigy	Duraloc	129	1,946.9	31	1.59	1.06	2.23	0
Elite plus	Duraloc	614	8,377.4	133	1.59	1.33	1.88	0
Accolade II	Trident II Tritanium	1014	1,116.8	17	1.52	0.89	2.44	567
Accolade II	RM Pressfit cup	320	1,031.5	15	1.45	0.78	2.34	23
ABGII	RM Pressfit cup	91	619.0	9	1.45	0.66	2.76	0
Spectron	Duraloc	1179	15,928.2	225	1.41	1.23	1.61	0
Corail	Trident II Tritanium	55	141.9	2	1.41	0.17	5.09	4
Accolade II	Continuum TM	350	993.6	14	1.41	0.73	2.30	8
Metafix	Trinity	316	517.1	7	1.35	0.54	2.79	172
СВС	Expansys shell	183	2,309.0	31	1.34	0.91	1.91	0

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
MasterSL	Delta-TT	131	601.7	8	1.33	0.57	2.62	0
H-Max M	Delta-PF	71	764.2	10	1.31	0.63	2.41	0
CLS	RM cup	114	1,536.1	20	1.30	0.80	2.01	0
Exeter V40	Avantage cemented	52	153.7	2	1.30	0.07	4.70	5
Actis Duofix	Pinnacle	153	231.7	3	1.29	0.27	3.78	51
AML MMA stem	Duraloc	79	1,330.9	17	1.28	0.74	2.05	0
TwinSys SS Stem Standard	Pinnacle	127	395.3	5	1.26	0.41	2.95	10
CLS	Duraloc	713	11,169.1	141	1.26	1.06	1.49	0
TwinSys SS Stem Standard	ССВ	91	399.5	5	1.25	0.34	2.74	2
Quadra-H	Acetabular Shell	449	1,223.8	15	1.23	0.69	2.02	39
Spectron	Reflection cemented	2984	32,740.6	399	1.22	1.10	1.34	0
Exeter V40	Duraloc	1606	23,148.2	279	1.21	1.07	1.35	0
Contemporary	Contemporary	71	1,000.1	12	1.20	0.62	2.10	0
Mallory-Head	M2A	105	1,601.3	19	1.19	0.71	1.85	0
H-Max C	Delta-TT	154	596.8	7	1.17	0.47	2.42	19
CCA Straight Stem Lateral	Contemporary	78	856.5	10	1.17	0.56	2.15	0
Avenir Complete Cementless	G7 acetabular shell	54	86.5	1	1.16	0.03	6.44	0
Exeter V40	Trabecular Metal Shell	283	1,838.6	21	1.14	0.71	1.75	11
Spectron	Muller PE cup	67	706.8	8	1.13	0.49	2.23	0
Spectron	Morscher	211	3,201.0	35	1.09	0.76	1.52	0
TwinSys Stem Standard	Selexys TPS	1285	15,811.2	170	1.08	0.92	1.25	0
Friendly	Delta-TT	70	668.9	7	1.05	0.42	2.16	1
M/L Taper	Delta-TT	64	581.5	6	1.03	0.38	2.25	0
AML Standard Stem	Duraloc	52	886.3	9	1.02	0.46	1.93	0
Corail	Duraloc	464	6,479.0	65	1.00	0.77	1.28	0
TwinSys Stem Standard	Pinnacle	94	816.8	8	0.98	0.42	1.93	0

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
S-Rom	Ultima	78	1,550.3	15	0.97	0.54	1.60	0
CLS	Allofit	192	2,584.9	25	0.97	0.63	1.43	0
MS 30	Duraloc	88	1,497.1	14	0.94	0.51	1.57	0
CPT Femoral Stem	Tritanium	85	967.5	9	0.93	0.43	1.77	0
ABGII	Trident	342	5,268.5	48	0.91	0.67	1.21	0
CLS	Fitek	66	1,427.5	13	0.91	0.48	1.56	0
Spectron	Reflection porous	2755	33,877.3	308	0.91	0.81	1.02	0
MS 30	Contemporary	128	1,366.4	12	0.88	0.45	1.53	0
MS 30	G7 acetabular shell	411	461.1	4	0.87	0.24	2.22	198
Avenir Muller Lateral Uncemented	Continuum TM	182	1,734.9	15	0.86	0.48	1.43	0
CLS	CLS Expansion	1263	19,408.6	166	0.86	0.73	1.00	0
Corail	Fitmore	370	2,461.3	21	0.85	0.53	1.30	5
Accolade	Muller PE cup	114	1,408.8	12	0.85	0.44	1.49	0
CLS	Weill ring	118	2,231.2	19	0.85	0.51	1.33	0
CPT Femoral Stem	Fitmore	195	1,763.9	15	0.85	0.48	1.40	0
Accolade II	Delta-TT	102	477.0	4	0.84	0.23	2.15	11
SL modular stem	RM cup	322	5,273.3	44	0.83	0.60	1.11	0
ABGII	Delta-PF	107	1,679.6	14	0.83	0.46	1.40	0
C-Stem	Duraloc	53	731.6	6	0.82	0.30	1.78	0
Zimmer Standard Straight Stem	RM cup	137	1,837.0	15	0.82	0.46	1.35	0
S-Rom	Pinnacle	404	5,290.9	43	0.81	0.59	1.09	1
C-Stem AMT	RM Pressfit cup	152	985.2	8	0.81	0.32	1.53	15
Corail	Trident	124	991.2	8	0.81	0.35	1.59	5
Zimmer Lateral Straight Stem	RM cup	534	6,560.7	52	0.79	0.59	1.03	0
Accolade II	Fitmore	144	509.8	4	0.78	0.21	2.01	8
CPT Femoral Stem	Trilogy	850	8,806.3	69	0.78	0.61	0.99	0

Femur Prosthesis	Acetabular Prosthesis	Ν	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
Furlong	Furlong	66	1,021.5	8	0.78	0.34	1.54	0
TwinSys Stem Standard	ССВ	412	3,220.0	25	0.78	0.50	1.15	0
Echo Bi-Metric	Continuum TM	204	905.4	7	0.77	0.31	1.59	15
Taperloc Complete	RM Pressfit cup	523	1,941.1	15	0.77	0.41	1.24	67
Charnley	Charnley Cup Ogee	303	4,353.3	33	0.76	0.52	1.06	0
Corail	RM Pressfit cup	186	1,246.0	9	0.72	0.30	1.32	10
CPT Femoral Stem	Duraloc	212	2,771.8	20	0.72	0.43	1.09	0
Stemsys HAC	Polymax	114	559.4	4	0.72	0.19	1.83	8
C-Stem AMT	Marathon cemented	369	2,813.4	20	0.71	0.42	1.08	0
H-Max S	Delta-PF	374	1,849.0	13	0.70	0.37	1.20	59
Friendly	Mueller Cup	51	286.4	2	0.70	0.08	2.52	3
Accolade II	Trident II Clusterhole HA	170	144.8	1	0.69	0.02	3.85	89
CPT Femoral Stem	ZCA	563	6,410.6	44	0.69	0.50	0.92	0
Corail	Monoblock Acetabular Cup	95	1,311.6	9	0.69	0.31	1.30	0
C-Stem AMT	Pinnacle	3930	20,842.6	142	0.68	0.57	0.80	374
Exeter V40	Exeter	3012	35,585.7	242	0.68	0.60	0.77	0
TwinSys Stem Standard	RM cup	270	3,401.2	23	0.68	0.43	1.01	0
CBC	RM Pressfit cup	445	4,466.3	30	0.67	0.45	0.96	0
CPT Femoral Stem	Monoblock Acetabular Cup	84	1,202.4	8	0.67	0.26	1.26	0
CLS	RM Pressfit cup	691	6,489.9	43	0.66	0.48	0.89	24
Elite plus	Charnley	302	4,083.1	27	0.66	0.44	0.96	0
H-Max S	Delta-TT	1166	7,124.7	47	0.66	0.48	0.88	137
MS 30	Morscher	804	11,755.3	77	0.66	0.52	0.82	0
Quadra-C	Acetabular Shell	333	916.8	6	0.65	0.24	1.42	22
Accolade II	Tritanium	1579	8,713.3	57	0.65	0.50	0.85	0
Exeter V40	Trident II Tritanium	3253	5,049.9	33	0.65	0.45	0.92	1309

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
C-Stem	Pinnacle	86	612.8	4	0.65	0.18	1.67	1
ABGII	Pinnacle	67	926.2	6	0.65	0.24	1.41	0
CLS	Trident	165	2,371.7	15	0.63	0.35	1.04	0
CPT Femoral Stem	Continuum TM	1974	12,570.9	78	0.62	0.49	0.77	107
Stemsys HAC	Agilis Ti-por	444	3,237.4	20	0.62	0.38	0.95	0
Exeter V40	Osteolock	1106	16,360.6	101	0.62	0.50	0.75	0
Exeter V40	Continuum TM	3186	22,684.1	139	0.61	0.51	0.72	31
CLS	Monoblock Acetabular Cup	80	1,145.1	7	0.61	0.25	1.26	0
Polarstem uncemented	RM Pressfit cup	199	656.4	4	0.61	0.17	1.56	2
Omnifit	Trident	149	2,301.4	14	0.61	0.32	0.99	0
Optimys	RM Pressfit cup	992	2,137.4	13	0.61	0.32	1.04	357
Exeter V40	Contemporary	8302	85,618.5	520	0.61	0.56	0.66	0
CPT Femoral Stem	Trident	145	2,161.6	13	0.60	0.32	1.03	0
H-Max M	Delta-TT	86	998.8	6	0.60	0.22	1.31	0
TwinSys Stem Standard	RM Pressfit cup	6744	59,310.0	353	0.60	0.53	0.66	121
Summit	Pinnacle	3160	25,402.1	150	0.59	0.50	0.69	214
CBC	Fitmore	59	858.0	5	0.58	0.19	1.36	0
Corail	G7 acetabular	104	520.4	3	0.58	0.12	1.68	2
Exeter V40	Bio-clad poly	253	2,625.4	15	0.57	0.31	0.92	0
CLS	Trilogy	784	7,196.3	41	0.57	0.41	0.77	18
Taperloc Complete	Continuum TM	289	1,240.1	7	0.56	0.23	1.16	5
Corail	Pinnacle	18350	112,612.3	630	0.56	0.52	0.60	1679
Exeter V40	Delta-TT	411	2,159.7	12	0.56	0.29	0.97	55
Spectron	Trident	78	1,083.2	6	0.55	0.18	1.14	0
Zimmer Lateral Straight Stem	Muller PE cup	770	8,128.7	45	0.55	0.40	0.74	0
CCA Straight Stem Lateral	ССВ	784	7,245.5	39	0.54	0.38	0.73	0

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
Accolade II	Trident	1729	8,693.3	46	0.53	0.39	0.71	47
Zimmer Lateral Straight Stem	Continuum TM	78	756.1	4	0.53	0.11	1.26	0
Taperloc Complete	G7 acetabular	550	2,458.9	13	0.53	0.27	0.88	34
CCA Straight Stem Lateral	RM Pressfit cup	135	1,513.9	8	0.53	0.23	1.04	0
TwinSys Stem Standard	Trilogy	213	2,664.6	14	0.53	0.27	0.86	0
CLS	Reflection porous	403	4,575.1	24	0.52	0.33	0.77	0
CLS	Tritanium	89	763.2	4	0.52	0.14	1.34	0
Echo Bi-Metric	G7 acetabular	1031	4,613.8	24	0.52	0.33	0.77	35
Elite plus	Elite Plus LPW	284	3,470.9	18	0.52	0.31	0.82	0
MS 30	RM Pressfit cup	90	964.4	5	0.52	0.14	1.14	0
Elite plus	Elite Plus Ogee	111	1,160.6	6	0.52	0.19	1.13	0
Exeter V40	R3 porous	981	5,450.3	28	0.51	0.34	0.74	83
Exeter V40	G7 acetabular	390	1,566.9	8	0.51	0.22	1.01	26
M/L Taper	Continuum TM	1047	9,009.8	46	0.51	0.37	0.68	0
M/L Taper	Trilogy	215	2,743.0	14	0.51	0.28	0.86	0
Polarstem uncemented	Reflection porous	335	3,340.6	17	0.51	0.30	0.81	0
CLS	Morscher	1700	29,358.1	147	0.50	0.42	0.59	0
Trabecular Metal Stem	Continuum TM	537	4,400.2	22	0.50	0.30	0.74	15
Taperloc Complete	Trident	162	401.2	2	0.50	0.06	1.80	8
Corail	Continuum TM	340	2,616.0	13	0.50	0.25	0.83	3
Spectron	Biomex acetab shell porous	68	1,208.2	6	0.50	0.18	1.08	0
CLS	Continuum TM	1140	7,288.1	36	0.49	0.35	0.68	80
Exeter V40	Muller PE cup	226	2,855.3	14	0.49	0.27	0.82	0
Stemsys HAC Offset	Fixa Ti Por	351	2,451.6	12	0.49	0.25	0.86	10
Zimmer Standard Straight Stem	Muller PE cup	258	2,664.6	13	0.49	0.25	0.81	0
CLS	Fitmore	2453	33,455.8	161	0.48	0.41	0.56	6

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
Exeter V40	Tritanium	3933	2,7157.0	130	0.48	0.40	0.57	0
Wagner cone stem	Continuum TM	75	419.5	2	0.48	0.06	1.72	8
Exeter V40	Morscher	1209	19,129.6	91	0.48	0.38	0.58	0
Charnley	Charnley	461	6,100.2	29	0.48	0.31	0.67	0
CLS	Trabecular Metal Shell	59	631.1	3	0.48	0.10	1.39	0
SL monoblock	Muller PE cup	559	6,952.4	33	0.47	0.32	0.66	0
TwinSys SS Stem Standard	Continuum TM	89	421.6	2	0.47	0.06	1.71	3
Spectron	Fitmore	78	1,078.5	5	0.46	0.13	1.02	0
Polarstem uncemented	R3 porous	2583	14,277.0	66	0.46	0.36	0.59	192
Exeter V40	Exeter X3	3325	19,010.1	87	0.46	0.37	0.56	158
Versys Heritage	ZCA	300	3,501.2	16	0.46	0.25	0.72	0
Versys Fiber Metal Midcoat	Trilogy	254	4,429.5	20	0.45	0.28	0.70	0
Exeter V40	CLS Expansion	217	2,899.3	13	0.45	0.23	0.74	0
Taperloc Complete	Delta-TT	191	669.9	3	0.45	0.09	1.31	2
Wagner cone stem	Fitmore	79	1,135.8	5	0.44	0.12	0.96	0
Stemsys HAC	Fixa Ti Por	634	4,321.3	19	0.44	0.26	0.69	21
Synergy Porous	R3 porous	1859	16,008.4	69	0.43	0.34	0.55	4
Tri-Lock BPS	Pinnacle	197	949.5	4	0.42	0.09	1.08	37
Avenir Muller Lateral Uncemented	RM cup	105	1,187.5	5	0.42	0.11	0.92	0
Exeter V40	ССВ	614	4,795.1	20	0.42	0.25	0.64	5
Exeter V40	Reflection cemented	1077	8,976.5	37	0.41	0.29	0.57	17
CPT Femoral Stem	Delta-TT	143	728.0	3	0.41	0.08	1.20	0
Spectron	Mallory-Head	152	2,196.2	9	0.41	0.19	0.78	0
Stemsys HAC Collared	Delta-PF	156	740.2	3	0.41	0.08	1.18	3
Stemsys HAC Offset	Agilis Ti-por	100	742.9	3	0.40	0.08	1.18	0
Exeter V40	Pinnacle	3980	25,119.6	101	0.40	0.33	0.49	283

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
Exeter V40	Trident	15048	118,279.8	470	0.40	0.36	0.43	436
CPCS	R3 porous	400	2,275.4	9	0.40	0.18	0.75	19
Exeter V40	ZCA	125	1,018.6	4	0.39	0.11	1.01	1
Accolade	Trident	1867	27,570.6	107	0.39	0.32	0.47	0
Avenir Muller Lateral Uncemented	Fitmore	70	515.6	2	0.39	0.05	1.40	0
Summit	Trilogy	215	2,085.7	8	0.38	0.17	0.76	13
Standard straight stem	Weber	103	1,049.5	4	0.38	0.08	0.91	0
MS 30	Pinnacle	305	790.8	3	0.38	0.05	1.01	77
Summit	Duraloc	101	1,583.0	6	0.38	0.14	0.82	0
Spectron	R3 porous	458	4,040.1	15	0.37	0.20	0.60	2
Synergy Porous	Reflection porous	1271	17,089.1	63	0.37	0.28	0.47	0
Exeter V40	Trilogy	3745	34,812.5	127	0.36	0.30	0.43	137
CLS	Pinnacle	133	1,101.4	4	0.36	0.10	0.93	2
Corail	Trilogy	263	1,939.1	7	0.36	0.15	0.74	12
Exeter V40	Reflection porous	494	5,845.6	21	0.36	0.22	0.54	0
MS 30	Muller PE cup	505	5,301.6	19	0.36	0.21	0.55	1
Exeter V40	RM Pressfit cup	3388	23,200.8	83	0.36	0.28	0.44	117
TwinSys Stem Standard	Continuum TM	207	2,002.5	7	0.35	0.14	0.72	0
C-Stem	Elite Plus Ogee	55	582.4	2	0.34	0.04	1.24	0
Zimmer Lateral Straight Stem	Weber	287	3,223.8	11	0.34	0.17	0.61	0
MS 30	Continuum TM	549	3,641.8	12	0.33	0.16	0.56	43
Exeter V40	Monoblock Acetabular Cup	136	2,153.7	7	0.33	0.12	0.64	0
Stemsys HAC Offset	RM Pressfit cup	133	923.9	3	0.32	0.07	0.95	0
Corail	Reflection porous	140	1,851.8	6	0.32	0.12	0.71	0
TwinSys SS Stem Standard	RM Pressfit cup	1,446	5,393.9	17	0.32	0.18	0.50	228
Synergy Porous	Delta-PF	118	1,282.2	4	0.31	0.09	0.80	0

Femur Prosthesis	Acetabular Prosthesis	Ν	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
M/L Taper	Trident	333	2,286.1	7	0.31	0.12	0.63	0
C-Stem	Marathon cemented	94	662.4	2	0.30	0.04	1.09	0
Avenir Muller Lateral Uncemented	Tritanium	91	994.6	3	0.30	0.06	0.88	0
Stemsys HAC Offset	Delta-PF	438	2,657.5	8	0.30	0.13	0.59	6
Corail	Ultima	135	1,331.2	4	0.30	0.08	0.77	0
Stemsys HAC	RM Pressfit cup	115	1,007.2	3	0.30	0.06	0.87	0
Exeter V40	PolarCup cemented	107	336.0	1	0.30	0.01	1.66	13
MS 30	Fitmore	2,896	24,343.7	71	0.29	0.23	0.37	54
Accolade	Tritanium	152	1,719.8	5	0.29	0.09	0.68	0
CPT Femoral Stem	Pinnacle	66	694.5	2	0.29	0.03	1.04	0
PLS	Delta-TT	53	349.3	1	0.29	0.01	1.60	2
H-Max S	Trident	67	356.4	1	0.28	0.01	1.56	0
FTC HA Femoral Stem	DeltaMotion	112	1,494.8	4	0.27	0.07	0.69	0
Avenir Muller Lateral Uncemented	RM Pressfit cup	53	385.0	1	0.26	0.01	1.45	0
Trabecular Metal Stem	Monoblock Acetabular Cup	74	1,158.5	3	0.26	0.04	0.69	0
Standard straight stem	Muller PE cup	382	3,921.8	10	0.25	0.12	0.47	0
Corail	Tritanium	175	1,611.8	4	0.25	0.07	0.64	0
Friendly	Delta-PF	192	2,438.7	6	0.25	0.09	0.54	14
Corail	Delta-PF	82	1,236.1	3	0.24	0.05	0.71	0
Avenir Muller Lateral Uncemented	Pinnacle	99	1,241.5	3	0.24	0.03	0.64	0
Zimmer Lateral Straight Stem	RM Pressfit cup	173	1,752.3	4	0.23	0.06	0.58	0
Corail	DeltaMotion	78	896.0	2	0.22	0.03	0.81	0
Versys Heritage	Trilogy	221	2,720.5	6	0.22	0.08	0.48	0
Stemsys HAC Collared	DeltaMotion	225	1,368.2	3	0.22	0.05	0.64	0
Exeter V40	Polymax	85	460.7	1	0.22	0.01	1.21	0
Exeter V40	Weber	74	959.9	2	0.21	0.03	0.75	0

Femur Prosthesis	Acetabular Prosthesis	N	Observed comp. Yrs	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Ops 2023
TwinSys Stem Standard	Delta-PF	402	4,899.3	10	0.20	0.10	0.38	0
MS 30	Trilogy	449	3,460.0	7	0.20	0.07	0.40	27
TwinSys XS Stem HA uncemented	RM Pressfit cup	112	991.8	2	0.20	0.02	0.73	4
Stemsys HAC Offset	DeltaMotion	57	498.1	1	0.20	0.01	1.12	0
SL modular stem	Muller PE cup	110	1,559.7	3	0.19	0.04	0.56	0
Accolade	Pinnacle	180	2,271.6	4	0.18	0.05	0.45	0
Echo Bi-Metric	Exceed ABT Ringloc-X	57	575.3	1	0.17	0.00	0.97	8
Basis	Reflection porous	108	1,153.5	2	0.17	0.02	0.63	0
Stemsys HAC	DeltaMotion	116	1,223.3	2	0.16	0.02	0.59	0
Exeter V40	Fitmore	1,249	10,258.9	16	0.16	0.09	0.25	19
CPT Femoral Stem	ZCA all-poly cup	100	756.4	1	0.13	0.00	0.74	1
Stemsys HAC Collared	RM Pressfit cup	151	758.1	1	0.13	0.00	0.73	0
MS 30	ZCA all-poly cup	96	821.6	1	0.12	0.00	0.68	0
Zimmer Lateral Straight Stem	ZCA	98	969.8	1	0.10	0.00	0.57	0
Std Femoral Stem	Acetabular Shell	333	278.5	0	0.00	0.00	1.32	196
Exeter V40	Trident PSL HA Cluster	145	136.5	0	0.00	0.00	2.70	70
Furlong Evolution Collared Ste	Delta-PF	130	137.6	0	0.00	0.00	2.68	64
Medacta Lateral Stem	Acetabular Shell	127	94.5	0	0.00	0.00	3.90	87
Exeter V40	ZCA all-poly cup	110	702.4	0	0.00	0.00	0.53	0
Standard straight stem	RM Pressfit cup	109	1,175.3	0	0.00	0.00	0.31	0
Stemsys HAC Collared	Maxera Cup	108	281.0	0	0.00	0.00	1.31	5
Accolade II	G7 acetabular shell	89	38.4	0	0.00	0.00	9.62	89
Stemsys HAC Offset	Polymax	85	476.4	0	0.00	0.00	0.77	1
Zimmer Lateral Straight Stem	ZCA all-poly cup	70	653.4	0	0.00	0.00	0.56	0
Stemsys Cemented	Delta-PF	62	261.6	0	0.00	0.00	1.41	6
Stemsys HAC Collared	Zimmer Maxera Cup	61	137.3	0	0.00	0.00	2.69	11

Femur	Acetabular	N	Observed	N	Rate/100-	Lower	Upper	Ops
Prosthesis	Prosthesis		comp.	Revised	component-	95% CI	95% CI	2023
			Yrs		years			
Stemsys Cemented Lateralized	Delta-PF	56	301.9	0	0.00	0.00	1.22	0
Synergy Porous	Continuum TM	55	395.5	0	0.00	0.00	0.93	1
Corail	G7 acetabular shell	53	59.7	0	0.00	0.00	6.18	28

TABLE 1.60

#### Top 30 Matches

Femur: Acetabular Prosthesis	No. Ops.	Observed comp. Yrs.	Events	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl	Procedures 2023	Procedures Pre-2023
Corail: Pinnacle	18,350	112,612.3	630	0.56	0.52	0.60	1679	16,671
Exeter V40: Trident	15,048	118,279.8	470	0.40	0.36	0.43	436	14,612
Exeter V40: Contemporary	8,302	85,618.5	520	0.61	0.56	0.66	0	8,302
TwinSys Stem Standard: RM Pressfit cup	6,744	59,310.0	353	0.60	0.53	0.66	121	6,623
Exeter V40: Pinnacle	3,980	25,119.6	101	0.40	0.33	0.49	283	3,697
Exeter V40: Tritanium	3,933	27,157.0	130	0.48	0.40	0.57	0	3,933
C-Stem AMT: Pinnacle	3,930	20,842.6	142	0.68	0.57	0.80	374	3,556
Exeter V40: Trilogy	3,745	34,812.5	127	0.36	0.30	0.43	137	3,608
Exeter V40: RM Pressfit cup	3,388	23,200.8	83	0.36	0.28	0.44	117	3,271
Exeter V40: Exeter X3	3,325	19,010.1	87	0.46	0.37	0.56	158	3,167
Exeter V40: Trident II Tritanium	3,253	5,049.9	33	0.65	0.45	0.92	1309	1,944
Exeter V40: Continuum TM	3,186	22,684.1	139	0.61	0.51	0.72	31	3,155
Summit: Pinnacle	3,160	25,402.1	150	0.59	0.50	0.69	214	2,946
Exeter V40: Exeter	3,012	35,585.7	242	0.68	0.60	0.77	0	3,012
Spectron: Reflection cemented	2,984	32,740.6	399	1.22	1.10	1.34	0	2,984
MS 30: Fitmore	2,896	24,343.7	71	0.29	0.23	0.37	54	2,842
Spectron: Reflection porous	2,755	33,877.3	308	0.91	0.81	1.02	0	2,755
Polarstem uncemented: R3 porous	2,583	14,277.0	66	0.46	0.36	0.59	192	2,391
CLS: Fitmore	2,453	33,455.8	161	0.48	0.41	0.56	6	2,447
CPT Femoral Stem: Continuum TM	1,974	12,570.9	78	0.62	0.49	0.77	107	1,867
Accolade: Trident	1,867	27,570.6	107	0.39	0.32	0.47	0	1,867
Femur: Acetabular	No. Ops.	Observed	Events	Rate/100-	Lower 95% Cl	Upper 95% Cl	Procedures	Procedures
---	----------	------------	--------	------------	--------------	--------------	------------	------------
Prosthesis		comp. Yrs.		component-			2023	Pre-2023
				years				
Synergy Porous: R3 porous	1,859	16,008.4	69	0.43	0.34	0.55	4	1,855
Accolade II: Trident	1,729	8,693.3	46	0.53	0.39	0.71	47	1,682
CLS: Morscher	1,700	29,358.1	147	0.50	0.42	0.59	0	1,700
Exeter V40: Duraloc	1,606	23,148.2	279	1.21	1.07	1.35	0	1,606
Accolade II: Tritanium	1,579	8,713.3	57	0.65	0.50	0.85	0	1,579
TwinSys SS Stem Standard: RM Pressfit cup	1,446	5,393.9	17	0.32	0.18	0.50	228	1,218
TwinSys Stem Standard: Selexys TPS	1,285	15,811.2	170	1.08	0.92	1.25	0	1,285
Synergy Porous: Reflection porous	1,271	17,089.1	63	0.37	0.28	0.47	0	1,271
CLS: CLS Expansion	1,263	19,408.6	166	0.86	0.73	1.00	0	1,263

## **KNEE ARTHROPLASTY**



## PRIMARY KNEE ARTHROPLASTY

The **twenty-five-year** report analyses data for the period January 1999 – December 2023.

New data forms introduced in October 2020 have 3 categories of knee arthroplasty: total knees, unicompartmental knees with medial or lateral approach, and patellofemoral knees. There were 10,982 new knee registrations in 2023.

## Primary Knee Arthroplasty by Type – 1999 to 2023

Primary Knee Arthroplasty (PKA) Type	Ν
Total Knee Arthroplasty (TKR)	152,786
Unicompartmental Knee Arthroplasty (UKR)	17,981
Patellofemoral Knee Arthroplasty (PFJ)	975

TABLE 2.1

## Number of operations by year



### Age of Primary Knee Arthroplasty Patients by Gender

	Female			
	Mean	Minimum	Maximum	N (%)
Total Knee Arthroplasty (TKR)	68.6	10.2	100.5	73,656 (51.1)
Unicompartmental Knee Arthroplasty (UKR)	65.9	18.3	61.08	750 (43.1)
Patellofemoral Knee Arthroplasty (PFJ)	60.1	31.3	89.4	635 (71.5)

### TABLE 2.2

	Male				
	Mean	Minimum	Maximum	N (%)	
Total Knee Arthroplasty (TKR)	67.9	8.2	98.7	69,849 (48.9)	
Unicompartmental Knee Arthroplasty (UKR)	66.2	19.5	94.6	9,889 (56.9)	
Patellofemoral Knee Arthroplasty (PFJ)	61.1	31.3	100.5	252 (28.4)	

TABLE 2.3

Ethnicity	Ν	%
Asian	4,844	3.4
Euro/Other	124,550	86.8
Māori	8,916	6.2
Pacifica	5,244	3.7

#### TABLE 2.4

Data form analysis includes new form and legacy data and is for **Total Knee Arthroplasty**.

Age Groups	Ν	%
<40	430	0.3
40-54	11,935	7.8
55-64	42,894	28.1
65-74	59,230	38.8
>=75	38,296	25.1

TABLE 2.5

### **Body Mass Index**

BMI (kg/m2)	Ν	%
< 19	157	0.2
19 - 24	8,499	10.5
25 - 29	26,022	32.1
30 - 39	38,370	47.3
40+	8,009	9.9

TABLE 2.6

For the fourteen-year period 2010 - 2023, there were 81,057 BMI registrations for total knee arthroplasties. The average was 31.3 with a range of 12.5 - 70.0 and a standard deviation of 5.91.

#### ASA Class

ASA Class	Ν	%
1	13,391	10.3
2	82,293	63.3
3	33,801	26.0
4	514	0.4

#### TABLE 2.7

Previous operation	N
None	128,793
Menisectomy	15,316
Osteotomy	2,149
Ligament reconstruction	2,469
Internal fixation	1,336
Synovectomy	231
Other	5,317

#### TABLE 2.8

Diagnosis	N
Osteoarthritis	145,216
Rheumatoid arthritis	3,887
Other Inflammatory	1,356
Post dysplasia	1,814
Post fracture	1,749
Avascular necrosis	480
Tumour	132

TABLE 2.9

Approach	N
Media parapatellar	139,272
Lateral parapatellar	1,687
тто	3
Other	337



Surgical Adjuncts	N
Computer Navigation	26,250
Robotic assisted	3,408
Patient Specific Cutting Guides	487

TABLE 2.10

## Operative time (skin to skin in minutes)

## All Primary Knee Arthroplasty Surgical Time



## Surgeon grade

The updated forms introduced in 2005 have separated advanced trainees into supervised and unsupervised. The following figures are for the nineteen-year period 2005 – 2023.

Surgeon grade	N
Consultant	136,195
Advanced trainee supervised	10,592
Advanced trainee unsupervised	2,454
Basic trainee	2,297

TABLE 2.11

## Surgeon and Hospital Workload

Operations per Year	Ν
<10	2,848
10-24	27,991
25-49	57,898
50-74	42,368
75-99	10,760
>=100	10,921

TABLE 2.12

### Surgeons

In 2023, 239 surgeons performed 9,799 total knee arthroplasties, an average of 41 procedures per surgeon.

35 surgeons performed less than 10 procedures and 99 performed more than 40.

## Hospitals

In 2023, total knee arthroplasty was performed in 54 hospitals; 27 were public hospitals and 27 were private.

#### **Cementation Rates for TKR by Year**



Cemented Uncemented Hybrid

### Fixed and Mobile Bearings in TKR by Year



Fixed Mobile

## Bearing Constraint in TKR by Year



OTHER refers to minimally stabilised of which 98% are LCS.

#### Top 10 Knee Femoral Components used in 2023

Prostheses	N
Triathlon cemented	2,582
Attune cemented	2,472
Persona Cemented	1,902
Triathlon uncemented	894
Attune uncemented	801
Genesis II cemented	136
Journey II BCS	127
Unity Knee CR Femur	98
Persona	78

TABLE 2.13

## Most used total knee prostheses per year for five years 2018-2023



2019 2020 2021 2022 2023

The figure below summarises the 23 Knee prostheses with >1000 procedures. Showing the number of procedures for the history of the Registry and for the previous 2 years.



Procedures 2022-23

Procedures Pre-2022-23

Prosthesis	Revision Rate/	Procedures
Triathlon Cemented	0.373	3,496
Attune cemented	0.508	4,446
Genesis II cemented	0.432	272
Persona Cemented	0.596	3,343
PFC Sigma cemented	0.334	166
Triathlon CR Fem Cemented	0.395	1,352
Nexgen LPS-Flex cemented	0.566	26
Nexgen CR-Flex cemented	0.363	67
LCS Complete cemented	0.365	4
LCS Complete uncemented	0.507	32
Triathlon uncemented	0.545	1,601
LCS cemented	0.316	0
Duracon cemented	0.304	0
Nexgen LPS cemented	0.537	0
Nexgen CR cemented	0.327	18
Sigma cemented	0.390	144
Attune uncemented	0.810	1,224
Balansys	0.501	141
Vanguard (TM) CR	0.594	49
Sigma Femoral Cemented CR	0.251	18
LCS uncemented	0.536	0
Sigma CR150	0.396	14
Trekking	0.678	59

TABLE 2.14

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# Revision Total 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 is exchanged, removed, manipulated or added.

Procedures where all components are removed are all recorded as revisions.

## **Classification of Revision Procedures**

Revision Procedure	Category
Change of all components	Major
Change of femoral component	Major
Change of tibial component	Major
Change of patellar component	Minor
Change of polyethylene liner	Minor
Removal of components only	Major

#### TABLE 2.15

Re-operation only: no components added, exchanged or removed.

### Total Knee Arthroplasties Revised within One Year



## Data analysis

For the twenty-five-year period January 1999 – December 2023, there were 10,571 revision knee procedures registered. There were an additional 776 revisions over the past 12 months.

The average age for a revision knee arthroplasty was 70 years, with a range of 11 - 98 years.

The following data analyses are restricted to revisions of primary registered knee arthroplasties for the twenty-five-year period. There were 5,435 revisions of the 152,786 primary total knee arthroplasties.

# Total knee arthroplasty analysis - this includes new form and legacy reasons for revision

Time to revision	Years
Average	1,767 days (4.8 years)
Maximum	8,947 days (24.5 years)
Minimum	1 day
Standard deviation	4.6 years

TABLE 2.16

#### Proportion of Minor and Major Revisions by Year



## All Primary Total Knee Arthroplasties

	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
All patients	152,786	1,244,445.3	5,435	0.44 (0.43-0.45)

TABLE 2.17

## Survival by Gender

Sex	N	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
F	78,374	652,762.6	2,574	0.39 (0.38-0.41)
М	74,412	591,682.7	2,861	0.48 (0.47-0.50)

#### TABLE 2.18



## Survival by Age Group

Age Groups	N	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
<40	430	4,828.9	59	1.22 (0.92-1.56)
40-54	11,935	110,303.5	894	0.81 (0.76-0.86)
55-64	42,894	378,008.4	2,049	0.54 (0.52-0.57)
65-74	59,230	485,775.4	1,783	0.37 (0.35-0.38)
>=75	38,296	265,527.8	650	0.24 (0.23-0.26)

#### TABLE 2.19



## Survival by BMI

For the thirteen-year period 2010 - 2023, there were 2,770 BMI registrations for revision knee arthroplasties. The average BMI was 31.73 kg/m2 with a range of 15-65 and a standard deviation of 6.42.

ВМІ	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
< 19	157	778.1	4	0.51 (0.00-1.32)
19 - 24	8,499	45,055.2	220	0.49 (0.43-0.56)
25 - 29	26,022	140,209.5	640	0.46 (0.42-0.49)
30 - 39	38,370	203,070.2	1,029	0.51 (0.48-0.54)
40+	8,009	41,461.4	272	0.66 (0.58-0.74)

TABLE 2.20



## **Revision by Ethnicity**

Ethni-city	N	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
Asian	4,844	37,997.5	129	0.34 (0.28-0.40)
Euro/Other	124,550	1,055,730.6	4,626	0.44 (0.43-0.45)
Māori	8,916	66,846.0	401	0.60 (0.54-0.66)
Pacifica	5,244	42,319.5	175	0.41 (0.35-0.48)

TABLE 2.21



	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
Public	73,185	621,496.2	2,623	0.42 (0.41-0.44)
Private	79,601	622,949.1	2,812	0.45 (0.43-0.47)

TABLE 2.22

## Survival by Approach

	Ν	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
Medial	139,272	1,124,899.0	4,897	0.44 (0.42-0.45)
Lateral	1,687	15,950.0	86	0.54 (0.43-0.66)
Other	337	400.5	11	2.75 (1.37-4.91)

Ops per year	N	Observed comp. years (ocys)	N. Revised	Rate/100-component- years (95% CI)
<10	2,848	26,066.3	106	0.41 (0.33-0.49)
10-24	27,991	243,531.4	1214	0.50 (0.47-0.53)
25-49	57,898	478,661.6	2060	0.43 (0.41-0.45)
50-74	42,368	330,170.3	1418	0.43 (0.41-0.45)
75-99	10,760	87,984.2	327	0.37 (0.33-0.41)
>=100	10,921	78,031.5	310	0.40 (0.35-0.44)

TABLE 2.24

#### TABLE 2.23



#### Cumulative Incidence of Revision



Survival by Number of Procedures Performed per Year

## Survival by Bearing Constraint

Bearing Constraint	N	Observed comp. years (ocys)	Events	Rate/100- component- years (95% CI)
Cruciate Retaining	92,870	66,5041.0	2,571	0.39 (0.37-0.40)
Posterior Stabilising	36,498	313,478.0	1,773	0.57 (0.54-0.59)
Other	15,652	186,997.1	755	0.40 (0.38-0.43)

## Survival by Cementation

Cementation	N	Observed comp. years (ocys)	Events	Rate/100- component- years (95% CI)
Cemented	137,110	1,124,532.1	4,820	0.43 (0.42-0.44)
Uncemented	9,258	58,226.6	326	0.56 (0.50-0.62)
Hybrid	6,418	61,686.6	289	0.47 (0.42-0.53)

TABLE 2.26

## Survival by Fixation Method

Fixation Method	N	Observed comp. years (ocys)	Events	Rate/100- component- years (95% Cl)
Fixed	142,123	1,129,056.5	4,946	0.44 (0.43-0.45)
Mobile	10,663	115,388.8	489	0.42 (0.39-0.46)

**TABLE 2.27** 

#### TABLE 2.25







**Reason for Revision** 



Year	Loosening tibial component	Deep infection	Unexplained Pain	Loosening femoral component
	n	n	n	n
1999-2007	114	149	181	58
2008	38	47	52	22
2009	49	52	47	23
2010	49	40	60	18
2011	51	44	68	24
2012	52	68	62	19
2013	61	73	77	29
2014	61	84	78	38
2015	58	91	95	22
2016	89	115	105	40
2017	84	111	102	37
2018	95	76	99	34
2019	108	109	82	35
2020	95	93	111	49
2021	68	128	34	31
2022	71	129	26	39
2023	79	146	34	35

TABLE 2.28

Years from procedure		oosening tibial component		Deep infection		Unexplained Pain	Loo	sening femoral component
	Count	%	Count	%	Count	%	Count	%
0	57	4.7	625	40.2	165	12.6	19	3.4
1	99	8.1	250	16.1	324	24.7	38	6.9
2	133	10.9	144	9.3	201	15.3	40	7.2
3	126	10.3	115	7.4	117	8.9	40	7.2
4	101	8.3	72	4.6	90	6.9	56	10.1
5	93	7.6	58	3.7	69	5.3	44	8.0
6	98	8.0	59	3.8	60	4.6	35	6.3
7	83	6.8	43	2.8	56	4.3	36	6.5
8	62	5.1	30	1.9	49	3.7	30	5.4
9	71	5.8	31	2.0	32	2.4	28	5.1
10	53	4.3	22	1.4	35	2.7	28	5.1
>10	246	20.1	106	6.8	115	8.8	159	28.8
	1,222		1,555		1,313		553	

TABLE 2.29

The figure to the right summarises he 23 Knee prosthesis with >1000 procedures. Showing the number of procedures for the previous 2 years and the historical revision rate.







# Knee Re-Revisions



Analysis was undertaken of rerevisions. There were 264, 79 and 27 arthroplasties revised three, four and five times, respectively.

#### **Re-Revisions**

	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)
Re-Revisions	5,435	31,795.9	937	2.95 (2.76-3.14)

#### TABLE 2.30

	N	Observed comp. years (ocys)	N. Revised	Rate/100- component- years (95% CI)
Minor	2,659	14,935.6	490	3.28 (3.00-3.58)
Major	2,776	16,860.3	447	2.65 (2.41-2.91)

#### TABLE 2.31



## Second revision

Time between the first and second revision for the 937 knee arthroplasties averaged 2.3 years, with a range of 1 day to 18.8 years. This compares to an average of 1,767 days (4.8 years) between primary and first revision knee arthroplasty.

### **Revision by Bearing Surface and Age Group**

Years	N	% Re- revision	Lower 95% Cl	Upper 95% Cl
1	4,502	91.37	90.61	92.13
2	3,977	88.30	87.42	89.19
3	3,525	86.33	85.37	87.29
4	3,072	84.64	83.62	85.67
5	2,638	83.10	82.01	84.19
6	2,277	81.88	80.74	83.03
7	1,921	81.27	80.09	82.44
8	1,588	79.98	78.73	81.22
9	1,316	79.48	78.20	80.76
10	1,072	78.48	77.11	79.84
11	855	77.42	75.96	78.88
12	680	76.60	75.05	78.16
13	541	75.86	74.21	77.50
14	407	75.71	74.04	77.38
15	302	75.28	73.52	77.05
16	209	74.94	73.07	76.82
17	144	74.94	73.07	76.82

#### TABLE 2.32

Reason for revision	N	%
Deep infection	507	54.1
Unexplained Pain	157	16.8
Loosening tibial component	114	12.2
Loosening femoral component	107	11.4
Loosening patellar component	16	1.7
Instability	32	3.4
Fractured Femur	10	1.1
Fracture tibia	1	0.1

#### TABLE 2.32

There were 264, 79 and 27 arthroplasties revised three, four and five times, respectively.

# Patient Recorded Outcome Measures

Patient Reported Outcome Measures at Six months, Five, Ten, Fifteen and Twenty years

## Questionnaires at six months post-surgery

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

A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

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

#### This groups each score into four categories:

Category	Score	Interpretation
1	< 27	Poor
2	27-33	Fair
3	34-41	Good
4	>41	Excellent

#### TABLE 2.33

For the twenty-five-year period, there were 64,374 primary knee questionnaire responses registered at six months post-surgery. The average score was 37.7 (standard deviation 8.0, range 0-48).

Kalairajah Classification at 6 months	Revision to 2 Years	N revised	%	Std error
Poor	3,038	154	5.07	0.40
Fair	4,507	65	1.44	0.18
Good	10,923	76	0.70	0.08
Excellent	12,116	49	0.40	0.06

TABLE 2.34

#### Revision (%) to 2 years by Oxford score at 6 months



Kalairajah Classification at 6 months	Revision to 2 to 4 Years	N revised	%	Std error
Poor	2,660	63	2.37	0.29
Fair	3,945	50	1.27	0.18
Good	9,485	82	0.86	0.10
Excellent	10,630	40	0.38	0.06

TABLE 2.35

#### Revision (%) 2 to 4 years by Oxford score at 6 months



Kalairajah Classification at 6 months	Revision 4 to 6 years	N revised	%	Std error
Poor	2,322	17	0.73	0.18
Fair	3,499	24	0.69	0.14
Good	8,371	51	0.61	0.09
Excellent	9,338	43	0.46	0.07

TABLE 2.36



## 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 13,275 individual patients. At five years post-surgery, 85% of patients achieved an excellent or good score and had an average of 40.7 (standard deviation 7.7, range 1-48).

Kalairajah Classification at 5 years	Revision to 2 years	N revised	%	Std error
Poor	883	30	3.40	0.61
Fair	1,168	18	1.54	0.36
Good	3,215	16	0.50	0.12
Excellent	8,009	21	0.26	0.06

**TABLE 2.37** 

#### Revision (%) within 2 years by Oxford score at 5 Years



#### Kalairajah Revision N revised % Std **Classification at** 2 to 4 years error 5 years Poor 693 17 2.45 0.59 Fair 957 7 0.73 0.28 10 0.37 0.12 Good 2.681 Excellent 6,500 23 0.35 0.07

TABLE 2.38



## Questionnaires at ten years post-surgery

All patients who had a six-month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at ten years post-surgery. This dataset represents sequential Oxford knee scores for 7,441 individual patients.

At ten years post-surgery, 83% of patients achieved an excellent or good score and had an average of 40.2 (standard deviation 8.0, range 1-48).

Kalairajah Classification at 10 years	Revision to 2 years	N revised	%	Std error
Poor	551	25	4.54	0.89
Fair	730	13	1.78	0.49
Good	1,821	7	0.38	0.15
Excellent	4,339	21	0.48	0.11

TABLE 2.39

## Revision (%) to 2 years by Oxford score at 10 Years



## Questionnaires at fifteen 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 fifteen years post-surgery. This dataset represents sequential Oxford knee scores for 2,689 individual patients. At fifteen years post-surgery, 80% of patients achieved an excellent or good score and had an average of 39.5 (standard deviation 8.5, range 0-48).

Kalairajah Classification at 15 years	Revision to 2 years	N revised	%	Std error
Poor	251	17	6.77	1.59
Fair	277	2	0.72	0.51
Good	668	1	0.15	0.15
Excellent	1,493	8	0.54	0.19

#### TABLE 2.40

## Revision (%) to 2 years by Oxford score at 15 years



# Oxford 12 Score as a predictor of Knee Arthroplasty Revision

### Six-month score and revision arthroplasty

In view of the large number of six- month Oxford scores it is possible with statistical significance to further break down the score groupings to demonstrate an even more convincing relationship between score and risk of revision within two years.

Score Group at Six Months	Revision to 2 years	N revised	%	Std error
<= 15	436	53	12.16	1.56
16 - 20	732	41	5.60	0.85
21 - 25	1,454	49	3.37	0.47
26 - 30	2,600	48	1.85	0.26
31 - 35	4,352	46	1.06	0.16
36 - 40	7,092	50	0.71	0.10
41 - 45	9,395	44	0.47	0.07
46+	4,523	13	0.29	0.08

TABLE 2.41

## Revision (%) to 2 years by Oxford score at 6 months



#### Five-year score and revision arthroplasty

As with the six- month scores, plotting the patients' five- year scores in the Kalairajah groupings against the proportion of knees revised for that same group demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has 12 times the risk of a revision within two years compared to a person with a score > 42.

Score Group 5 years	Revision to 2 years	N revised	%	Std error
<= 15	145	9	6.21	2.00
16 - 20	226	10	4.42	1.37
21 - 25	406	10	2.46	0.77
26 - 30	666	13	1.95	0.54
31 - 35	1,161	11	0.95	0.28
36 - 40	2,015	8	0.40	0.14
41 - 45	4,421	17	0.38	0.09
46+	4,235	7	0.17	0.06

**TABLE 2.42** 

#### Revision (%) to 2 years by Oxford score at 5 years



## Oxford scores for 6 most common Knees prostheses with 6 month and 5 years Oxford Scores

Prosthesis

Oxford Score		Attune cemented	Genesis II cemented	Nexgen LPS-Flex cemented	Persona cemented	PFC Sigma cemented	Triathlon cemented
6 Month	Mean	38.7	37.4	38.7	38.2	38.3	38.4
	Std. Error of Mean	0.11	0.13	0.21	0.15	0.15	0.10
	N	4,812	3,604	1,375	2,645	2,613	5,144
5 Year	Mean	41.6	40.6	41.1	41.5	41.2	41.6
	Std. Error of Mean	0.26	0.17	0.26	0.42	0.19	0.17
	Ν	781	1,893	812	367	1,462	1,727

TABLE 2.43



- 90 -

Femur Prosthesis	N	Observed	N	Rate/100-	Lower	Upper
		years	Revised	years	95% CI	95% CI
Advance cemented	157	2,048.7	4	0.195	0.053	0.500
AGC cemented	376	4,900.8	16	0.326	0.187	0.530
AMK cemented	95	1,417.6	1	0.071	0.002	0.393
Attune cemented	18,103	75,443.5	383	0.508	0.458	0.561
Attune uncemented	2,093	4,198.6	34	0.810	0.561	1.132
Balansys	1,968	14,358.0	72	0.501	0.389	0.628
Duracon cemented	3,433	46,707.8	142	0.304	0.256	0.358
Duracon uncemented	779	11,484.4	25	0.218	0.141	0.321
Evolution cemented	94	180.3	2	1.110	0.134	4.008
Genesis II cemented	15,055	151,687.9	655	0.432	0.399	0.466
Insall/Burstein	249	3,547.0	25	0.705	0.445	1.024
Journey BCS	144	1,697.4	19	1.119	0.651	1.712
Journey II BCS	588	2,065.9	18	0.871	0.516	1.377
Journey II CR	60	177.0	1	0.565	0.014	3.147
LCS cemented	3,584	50,321.3	159	0.316	0.269	0.369
LCS Complete cemented	6,169	69,644.2	254	0.365	0.321	0.412
LCS Complete RPS	70	685.0	5	0.730	0.237	1.703
LCS Complete uncemented	4,480	45,775.3	232	0.507	0.443	0.575
LCS uncemented	1,091	16,423.7	88	0.536	0.430	0.660
Legion Oxinium	154	1,216.1	7	0.576	0.231	1.186
Legion PS cemented	155	671.5	7	1.042	0.419	2.148
Maxim	822	11,339.1	64	0.564	0.435	0.721
MBK cemented	246	3,768.4	14	0.372	0.193	0.607
Medacta Femoral Component	170	313.8	9	2.868	1.205	5.235
Nexgen cemented	54	331.7	16	4.823	2.757	7.833

Revision Rate of Femoral Prostheses (number of procedures >100) in Alphabetical Order

Femur Prosthesis	N	Observed comp	N Revised	Rate/100- comp	Lower 95% Cl	Upper 95% Cl
Nexgen CR cemented	3,082	39,740.6	130	0.327	0.273	0.388
Nexgen CR uncemented	482	6,155.3	22	0.357	0.218	0.531
Nexgen CR-Flex cemented	6,281	58,107.7	211	0.363	0.316	0.416
Nexgen CR-Flex uncemented	309	2,159.9	11	0.509	0.254	0.911
Nexgen LCCK cemented	329	2,457.2	25	1.017	0.642	1.478
Nexgen LPS cemented	3,237	38,366.7	206	0.537	0.466	0.615
Nexgen LPS uncemented	164	1,815.4	8	0.441	0.172	0.832
Nexgen LPS-Flex cemented	6,774	74,229.8	420	0.566	0.512	0.622
Optetrak cemented	281	3,221.9	39	1.210	0.861	1.655
Optetrak uncemented	380	4,333.2	42	0.969	0.689	1.297
Persona Cemented	11,114	40,637.2	242	0.596	0.522	0.674
Persona uncemented	205	230.2	3	1.303	0.269	3.809
PFC Sigma cemented	9,727	109,558.6	366	0.334	0.300	0.370
PFC Sigma uncemented	689	6,561.9	33	0.503	0.340	0.697
Saiph	237	887.5	4	0.451	0.095	1.154
Scorpio	852	11,394.6	74	0.649	0.510	0.815
Sigma cemented	2,156	15,628.6	61	0.390	0.299	0.501
Sigma CR150	1,071	10,599.5	42	0.396	0.282	0.530
Sigma Femoral Cemented CR	1,196	13,540.8	34	0.251	0.174	0.351
Trekking	1,053	6,931.5	47	0.678	0.492	0.893
Triathlon Cemented	35742	240352.9	905	0.377	0.352	0.402
Triathlon uncemented	4,007	12,288.9	67	0.545	0.423	0.692
Unity Knee CR Femur	127	79.3	0	0.000	0.000	4.651
Vanguard (TM) CR	1,754	14,639.7	87	0.594	0.476	0.733
Vanguard (TM) PS	620	5,347.7	45	0.841	0.606	1.115
Zimmer	66	233.2	5	2.144	0.696	5.004

Revision rate of Fully Cemented Femoral Prostheses sorted by Revision Rate (procedures >100)

Femur Prosthesis	N	Observed comp	Events	Rate/100- comp	Lower 95% Cl	Upper 95% Cl
Nexgen cemented	54	331.7	16	4.823	2.757	7.833
Persona Revision	52	62.5	2	3.200	0.388	11.559
Medacta Femoral Component	159	305.7	9	2.944	1.346	5.589
Zimmer	59	215.0	5	2.326	0.755	5.428
Optetrak cemented	281	3,221.9	39	1.210	0.861	1.655
Journey BCS	144	1,697.4	19	1.119	0.651	1.712
Evolution cemented	94	180.3	2	1.110	0.134	4.008
Legion PS cemented	154	671.4	7	1.043	0.373	2.047
Nexgen LCCK cemented	329	2,457.2	25	1.017	0.642	1.478
Journey II BCS	586	2,065.8	18	0.871	0.516	1.377
Vanguard (TM) PS	618	5,334.9	45	0.843	0.607	1.118
LCS Complete RPS	65	630.6	5	0.793	0.257	1.850
Insall/Burstein	249	3,547.0	25	0.705	0.445	1.024
Trekking	1,049	6,920.3	46	0.665	0.480	0.878
Scorpio	852	11,394.6	74	0.649	0.510	0.815
Persona Cemented	11,109	40,636.0	241	0.593	0.519	0.672
Vanguard (TM) CR	1,734	14,462.1	85	0.588	0.466	0.723
Journey II Cr	59	173.5	1	0.576	0.015	3.212
Legion Oxinium	154	1,216.1	7	0.576	0.231	1.186
Nexgen LPS-Flex cemented	6,774	74,229.8	420	0.566	0.512	0.622
Maxim	822	11,339.1	64	0.564	0.435	0.721
Nexgen LPS cemented	3,233	38,313.2	206	0.538	0.467	0.616
Attune cemented	18,075	75,395.8	380	0.504	0.455	0.557
Balansys	1,967	14,356.6	72	0.502	0.389	0.628

Femur Prosthesis	N	Observed	Events	Rate/100-	Lower	Upper
		comp		comp	95% CI	95% CI
		years		years		
Saiph	236	886.0	4	0.451	0.123	1.156
Genesis II cemented	15,049	151,654.4	654	0.431	0.399	0.466
Sigma CR150	1,071	10,599.5	42	0.396	0.282	0.530
Triathlon Cemented	35,742	240,352.9	905	0.377	0.352	0.402
MBK cemented	246	3,768.4	14	0.372	0.193	0.607
LCS Complete cemented	6,135	69,185.7	252	0.364	0.321	0.412
Nexgen CR-Flex cemented	6,277	58,082.3	211	0.363	0.315	0.415
Sigma cemented	1,734	13,117.0	45	0.343	0.250	0.459
PFC Sigma cemented	9,516	106,924.4	355	0.332	0.298	0.368
Nexgen CR cemented	3,076	39,642.7	130	0.328	0.274	0.389
AGC cemented	376	4,900.8	16	0.326	0.187	0.530
LCS cemented	3,546	49,682.0	158	0.318	0.270	0.372
Duracon cemented	3,431	46,668.2	142	0.304	0.256	0.359
Sigma Femoral Cemented CR	1,196	13,540.8	34	0.251	0.174	0.351
Advance cemented	157	2,048.7	4	0.195	0.053	0.500
AMK cemented	95	1,417.6	1	0.071	0.002	0.393
Unity Knee CR Femur	127	79.3	0	0.000	0.000	4.651

Revision rate of Uncemented Femoral Prostheses sorted by Revision Rate (Procedures >=50)

Femur Prosthesis	N	Observed comp years	N Revised	Rate/100- comp years	Lower 95% Cl	Upper 95% Cl
Persona uncemented	77	120.1	1	0.832	0.021	4.638
Attune uncemented	1,776	3,598.6	29	0.806	0.540	1.157
LCS uncemented	488	7927.0	60	0.757	0.578	0.974
Nexgen CR uncemented	55	655.3	4	0.610	0.166	1.563
LCS Complete uncemented	2,721	27,948.4	159	0.569	0.484	0.665
Nexgen LPS uncemented	136	1,511.1	8	0.529	0.229	1.043
Triathlon uncemented	3,404	9,202.1	44	0.478	0.347	0.642
Duracon uncemented	460	6,263.0	14	0.224	0.122	0.375

## Revision rate of Hybrid Femoral Prostheses sorted by Revision Rate (Procedures >=50)

Femur Prosthesis	N	Observed comp years	N Revised	Rate/100- comp years	Lower 95% Cl	Upper 95% Cl
LCS Complete uncemented	1759	17826.9	73	0.409	0.321	0.515
PFC Sigma uncemented	682	6457.8	33	0.511	0.345	0.709
LCS uncemented	603	8496.8	28	0.330	0.219	0.476
Triathlon uncemented	586	3065.3	23	0.750	0.463	1.106
Nexgen CR uncemented	426	5498.5	18	0.327	0.194	0.517
Sigma cemented	421	2510.3	16	0.637	0.364	1.035
Optetrak uncemented	380	4333.2	42	0.969	0.689	1.297
Duracon uncemented	319	5221.3	11	0.211	0.105	0.377
Attune uncemented	307	590.5	4	0.677	0.185	1.734
Nexgen CR-Flex uncemented	254	1761.8	10	0.568	0.253	1.007
PFC Sigma cemented	211	2634.1	11	0.418	0.208	0.747
Persona uncemented	128	110.1	2	1.817	0.220	6.564

Femur Prosthesis	Bearing Constraint	N Obs	Observed comp years	Events	Rate/100- comp years	Lower 95% Cl	Upper 95% Cl
Attune cemented	CR	10,919	46,364.7	224	0.483	0.421	0.550
	PS	7,107	28,898.6	157	0.543	0.462	0.635
Attune uncemented	CR	1,612	3,492.5	27	0.773	0.498	1.108
	PS	472	697.1	7	1.004	0.359	1.972
Balansys	CR	1,673	13,207.3	60	0.454	0.347	0.585
	PS	113	856.4	10	1.168	0.520	2.071
Genesis II cemented	CR	8,043	84,351.2	266	0.315	0.279	0.356
	PS	6,999	67,285.1	389	0.578	0.521	0.638
Genesis II uncemented	CR	38	576.4	1	0.173	0.004	0.967
	PS	11	120.4	2	1.662	0.201	6.002
Maxim	CR	657	9,052.0	43	0.475	0.344	0.640
	PS	165	2,287.2	21	0.918	0.568	1.404
Nexgen cemented	CR	3,081	39,736.6	129	0.325	0.270	0.384
	PS	3,237	38,366.7	206	0.537	0.466	0.615
Nexgen uncemented	CR	482	6,155.3	22	0.357	0.218	0.531
	PS	164	1,815.4	8	0.441	0.172	0.832
Nexgen Flex	CR	6,281	58,107.7	211	0.363	0.316	0.416
cemented	PS	6,769	74,197.3	419	0.565	0.511	0.621
Optetrak cemented	CR	83	984.2	8	0.813	0.318	1.602
	PS	198	2,237.7	31	1.385	0.923	1.940
Optetrak uncemented	CR	354	4,035.3	39	0.966	0.687	1.321
	PS	26	297.9	3	1.007	0.208	2.943
Persona cemented	CR	9,220	32,181.3	179	0.556	0.478	0.644
	PS	1,863	8,440.6	63	0.746	0.574	0.955

## Revision rate of Femoral Prostheses by Bearing Constraint sorted by Revision Rate

Femur Prosthesis	Bearing Constraint	N Obs	Observed comp years	Events	Rate/100- comp years	Lower 95% Cl	Upper 95% Cl
PFC Sigma cemented	CR	7,788	84,106.8	247	0.294	0.258	0.333
	PS	1,890	24,764.5	119	0.481	0.398	0.575
Scorpio	CR	739	10,091.2	63	0.624	0.480	0.799
	PS	111	1,286.9	11	0.855	0.400	1.479
Sigma cemented	CR	402	2,723.9	3	0.110	0.015	0.294
	PS	1,754	12,904.7	58	0.449	0.338	0.577
Trekking	CR	343	2,512.8	18	0.716	0.425	1.132
	PS	699	4,359.3	28	0.642	0.427	0.928
Triathlon cemented	CR	22,482	146,971.3	523	0.356	0.326	0.387
	PS	3,624	31,865.8	145	0.455	0.384	0.535
Triathlon uncemented	CR	3863	11,215.4	62	0.553	0.424	0.709
	PS	95	1,021.4	3	0.294	0.041	0.784
Vanguard ™	CR	1754	14,639.7	87	0.594	0.476	0.733
	PS	620	5,347.7	45	0.841	0.606	1.115

# **UNICOMPARTMENTAL KNEE ARTHROPLASTY**



## UNICOMPARTMENTAL KNEE ARTHROPLASTY

The data analysis is for the **twenty-five-year** period January 1999 – December 2023. There were 17,984 unicompartmental knee procedures registered. There were 1,095 new procedures registered in 2023.

## Data analysis

This includes new form and legacy data.

## Age and sex distribution

The average age for a unicompartmental knee arthroplasty was 66 years, with a range of 18 – 95 years.

	Female	Male
Number	7,930	10,051
Percentage	44.1	55.9
Mean age	65.9	66.2
Maximum age	94.7	94.6
Minimum age	18.3	19.5
Standard dev.	10.1	9.22

## Age Groups (Years)

<55	2,301
55-64	6,087
65-74	6,170
>=75	3,423

TABLE 3.2

## Ethnicity

Asian	213
Euro/Other	16,024
Māori	569
Pacifica	96

TABLE 3.3

## **Operation Type**

Cemented	9,730
Uncemented	7,480
Hybrid	771

TABLE 3.4

## Approach

Medial parapatellar	14,059
Lateral parapatellar	413

TABLE 3.5

## **Surgical Adjuncts**

Not Image guided	17,585
Image guided	396

TABLE 3.6

## **Body Mass Index**

For the 14-year period 2010 - 2023, there were 10,693 BMI registrations for unicompartmental knee arthroplasties. The average was 30.1 kg/m2 with a range of 15 – 66 and a standard deviation of 5.1.

Previous operation	N
None	14,799
Menisectomy	2,359
Ligament reconstruction	117
Osteotomy	75
Internal fixation for juxtarticular fracture	50
Synovectomy	5

TABLE 3.7

Diagnosis	Ν
Osteoarthritis	17,615
Avascular necrosis	152
Post ligament- disruption/reconstruction	100
Rheumatoid arthritis/other inflammatory	85
Post fracture	46
Tumour	2

TABLE 3.8

## **ASA Class**

This was introduced with the updated forms at the beginning of 2005. For the nineteen-year period 2005 – 2023, there were 15,037 unicompartmental knee procedures with the ASA class recorded.

#### Definitions

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e that is

ASA Class	Ν	%
1	2,578	17
2	9,683	64
3	2,742	18
4	34	1

TABLE 3.9

## Operative time (skin to skin)

The average operative time was **67 minutes**, with a standard deviation of 36 minutes.

## Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the nineteen-year period 2005-2023.

Surgeon grade	N
Consultant	17,011
Advanced trainee supervised	695
Advanced trainee unsupervised	124
Basic trainee	22

TABLE 3.10

## Surgeon and hospital workload

#### Surgeons

In 2023, 88 surgeons performed 1,095 unicompartmental knee arthroplasties, an average of 12 procedures per surgeon.

49 surgeons performed less than 10 procedures and 39 surgeons performed greater or equal to 10 procedures.

#### Hospitals

In 2023, unicompartmental knee arthroplasties were performed in 42 hospitals; 18 were public and 24 were private.

## **Prosthesis Usage**

Unicompartmental knee prostheses used in registry

Prosthesis	N
Oxford 3 uncemented	8,116
Oxford 3 cemented	4,238
Zimmer Unicompartmental Knee	1863
Persona Partial cemented	868
Miller/Galante	710
Preservation	483
Restoris MCK	381
Genesis Uni	359
Triathlon PKR	287
Sigma HP Uni	214

TABLE 3.11

## Most Used Unicompartmental Prostheses for 5 years - 2019 to 2023





R

# Revision of Registered Primary Unicompartmental Arthroplasties

This section analyses the data for revision of unicompartmental knee replacement over the **twenty-four-year** period. There were 1,594 revisions of the 17,981 registered unicompartmental knee arthroplasties.

A further 192 had a second-, 37 a third-, 6 a fourth-and two had a fifth revision.

1,340 were revised to total knee arthroplasties.

Time to revision	Days	(Equiv. years)
Average	2,457	6.7
Maximum	8,301	
Minimum	1	
Standard Deviation	1,992	

#### TABLE 3.12

Reason for revision	N
Unexplained Pain	388
Loosening tibial component	251
Loosening femoral	164
Deep infection	67
Fracture tibia	52
Fracture femur	7

TABLE 3.13

N	Sum Comp. Years	Events	Rate/ 100 Comp. Years	Lower (95% CI)	Upper (95% CI)
17,981	145,101.0	1,594	1.0985	1.04	1.15
17,981	145,101.0	1,594	1.0985	1.04	

TABLE 3.14

## **Revision by Gender**

Sex	No. Ops	Obs. comp. years)	N Revised	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
Female	7,930	67,177.1	812	1.21	1.13	1.29
Male	10,051	77,923.9	782	1.00	0.93	1.08

#### **Revision versus Age Bands**

Age Groups	No. Ops	Obs. comp. years)	N Revised	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% Cl)
<55	2,301	19,264.6	348	1.81	1.62	2.00
55-64	6,087	52,469.1	716	1.36	1.27	1.47
65-74	6,170	49,845.6	388	0.78	0.70	0.86
>=75	3,423	23,521.7	142	0.60	0.51	0.71

TABLE 3.16

#### **Revision by Ethnicity**

Ethnicity	N	Sum comp. Years	Events	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
Asian	213	1,624.8	10	0.62	0.27	1.09
Euro/ Other	16,024	133,854.9	1,499	1.12	1.06	1.18
Māori	569	4,259.0	51	1.20	0.88	1.56
Pacifica	96	760.2	6	0.79	0.25	1.63

#### TABLE 3.17

#### **Revision by Surgeon Annual Workload**

Consultant No. of ops/ year	No. Ops.	Obs comp. Years	Number revised	Rate/100 comp. years	Exact cc inte	95% onf erval
<10	6,544	62,002.1	788	1.27	1.18	1.36
>=10	11,435	83,082.5	805	0.97	0.90	1.04

TABLE 3.18

TABLE 3.15

## **Revision by Arthroplasty Fixation**

Fixation	No. Ops	Obs. comp. years)	N Revised	Rate/ 100-comp. years	Lower (95% CI)	Upper (95% CI)
Cemented	9,730	96,832.5	1,171	1.21	1.14	1.28
Uncemented	7,480	43,089.5	355	0.82	0.74	0.91
Hybrid	771	5,178.9	68	1.31	1.02	1.66

TABLE 3.19

## **Revision vs. Surgical Approach**

Surgical Approach	No. Ops	Obs. comp. years)	N Rev	Rate/ 100-comp. years	Lower (95% CI)	Upper (95% Cl)
Medial parapatellar	14,059	109,957.8	1,243	1.13	1.07	1.19
Lateral parapatellar	413	3,149.3	51	1.62	1.19	2.11

TABLE 3.20

## **Revision versus Adjunct**

	No. Ops	Obs. comp. years)	N Rev	Rate/ 100-comp. years	Lower (95% Cl)	Upper (95% Cl)
Not Image guided	17,585	143,103.9	1,573	1.10	1.05	1.15
Image guided	396	1,997.1	21	1.05	0.00	1.61

TABLE 3.21

Oxford 3 uncemented	No. Ops	Obs. comp. years)	Events	Rate/ 100-comp. years	Lower (95% Cl)	Upper (95% CI)
Not Lateral Domed	7,614	44,184.4	366	0.83	0.75	0.92
Oxford 3 Lateral Domed	492	3,117.2	47	1.51	1.11	2.01
Oxford 3 uncemented	8,106	47,301.6	413	0.87	0.79	0.96

### TABLE 3.22

Survival curves for the top 3 Unicompartmental knee prostheses excluding lateral domed Oxford 3 uncemented



## Cumulative Incidence of Revision

Prosthesis	Ν	Sum comp. Years	Events	Rate/100-component-years	Lower 95% Cl	Upper 95% Cl
Genesis Unicompartmental Knee	359	4,641.8	57	1.23	0.92	1.58
Journey Unicompartmental Knee	93	294.6	9	3.06	1.40	5.80
Miller/Galante	710	9,891.1	93	0.94	0.75	1.15
Optetrak Unicondylar Cemented	101	1,188.5	14	1.18	0.64	1.98
Oxford 3 cemented PKR	4,237	52,159.7	701	1.34	1.25	1.45
Oxford 3 uncemented PKR	8,078	47,357.9	411	0.87	0.79	0.96
Persona Partial cemented	858	2,054.0	22	1.07	0.67	1.62
Preservation	483	6,273.1	108	1.72	1.41	2.07
Repicci II	98	1,380.2	28	2.03	1.35	2.93
Restoris MCK	408	1,151.8	11	0.96	0.48	1.71
Sigma HP Uni	214	1,529.6	11	0.72	0.36	1.29
Triathlon PKR	287	2,151.8	19	0.88	0.53	1.38
Zimmer Unicompartmental Knee	1863	13,722.5	76	0.55	0.43	0.69

## Revision Rate of Individual Unicompartmental Knee Prostheses Sorted Alphabetically (N >50)

TABLE 3.23

## Analysis of the three main reasons for revision by year after the primary procedure

Years from procedure	Lo	oosening Femur		Loosening Tibia		Pain	TABLE 3
0	14	8.6	40	16.1	52	13.5	
1	26	16.0	47	19.0	86	22.4	
2	10	6.1	25	10.1	43	11.2	
3	18	11.0	19	7.7	18	4.7	
4	5	3.1	11	4.4	36	9.4	
5	11	6.7	9	3.6	18	4.7	
6	6	3.7	13	5.2	21	5.5	
7	11	6.7	9	3.6	19	4.9	
8	9	5.5	8	3.2	14	3.6	
9	9	5.5	14	5.6	15	3.9	
10	8	4.9	7	2.8	15	3.9	
11+	36	22.1	46	18.5	47	12.2	
Total	163		248		384		

6

Cumulative Incidence of Revision



## **Cumulative Incidence of Revision**



# Patient Recorded Outcome Measures

Patient based questionnaire outcomes at six months, five years, ten years, fifteen years and twenty years postsurgery

## Questionnaires at six months post-surgery

At six months post-surgery a random selection of patients is 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.

A score of 48 is the best, indicating normal function. A score of 0 is the worst, indicating the most severe disability.

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

This groups each score into four categories:

Category	Score	Interpretation
1	>41	Excellent
2	34 - 41	Good
3	27 - 33	Fair
4	< 27	Poor

#### TABLE 3.25

For the twenty-four-year period, there were 9,380

unicompartmental knee questionnaire responses registered at six months post-surgery. At 6 months post-surgery, 84% of patients achieved an excellent or good score. The average was 39.9, range 3 to 48, and the standard deviation was 7.12.

Score Group at 6 months	Revision to 2 years	No. revised	%	Std error
0-26	555	101	18.20	1.64
27-33	957	39	4.08	0.64
34-41	2,966	35	1.18	0.20
> 41	4,902	42	0.86	0.13

TABLE 3.26

#### Revision (%) to 2 years by Oxford score at 6 months



Score Group at 6 months	Revision 2 - 4 years	No. revised	%	Std error
481	22	4.57	0.95	0.95
848	19	2.24	0.51	0.53
2,592	44	1.70	0.25	0.26
4,272	30	0.70	0.13	0.14

TABLE 3.27

#### Revision (%) 2 to 4-years by Oxford score at 6 months



## 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. There were 3,812 unicompartmental knee questionnaire responses registered at five years post-surgery.

At five years post-surgery, 89% of patients achieved an excellent or good score. The average was 41.74, range 5 to 48, and the standard deviation was 6.79.

Score Group at 5 years	Revision to 2 years	No. revised	%	Std error
0-26	171	17	9.94	2.29
27-33	263	7	2.66	0.99
34-41	876	12	1.37	0.39
> 41	2,502	13	0.52	0.14

Questionnaires at ten years post-surgery

All patients who had a six-month registered questionnaire, and who had not had revision surgery were sent a further questionnaire at ten years post-surgery. There were 2,065 unicompartmental knee questionnaire responses registered at ten years post-surgery.

At ten years post-surgery, 84% of patients achieved an excellent or good score. The average was 41.82, range 5 to 48, and the standard deviation was 7.85.

Score Group at 10 years	Revision to 2 years	No. revised	%	Std error
0-26	148	18	12.16	2.69
27-33	175	6	3.43	1.38
34-41	460	11	2.39	0.71
> 41	1,282	13	1.01	0.28

TABLE 3.28



## Revision (%) to 2 years by Oxford score at 5 Years

## 20

Revision (%) to 2 years by Oxford score at 10 Years

TABLE 3.29



# PATELLO-FEMORAL ARTHROPLASTY



The data analysis is for the **twenty-four-year** period January 2000 – December 2023.

There were 975 patellofemoral knee procedures registered. There were 88 new procedures registered in 2023.

## DATA ANALYSIS

This includes new form and legacy data.

#### Age and sex distribution

	Age					
	Mean	Minimum	Maximum	N (%)		
Female	59.9	693	31.1	89.4		
Male	61.5	282	31.2	90.7		
Total	60.3	975	31.1	90.7		

TABLE 4.1

## Patellofemoral prostheses used in 2023

Prostheses	Ν
Gender patellofemoral	61
Restoris patellofemoral	7
Attune uncemented	4
Persona cemented	4
Attune cemented	3
Journey PFJ	3
Custom device	3
Avon Patellofemoral Joint	1
Genesis II cemented	1
Legion PS cemented	1

TABLE 4.2

#### **Revision Rate**

Ν	Observed comp. years (ocys)	N. Revised	Rate/100- component-years (95% CI)
975	6,264.3	120	1.92 (1.59-2.29)

#### TABLE 4.3

The revision rate is four times that for total knee arthroplasty.

Re-revisions	Ν
Revised to Total	112
Revised to Uniknee	3
Revised to Patellofemoral	3

TABLE 4.4

## **Revision of Patellofemoral knees**

Of the 975 registered, n = 120 have been revised.

Time to Revision from Primary Procedure	Days	(Equiv. years)
Average	2,241	6.1
Maximum	6,880	18.8
Minimum	108	

#### TABLE 4.5

Reason for revision	N
Pain	33
Deep infection	16
Loosening patella	7
Loosening femur	4
Wear in non-replaced compartment	15
Instability	3
Polywear	2

TABLE 4.6

## **ANKLE ARTHROPLASTY**



## PRIMARY ANKLE ARTHROPLASTY

The **twenty-five-year** New Zealand Joint Registry report analyses ankle arthroplasty data for the 24-year period January 2000 – December 2023. There are 2,391 primary ankle procedures registered. This is an addition of 207 compared to last year's report.

## Data analysis

Data analysis includes the data collected from January 2000 onwards and relates to all 2,391 registered primary ankle arthroplasties and smaller data sets collected from subsequent dates when the data forms have been revised. Data form modifications occurred in 2005, 2010 and November 2020.

- The 2005 form added ASA and registrar primary surgeon supervision data
- The 2010 form added BMI
- In November 2020 the form was significantly revised for primary and revision procedures. They can be found in the appendices. The primary form added new categories for previous operations, diagnosis, X-ray alignment, concurrent surgery, approach (including technologies assisting implant insertion) and surgeon attire. The revision form added a wider range of categories for diagnosis.

Pain was replaced with 'pain without obvious cause'. Further categories were added for revision procedure and re-operation procedure.

In this report data from the new and the legacy forms have been grouped together for analysis. There have been 512 new ankles registered using the current form. Small variations in numbers reported versus previous years and apparent discrepancies in tallies since the new data forms were introduced reflect late data form deliveries and historic forms being used on occasion.

## Age, sex and ethnicity distribution

The average age for an ankle arthroplasty was 66.9 years, with a range of 32 - 96 years.

	Female	Male
Number	993	1,458
Percentage	39	61
Mean age	65.1	68.0
Maximum age	95.5	91.8
Minimum age	32.3	33.4
Standard dev.	9.0	8.9

TABLE 5.1

Age Groups (years)	N	%
<40	14	0.6
40-54	206	8.6
55-64	719	30.1
65-74	1,010	42.2
>=75	442	18.5
Total	2,391	100.0

#### TABLE 5.2

Patient ethnicity data was added to the reports from 2022 onwards. It was obtained from the national NHI dataset by matching to the registry form information rather than the registry forms themselves. Individuals for whom ethnicity was not recorded have not been included.

Total	2,347	100.0
Pacifika	38	1.6
Māori	82	3.5
Euro/Other	2,203	93.9
Asian	24	1.0
Ethnicity	N	%

TABLE 5.3

## **Body Mass Index**

For the fourteen-year period 2010 - 2023, there were 1,301 BMI registrations for primary ankle arthroplasties. The average was 29 kg/m<sup>2</sup> with a range of 17 - 54.

ВМІ	N	%
< 19	5	0.4
19 - 24	219	16.8
25 - 29	566	43.5
30 - 39	466	35.8
40+	45	3.5

#### TABLE 5.4

Previous operation	N
None	1,882
Internal fixation for juxta- articular fracture	242
Arthrodesis	56
Osteotomy	25
Ligament reconstruction	13
Subjacent fusion	24
Other	177
Total in data set	2,394

TABLE 5.5

Diagnosis	N
Post fracture	95
Osteoarthritis	1,795
Rheumatoid arthritis/ Other inflammatory	215
Avascular necrosis	14
Instability	47
Other	111
Total in data set	2,280

TABLE 5.6

X-Ray	N
Concentric or mild deformity	277
>10 degrees varus	113
>10 degrees valgus	50
Total in data set	440

TABLE 5.7

Concurrent surgery	N
Achilles or calf lengthening	147
Ligament reconstruction – lateral	70
Hindfoot fusion or osteotomy	62
Midfoot fusion or osteotomy	45
Total in data set	324

#### TABLE 5.8

With a view to the future the November 2020 data form update included data about modern surgical adjuncts (Patient specific instrumentation/Navigation/Robotics). No procedures have used Robotics or navigation. 60 primary procedures have recorded using Patient specific instrumentation.

Data regarding operating theatre air flow types (Laminar flow or similar/conventional) have been removed after 2022's report. This information is to be sought from each hospital contributing to the registry.

## ASA Class

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

For the nineteen-year period 2005 -2023, there were 2,106 primary ankle procedures with the ASA class recorded.

ASA Class	Ν	%
1	340	16.1
2	1,346	63.9
3	412	19.6
4	8	0.4

TABLE 5.9

#### Operative time (skin to skin minutes)



Minutes

## Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. However there have not been any unsupervised advanced trainees recorded since 2005. The following figures are for the nineteen-year period 2005 -2023.

Surgeon grade	Ν
Consultant	2,362
Advanced trainee supervised	29

TABLE 5.10

## Surgeon and hospital workload

#### Surgeons

In 2023, 26 surgeons performed 208 primary ankle procedures. 9 surgeons performed 10 or more procedures and 17 performed less than 10 procedures.

## Hospitals

In 2023, primary ankle arthroplasty was performed in 29 hospitals. 14 were public and 15 were private.

#### Ankle Prostheses used in 2023

The table reports prosthesis by tibial component variation. Previously a single Ossis implant was reported from 2021. This is not in the table or graph this year as it was a custom talar implant.

Prosthesis	N
Inbone II Tibial Tray	6
Infinity Adaptis Tibial Tray	93
Infinity Tibial Tray	2
Salto Tibia	8
Salto Talaris	13
Vantage Tibial Plate (fixed bearing)	16
Vantage Tibial Plate (mobile bearing)	42
Zimmer TM	27
Total	207

#### TABLE 5.11

In 2023 the Inbone II has been used as a primary implant. It has been available in New Zealand since 2016, with a Patient specific implantation option from 2020 onwards. It has a fixed bearing. In November 2022 it was offered with a new modified polyethylene (Everlast, highly crosslinked Vitamin E infused). The Infinity is a fixed bearing implant used in NZ since 2014. It started with a plasma sprayed backing, used a fixed conventional polyethylene bearing and had the option of the infinity talus or Inbone II talus (flat cut) as the articular surface geometry is the same for the Infinity and Inbone II. From 2016 the Infinity had a Patient specific implantation option. In November 2022 it added a new backing surface (Infinity with Adaptis) as well as a new modified polyethylene (Everlast, Highly crosslinked Vitamin E infused). The Salto is the oldest design remaining in use and has a mobile bearing. It has been in use in New Zealand since 2005. The Salto Talaris is based on the Salto but has a fixed bearing and has been in use in NZ since 2014. The supplier has indicated an imminent withdrawal from the market and numbers used have consequently dropped in 2023 as surgeons have moved to the Vantage and Infinity. 2023 has seen the Vantage enter the New Zealand market, with both a mobile and a fixed bearing option.

The Zimmer TM is a fixed bearing implant with highly crosslinked polyethylene implanted through a lateral approach with fibular osteotomy and has been in use in NZ since 2014.

#### Ankle Prostheses Used for the Five Years 2019-2023



NOTE: In the graph above the Infinity Group includes both Infinity II and Infinity with Adaptis (93) Tibial Components. The Vantage group includes both mobile bearing (42) and fixed bearing (16).

# 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. Procedures where all components are removed are recorded as revisions (e.g., ankle fusion post failed ankle arthroplasty, removal of components and insertion of a cement spacer for infection, or amputation). It does not include soft tissue procedures or bony debridement without component changes which are included in the category referred to as reoperation

## Data analysis

For the twenty-four-year period January 2000–December 2023, there were 330 revision ankle procedures registered. The average age for an ankle revision was 66 years, with a range of 35 - 87.

## Revision of registered Primary Ankle Arthroplasties

This section analyses data for revisions of primary ankle procedures for the twenty-four-year period 2000 – 2023. There were 257 revisions of the 2,391 primary total ankle procedures registered.

There was no difference in average age at revision, compared to the average age at primary arthroplasty.

	N	Sum comp. Years	Events	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
All patients	2,391	17,395.8	257	1.48	1.30	1.67

#### TABLE 5.11

Sex	N	Sum comp. Years	Events	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Females	933	6,974.5	107	1.53	1.25	1.85
Males	1,458	10,421.3	150	1.44	1.22	1.69

TABLE 5.12
Age Groups	N	Sum comp. Years	Events	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
<55	220	1,873.9	46	2.45	1.77	3.24
55-64	719	5,743.1	119	2.07	1.72	2.48
65-74	1,010	7,139.4	80	1.12	0.89	1.39
>=75	442	2,639.5	12	0.45	0.23	0.79

#### TABLE 5.13

Ethnicity	N	Sum comp. Year	Events	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Asian	24	181.3	4	2.21	0.47	5.25
Euro/Other	2,203	16,094.2	237	1.47	1.29	1.67
Māori	82	493.1	5	1.01	0.27	2.22
Pacifika	38	200.8	7	3.49	1.40	7.18

TABLE 5.14

### Ankle re-revisions

Years from procedure	Loosening Talar Component		Loosening Tibial Component		D	eep Infection
	Count	%	Count	%	Count	%
0	3	4.9	3	6.7	12	45.8
1	7	11.5	13	28.9	3	12.5
2	8	13.1	3	6.7	3	8.3
3	9	14.8	3	6.7	3	12.5
4	9	14.8	5	11.1	1	4.2
5	5	8.2	2	4.4	0	0.0
6	4	6.6	3	6.7	0	0.0
7	3	4.9	2	4.4	1	4.2
8	2	3.3	4	8.9	0	0.0
9	4	6.6	2	4.4	0	0.0
10	2	3.3	2	4.4	0	0.0
11+	5	8.2	3	6.7	4	12.5
Total	61		45		27	

#### TABLE 5.15

In November 2020 the data form updates removed the 'pain' category from the diagnosis options on the revision ankle arthroplasty data form and replaced it with 'pain with no obvious cause'. For this reason, the column of the table above relating to pain that was seen in reports prior to 2023 has been removed.

# Cumulative Incidence of Revision



This year implant survival presentation with a Kaplan Meier survival curve has been replaced by a cumulative incidence of revision graph, with confidence intervals for the incidence of revision. The Kaplan Meier Survival table has been retained for reference.



Years

1

2

8

9 10

11

12

13

14

15

16

17

18

19

20

#### Kaplan Meier Survival Table

#### % Revision-free Ν 98.8 2,142 97.1 1,933 95.4 1,742 93.8 1,555 92.2 1,395 91.3 1,249 90.1 1,097 88.7 967 87.4 845 85.6 730 84.3 622 82.6 520 427 82.1 81.2 330 80.6 240 80.2 165 80.2 122

78.5

78.5

78.5

74

42

23

Prosthesis	N	Obs. comp years	Events	Rate/ 100- comp. years	ower 95% Cl	Upper 95% Cl
Inbone Tibial Tray	6	2.0	1	50.00	1.27	278.58
Вох	6	53.8	3	5.57	1.15	16.29
Ramses	11	122.7	5	4.07	1.32	9.51
Hintegra	22	180.2	6	3.33	1.22	7.25
Agility	119	1,500.7	37	2.47	1.74	3.40
STAR	47	529.8	12	2.27	1.10	3.84
Mobility	450	5,092.1	74	1.45	1.14	1.82
Salto	862	7,169.3	91	1.27	1.02	1.56
Infinity Tibial Tray	312	1,185.17	10	0.84	0.40	1.55
Zimmer TM	166	511.8	4	0.78	0.21	2.00
Salto Talaris	230	980.0	3	0.31	0.04	0.82
Infinity Adaptis Tibial Tray	101	49.2	0	0.00	0.00	7.50
Vantage Tibial Plate Mobile Bearing	42	20.6	0	0.00	0.00	17.88
Vantage Tibial Plate Fixed Bearing	16	0.8	0	0.00	0.00	461.43

TABLE 5.16

TABLE 5.17

## Revision by Prosthesis Type

# Patient Recorded Outcome Measures

### **ANKLE RE-REVISIONS**

There were 37 registered primary ankle procedures that were revised twice and 4 procedures that were revised three times.

# Patient Based Questionnaire Outcomes at Six Months Post-Surgery

At six months post-surgery patients are sent an outcome questionnaire.

The non -validated ankle questionnaire used previously by the Registry was replaced by the validated Manchester-Oxford Foot Questionnaire towards the end of 2015.

This has 16 questions answered on a 5- point Likert scale, with each item scoring from 0 - 4, with 4 denoting "most severe". Total score ranges from 0-64, 0 is best possible, 64 is worst possible outcome.

There have been 543 responses since the validated questionnaire has been in place. The average score is 4.42; the range of scores is 0-24 and the standard deviation is 1.03.

# SHOULDER ARTHROPLASTY



# PRIMARY SHOULDER ARTHROPLASTY

The **twenty-five-year** report analyses data for the period January 2000 – December 2023.

There were 16,383 shoulder procedures registered with 1,476 added in 2023.

New data forms introduced in October 2020 now have 3 categories of shoulder arthroplasty.

These are total shoulder with 4,830 registered, reverse with 9,242 registered and hemiarthroplasty with 2,298 registered.

The previous category of resurfacing head has been updated to total shoulder, and partial resurfacing has been updated to hemiarthroplasty. A single humeral sphere has been updated to hemiarthroplasty.

#### Shoulder Arthroplasty Type by Year



### Data analysis

Data form analysis includes new form and legacy data.

#### Age and sex distribution

The average age for all patients with shoulder arthroplasty was 71 years, with a range of 13 - 99. years.

	Female					
	Mean	Minimum	Maximum	N (%)		
Total shoulder	69.9	15.0	97.7	1,368		
Reverse shoulder	74.7	15.7	96.8	5,661		
Hemiarthroplasty	69.8	26.6	95.4	2,854		

TABLE 6.1

	Male					
	Mean	Minimum	Maximum	N (%)		
Total shoulder	61.3	19.1	99.4	930		
Reverse shoulder	71.7	19.6	94.3	3,572		
Hemiarthroplasty	65.2	13.3	89.1	1,977		

TABLE 6.2

Ethnicity	Hemiarthroplasty	Reverse shoulder	Total shoulder
Asian	2	79	15
Euro/Other	203	3,650	982
Māori	22	188	62
Pacifica	10	43	10

#### Data analysis by Shoulder Arthroplasty Type

Previous operation	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
None	1,831	7,350	4,325
Rotator cuff repair	75	1,261	87
Internal fixation for Juxta articular fracture	101	218	55
Previous stabilisation	92	132	135
Arthroscopic debridement	19	76	67

#### TABLE 6.4

Diagnosis	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
Osteoarthritis	908	3,336	4,185
Rheumatoid arthritis/other inflammatory	245	529	230
Cuff tear arthropathy	219	3,686	32
Massive Cuff Tear without Arthritis	0	373	2
Acute fracture proximal humerus	507	976	19
Post old trauma	233	538	155
Avascular necrosis	153	176	107
Tumour	4	8	1
Post recurrent dislocation	82	97	94

#### TABLE 6.5

Approach	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
Image Guided	0	80	26
Deltopectoral	2,048	8,063	4,390
Other including patient specific instrumentation	0	44	20

TABLE 6.6

Humeral stem type	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
NR	2,123	6,470	4,119
Short/metaphyseal stem	102	602	162
Standard	59	2,123	215
Stemless	15	47	334



Glenoid Morphology	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
NR	2,145	6,552	4,129
A1	75	1,267	183
A2	26	639	188
B1	11	166	110
B2	25	359	175
B3	9	164	27
С	6	55	8
D	2	40	10

#### TABLE 6.8

Operating theatre	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder	
Conventional	1,604	5,347	3,053	
Laminar flow	663	3,757	1,702	

TABLE 6.9

#### ASA Class

Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
46 (17)	227 (5)	139 (12)
147 (53)	2,499 (56)	766 (65)
83 (30)	1,686 (38)	281 (24)
2 (1)	46 (1)	1 (0)
21 (0.5)	104 (1.3)	205 (7.1)
	Hemi- arthroplasty 46 (17) 147 (53) 83 (30) 2 (1) 21 (0.5)	Hemi- arthroplasty         Reverse Shoulder           46 (17)         227 (5)           147 (53)         2,499 (56)           83 (30)         1,686 (38)           2 (1)         46 (1)           21 (0.5)         104 (1.3)

TABLE 6.10

#### Mean Operative Time (skin to skin in minutes)

Mean Operative Time (skin to skin in minutes)	Mean (SD)
Total shoulder	123.6 (34.1)
Reverse shoulder	107.7 (41.0)
Hemiarthroplasty	108.3 (44.7)

TABLE 6.11

#### Number of Operations by Surgical Time in Minutes



### Surgeon grade

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

The following figures are for the nineteen-year period 2005 – 2023.

Surgeon grade	Hemi- arthroplasty	Reverse Shoulder	Total Shoulder
Consultant	2,175	8,716	4,635
Advanced trainee supervised	76	538	194
Advanced trainee unsupervised	15	25	7

Surgeon and Hospital Workload	Total Shoulder	Reverse Shoulder	Hemi- arthroplasty
Hospitals	43	52	23
Operations	256	1,147	78
Public/Private	21/22	27/25	12/11
Consultants	58	86	25
Surgeons performing >=10 procedures	7	45	1

TABLE 6.13

#### PROSTHESES

Reverse Shoulder Prostheses	N (2023)
SMR	470
Perform Humeral Stem	165
Comprehensive	98
Global Unite	73
Univers Revers	70
Delta Xtend Reverse	61
Equinoxe Humeral	49
Aequalis Reversed Fracture	32

TABLE 6.14

Total Shoulder Prostheses	N (2023)
Affinis Short stem	43
SMR stemless	34
SMR	32
Global Unite	25
Simpliciti TM	18
Equinoxe Humeral	13
Comprehensive	12
Perform Humeral stem	11
Mirai Humeral Core	10
Eclipse Trunion	10

Hemiarthroplasty	N (2023)
Aequalis Ascend Flex	50
SMR	13
Affinis Short stem	3
Perform Humeral stem	2
Aequalis Flex Revive	2
Aequalis Flex	2
Standard PTC Humeral Stem	1
Aequalis Reversed Fracture	1
SMR stemless	1
MUTARS	1

TABLE 6.16

# Top 10 Shoulder Humerus Prostheses for the five years 2019 – 2023



# Revision of 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. Procedures where all components are removed (e.g., Girdlestone, ankle fusion post failed ankle arthroplasty, or removal of components and insertion of a cement spacer for infection) are all recorded as revisions.

## REVISION OF REGISTERED PRIMARY SHOULDER ARTHROPLASTIES

### Data analysis

For the twenty-four-year period January 2000 – December 2023 there were 864 revisions of shoulder procedures registered. There were 240 revisions of the hemiarthroplasty group, 281 revisions of the reverse shoulder group and 343 revisions of the total shoulder group.

The average age for a shoulder revision was 69 years with a range of 33-91 years.

	Female	Male
Number	477	387
Percentage	55.2	44.8
Mean	70.6	67.6
Maximum age	91.3	88.5
Minimum age	33.2	36.7
Standard dev.	10.2	9.9

TABLE 6.17

This section analyses data for revisions of shoulder primary procedures for the twenty-four-year period January 2000 – December 2023.

For all primary shoulder procedures, there 123 procedures that had been revised twice and 32 procedures that had been revised three times.

#### Time to revision- all shoulders

	Time
Average	1,624 days (4.4 years)
Maximum	7,843 days (21.5 years)
Minimum	0 days
Standard deviation	1,603 days (4.4 years)

Reason for revision	Loosenin	g glenoid	Disloc	cation	Deep ir	fection	Subacro	mial Cuff	Loosening	Humeral
	Count	%	Count	%	Count	%	Count	%	Count	%
0	27	19.1	77	62.1	29	29.0	6	17.1	8	22.2
1	20	14.2	15	12.1	20	20.0	4	11.4	4	11.1
2	13	9.2	4	3.2	17	17.0	4	11.4	5	13.9
3	10	7.1	5	4.0	8	8.0	4	11.4	3	8.3
4	8	5.7	4	3.2	7	7.0	1	2.9	3	8.3
5	5	3.5	6	4.8	4	4.0	2	5.7	4	11.1
6	9	6.4	2	1.6	3	3.0	3	8.6	0	0.0
7	2	1.4	4	3.2	2	2.0	2	5.7	0	0.0
8	5	3.5	3	2.4	3	3.0	0	0.0	2	5.6
9	11	7.8	0	0.0	2	2.0	2	5.7	3	8.3
10	6	4.3	1	0.8	1	1.0	1	2.9	1	2.8
11+	25	17.7	3	2.4	4	4.0	6	17.1	3	8.3
Total	141		124		100		35		36	

Analysis of the main reasons for revision by year after primary procedure for all shoulder types

TABLE 6.19

#### All Total Arthroplasties

	N	Observed comp. years (ocys)	N Revised	Rate/100- component-years	Lower 95% Cl	Upper 95% Cl
All patients	16,374	103,182.3	864	0.837	0.78	0.90

TABLE 6.20

#### Revision rate by Age groups

Age Group	N	Observed comp. years	N Revised	Rate/100- component-years	Lower 95% Cl	Upper 95% Cl
<55	994	7,038.7	122	1.73	1.44	2.07
55-64	3,012	20,351.3	275	1.35	1.20	1.52
65-74	6,349	41,559.5	310	0.75	0.66	0.83
>=75	6,019	34,232.8	157	0.46	0.39	0.54

TABLE 6.22

#### **Revision rate by Sex**

Sex	N	Observed comp. years (ocys)	N Revised	Rate/100- component-years	Lower 95% Cl	Upper 95% Cl
F	9,890	64,139.8	477	0.74	0.68	0.81
М	6,484	39,042.6	387	0.99	0.89	1.10

TABLE 6.21

## **Revision rate by Ethnicity**

Ethnicity	N	Observed comp. years	N Revised	Rate/100- component-years	Lower 95% Cl	Upper 95% Cl
Asian	257	1,630.1	8	0.49	0.21	0.97
Euro/Other	14,378	94,657.4	792	0.84	0.78	0.90
Māori	644	3,673.1	43	1.17	0.85	1.58
Pacifica	168	1136.7	6	0.53	0.19	1.15

#### Revision rate by Arthroplasty Type

Operation Type	N	Observed comp. years	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Hemiarthroplasty	2,298	20,912.8	240	1.15	1.01	1.30
Reverse shoulder	9,233	44,642.1	281	0.63	0.56	0.71
Total shoulder	4,831	37,597.2	342	0.91	0.81	1.01

TABLE 6.24

#### Revision rate by Age Group and Arthroplasty Type

Shoulder Type	Age Groups	N	Observed comp. years	N. Revised	Rate/100- component- years (95% Cl)	Lower 95% Cl	Upper 95% Cl
Hemiarthroplasty	<55	440	3,922.1	68	1.73	1.35	2.20
	55-64	526	5,129.7	83	1.62	1.29	2.01
	65-74	633	6,345.6	59	0.93	0.71	1.20
	>=75	699	5,515.4	30	0.54	0.37	0.78
Reverse shoulder	<55	149	564.2	6	1.06	0.39	2.31
	55-64	1,200	5,407.3	66	1.22	0.94	1.55
	65-74	3,639	18,288.6	121	0.66	0.55	0.79
	>=75	4,245	20,382.1	88	0.43	0.35	0.53
Total shoulder	<55	405	2,552.3	48	1.88	1.39	2.49
	55-64	1,283	9,808.9	125	1.27	1.06	1.52
	65-74	2,074	16,913.4	130	0.77	0.64	0.91
	>=75	1,069	8,322.6	39	0.47	0.33	0.63

TABLE 6.25

#### Revision by Number of Operations per year

Number of operations per year	N	Observed comp. years	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
<10	4,601	31,676.1	287	0.91	0.80	1.02
>=10	11,771	71,505.5	577	0.81	0.74	0.87

TABLE 6.26

#### Revision by cementation of Glenoids (from total shoulders)

	N	Observed comp. years	N Revised	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Uncemented	1,385	10,504.7	183	1.74	1.50	2.01
Cemented	3,446	27,092.6	159	0.59	0.50	0.69

TABLE 6.27



## Cumulative Incidence of Revision

Cumulative Incidence of Revision for Different Arthroplasty Types



Revision Rate of Individual Shoulder Prostheses Sorted by Alphabetical Order

#### Hemiarthroplasty

Prosthesis	N	Observed comp. years	N. Revised	Rate/100-component-years	Lower 95% Cl	Upper 95% Cl
Aequalis	371	2,292.0	92	0.83	0.50	1.29
Aequalis Fracture	40	296.2	4	1.35	0.29	3.46
Aequalis Reverse II	1	2.4	0	0.00	0.00	153.46
Aequalis Reversed Fracture	3	2.3	1	43.95	1.11	244.89
Affinis Inverse stem	1	4.7	0	0.00	0.00	78.38
Affinis Short stem	25	102.6	1	0.98	0.00	5.43
Anatomical	19	288.9	0	0.00	0.00	1.28
Arthrex Eclipse	4	36.8	1	2.72	0.07	15.15
Arthrex Univers	1	3.5	0	0.00	0.00	105.92
Arthrex Univers Revers	1	3.2	0	0.00	0.00	114.09
Ascend TM	1	6.9	0	0.00	0.00	53.62
Bi-Angular	19	239.7	2	0.83	0.10	3.01
Bigliani/Flatow	137	1,601.7	15	0.94	0.50	1.51
Bio-modular	1	71	1	14.00	0.35	78.03
Cofield 2	50	653.3	3	0.46	0.09	1.34
Comprehensive	5	19.9	0	0.00	0.00	18.52
Delta	1	8.8	0	0.00	0.00	42.08
Delta Xtend Reverse	35	193.0	4	2.07	0.56	5.31
Epoca Humeral stem	1	6.8	0	0.00	0.00	54.39
Equinox Humeral	1	3.0	0	0.00	0.00	124.76
Flex Revive	3	3.0	0	0.00	0.00	123.72
Global	723	7,884.2	63	0.80	0.61	1.02
Global AP	97	775.0	7	0.90	0.32	1.77
Global Icon	1	5.8	0	0.00	0.00	63.38
Global Unite	68	360.8	16	4.43	2.53	7.20

Prosthesis	N	Observed comp. years	N. Revised	Rate/100-component-years	Lower 95% Cl	Upper 95% Cl
Hemicap Resurfacing	4	10.1	0	0.00	0.00	36.38
Perform Humeral stem	4	3.1	0	0.00	0.00	120.52
MRS Humeral	4	23.9	0	0.00	0.00	15.41
MUTARS	1	0.3	0	0.00	0.00	1181.90
Neer II	24	263.1	0	0.00	0.00	1.40
Osteonics humeral component	42	415.2	2	0.48	0.06	1.74
Randelli	1	8.2	0	0.00	0.00	44.82
Simpliciti TM	3	16.5	0	0.00	0.00	22.42
SMR	373	2,946.6	53	1.80	1.35	2.35
SMR Resurfacing	52	504.2	14	2.78	1.52	4.66
SMR stemless	3	8.0	0	0.00	0.00	46.10
Standard PTC Humeral Stem	1	0.1	0	0.00	0.00	5389.45
Univers 3D	1	3.8	0	0.00	0.00	96.59
Univers Apex	1	2.4	0	0.00	0.00	153.28

TABLE 6.28

#### Reverse shoulder

Prosthesis	N	Observed comp. years	N. Revised	Rate/100-component-years (95% CI)	Lower 95% Cl	Upper 95% Cl
Aequalis	662	3,143.2	27	0.86	0.57	1.25
Ascend Revive	14	20.9	1	4.78	0.12	26.65
Aequalis Reverse II	235	1,351.0	7	0.52	0.21	1.07
Aequalis Reversed	3	14.5	0	0.00	0.00	25.40
Aequalis Reversed Fracture	135	437.7	2	0.46	0.06	1.65
Affinis Fracture stem	5	17:1	1	5.85	0.15	32.58
Affinis Inverse Stem	57	191.3	5	2.61	0.85	6.10
Arthrex Univers	15	42.0	1	2.38	0.06	13.25
Arthrex Univers Revers	122	393.8	2	0.51	0.03	1.83

Prosthesis	N	Observed comp. years	N. Revised	Rate/100-component-years (95% CI)	Lower 95% Cl	Upper 95% Cl
Comprehensive	429	1,474.2	8	0.54	0.23	1.07
Comprehensive Hum Fracture Stem	1	0.0	0	0.00	0.00	7925.67
Comprehensive Mod Stem	1	0.5	0	0.00	0.00	709.14
Custom device	2	4.0	0	0.00	0.00	91.22
Delta	55	546.4	2	0.37	0.04	1.32
Delta Xtend Reverse	2,270	13,646.9	96	0.71	0.57	0.86
Eclipse Trunion	1	0.8	0	0.00	0.00	486.41
Equinoxe Humeral Stem	184	422.7	8	1.89	0.82	3.73
Equinoxe Reverse	1	1.8	0	0.00	0.00	204.15
Flex Shoulder System	1	3.3	0	0.00	0.00	111.54
Global Unite	185	300.6	3	1.00	0.21	2.92
Inhance Short Stem	1	0.6	0	0.00	0.00	590.95
MD Prima Stem	27	16.3	0	0.00	0.00	22.63
Mirai Humeral Stem	35	53.9	0	0.00	0.00	20.66
Mutars	1	5.3	0	0.00	0.00	69.13
RSP	2	8.8	0	0.00	0.00	41.71
SMR	4,271	21,522.1	110	0.51	0.42	0.62
SMR Humeral Body	11	4.3	0	0.00	0.00	85.28
SMR stemless	68	310.8	3	0.97	0.13	2.58
Tornier Perform	203	112.0	4	3.57	0.97	9.14
Trabecular Metal Reverse	67	350.9	2	0.57	0.07	2.06
Univers Revers	166	238.5	0	0.00	0.00	1.55
Vaios	1	11.2	0	0.00	0.00	32.86
Zimmer Trabecular Metal Shoulder	4	11.5	0	0.00	0.00	32.21

#### Total shoulder

Prosthesis	N	Observed comp. years	N. Revised	Rate/100-component-years	Lower 95% Cl	Upper 95% Cl
Aequalis	290	3,300.8	19	0.58	0.35	0.90
Aequalis Ascend Flex	374	2,323.6	10	0.43	0.21	0.79
Affinis Fracture stem	1	4.6	0	0.00	0.00	80.97
Affinis Inverse stem	297	1,023.3	3	0.29	0.04	0.78
Anatomical	35	516.2	2	0.39	0.05	1.40
Arthrex Eclipse	24	85.2	1	1.17	0.00	5.49
Arthrex Univers	6	21.4	0	0.00	0.00	17.23
Arthrex Univers Revers	1	3.2	0	0.00	0.00	116.25
Ascend TM	2	12.9	0	0.00	0.00	28.67
Bi-Angular	8	53.9	0	0.00	0.00	6.85
Bigliani/Flatow	310	3,671.5	14	0.38	0.21	0.64
Cofield 2	21	271.3	0	0.00	0.00	1.36
Comprehensive	92	385.8	4	1.04	0.28	2.65
Custom device	1	3.9	0	0.00	0.00	95.49
Eclipse Trunion	10	2.3	0	0.00	0.00	162.53
Epoca Humeral stem	4	45.2	0	0.00	0.00	8.16
Equinoxe Humeral	50	102.8	1	0.97	0.02	5.42
Global	519	6,061.1	36	0.59	0.42	0.82
Global AP	537	4,775.2	22	0.46	0.29	0.70
Global Icon	13	50.0	2	4.00	0.22	14.44
Global Unite	329	1,611.0	12	0.74	0.36	1.26
MD Prima Stem	4	3.3	0	0.00	0.00	111.78
Mirai Humeral Stem	59	115.3	1	0.87	0.02	4.83
MUTARS	2	3.4	0	0.00	0.00	108.66
Neer 3	2	33.4	0	0.00	0.00	11.04
Neer II	12	165.7	1	0.60	0.02	3.36

Prosthesis	N	Observed comp. years	N. Revised	Rate/100-component-years	Lower 95% Cl	Upper 95% Cl
Osteonics humeral component	49	582.7	8	1.37	0.59	2.71
Perform Humeral Stem	46	37.1	1	2.70	0.07	15.02
Sidus	1	9.3	0	0.00	0.00	39.56
Simpliciti TM	156	573.3	3	0.52	0.11	1.53
SMR	1,127	9,191.1	181	1.97	1.69	2.27
SMR Resurfacing	3	24.6	2	8.12	0.98	29.32
SMR stemless	209	722.0	11	1.52	0.76	2.73
Stemless Hum Cage	2	1.2	0	0.00	0.00	303.46
Trabecular Metal Reverse	1	10.5	0	0.00	0.00	35.23
Univers 3D	5	28.2	0	0.00	0.00	13.09
Univers Apex	28	87.6	0	0.00	0.00	4.21
Univers II	1	1.6	1	62.87	1.59	350.27
Univers Revers	1	2.1	0	0.00	0.00	172.08

# Patient Recorded Outcome Measures

Patient based questionnaire outcomes at six month, five years, ten years and fifteen years postsurgery

### Questionnaires at six months post-surgery

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

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 as published by Kalairajah et al, in 2005 (See appendix 1). This groups each score into four categories:

Category	Score	Interpretation
1	>41	Poor
2	34 - 41	Fair
3	27 - 33	Good
4	< 27	Excellent

TABLE 6.33

For the twenty-four-year period and as 31 December 2023, there were 8,951 shoulder questionnaire responses registered at six months post-surgery.

The average shoulder score was 36.6 (standard error 0.1, range 0 - 48)

At six months post-surgery, 70% had an excellent or good score.

#### 6-month Oxford Scores

Operation types	Ν	Mean	Std Error	Lower 95% Cl	Upper 95% Cl
Hemi	1,269	32.4	0.3	31.8	32.9
Reverse	4,719	35.8	0.1	35.5	36.0
Total	2,963	39.6	0.1	39.3	39.9
Total Procedures	8,951	36.6	0.1	36.4	36.8

TABLE 6.34

#### Oxford score at 6 months by shoulder operation



### 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 3,147 individual patients.

At five years post-surgery, 81% of these patients achieved an excellent or good score and had an average of 40.2.

#### **5 Year Oxford Scores**

Operation types	N	Mean	Std Error	Lower 95% Cl	Upper 95% CI
Hemi	556	36.0	0.4	35.2	36.9
Reverse	1,278	39.8	0.2	39.3	40.3
Total	1,313	42.4	0.2	42.0	42.8
Total Procedures	3,147	40.2	0.2	39.9	40.5

TABLE 6.35

#### Oxford score at 5 Years by shoulder operation



## Questionnaires at ten years post-surgery

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

This dataset represents sequential Oxford shoulder scores for 1,130 individual patients.

At ten years post-surgery, 79% of these patients achieved an excellent or good score and had an average of 39.9.

#### **Ten Year Oxford Scores**

Hemi

Operation types	N	Mean	Std Error	Lower 95% Cl	Upper 95% Cl
Hemi	302	37.0	0.5	35.9	38.1
Reverse	244	39.2	0.6	38.1	40.3
Total	584	41.7	0.3	41.1	42.3
Total Procedures	1,130	39.9	0.3	39.4	40.4

TABLE 6.37

#### 50 45 40 35 30 25 5 10 5 0

Reverse

Total

#### Oxford score at 10 Years by shoulder operation

### Questionnaires at fifteen 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 fifteen years post-surgery.

This dataset represents sequential Oxford shoulder scores for 309 individual patients.

At fifteen years post-surgery, 74% of these patients achieved an excellent or good score and had an average of 38.2.

#### Fifteen Year Oxford Scores

Operation types	N	Mean	Std Error	Lower 95% Cl	Upper 95% Cl
Hemi	122	37.3	0.8	35.6	38.9
Reverse	32	36.3	2.1	32.0	40.6
Total	155	39.4	0.7	38.0	40.7
Total Procedures	309	38.2	0.5	37.2	39.2

# Oxford 12 Score as a predictor of Shoulder Arthroplasty Revision

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

# Six- month score and revision arthroplasty

Plotting the patients' six-month scores in the Kalairajah groupings against the proportion of shoulders revised for that same group demonstrates that there is an incremental increase in risk during the next two years related to the Oxford score. A patient with a score below 27 has 6 times the risk of a revision within two years compared to a person with a score of >41.

# Revision risk versus Kalairajah groupings of Oxford scores within two years of the six- month score date

#### 6 months

Kalairajah Classification at 6 months	Revision to 2 years	N revised	%	Std error
Poor	1,204	71	5.90	0.68
Fair	1,168	34	2.91	0.49
Good	2,560	24	0.94	0.19
Excellent	2,978	26	0.87	0.17

TABLE 6.39

#### Revision (%) to 2 years by Oxford score at 6 months



#### 5 years

Kalairajah Classification at 5 years	Revision to 2 years	N revised	%	Std error
Poor	206	6	2.91	1.17
Fair	262	6	2.29	0.92
Good	607	6	0.99	0.40
Excellent	1,514	5	0.33	0.15

TABLE 6.40

#### Revision (%) to 2 years by Oxford score at 5 Years



Six Month, Five and Ten- Year Oxford Scores by Arthroplasty Type

Header

Arthroplasty Type	Time from Surgery	Mean	Std Error	Lower 95% Cl	Upper 95% Cl
Hemi	6 Months	32.37	0.28	31.83	32.92
	5 Years	36.05	0.41	35.23	36.86
	10 Years	37.00	0.55	35.92	38.08
Reverse	6 Months	35.77	0.14	35.51	36.04
	5 Years	39.78	0.24	39.30	40.26
	10 Years	39.20	0.55	38.12	40.29
Total	6 Months	39.63	0.15	39.34	39.92
	5 Years	42.37	0.20	41.98	42.76
	10 Years	41.71	0.32	41.07	42.34

Six Month, Five and Ten- Year Oxford Scores by Arthroplasty Type



# **ELBOW ARTHROPLASTY**



# PRIMARY ELBOW ARTHROPLASTY

The **twenty-five-year** report analyses data for the period January 2000 – December 2023. There were 850 primary elbow procedures registered.

# Data analysis

#### Age and sex distribution

The average age for an elbow arthroplasty was 67 years, with a range of 14 – 94 years.

	Age			
	Mean	Minimum	Maximum	N (%)
Female	67.6	25.5	92.4	641 (75.1)
Male	63.3	13.9	94.0	209 (24.9)
Total	66.5	13.9	94.0	850 (100.0)

TABLE 7.1

Ν	%
30	3.5
736	87.7
55	6.6
18	2.1
	N 30 736 55 18

ВМІ	N	%
< 19	8	3.8
19 - 24	69	32.7
25 - 29	65	30.8
30 - 39	56	26.5
40+	13	6.2
Total	211	100.0

TAB	LE	7.3	

Previous operation	Ν	%
None	702	82.6
Internal fixation for	53	6.2
Osteotomy	3	0.4
Ligament reconstruction	10	1.2
Synovectomy	27	3.2
Debridement	24	2.8

TABLE 7.4

Diagnosis	Ν	%
OA	112	13.2
RA	343	40.4
Tumour	4	0.5
Fracture	372	43.8
Dysplasia	15	1.8
Dislocation	21	2.5

TABLE	7.5
-------	-----

Approach	Ν
Posterior	523
Medial	114
Lateral	110

TABLE 7.6

Surgeon Attire	N
Space Suits/Helmet Fan	88
Conventional gown	178

# **ASA** Class

For the nineteen- year period 2005 – 2023, there were 693 primary elbow procedures with the ASA class recorded.

ASA Class	N	%
1	59	8.5
2	318	45.9
3	303	43.7
4	13	1.9

TABLE 7.8

Operative time (skin to skin)	N	%
Operative time (minutes)	N	%
< 45	26	3.1
45 - 59	15	1.8
60 - 74	12	1.5
75 - 89	34	4.1
90 - 104	48	5.8
105 - 119	100	12.1
120 - 149	247	29.9
150 - 179	181	21.9
180+	164	19.8
Total	827	100.0
TABLE 7.9		

Surgeon grade

The updated forms introduced in 2005 have separated advanced trainee into supervised and unsupervised. The following figures are for the nineteen- year period 2005 – 2023.

Surgeon grade	N	%
Consultant	793	93.3
Advanced Trainee Supervised	30	3.5
Advanced Trainee UnSupervised	15	1.8

TABLE 7.10

# Surgeon and hospital workload

In 2023, 35 surgeons performed 69 primary elbow procedures. These ranged from 1 (n=18), 2-5 (n=15) and >5 (n=2) procedures performed per surgeon.

#### Hospitals

In 2023, primary elbow arthroplasty was performed in 27 hospitals, of which 15 were public and 12 were private.

## Prostheses

Most Used Elbow Prostheses for Five Years 2019-2023



# 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. Procedures where all components are removed (e.g. removal of components and insertion of a cement spacer for infection) are all recorded as revisions.

### Data analysis

For the twenty-four-year period January 2000 – December 2023, there were 153 revision elbow procedures registered.

The average age for a revision elbow arthroplasty was 66 years, with a range of 22 - 90 years.

	Female	Male
Number	107	46
Percentage	69.9	30.1
Mean	66.1	65.8
Maximum age	89.1	90.5
Minimum age	31.5	22.4
Standard dev.	10.2	11.7

TABLE 7.11

## Revision of Registered Primary Elbow Arthroplasties

This section analyses data for revisions of primary elbow procedures for the twenty-four-year period January 2000 – December 2023.

There were 64 revisions of the primary group of 850.

#### All Primary Total Elbow Replacements

	No. Ops	Sum. comp. years	Events	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
All patients	850	5,911.0	64	1.08	0.83	1.38

TABLE 7.12

Sex	No. Ops	Sum. comp. years	Events	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% CI)
Females	641	4,678.0	42	0.90	0.65	1.21
Males	209	1,233.0	22	1.78	1.12	2.70

TABLE 7.13

Age Groups	No. Ops	Sum. comp. years	Events	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% Cl)
<55	159	1,242.7	19	1.53	0.92	2.39
55-64	198	1,668.3	17	1.02	0.59	1.63
65-74	249	1,705.6	19	1.11	0.67	1.74
>=75	244	1,294.3	9	0.70	0.32	1.32

TABLE 7.14

Ethnicity	No. Ops	Sum. comp. years	Events	Rate/ 100- comp. years	Lower (95% CI)	Upper (95% Cl)
Asian	30	247.7	1	0.40	0.01	2.25
Euro/Other	736	5,082.2	51	1.00	0.74	1.31
Māori	55	338.7	8	2.36	1.02	4.65
Pacifica	18	178.6	2	1.12	0.14	4.05

Prosthesis	N	Observed comp. years	Events	Rate/100- component- years	Lower 95% Cl	Upper 95% Cl
Acclaim	16	183.8	7	3.81	1.53	7.85
Align Radial Stem	3	3.3	1	30.24	0.77	168.46
Anatomic radial head	1	3.0	0	0.00	0.00	124.76
Coonrad/Morrey	354	3,406.5	21	0.62	0.38	0.94
Custom Cem Stem	1	2.1	0	0.00	0.00	178.70
Evolve Proline Stem	3	2.0	0	0.00	0.00	183.07
Evolve Stem	50	276.7	2	0.72	0.09	2.61
Humeral stem	5	6.9	0	0.00	0.00	53.81
Kudo	18	193.0	4	2.07	0.56	5.31
Latitude	178	1,036.2	21	2.03	1.25	3.10
Latitude EV	2	2.4	0	0.00	0.00	156.85
Mutars	1	7.9	0	0.00	0.00	46.98
Sorbie Questor	1	6.8	0	0.00	0.00	54.09
Stanmore custom implant	1	13.4	0	0.00	0.00	27.46
Zimmer Nexel	160	696.33	8	1.15	0.50	2.26



Reason for revision		Loosening humeral		Loosening Ulna		Deep Infection
Years since operation	Count	%	Count	%	Count	%
0	1	4.8	2	10.5	4	23.5
1	2	9.5	0	0.0	4	23.5
2	5	23.8	6	31.6	3	17.6
3	3	14.3	3	15.8	1	5.9
4	2	9.5	0	0.0	1	5.9
5	1	4.8	0	0.0	0	0.0
6	1	4.8	1	5.3	1	5.9
7	1	4.8	1	5.3	0	0.0
8	1	4.8	1	5.3	1	5.9
9	1	4.8	2	10.5	0	0.0
10	1	4.8	2	10.5	0	0.0
11+	2	9.5	1	5.3	2	11.8
Total	21		19		17	

Patient Recorded Outcome Measures

## Questionnaires at six months post-surgery

At six months post-surgery patients are sent an outcome questionnaire.

This was replaced by the validated Oxford Elbow score at the end of 2015.

There are 12 questions and each response scores from 4-0 with 0 representing the greatest severity.

Total score range 0-48

For the 7-year period 2016 - 2023 there were n = 463 responses at 6 months. The average score was 24.3, the range was 0-48 and the standard deviation was 19.3. At five years, there were 130 responses, with an average score of 27.7, a range of 0-48 and a standard deviation was 20.5.

Patient based questionnaire outcomes at six months post-surgery

# LUMBER DISC REPLACEMENT



# PRIMARY LUMBAR DISC REPLACEMENT

This report analyses data for the **twenty-two-year** period January 2002 – December 2023.

There were 286 lumbar disc arthroplasties registered.

## Data analysis

#### Age

	Age				
	Mean	Minimum	Maximum	N (%)	
Female	39.4	21.8	62.2	118 (41)	
Male	39.0	20.9	70.3	168 (59)	

TABLE 8.1

Disc arthroplasty levels	Ν
L3/4	25
L4/5	157
L5/S1	111
TABLE 8.2	

Fusion levels	Ν
L3/4	16
L4/5	121
L5/S1	241

106 C 20

TABLE 8.3

Fusion levels	Ν
L3/4	4
L4/5	16
L5/S1	76

TABLE 8.4

Previous operation	Ν
Discectomy	32
L3/4	0
L4/5	11
L5/S1	19

TABLE 8.5

### Diagnosis

Degenerative disc disease	Ν
L3/4	8
L4/5	35
L5/S1	51

#### TABLE 8.6

Annular tear MRI scan	Ν
L3/4	9
L4/5	61
L5/S1	15

#### TABLE 8.7

Discogenic pain on discography	Ν
L3/4	15
L4/5	101
L5/S1	49

TABLE 8.8

Approach	Ν
Retroperitoneal midline	239
Retroperitoneal lateral	4
Transperitoneal	21

TABLE 8.9

Intraoperative complications	Ν
Damage to major veins	13
Subsidence	1
 TABLE 8.10	

Operative time (skin to skin)	Ν
Mean	113 minutes
Range	40-284 minutes.
Standard deviation	52 minutes

TABLE 8.11

Surgeon grade	Ν
Consultant	286
 TABLE 8.12	

# Revision of registered Primary Lumbar Disc Replacements

There has been no change in the number of revisions.

There has been no change in the number of revisions.

There were 6 revisions of the primary group of 286 lumbar disc arthroplasties.

Time to revision	Days
Mean	1,841 days (5.0 years)
Maximum	4,528 days (12.4 years)
Minimum	242 days
 TABLE 8.13	

Reason for revision	Ν
Loosening of Component	2
Loss of Alignment	1
Pain	2

TABLE 8.14

# **CERVICAL DISC REPLACEMENT**



# **CERVICAL DISC REPLACEMENT**

This report analyses data for the **twenty-year** period January 2004 – December 2023.

There were 1,071 primary cervical disc arthroplasties.

## Data analysis

#### Age

	Age			
	Mean	Minimum	Maximum	N (%)
Female	46.9	19.3	73.3	485 (45)
Male	45.8	22.1	73.2	586 (55)

TABLE 9.1

Disc replacement levels	N
C3/4	30
C4/5	126
C5/6	562
C6/7	506
С7Т1	22

TABLE 9.2

Previous operation	Ν
Foraminotomy	27
Adjacent level fusion	55
Adjacent level disc arthroplasty	11

TABLE 9.3

Diagnosis	Ν
Acute disc prolapse	718
Chronic spondylosis	199
Neck pain	50
	-

TABLE 9.4

Approach	Ν
Anterior right	679
Anterior left	234

TABLE 9.5

Intra operative complications	Ν
Equipment failure	1
Removal of implant	1
Tear jugular vein	1
Misplaced prosthesis removed and new device placed	1

#### TABLE 9.6

Operative time (skin to skin)	N
Average	90 minutes
Range	70-168 minutes
Standard Deviation	53 minutes

TABLE 9.7

Surgeon grade	N
Consultant	1064
Advanced trainee supervised	3

TABLE 9.8

# Revision of Cervical disc arthroplasties

## **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.

Neck Disa	bility Index	(N=307)
Range		0-82
Mean		18
Standard D	Deviation	16.7

TABLE 9.9

# There were 7 revisions registered.



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



NEW ZEALAND JOINT REGISTRY Established by the New Zealand Orthopaedic Association

Department of Orthopaedic Surgery and Musculoskeletal Medicine Christchurch Hospital Private Bag 4710 Christchurch 8140



#### E-mail: jinny.willis3@cdhb.health.nz

#### CONSENT FORM

#### TO BE FILED IN PATIENT NOTES

	REQUEST FOR INTERPRETER				
English	I wish to have an interpreter	Yes	No		
Maori	E hiahia ana ahau ki tetahi kaiwhakamaori/kaiwhaka pakeha korero	Ae	Као		
Samoan	Oute mana'o ia iai se fa'amatala upu	loe	Leai		
Tongan	Oku ou fiema'u ha fakatonulea	lo	Ikai		
Cook Island	Ka inangaro au I tetai tangata uri reo	Ae	Kare		
Niuean	Fia manako au ke fakaaoga e taha tagata fakahokohoko kupu	E	Nakai		

The New Zealand Orthopaedic Association has a New Zealand Joint Registry which records the technical data on all artificial joint replacement surgery performed in New Zealand, eg, the different types of artificial joints implanted, whether cemented or not, how long the operation took, the need to use antibiotics. The Register will provide independent data on the performance of these artificial joints over many years. The data will be used in the future for an audit of joint replacement outcomes and will identify the factors which will provide the best long term surgical results for New Zealanders.

You are asked for your consent to allow your name, address, date of birth, national health index number along with the technical data on your joint surgery to be forwarded to the Registry.

We need this information in order to track the outcome over many years of your artificial joint replacement.

No other personal information will be entered without your written consent and it will not be possible to identify your name from any information taken from the data base for audit purposes.

If you wish to withdraw from the Register, you may do so by writing to the New Zealand Joint Registry, Department of Orthopaedic Surgery and Musculoskeletal Medicine, Christchurch Hospital. Withdrawing from the Register will not affect your current or future health care in any way.

Mr John McKie Registry Supervisor

I consent to my name, address, date of birth, national health index number along with the technical data on my joint surgery being forwarded to the New Zealand Joint Registry.

**NEW ZEALAND JOINT REGISTRY** Established by the New Zealand Orthopaedic Association



#### PRIMARY JOINT REPLACEMENT QUESTIONNAIRE

Dear

The New Zealand Orthopaedic Association has a National Joint Replacement Register which records technical information about all artificial hip, knee, shoulder, elbow and ankle replacements carried out in New Zealand. This Register will provide very important data on the performance of these artificial joints over many years and enable identification of the factors which produce the best long-term results for New Zealanders like you.

In order to enhance the value of the research results, it will be extremely helpful to have your opinion as to the success of your artificial joint replacement. Therefore, you are invited to answer a few written questions at regular intervals on how you feel about your joint replacement. This questionnaire refers to the left knee surgery you had approximately six months ago.

Enclosed is more information regarding the New Zealand Joint Registry and I hope you will take the time to read it and complete the questionnaire.

Please note that your Regional Ethics Committee has approved the project.

Yours sincerely

Mr John McKie Supervisor New Zealand Joint Registry Please fill out the details below and answer the questions overleaf and return in the enclosed envelope. If you prefer, you may answer your questionnaire online at <u>www.nzoa.org.nz/nzir-patient-questionnaires</u>.

PATIENT NAME \_\_\_\_\_\_

\_\_\_\_\_

DATE OF BIRTH

EMAIL

#### MOBILE

Mailing address: Department of Orthopaedic Surgery and Musculoskeletal Medicine, Christchurch Hospital, Private Bag 4710, Christchurch 8140. Or scan/email to: <u>iinnv.willis3@cdhb.health.nz</u>



# **APPENDIX 3**

# THEATRE FORMS

PRIMARY AND	<b>KLE REPLACEMENT</b>			
NEW ZEALAND JOINT REGISTRY - DO NOT PLACE	IN PATIENT NOTES - TO BE	RETAINED IN THEATRE SUITE		
DATE THEATRE NO. HOSPIT	TAL NAME			
ASA CLASS 1 2 3 4 [PLEASE CIRCLE]				
BMI				
CONSULTANT	STICK PATIENT LABEL H	IERE		
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FUNDING O ACC O Private	O DHB O DH	IB Outsourced		
REVIOUS OPERATION ON INDEX JOINT [TICK ALL THAT APPLY]	CONCURRENT SURGERY	[TICK ALL THAT APPLY]		
None	Achilles or calf lengthening			
Internal fixation for juxtarticular fracture	Ugament reconstruction: med	lial 🗆 or lateral 🗆		
) Arthrodesis	Hindfoot fusion or asteatomy	Hindfoot fusion or asteotomy		
Ugament reconstruction	Midfoot fusion or osteotomy			
Subjacent fusion	APPROACH [TICKALL THAT APPLY]			
) Other [SPECIFY]	O Anterior			
IAGNOSIS	O Lateral			
) Post fracture	Patient specific instrument			
) Osteoarthritis	Computer Navigation			
Rheumatoid arthritis / other inflammatory	O Robotic			
) AVN	SYSTEMIC ANTIBIOTIC P	ROPHYLAXIS		
Instability				
Other (SPEOPY)				
RAY	C			
) Concentric or mild deformity				
>10 degrees varus				
>10 degrees valgus	OPERATING THEATRE	OPERATING TIME		
		Start Skin Time:		
	Laminar Flow or similar	Finish Skin Time:		
	SURGEON ATTIRE			
	O Space Suits/Helmet Fan: One-	piece Toga or Sterile Hood and Gown		

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# **APPENDIX 3**

# THEATRE FORMS

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NEW ZEALAND JOINT REGISTRY - DO NOT PLA	ACE IN PATIENT NOTES - TO BE	RETAINED IN THEATRE SUITE		
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BMI				
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(IF DIFFERENT FROM PARENT LABEL)	PLEASE PLACE IMPLANT			
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LEVELS OF DISC REPLACEMENT				
	Anterior - Right			
	Anterior - Left	Anterior - Left		
		O Other [second]		
	INTRAOPERATIVE COMP	LICATIONS		
PREVIOUS OPERATION				
Foreminotomy	_			
Adjacent Level Fusion				
Adjacent Level Disc Arthroplasty				
DIAGNOSIS	SYSTEMIC ANTIBIOTIC P	ROPHYLAXIS		
Acute Disc Prolapse	NAME:			
Chronic Spandylosis				
Neck Pain				
Other [secony]_				
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	Laminar Flow or similar	Finish Skin Time:		
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#### DO NOT PLACE IN PATIENT NOTES - TO BE RETAINED IN THEATRE SUITE

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IMPORTANT IF A BILATERAL PROCEDURE TWO COMPLETED FORMS ARE REQUIRED



# **APPENDIX 3**

# THEATRE FORMS

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FUNDING       ACC       Private       DHB       DHB Outsourced         REVIOUS OPERATION ON INDEX JOINT [IncrAIL INATAPY]       CLASS         None       Internal floation for justericular fracture       Itadial head replacement         Itagrament reconstruction       Radiocapitellar replacement       Radiocapitellar replacement         Interposition arthroplasty       Total Ulnohumeral replacement (semiconstrained/linked)         Obter (secony)       Medial         Other (secony)       Medial         Other (secony)       Medial         Other (secony)       Medial         Debridement       Systemation arthroplasty         Other (secony)       Medial         Other (secony)       Medial         Dubti facture       Postelior         Systematic arthritis / other inflammatory       NAME:         Namour       Post flaqueent disruption         Post discusion       Other (secony)         Other (secony)	& SIGI	$v \text{ please} \longrightarrow X$	
PREVIOUS OPERATION ON INDEX JOINT [InCOMETIMETARYY]       CLASS         None       Hemiathroplasty (distal humerus replacement)         Internal floation for justarticular fracture       Radial head replacement         Ugament reconstruction       Radiocapitellar replacement         Internal floation for justarticular fracture       Radiocapitellar replacement         Ugament reconstruction       Radiocapitellar replacement         Interposition arthroplasty       Total Ulinchumeral replacement (unconstrained/linked)         Obter (secony	FUNDING O ACC O Private	O DHB O DH	B Outsourced
Tumour         Post fracture         Post figument disruption         Post dislocation         Other (secory)	Internal inkation for juxtericular fracture Ugament reconstruction Interposition anthroplasty Debridement Synovectomy + removal radial head Osteoormy Other (secory	for justarticular fracture	
OPERATING THEATRE     OPERATING TIME       Conventional     Start Skin Time:       Laminar Flow or similar     Finish Skin Time:       SURGEON ATTIRE     Space Suitb/Helmet Fanc □ One-piece Toga or □ Sterile Hood and Gown       Space Suitb/Helmet Fanc □ One-piece Toga or □ Sterile Hood and Gown     Conventional Gown	Tumour     Post fracture     Post ligament disruption     Post dislocation     Other (secory L.		
Conventional Start Skin Time: Laminar Flow or similar Pinish Skin Time: SURGEON ATTIRE Space Suitu/Helmet Fanc One-piece Toga or Sterile Hood and Gown Conventional Gown		OPERATING THEATRE	OPERATING TIME
Laminar Flow or similar Finish Skin Time: SURGEON ATTIRE Space Suito/Helmet Fan: One-piece Toga or Sterile Hood and Gown Conventional Gown RIMARY SURGEON			Start Skin Time:
SURGEON ATTIRE  Space Suits/Helmet Farc  One-piece Toga or  Sterile Hood and Gown Conventional Gown		C Laminar Flow or similar	Finish Skin Time:
Space Suits/Helmet Fax:  One-piece Toga or  Sterile Hood and Gown Conventional Gown RIMARY SURGEON		SURGEON ATTIRE	
RIMARY SURGEON		O Space Suits/Helmet Fan: □ One	-piece Toga or 🖾 Sterile Hood and Gown
RIMARY SURGEON		Conventional Gown	
	RIMARY SURGEON		1472-1-10 1

# Cement [ IF MORE THAN ONE MIX IS USED ONLY ONE CEMENT STICKER IS REQUIRED ] Humerus 🔿 Yes 🔿 No PLACE CEMENT STICKER OR COMPLETE Ulna 🔿 Yes 🔿 No Cement Name: Radial O Yes O No Cement Antibiotic (if present): Humerus Ulna Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label **Radial Head** Augments Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label

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

IMPORTANT IF A BILATERAL PROCEDURE TWO COMPLETED FORMS ARE REQUIRED

- 143 -



O Consultant

O Adv Trainee Unsupervised

# **APPENDIX 3**

# THEATRE FORMS

	Pi (THU	MB OR FIN	GER: CMCJ, MCP	J, PIPJ)		
NEW ZEALAND JOIN	T REGISTRY - D	O NOT PLACE	IN PATIENT NOTES	- TO BE RET	AINED IN THEATRE SUITE	
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IF BILATERAL THEN DO	SEPARATE FORMS					
FOR SIMULTANEOUS REPL JOINTS WITH THE SAME IM IN THE SAME HAND, 1 FOR OTHERWISE SEPARATE	ACEMENT OF MULTIPI PLANT AND TECHNIQ M CAN BE COMPLETE FORMS REQUIRED.	E SURG D, & SIG	EON TO CHECK N PLEASE $\longrightarrow$	urgeon to sign here: K		
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O Adv Trainee Supervised

O Basic Trainee

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

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#### IMPORTANT IF A BILATERAL PROCEDURE TWO COMPLETED FORMS ARE REQUIRED


## THEATRE FORMS

NEW ZEALAND JOINT REGISTRY - DO NO	DT PLACE I	IN PATIENT NUT	C3 - TO BE RETAINED IN THEATRE SUITE	
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FUNDING     Acc     Previous operation on index joint [ucc]       None     Hip Arthroscopy       Internal floation for justarticular fracture	livate NLI THAT APPLY ]	DHB  APPROACH  Posterior  Anterior  Superior	DHB Outsourced	
FUNDING     Acc     Previous operation on index joint [ncc/]       None     Hip Arthroscopy       Internal fixation for justarticular fracture       Osteotomy	livate	DHB APPROACH Posterior Anterior Superior Lateral	DHB Outsourced	
FUNDING     Acc     Previous operation on index joint [ucc]       None     Hip Arthroscopy       Internal fluxition for justarticular fracture       Osteotomy       Other [secory]	livate	DHB APPROACH Posterior Anterior Superior Lateral Trans-trochan	DHB Outsourced	
FUNDING     ACC     Previous operation on index joint [neck]       None     Hip Arthroscepy       Internal floation for justarticular fracture       Osteotomy       Other [secory]	NULTHAT APPOY]	DHB APPROACH Posterior Anterior Superior Lateral Trans-trachan SURGICAL A	DHB Outsourced  TECCALL TWAT AMPLY [  TECCALL TWAT AMPLY [  TERIC (osteotomy)  DJUNCTS [TECC #1 (SED]]	
FUNDING     ACC     Pr       PREVIOUS OPERATION ON INDEX JOINT [IICC/       None       Hip Arthroscopy       Internal floadion for justarticular fracture       Osteodromy       Other [secury]	ivate	DHB  APPROACH  Posterior  Anterior  Superior  Lateral  Trans-trochan  SURGICAL AI  Computer Na	DHB Outsourced  TECALL THAN AMPLY  TERE (osteotomy)  DJUNCTS [TECK IF USED]  Vigation	
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FUNDING     ACC     Previous operation on index joint [ucc]       None     Internal fluxition for justarticular fracture       Internal fluxition for justarticular fracture       Other [secory]	flvate	DHB  APPROACH  Posterior Anterior Superior Lateral Trans-trochan  SURGICAL AI  Computer Na Robotic assist  SYSTEMC AI	O DHB Outsourced   (TECALL THAT APPLY)  teric (osteotomy)  DJUNCTS (TECK IF USEO)  vigation  ed  NTIBIOTIC PROPHYLAXIS	
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		OPERATING THEATRE	OPERATING TIME
		Conventional Laminar Flow or similar SURGEON ATTIRE Space Suits/Helmet Far.	Start Skin Time:
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#### DO NOT PLACE IN PATIENT NOTES - TO BE RETAINED IN THEATRE SUITE

PLACE CEMENT STICKER OR COMPLETE Cement Name: Cement Antibiotic (if present):
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Augments
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## THEATRE FORMS

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		O Conventional	Start Skin Time:
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O Consultant	O Adv Trainee Unsupervised	Adv Trainee Supervised	O Basic Trainee

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

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## THEATRE FORMS

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		Retroperitoneal later	al abdominal wall incision	
	6			
LEVELS OF FUSION				
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0 14/5				
J 15/51				
PREVIOUS OPERATION				
Discectomy         L3/4         L4/5         L5/51           Other         L3/4         L4/5         L5/51         (secony)				
Discetomy         1.3/4         1.4/5         1.5/51           Other         1.3/4         1.4/5         1.5/51         1.9/10/11/11/11/11/11/11/11/11/11/11/11/11/				
Discectomy         1.3/4         1.4/5         1.5/51           Other         1.3/4         1.4/5         1.5/51         (srcory).           Other         1.3/4         1.4/5         1.5/51         (srcory).		SYSTEMIC ANTIB	IOTIC PROPHYLAXIS	
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Discectomy         L3/4         L4/5         L5/51           Other         L3/4         L4/5         L5/51         [stream].           Differ [stream].         Differ [stream].         Differ [stream].         Differ [stream].           Other         L4/5         L5/51         [main xawr clawads reseawdings reseawd			IOTIC PROPHYLAXIS  TRE OPERATING TIME Start Skin Time:	
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Internal fixation for juxtarticular fracture     Superior capsular reconstruction	STRUCTURAL BONE GRAFT GLENOID
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Terroro standardovi Internal fication for juxtarticular fracture Superior capsular reconstruction Arthroscopic debridement/decompression Other [srcov1	STRUCTURAL BONE GRAFT GLENOID  Allograft  GLENOID MORPHOLOGY
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Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Superior capsular reconstruction Antiroscopic debridement/decompression Other (secore) Other (secore) Other (secore) Other (secore) Other inflammatory Cuff tear arthropathy Massive cuff tear without arthritis Acute facture proximal humerus Tereford Stadmandow	Shortmetappped sem         STRUCTURAL BONE GRAFT GLENOID         Allograft         GLENOID MORPHOLOGY         All         All         B1         All         B1         All         B1         All         B1         All         B1         All         B1         All         B2         A2         B3         SYSTEMIC ANTIBIOTIC PROPHYLAXIS         NAME:
Tereford Statutation Tereford	Structural Bone Graft GLENOID         Allograft         GLENOID MORPHOLOGY $Allograft$ $Bl         Allograft Bl         Bl   $
Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Tereford Stadmandow Superior capsular reconstruction Arthroscopic debridgement/decompression Other (secore) Other (secore) Other (secore) Other (secore) Other inflammatory Cuff tear arthropathy Cuff tear arthropathy Cuff tear arthropathy Massive cuff tear without arthritis Acute fracture proximal humerus Post old trauma Avascular necrosis Dest recurrent dilocation	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $
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Tereford Statumator Tereford Statumator Tereford Statumator Tereford Statumator Tereford Statumator Tereford Statumator Superior capsular reconstruction Anthroscopic debridgement/decompression Other (secore) Other (secore) Odden Statumator Odd	Structural Bone Graft GLENOID         Allograft         GLENOID MORPHOLOGY         Allograft         GLENOID MORPHOLOGY         All         All         B1         All         B1         All         B2         B3         SYSTEMIC ANTIBIOTIC PROPHYLAXIS         NAME:
Tereford Stabilization Tereford Terefor	Structural Bone Graft GLENOID         Allograft         GLENOID MORPHOLOGY         All         All         B1         All         B1         All         B1         All         B1         Correctional
Tereford Statutadoff Internal fixation for juxtarticular fracture Superior capsular reconstruction Arthroscopic detridement/decompression Other (secory L  DIAGNOSIS Osteoarthritis Reheumatoid arthritis/other inflammatory Cuff tear arthropathy Massive cuff tear without arthritis Acute fracture proximal humerus Post old trauma Avacular necrosis Post recurrent dislocation Turnour Other (secory)  APPROACH [Inc.ALLINKTAPPY] Detopectoral	Structural Bone Graft GLENOID         Allograft         GLENOID MORPHOLOGY         All         All         B1         All         B1         All         B2         B3         SYSTEMIC ANTIBIOTIC PROPHYLAXIS         NAME:
Tereford Statutadolf Tereford Statutadolf Tereford Statutadolf Tereford Statutadolf Tereford Statutadolf Superior capsular reconstruction Arthroscopic detridement/decompression Other (secory L  Other (secory L	Structural Bone Graft GLENOID         Allograft         GLENOID MORPHOLOGY         All         All         B1         All         B1         All         B1         All         B2         B3         SYSTEMIC ANTIBIOTIC PROPHYLAXIS         NAME:
Tereford Statutation Tereford	Structural BONE GRAFT GLENOID         Allograft         GLENOID MORPHOLOGY         All         All         B1         All         B2         B3         SYSTEMIC ANTIBIOTIC PROPHYLAXIS         NAME:

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

tumerus ○Yes ○No Slenold ○Yes ○Ho	PLACE CEMENT STICKER OR COMPLETE Cement Name: Cement Antibiotic (if present):
Humerus Please do not fold placed stickers bar coded label	Glenoid Please do not fold placed stickersbar coded label
Humeral Head	Augments
Please do not fold placed stickers bar coded label	Please do not fold placed stickers bar coded label



## THEATRE FORMS

PR	IMARY REI (WR	PLACEMENT WRIST IST, DRUJ)		
NEW ZEALAND JOINT REGISTRY - D	O NOT PLACE	IN PATIENT NOTES - TO BE I	RETAINED IN THEATRE SUITE	
DATE THEATRE NO.	HOSPI	HOSPITAL NAME		
ASA CLASS 1 2 3 4 (MEASE ORGE)				
BMI				
CONSULTANT		STICK PATIENT LABEL HERE PLEASE PLACE IMPLANT LABELS ON THE REVERSE		
[IF DIFFERENT FROM PATIENT LABEL]				
LEFT - SIDE - RIGHT (				
	SURGE & SIG	$\begin{array}{c} \text{ON TO CHECK} \\ \text{N PLEASE} \longrightarrow \end{array} \begin{array}{c} \text{Surgeon to sign} \\ \text{X} \end{array}$	iere:	
	O Private		IB Outsourced	
JOINT REPLACED WRIST		ASSOCIATED PROCEDUR	ES (SOFT TISSUE OR BONE)	
WRIST		Yes ( seecily )_		
Partial / Ulna Head				
O Total		FIXATION		
PREVIOUS OPERATION ON INDEX JOIN	r	PROXIMAL IMPLANT		
		Cemented		
		DISTAL IMPLANT		
Interposition arthroplasty				
Debridement				
Synvectomy		SYSTEMIC ANTIBIOTIC P	ROPHYLAXIS	
Osteotomy		NAME:		
Other [SPECIFY]				
DIAGNOSIS				
Osteoarthritis		ODED ATIME STREET	ODED ATINES THE	
Rheumatoid arthritis		OPERATING THEATRE	OPERATING TIME	
Other inflammatory			Start Skin Time:	
Post fracture		U Laminar Flow or similar	Finish Skin Time:	
Post ligament disruption		SURGEON ATTIRE		
Other (SPECIFY)		Space Suits/Helmet Fan:  One	-piece Toga or Sterile Hood and Gown	
		Conventional Gown		
		O	0	
O consultant O Adv Trains	e unsupervised	Adv Trainee Supervised	Basic Trainee	

Wrist - Implant info	rmation stickers	
	Please do not fold placed stickers	
	bar coded label	



## THEATRE FORMS

<b>REVISION / RE-OPERATION</b>	I ANKLE JOINT REPLA	CEMENT
NEW ZEALAND JOINT REGISTRY - DO NOT PLACE I	N PATIENT NOTES - TO BE R	ETAINED IN THEATRE SUITE
DATE THEATRE NO. HOSPITA	AL NAME	
ASA CLASS 1 2 3 4 [PLEASE CIBCLE]		
BMI		
CONSULTANT	STICK PATIENT LABEL H	ERE
In Dragneau and a survey react	PLEASE PLACE IMPLANT	
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DATE OF INDEX OPERATION / / SURGEO	ON TO CHECK Surgeon to sign h	ere:
IF RE-REVISION PREVIOUS DATE / / & SIGN	PLEASE $\longrightarrow \chi$	
		B Outsourced
	0	
NAGNOSIS [TICK ALL THAT APPLY]	RE-OPERATION PROCEDU	JRE (TICKAIL THAT APPLY)
) Impingement	O Tendon surgery	
) Osteolysis: Talus 🗆 or Tibia 🗆	Subjacent Fusions (SPECIFY)_	
) Pain with no obvious cause	O Debridement for infection +/- be	aring exchange for access
Subjacent arthritis	O Debridement for impingement:	open 🗆 or arthroscopic 🗆
Bearing failure: wear 🗆 or fracture 🗖	Ligament reconstruction: medi	ial 🗆 or lateral 🗆
Failure to osseointergrate	ORIF Peri prosthetic #	
Periprosthetic #	Grafting of cysts: with bearing	exchange
Deep infection	Osteotomy (SPECIPY).	
Malalignment	Other (SPECIFY).	
Subsidence: Talus O or Tibia O	SYSTEMIC ANTIBIOTIC PR	ROPHYLAXIS
Other [specify].	Cephazolin	
EVISION PROCEDURE (TICKALL THAT APPRY)	Other [setcery]	
Bearing exchange only	A CONTRACTOR OF A CONTRACTOR OFTA CONT	
Amputation		
Extraction +/- cement spacer		
Fusion: TT C or TTC C		
) Tibia: standard 🗆 revision 🗆 custom 🗆 allograft composite	OPERATING THEATRE	OPERATING TIME
Talus: standard revision custom allograft composite		
Additional procedures (SPECIFY ]	Caminar Flow or similar	Finish Skin Time:
	SURGEON ATTIRE	
		nines Tons or Ci Starila Hoad and Course
		piece loga of L1 stenie Hood and Gown

ement   IF MORETHAN ONE MIX IS USED ONLY ONE CEMENT STICKER IS REQUIRED	
libla ○Yes ○No alus ○Yes ○No	PLACE CEMENT STICKER OR COMPLETE Cement Name: Cement Antibiotic (if present):
Tibia	Talus
Please do not fold placed stickers bar coded label	Please do not fold placed stickers : bar coded label
Bearing	
Please do not fold placed stickers bar coded label	



PRIMARY SURGEON

# **APPENDIX 3**

## THEATRE FORMS

	OINT REGISTRY	- DO NOT PLA	CE IN PATIENT NOTE	S - TO BE RETAINED I	N THEATRE SUIT
DATE THEATRE NO.		но	HOSPITAL NAME		
ASA CLASS 1 2	3 4   PLEASE CIRCI	s)			and the second second
BMI					
CONSULTANY (# DEFERENT FROM PATIENT LABEL)			STICK PATIENT LABEL HERE PLEASE PLACE IMPLANT		
O LEFT - S	IDE - RIGH	rΟ	LABELS ON I	HE REVERSE	1
IF BILATERAL TH	IEN DO SEPARATE FORMS	2			
IF BILATERAL TH	IEN DO SEPARATE FORMS	/ SUR	GEON TO CHECK	Surgeon to sign here:	
IF BILATERAL TH DATE OF INDEX OPERATION IF RE-REVISION PREVIOUS D/	IEN DO SEPARATE FORMS / ATE /	/ SUR / & SI	GEON TO CHECK GN PLEASE $\longrightarrow$	Surgeon to sign here:	

	ALVISION .
○ c 3/4	Replace disc prosthesis (same)
O C 4/5	Replace disc prosthesis (different)
○ c 5/6	Removal only
() C 6/7	O Fuse
O € 7/T1	Other (SPECEY)_
O Other [SHEORY]_	
REASON FOR REVISION	Computer Navigation
O Dislocation of component	Trans-trochanteric
Failure of component	Minimally invasive surgery
Adjacent level surgery	Anterior
Additional decompression required	O Posterior
Heterotopic calcification	O Lateral
O Infection	SYSTEMIC ANTIBIOTIC PROPHYLAXIS
O Pain (neck)	
O Other ( SPECIFY )	NAME:

	OPERATING THEATRE	OPERATING TIME	
	O Conventional	Start Skin Time:	
	O Laminar Flow or similar	Finish Skin Time:	
	SURGEON ATTIRE		
	O Space Suits/Helmet Fan: One	-piece Toga or 🗆 Sterile Hood and Gown	
	Conventional Gowm		
	A		
Adv Trainee Unsupervised	Adv Trainee Supervised	Basic Trainee	

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

Implants	- Implants
Please do not fold placed stickers bar coded label	Please do not fold placed stickers bar coded label
mplants	Implants
Please do not fold placed stickers bar coded label	Please do not fold placed stickers bar coded label



## THEATRE FORMS

REVISION / RE-	-OPERATION ELB	OW JOINT	rs I	
NEW ZEALAND JOINT REGISTRY - DO NOT PL	ACE IN PATIENT NOT	ES - TO BE RI	ETAINED IN THEATRE SUITE	
DATE THEATRE NO. H	IOSPITAL NAME	/AL NAME		
ASA CLASS 1 2 3 4 [PIEASE CIRCLE]	and the second			
RMI				
CONCULTANT	STICK PATIEN	T LABEL HE	RE	
[IF DIFFERENT FROM PATIENT LABEL]	PLEASE PLA	CE IMPLANT		
	LABELS ON	THE REVERSE		
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DATE OF INDEX OPERATION / / SU	RGEON TO CHECK	Surgeon to sign her	re:	
IF RE-REVISION PREVIOUS DATE / / &	SIGN PLEASE $\longrightarrow$	Х		
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FUNDING O ACC O Private	O DHB	O DHB	Outsourced	
	<b>CI 1 C</b>			
	CLASS			
Change of humeral component	Hemiathropias	sty (distal humerus r	eplacement)	
Change of ulnar component	Radial head re	Radial head replacement		
Change of radial head component	Radiocapitella	r replacement		
Change of all components	Total Ulnohum	Total Ulnohumeral replacement (unconstrained/linked)		
Removal of components	Total Ulnohum	ieral replacement (se	emiconstrained/finked)	
) Other (SPECIPY)_	APPROACH I	TICK ALL THAT APPLY		
EASON FOR REVISION	Medial			
Costening humeral component	O Lateral			
Coosening ulnar component	O Posterior		5	
Loosening radial head component	EVETENALC AL			
Unexplained pain	STSTEIVIC AI	ALIBIOTIC PR		
Deep infection	NAME:			
) Fracture humerus				
) Fracture ulna				
Dislocations				
Other [SPECIFY]				
	_			
ID COMPONENT ADDED, CHANGED OR REMOVED - SPECIFY PROCEDURE	OPERATING 1	HEATRE	OPERATING TIME	
Closed reduction of dislocation			Start Skin Time:	
Open reduction of dislocation	Laminar Flow	or similar	Finish Skin Time:	
Treatment deep infection	SURGEON AT	TIRE		
Superficial wound procedure	Space Suits/He	simet Fan: 🗌 One-p	elece Toga or Sterile Hood and Gown	
) MUA	Conventional	Gown		
RIMARY SURGEON				
	d 🔿 Adv Trainee Su	inenticed		

lumerus	() Yes	O No	
lina	Ves		PLACE CEMENT STICKER OR COMPLETE
adial	Over		Cement Name:
ataran	016		Cement Antibiotic (if present):
Hume	erus		Ulna
		Please do not fold placed stickers bar coded label	Please do not fold placed stickers bar coded label
Radia	l Head		Augments
		Please do not fold placed stickers bar coded label	Please do not fold placed stickers bar coded label

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



O Consultant

O Adv Trainee Unsupervised

# **APPENDIX 3**

## THEATRE FORMS

REVISION / RE (THUMB	OPERATION REPLA OR FINGER: CMCJ, M	CEMENT H CPJ, PIPJ)	IAND	
NEW ZEALAND JOINT REGISTRY - DO NO	OT PLACE IN PATIENT NO	TES - TO BE F	RETAINED IN THEATRE SU	
DATE THEATRE NO.	HOSPITAL NAME			
ASA CLASS 1 2 3 4 [PERASE CIRCLE]	the second se		the second s	
BMI				
CONSULTANT [# OWFIRENT FROM PATIENT LABEL]	STICK PATIENT LABEL HERE PLEASE PLACE IMPLANT LABELS ON THE REVERSE		IERE	
O LEFT - SIDE - RIGHT O IF BILATERAL THEN DO SEPARATE FORMS AN INDIVIDUAL FORM IS REQUIRED FOR EACH JOINT REVISED	LABELS OF	N THE REVERSE	1. A.	
DATE OF INDEX OPERATION / /	SURGEON TO CHECK	RGEON TO CHECK Surgeon to sign here:		
IF RE-REVISION PREVIOUS DATE / /	& SIGN PLEASE $\longrightarrow$	Х		
	rivate O DHB	O DH	B Outsourced	
		Ŭ		
JOINT REVISED - HAND [INCLUDING IF JOINT RUSED]	APPROACH	[TICK ALL THAT APPOY]		
FINGER - MCPJ FINGER - PIPJ	O Volar			
O Index	Dorsal	O Dorsal		
O Middle	O Lateral	C Lateral		
C Ring	PROCTURE	DROCTHESIS TYPE		
C Little				
гнимв	O Silicone	1		
С <u>сисі</u>	Surface repl	Surface replacement		
О мсри	O Pyrocarbon	O Pyrocarbon		
REASON FOR REVISION	O ther (seco	۲ <u>۲</u>		
	FIXATION			
Aseptic loosening	PROXIMAL IMPL	ANT	DISTAL IMPLANT	
Trauma - Fracture	Cemented		Cemented	
		l	O Uncemented	
) Pain	EVETENIC	NTIPLOTIC N		
Implant fracture	STSTEMICA	ANTIBIOTIC PI	COPIE LAXIS	
Other (SPECKY)_	NAME:			
	OPERATING	THEATRE	OPERATING TIME	
		d	Start Skin Time:	
0	Laminar Flow	w or similar	Finish Skin Time:	
	SURGEON A	TTIRE		
(a	Space Suits/	Helmet Fan: 🗌 One	piece Toga or 🗆 Sterile Hood and Gowr	
	Conventiona	Gown		

O Adv Trainee Supervised

O Basic Trainee

DO NOT PLACE IN PATIENT NOTES - TO BE RETAINED IN THEATRE SUITE	
Hand - Implant information stickers	
	1
riease do nor toio pieceo sociars bar coded label	



## THEATRE FORMS

NEW ZEALAND JOINT REGISTRY - DO NOT PLACE IN PATIENT NOTES - TO BE RETAINED IN THEATRE SUITI				
DATE	THEATRE NO.	HOSPITAL NAME		
ASA CLASS 1 BMI CONSULTANT LF DIFFERENT FROM PARE	2 3 4 [PERAE CRICE]	STICK PATIENT LABEL HERE PLEASE PLACE IMPLANT LABELS ON THE REVERSE		
DATE OF INDEX OPER	ATION / /			

PROCEDURE PERFORMED [TICK ALL THAT APPLY]	IF RE-OPERATION ONLY	IT STORY BOOTH BEI
Change of all components		infection
Change of femoral component	Closed reduction of distoration	intection
Change of acetabular shell		/
Change of liner	Haematoma Evaruation	
Change of head		
Removal of components only (Girdlestone)	Bone Grafting Lytic lesion only	
No components added, exchanged, or removed - re-operation only	ORIF of periprosthetic fracture	
REASON FOR THIS REVISION [TICK ALL THAT APPRY ] [REVISION = COMPONENT ADDED, CHANGED, OR REMOVED]	O Other ( SPEGIFY )	
O Reep infection		
C Loosening acetabular component	- O Posterior	
O Loosening femoral component	- O Anterior	
Dislocation/instability	Cateral     Cateral     Trace trachasticie (actuation)	
Fracture femur	- U inters-trochanteric (disted tomy)	
Failed hemiarthroplasty	SURGICAL ADJUNCTS (1)	CK IF USED ]
O Poly wear	Computer Navigation	Robotic assisted
Unexplained pain		
O Other [SPECIFY]	OPERATING THEATRE	OPERATING TIME
SYSTEMIC ANTIDIOTIC BROBLINI AVIS	Conventional	Start Skin Time:
STSTEMIC ANTIDIOTIC PROPHILARIS	Laminar Flow or similar	Finish Skin Time:
NAME:	SURGEON ATTIRE	
	Space Suits/Helmet Fan:	e-piece Toga or 🗍 Sterile Hood and Gown
	Conventional Gown	
PRIMARY SURGEON	<b>S</b>	
Consultant Adv Trainee Unsupervised	Adv Trainee Supervised	Basic Trainee

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

Cement [ IF MORE THAN ONE MIX IS USED ONLY ONE CEMENT STICKER IS REQUIRED ] Femur O Yes O No PLACE CEMENT STICKER OR COMPLETE Acetabulum O Yes O No Cement Name: Cement Antibiotic (if present): Femur Acetabulum Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label Femoral head Augments Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label

6



O Consultant

O Adv Trainee Unsupervised

## **APPENDIX 3**

## THEATRE FORMS

NEW ZEALAND JOINT REGISTRY	Y - DO NOT PLACE	IN PATIENT NOTES	- TO BE RETAIL	IED IN THEATRE SUITE	
DATE THEATRE NO.	HOSPI	TAL NAME			
ASA CLASS 1 2 3 4   PLEASE CIRC	(LE)	and the second se			
BMI					
CONSULTANT		STICK PATIENT	LABEL HERE		
LEFT - SIDE - RIGH	ŢO	PLEASE PLACE LABELS ON THE	IMPLANT REVERSE	A second second	
DATE OF INDEX OPERATION /	/ SURG		geon to sign here:		
IF RE-REVISION PREVIOUS DATE /	/ & SIG	N PLEASE $\rightarrow \chi$	1		
	O Private	O DHB	O DHB Outso	arced	
	U IIIIII	0	0		
Change of tibial polyethylene only Change of patellar component Addition of patellar component Removal of all components only No components added or changed - te-operatio Other (secory)	n only	OBIF Periprostheti OBIF Periprostheti Other (secury) APPROACH (rox Medial parapatelli Lateral parapatelli Tibial tubercle ostic Other (se ocrossas	Fracture		
RACON ROD WING DRINGLON	HAT APPLY]	SURGICAL ADJU	JNCTS (TICK IF USED )		
		Computer Navigat	ion		
Deep infection	O Loosening femoral component		Robotic assisted		
Deep Infection     Losening femoral component     Losening natellar component		Patient specific cutting guides			
		O Patient specific cut	ting guides		
REASON FOR THIS REVISION INCALL  Deep Infection  Lossening femaral component  Lossening statlar component  Lossening tiblal component  Failed uniconsentmental		Patient specific cut	ting guides BIOTIC PROPH	/LAXIS	
REASON FOR THIS REVISION INCALL Deep infection Lossening femoral component Lossening statilar component Lossening statilar component Lossening tibila component Failed unicompartmental Wear in non-replaced compartment		Patient specific cut SYSTEMIC ANTI NAME:	ting guides BIOTIC PROPH	/LAXIS	
REASON FOR THIS REVISION   TRUALLY Deep infection Lossening lemonal component Lossening satellar component Lossening tablal component Failed unicompartmental Wear in non-replaced compartment Periprosthetic Fracture   femur   Tibla			ting guides BIOTIC PROPH		
REASON FOR THIS REVISION   TRCAULT  Deep infection  Lossening lemoral component  Lossening satellar component  Lossening sibilal component  Failed unicompartmental  Wear in non-replaced compartment  Periprosthetic Fracture   Femur   Tibila  Poly wear		Patient specific cut SYSTEMIC ANTI NAME: OPERATING THI	ting guides BIOTIC PROPH	PERATING TIME	
REASON FOR THIS REVISION   TRCAULT  Deep infection  Lossening temoral component  Lossening shellar component  Lossening tiblal component  Failed unicompartmental  Wear in non-replaced compartment  Periprosthetic Fracture   Femur   Tibla  Poly wear  Stiffness/Arthrolibrosis		Patient specific cut  SYSTEMIC ANTI NAME:  OPERATING THI Conventional	ting guides BIOTIC PROPH  ATRE O Sta	YLAXIS PERATING TIME rt Skin Time:	
REASON FOR THIS REVISION INCLUIT         Deep Infection         Lossening lemoral component         Lossening satellar component         Lossening satellar component         Pailed unicompartmental         Wear in non-replaced compartment         Periprosthetic Fracture       Femur         Poly wear         Stiffness/Arthrofibrosis         Instability		Patient specific cut  SYSTEMIC ANTI NAME:  OPERATING THI  Conventional Laminar Flow or si	ting guides BIOTIC PROPH' EATRE O Sta millar Fin	YLAXIS PERATING TIME rt Skin Time: Ish Skin Time:	
REASON FOR THIS REVISION INCLUIT       Deep Infection       Loosening tenoral component       Loosening stellar component       Loosening stellar component       Failed unicompartmental       Wear in non-replaced compartment       Periprosthetic Fracture       Poly wear       Stiffness/Arthrolibrosis       Instability       Unexplained pain		Patient specific cut      SYSTEMIC ANTI NAME      OPERATING THI      Conventional      Laminar flow or si      SURGEON ATTIII	ting guides BIOTIC PROPH' EATRE O Stu millar Fin RE	YLAXIS PERATING TIME er Skin Time: Ish Skin Time:	

O Adv Trainee Supervised

O Basic Trainee

# Cement ( IF MORE THAN ONE MICH USED ONLY ONE CEMENT STICKER IS REQUIRED ) Femur O Yes O No PLACE CEMENT STICKER OR COMPLETE Tibia 🔿 Yes 🔿 No Cement Name: Patella 🔿 Yes 🔿 No Cement Antibiotic (if present): Femur Tibia Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label Patella Augments Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label IMPORTANT

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



## THEATRE FORMS

NEW ZEALAND JOINT REGISTRY - DO N	OT PLACE	N PATIENT NOT	ES - TO BE R	RETAINED IN THEATRE SUIT		
DATE THEATRE NO.	HOSPIT	AL NAME				
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BMI						
CONSULTANT		STICK PATIEN	IT LABEL H	IERE		
[IF DIFFERENT FROM PATIENT LABEL]	JLTANT NY FROM PATIENT LABEL]			PLEASE PLACE IMPLANT		
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IF RE-REVISION PREVIOUS DATE / /	& SIGN	$PLEASE \longrightarrow$	Х			
	Private	O DHB	O DH	B Outsourced		
	and the					
REASON FOR REVISION		APPROACH	TICKALL THAT APPLY ]			
C Loosening of components			al midline abdomir	nal wall incision		
Dislocation of articulating core		O Retroperitori	al lateral abdomina	al wall incision		
Loss of spinal alignment		Posterior Approach for in-situ fusion				
Fracture of vertebra			al			
Deep infection		O Other ( srecen	1			
Remarked of companyants	Deep infection					
O Neinoval of components		INTRAOPER	TIVE COMPL	LICATIONS		
Pain		INTRAOPER	ATIVE COMPI	LICATIONS		
Pain Other (SPCCPY)		INTRAOPER	ATIVE COMPI	LICATIONS		
Pelinvar or components     Paln     Other (secory) REVISION		INTRAOPER	ATIVE COMPI	LICATIONS		
Pain     Other [secory]_ REVISION     Change of TDR components		INTRAOPER/	ATIVE COMP	LICATIONS		
		INTRAOPER/	ATIVE COMPI			
Memoral of comparents     Pain     Other (secory )  REVISION     Change of TDR companents     Change to Anterior Fusion     Change to Anterior Fusion     Change of articulating core			ATIVE COMP			
removal of comparents     Pain     Other [secory ]  REVISION     Change of TDR companents     Change to Anterior Fusion     Change to Anterior Fusion     Change of articulating core     In-situ posterior instrumented fusion			ATIVE COMPI			
Memoral of components     Other [secory]      REVISION     Change of TDR components     Change to Anterior Fusion     Change to Anterior Fusion     Change of articulating core     In-situ posterior instrumented fusion LEVELS OF DISC REPLACEMENT		INTRAOPER	NTIBIOTIC PI	LICATIONS		
Memoral of components      Pain      Other [secory]_      REVISION      Change of TDR components      Change to Anterior Fusion      Change of articulating core      In-situ posterior instrumented fusion  LEVELS OF DISC REPLACEMENT      L3/4		INTRAOPER	NTIBIOTIC PI	LICATIONS		
Memoral of comparents      Pain      Other [sec:Pr]_      Change of TDR components      Change to Anterior Fusion      Change to Anterior Fusion      Change of articulating core      In-situ posterior instrumented fusion  LEVELS OF DISC REPLACEMENT      L3/4      L4/5		INTRAOPER	NTIBIOTIC PI	IICATIONS		
Memoral of components      Pain      Other [sec:Pr]_      Change of TDR components      Change to Anterior Fusion      Change to Anterior Fusion      Change of articulating core      In-situ posterior instrumented fusion  LEVELS OF DISC REPLACEMENT      L3/4      L4/5      L5/51		INTRAOPER	NTIBIOTIC PI	IICATIONS  ROPHYLAXIS  OPERATING TIME		
relevant of components      Pain      Other (secory)_      Change of TDR components      Change to Anterior Fusion      Change to Anterior Fusion      Change of articulating core      In-situ posterior instrumented fusion  LEVELS OF DISC REPLACEMENT      L3/4      L4/5      L5/51  LEVELS OF FUSION		INTRAOPER	NTIBIOTIC PI	LICATIONS  ROPHYLAXIS  OPERATING TIME Start Skin Time:		
relevant of collipcients     Pain     Pain     Other (secory)_     Change of TDR components     Change to Anterior Fusion     Change to Anterior Fusion     Change of articulating core     In-situ posterior instrumented fusion     LEVELS OF DISC REPLACEMENT     L3/4     L4/5     L5/51 LEVELS OF FUSION     L3/4		SYSTEMIC A NAME: OPERATING Conventional	NTIBIOTIC PI	LICATIONS  ROPHYLAXIS  OPERATING TIME Start Skin Time: Finish Skin Time:		
relational of collipcients     Pain     Other (second)     Change of TDR components     Change to Anterior Fusion     Change to Anterior Fusion     Change of articulating core     In-situ posterior instrumented fusion     LEVELS OF DISC REPLACEMENT     L3/4     L4/5     L5/51     L9/4     L3/4     L3/4     L3/4     L3/4		SYSTEMIC A NAME: OPERATING Conventional SURGEON A	NTIBIOTIC PI THEATRE or similar FTIRE	LICATIONS  ROPHYLAXIS  OPERATING TIME Start Skin Time: Finish Skin Time:		
Memoral of components  Pain Other (secory)_  Change of TDR components  Change of articulating core In-situ posterior instrumented fusion  EVELS OF DISC REPLACEMENT  L3/4 L4/5 L5/51  EVELS OF FUSION  L3/4 L4/5 L5/51		INTRAOPER	NTIBIOTIC PI THEATRE or similar FTIRE elimet Farc One	LICATIONS		

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

Implants	Implants
Please do not fold placed stickers bar coded label	Please do not fold placed stickers bar coded label
Implants	Implants
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## THEATRE FORMS

	ND JOINT REGISTRY - DO N	NOT PLACE IN PATIENT NOTES - TO BE RETAINED IN THEATRE SUI
DATE	THEATRE NO.	HOSPITAL NAME
ASA CLASS 1	2 3 4 (measeconcue)	
	- SIDE - RIGHT ()	STICK PATIENT LABEL HERE PLEASE PLACE IMPLANT LABELS ON THE REVERSE
	RAL THEN DO SEPARATE FORMS	

#### REVISION PROCEDURE [TICK ALL THAT APPOPT IF RE-OPERATION ONLY [ NO COMPONENT ADDED, CHANGED OR REMOVED - SPECIFY PROCEDURE ] O Change of all components O Closed reduction of dislocation O Change of glenoid component O Debridement / Lavage for deep infection O Change of humeral component O MUA O Change of liner O Open reduction of dislocation O Change of head only O Superficial wound procedure O Removal of components only (with or without spacer insertion) O Subscapular repair O Removal only humerus component APPROACH [TICK ALL THAT APPLY] O Removal only glenoid component O Conversion procedure (SPECRY)\_ O Deltopectoral O No components added or changed - re-operation only O Patient specific instrument O Other [SPECIFY]. O Other [ SPECIFY ]\_ REASON FOR THIS REVISION (TICK ALL THAT APPLY) BONE GRAFT O Deep infection O Allograft O Autograft O Loosening glenoid component SYSTEMIC ANTIBIOTIC PROPHYLAXIS O Loosening humeral component NAME: O Dislocation/instability anterior O Instability posterior **OPERATING THEATRE OPERATING TIME** Rotator cuff impingement/failure O Conventional Start Skin Time: O Fracture humerus O Laminar Flow or similar Finish Skin Time: O Implant breakage/dissociation SURGEON ATTIRE O Glenoid erosion ◯ Space Suits/Helmet Fan: □ One-piece Toga or □ Sterile Hood and Gown O Other [SPECIFY]\_ O Conventional Gown PRIMARY SURGEON O Consultant O Adv Trainee Unsupervised O Adv Trainee Supervised O Basic Trainee

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

Cement (IF MORE THAN ONE MIX IS USED ONLY ONE CEMENT STICKER IS REQUIRED.) Humerus () Yes () No PLACE CEMENT STICKER OR COMPLETE Glenoid O Yes O No Cement Name: Cement Antibiotic (if present): Humerus Glenoid Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label Humeral Head Augments Please do not fold placed stickers Please do not fold placed stickers bar coded label bar coded label



## THEATRE FORMS

	REVISION / R	WRI	ST, DRUJ)	EMENT	/KISI
NEW ZEALAND JOINT	REGISTRY - DO I	NOT PLACE	N PATIENT NOT	ES - TO BE R	RETAINED IN THEATRE SUITE
DATE THE	ATRE NO.	HOSPIT	AL NAME		
ASA CLASS 1 2 3 4	[PLEASE CIRCLE]	and the second second	No. of Concession, Name		and the second se
BMI					
CONSULTANT			STICK PATIEN	IT LABEL H	ERE
IF DIFFERENT FROM PATIENT LABEL ]			PLEASE PL/	ACE IMPLANT	
O LEFT - SIDE	- RIGHT ()	L	LABELS ON	THE REVERSE	
ATE OF INDEX OPERATION	1 1	SURGEO	ON TO CHECK	Surgeon to sign h	ere:
RE-REVISION PREVIOUS DATE	1 1	& SIGN	$PLEASE \longrightarrow$	Х	
	r ()	Private	O DHR		B Outsourced
0	- 0		0.00	0.0	
DINT REVISED WRIST			ASSOCIATED	PROCEDUR	ES (SOFTTESSUE OR BONE)
- WRIST			Yes [SPECIFY]		
) Partial			(1990) <del>(* 1990) (*</del>		
) Total					
) Fusion (secory)_					
Other [SPECIPY]					
- DRUJ					
) Total			FIXATION		
Excision		)	PROXIMAL IMPLA	NT	
Other rescion			Cemented	-1.4.2	
ASON FOR REVISION			DISTAL IMPLANT		
Infection			Cemented		
Aseptic loosening					
) Trauma - Fracture			SYSTEMIC A	NTIBIOTIC PR	<b>OPHYLAXIS</b>
Dislocation			NAME:		
Pain					
Implant fracture			ODEDATING	THEATOR	ODEDATING TIME
Other [SPECIPY]_			OPERATING	HEATRE	OPERATING TIME
				5252	Start Skin Time:
			U Laminar Flow	or similar	Finish Skin Time:
			SURGEON AT	TIRE	
			O Space Suits/He	elmet Fan: 🗌 One-	piece Toga or Sterile Hood and Gown
			Conventional	Gown	
IMARY SURGEON					
) Consultant	Adv Trainee Un	supervised	Adv Trainee St	pervised	Basic Trainge

Vrist - Implant information	stickers		
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## NZJR QUESTIONNAIRES

## Manchester-Oxford Foot Questionnaire (MOxFQ)

Cir	cle as appropriate	Right / Left		Full Name_	
Ple	ase tick ( $$ ) one fo	r each statement			
1.	During the past 4	weeks this has a	oplied to me:		
	I have pain in my	foot/ankle			
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
2.	During the past 4 I avoid walking lor	weeks this has ap	oplied to me: use of pain in my	/ foot/ankle	
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
3.	During the past 4 I change the way I	weeks this has ap walk due to pain	plied to me: in my foot/ankle	e	
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
4.	During the past 4	<u>weeks</u> this has ap use of pain in my	plied to me: foot/ankle	Most of the	
	Time	Barely	time	time	All of the time
5.	During the past 4 I have to stop and None of the Time	weeks this has ap rest my foot/ankl Rarely	plied to me: e because of pai Some of the time	in Most of the time	All of the time
6.	During the past 4	weeks this has ap	plied to me:		
	I avoid some hard	or rough surfaces	because of pain	in my foot/ank	le
	None of the	Desert	Some of the	Most of the	411 - <b>F</b> 41 - 41
7.	During the past 4	weeks this has ap	plied to me:		
	I avoid standing fo	r a long time beca	use of pain in m	y foot/ankle	
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
8.	During the past 4	weeks this has ap	plied to me:		
	I catch the bus or u	use the car instead	d of walking, bed	cause of pain in I	my foot/ankle
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time

	During the past 4	weeks this has	applied to me:		
	None of the	13 about my 100	Some of the	Most of the	
	Time	Rarely	time	time	All of the time
10.	During the past 4	weeks this has a substant weeks the second s	applied to me: es I have to wear		
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
11.	During the past 4	weeks this has a	applied to me:		
	The pain in my foo	it/ankle is more	painful in the eve	ening	
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
12.	During the past 4	<u>weeks</u> this has a	applied to me:		
	I get shooting pain	s in my foot/an	kle		
	None of the		Some of the	Most of the	
	lime	Rarely	time	time	All of the time
					1.11
13.	During the past 4	weeks this has a	applied to me:		
13.	During the past 4	weeks this has a t/ankle prevent	applied to me: s me from carryin	ng out my work/ev	veryday activities
13.	During the past 4 The pain in my foo None of the	↓↓ weeks this has a t/ankle prevent	applied to me: s me from carryin Some of the	ng out my work/ev Most of the	veryday activities
.3.	During the past 4 The pain in my foo None of the Time	L] weeks this has a t/ankle prevent Rarely	applied to me: s me from carryin Some of the time	ng out my work/ev Most of the time	veryday activities All of the time
13.	During the past 4 The pain in my foo None of the Time	L weeks this has a t/ankle prevent Rarely C	applied to me: s me from carryin Some of the time	ng out my work/ev Most of the time	veryday activities All of the time
13.	During the past 4 The pain in my foo None of the Time During the past 4	U weeks this has a t/ankle prevent Rarely D weeks this has a	applied to me: s me from carryin Some of the time D applied to me:	ng out my work/ev Most of the time	veryday activities All of the time
13.	During the past 4. The pain in my foo None of the Time During the past 4 I am unable to do a	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r	applied to me: s me from carryin Some of the time D spplied to me: recreational activi	ng out my work/ex Most of the time L ties because of pa	veryday activities All of the time
13.	During the past 4. The pain in my foo None of the Time During the past 4.7 I am unable to do a None of the	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r	applied to me: s me from carryin Some of the time  pplied to me: ecreational activi Some of the	ng out my work/ex Most of the time L ties because of pa Most of the	All of the time
13.	During the past 4. The pain in my foo None of the Time During the past 4. None of the Time Time	U weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely	applied to me: s me from carryin Some of the time applied to me: eccreational activi Some of the time	ng out my work/ew Most of the time U ties because of pa Most of the time	All of the time
13.	During the past 4. The pain in my foo None of the Time During the past 4. I am unable to do a None of the Time L	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely	applied to me: s me from carryin Some of the time spplied to me: ecreational activi Some of the time	Ing out my work/ex Most of the time ties because of pa Most of the time L	All of the time
13.	During the past 4. The pain in my foo None of the Time During the past 4. I am unable to do a None of the Time During the past 4. During the past 4.	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely Rarely weeks	applied to me: s me from carryin Some of the time pplied to me: recreational activi Some of the time	ng out my work/ex Most of the time ties because of pa Most of the time	veryday activities All of the time in in my foot/ankle All of the time
13. 14.	During the past 4. The pain in my foo None of the Time During the past 4. None of the Time During the past 4. How would you de	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely weeks scribe the pain	applied to me: s me from carryin Some of the time applied to me: recreational activi Some of the time applied to me: recreational activi some of the time applied to me: time applied to	ng out my work/ex Most of the time ties because of pa Most of the time time in your foot/ankle	veryday activities All of the time in in my foot/ankle All of the time
.5.	During the past 4. The pain in my foo None of the Time During the past 4. I am unable to do a None of the Time During the past 4. How would you de None	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely Rarely scribe the pain Very mild	applied to me: s me from carryin Some of the time applied to me: cecreational activi Some of the time U you usually have i Mild	In your foot/ankle	veryday activities All of the time in in my foot/ankle All of the time All of the time ? Severe
13. L4.	During the past 4. The pain in my foo None of the Time During the past 4. I am unable to do i None of the Time During the past 4.1 How would you de None None	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely Rarely scribe the pain Very mild	applied to me: s me from carryin Some of the time applied to me: recreational activi Some of the time U you <u>usually</u> have i Mild U	ag out my work/ev Most of the Lime Most of the time Lime Lime Lime Lime Lime Lime Lime L	All of the time Severe
.3. .4. .5.	During the past 4. The pain in my foo None of the Time During the past 4. I am unable to do a None of the Time During the past 4. How would you de None During the past 4. During the past 4.	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely Rarely scribe the pain Very mild weeks	applied to me: s me from carryin Some of the time poplied to me: ecreational activi Some of the time U Some of the time Mild	In your foot/ankle	reryday activities All of the time in in my foot/ankle All of the time All of the time ? Severe
.5.	During the past 4. The pain in my foo None of the Time During the past 4 I am unable to do a None of the Time During the past 4 How would you de None During the past 4 Have you been tro	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely Rarely weeks Very mild weeks ubled by pain fr	applied to me: s me from carryin Some of the time poplied to me: recreational activi Some of the time wou usually have i Mild mild om your foot/ank	ag out my work/ev Most of the ime Most of the ties because of pa Most of the time in your foot/ankle Moderate de in bed at night	All of the time Severe
13. 14. 15.	During the past 4.1 The pain in my foo None of the Time During the past 4.1 I am unable to do a None of the Time During the past 4.1 How would you de None During the past 4.1 Have you been tro	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely weeks scribe the pain fr Very mild weeks ubled by pain fr Only 1 or 2	applied to me: s me from carryin Some of the time ecreational activi Some of the time U you <u>usually</u> have i Mild Mild	in your foot/ankle	All of the time All of the time All of the time All of the time Severe
13. 14.	During the past 4.1 The pain in my foo None of the Time During the past 4.1 I am unable to do a None of the Time During the past 4.1 How would you de None During the past 4.1 Have you been tro No nights	weeks this has a t/ankle prevent Rarely weeks this has a all my social or r Rarely weeks scribe the pain fr Very mild weeks Uveld by pain fr Only 1 or 2 nights	Applied to me: s me from carryin Some of the time applied to me: ecreational activi Some of the time D Mild Mild Mild Some nights	In your foot/ankle Most of the time Most of the time In your foot/ankle Moderate In upour foot/ankle	All of the time Severe Every night

Thank you very much.



19	CVISION IVIA	neneste		root Que	Suomane (1910)	TQ)
Ci	rcle as appropriat	le Right/	Left	Full	Name	
Ple	ease tick $(\checkmark)$ one 1	or each state	ement			
1.	During the past 4 w	eeks mis has ap	opned to me:			
	None of the	ankie	Some of the	Most of the		
	Time	Rarely	time	time	All of the time	
2.	During the past 4 w	<u>eeks</u> this has ap	oplied to me:			
	I avoid walking long	distances becau	se of pain in my fo	oot/ankle		
	None of the	Sec. 21	Some of the	Most of the	10.000	
	Time	Rarely	time		All of the time	
3.	During the past 4 w	eeks this has ap	plied to me:			
	I change the way I wa	alk due to pain i	n my foot/ankle			
	None of the	12. 23	Some of the	Most of the		
	Time	Rarely	time	time	All of the time	
			1			
4.	During the past 4 we	eeks this has ap	plied to me:			
	I walk slowly because	e of pain in my f	Comankie	Mast of the		
	None of the	Densla	Some of the	Most of the	All of the time	
			time			
5.	During the past 4 w	eks this has an	plied to me:			
2	I have to stop and res	t my foot/ankle	because of pain			
	None of the	in the second se	Some of the	Most of the		
	Time	Rarely	time	time	All of the time	
			[			
6.	During the past 4 we	eks this has ap	plied to me:	mu faatlankia		
	None of the	rough surfaces t	Some of the	Most of the		
	Time	Rarely	time	time	All of the time	
			[			
7.	During the past 4 we	<u>eeks</u> this has ap	plied to me:			
	I avoid standing for a	long time becau	ise of pain in my f	oot/ankle		
	None of the	23 23/2	Some of the	Most of the	0000020-00	
	Time	Rarely	time	time	All of the time	
		Ц	[			
8.	During the past 4 we	eks this has ap	plied to me:			
	I catch the bus or use	the car instead of	of walking, becaus	e of pain in my fool	Vankle	
	None of the	Devel	Some of the	Most of the	All of the dimen	
		Rarely	time		All of the time	
9.	During the past 4 we	eks this has ap	plied to me:		_	
	None of the	loout my tool/an	Some of the	Most of the		
	Time	Rarely	time	time	All of the time	
10.	During the past 4 we	<u>eks</u> this has ap	plied to me:			
	I feel self-conscious a	bout the shoes I	have to wear			
	None of the	69 1571	Some of the	Most of the	100211203	
	Time	Rarely	time	time	All of the time	

	The pain in my fa-		ALTING ANY DIALS COLLEGED AND		
	None of the	oankie is more par	Some of the	Most of the	
	Time	Rarely	Some of the	wost of the	All of the time
12.	During the past 4	weeks this has ap	plied to me:		
	I get shooting pain:	in my foot/ankle			
	None of the		Some of the	Most of the	
	Time	Rarely	time	time	All of the time
3.	During the past 4	weeks this has ap	plied to me:		
	The pain in my foo	l/ankle prevents me	e from carrying ou	it my work/every	day activities
	None of the		Some of the	Most of the	
	Time	Raraly	time	time	All of the time
	THIC	Ratery	tinte		
4.	During the past 4	weeks this has ap	Died to me:		
4.	During the past 4	weeks this has app	plied to me:	because of nain	in my foot/ankle
14.	During the past 4 I am unable to do a None of the	weeks this has app	plied to me: eational activities Some of the	because of pain Most of the	in my foot/ankle
4.	During the past 4 I am unable to do a None of the Tîme	weeks this has app I my social or recr Rarely	plied to me: eational activities Some of the time	because of pain Most of the time	in my foot/ankle All of the time
4.	During the past 4 I am unable to do a None of the Time	weeks this has ap Il my social or recr Rarely	plied to me: eational activities Some of the time	because of pain Most of the time	in my foot/ankle All of the time
4.	During the past 4 I am <u>un</u> able to do a None of the Time During the past 4	weeks this has app I my social or recr Rarcly	olied to me: eational activities Some of the time	because of pain Most of the time	in my foot/ankle All of the time
5,	During the past 4 I am unable to do a None of the Time During the past 4 How would you des	weeks this has app Il my social or recr Rarely Rarely weeks	plied to me: eational activities Some of the time	because of pain Most of the time Dur foot/ankle?	in my foot/ankle All of the time
4.	During the past 4. T am unable to do a None of the Time During the past 4 How would you des None	weeks this has app Il my social or reer Rarely Rarely weeks cribe the pain you Very mild	olied to me: eational activities Some of the time Usually have in yo Mild	because of pain Most of the time Dur foot/ankle? Moderate	in my foot/ankle All of the time
4.	During the past 4. T am unable to do a None of the Time During the past 4 How would you des None	weeks this has app I my social or recr Rarely Rarely weeks verbe the pain you Very mild	Delied to me: eational activities Some of the time Usually have in ye Mild	because of pain Most of the time Dur foot/ankle? Moderate	in my foot/ankle All of the time Severe
4. 5, 6.	During the past 4 I am unable to do a None of the Time During the past 4 y How would you des None During the past 4 y	weeks this has app Il my social or recr Rarely weeks cribe the pain you Very mild	usually have in yo Mild	because of pain Most of the time bur foot/ankle? Moderate	in my foot/ankle All of the time Severe
4. 5, 6.	During the past 4:     I am <u>un</u> able to do a     None of the     Time     During the past 4:     How would you des     None     During the past 4:     Have you been trou	veeks veeks cribe the pain you Very mild	Died to me: eational activities Some of the time usually have in yo Mild vour foot/ankle in	because of pain Most of the time Dour foot/ankle? Moderate bed at niebt?	in my foot/ankle All of the time Severe
4. 5. 6.	During the past 4' I am unable to do a None of the Time During the past 4' How would you des None During the past 4 Market Allower States During the pas	weeks this has app I my social or reer Rarely weeks Very mild veeks Only 1 or 2	olied to me: eational activities Some of the time usually have in ye Mild your foot/ankle in	because of pain Most of the time Dur foot/ankle? Moderate bed at night?	in my foot/ankle All of the time Severe
4. 5.	During the past 4     I am unable to do a     None of the     Time     During the past 4     How would you des     None     During the past 4     Have you been trou     No nights	weeks this has app I my social or reer Rarely cribe the pain you very mild weeks Died by pain from : Only 1 or 2 niehts	Died to me: eational activities Some of the time usually have in ye Mild your foot/ankle in Some nights	because of pain Most of the me bur foot/ankle? Moderate bed at night?	in my foot/ankle All of the time Severe

mally, please check that you have answered <u>every quest</u> Thank you very much.



## NZJR QUESTIONNAIRES

## NECK DISABILITY INDEX (NDI) QUESTIONNAIRE

Patient Name:	 Date of Birth:	
Patient Address:	 Operating Surgeon:	
	 Date of Surgery:	

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

Sa	ection 1. Pain Intensity	Costion St. Conservation New
0	I have no pain at the moment	Jean concentration
2	The pair is year wild at the memory	1 can concentrate rully when I want to, with no
-	The pair is very find at the moment.	difficulty.
2	The pain is moderate at the moment.	I can concentrate fully when I want to, with slight
2	The pain is fairly severe at the moment.	difficulty.
0	The pain is very severe at the moment.	I have a fair degree of difficulty in concentrating
	The pain is the worst imaginable at the moment.	when I want to.
		I have a lot of difficulty in concentrating when I want
Se	ction 2: Personal Care (Washing, Dressing, etc)	to.
D	I can look after myself normally, without causing extra	I have a great deal of difficulty in concentrating when
	pain.	I want to
D	I can look after myself normally, but it causes extra pain	I cannot concentrate at all
0	It is painful to look after myself and I am slow and careful	a comoc concentrate of on.
	I need some help, but manage most of my personal save	Cartion 7. Work
8	I need some neip, out manage most of my personal care.	Section 7: Work
	I need help every day in most aspects of self care.	I can do as much work as I want to.
0	I do not get dressed, I wash with difficulty and stay in	I can only do my usual work, but no more.
	bed.	I can do most of my usual work, but no more.
lan-	34-1 TM / 78-3549	I cannot do my usual work.
Se	ction 3: Lifting	I can hardly do any work at all.
	I can lift heavy weights without extra pain.	I can't do any work at all.
	I can lift heavy weights, but it gives extra pain.	
0	Pain prevents me from lifting heavy weights off the floor,	Section 8: Driving
	but I can manage if they are conveniently positioned, for	I can drive my car without any neck pain
	example, on a table.	I can drive my car as long as I want, but with clight
11	Pain prevents me from lifting heavy weights off the floor	neck nain
2	but I can manage light to medium weights on the noor,	I can dela put car as long as Lugat, but with
	conveniently positioned	I can unve my car as long as I want, out with
-	L cap lift your light unights	moderate neck pain.
	I can nit very light weights.	I can't drive my car as long as I want because of
ш	a cannot lift or carry anything at all.	moderate pain in my neck.
		I can hardly drive at all because of severe pain in my
Sec	ction 4: Reading	neck.
	I can read as much as I want to with no pain in my neck.	I can't drive my car at all.
0	I can read as much as I want to with slight pain in my	19 7 19 10 10 N
	neck.	Section 9: Sleeping
	I can read as much as I want to with moderate pain in my	I have no trouble sleeping.
	neck.	My sleep is slightly disturbed (less than 1 hour
	I can't read as much as I want because of moderate pain	sleepless).
	in my neck.	My sleep is mildly disturbed (1-2 hours sleepless).
0	I can hardly read at all because of severe pain in my neck	<ul> <li>My sloop is mildly disturbed (12 hours sloopiess).</li> <li>My sloop is moderately disturbed (2-2 hours).</li> </ul>
0	I cannot read at all	cleanlass)
-		D My sloop is specific distant of (2 5 hours do not a)
Sor	tion Et Nordaches	My sleep is greatly disturbed (3-5 nours sleepless),
Sec	tion 5: Headaches	My sleep is completely disturbed (5-7 hours
	I have no neadaches at all.	sleepless).
<u> </u>	I have slight headaches which come infrequently.	
	I have moderate headaches which come infrequently.	Section 10: Recreation
	I have moderate headaches which come frequently.	<ul> <li>I am able to engage in all my recreation activities,</li> </ul>
0	I have severe headaches which come frequently.	with no neck pain at all.
	I have headaches almost all the time.	I am able to engage in all my recreation activities.
	The set of a second state of the second state	with some pain in my neck.
		I am able to engage in most but not all of my usual
		recreation activities because of pain in my park
		I am able to operate in only a faw of museum
		a am able to engage in only a rew or my usual
		recreation activities because of pain in my neck.
		I can hardly do any recreation activities because of
		pain in my neck.



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# **APPENDIX 4**

## NZJR QUESTIONNAIRES

PRIMARY	ELBOW	REPLACEMENT	QUESTIONNAIRE
1.			

Please circle the answer which best describes yourself OVER THE LAST 4 WEEKS 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.



LEFT	PLEASE CIRCLE THE SI If your surgery was bila	DE YOUR SURGERY WAS O teral, you will need to complete a o	N IN July 2021	RIG		
1. Have you had difficul	ty lifting things in your home, si	ich as putting out the rub	bish, because of your elbow n	roblem?		
(4)	3	2	1	0		
No difficulty	A little bit of difficulty	Moderate difficulty	Extreme difficulty	Impossible to do		
2. Have you had difficult	ty carrying bags of shopping, be	cause of your elbow prob	lem?			
<u>(4)</u>	FT <ul> <li>PLEASE CIRCLE THE SIDE YOUR SURGERY WAS ON IN</li></ul>		0			
No difficulty	A little bit of difficulty	Moderate difficulty	Extreme difficulty	Impossible to do		
3. Have you had any diff	iculty washing yourself all over,	because of your elbow pr	oblem?			
(4)	3	2	1	0		
No difficulty	A little bit of difficulty	Moderate difficulty	Extreme difficulty	Impossible to do		
4. Have you had any diff	iculty dressing yourself, because	of your elbow problem?				
(4)	3	2	1)	0		
No difficulty	A little bit of difficulty	Moderate difficulty	Extreme difficulty	Impossible to do		
5. Have you felt that you	r elbow problem is "controlling	your life"?				
LEFT       CPLEASE CIRCLE THE SIDE YOUR SURGERY WAS ON IN       July 2021         It your surgery was bilaterat, you will need to complete a questionnaite for each side         1. Have you had difficulty lifting things in your home, such as putting out the rubbish, because of your elbow problem?         (a)       (b)         (c)       (c)         (c) <td< td=""><td>0</td></td<>			0			
No, not at all	Occasionally	Some days	Most days	Every day		
6. How much has your ell	bow problem "been on your mir	nd"?				
(4)	3	Ø		0		
Not at all	A little of the time	Some of the time	Most of the time	All of the time		
7. Have you been trouble	d by pain from your elbow in be	ed at night?				
(4)	3	Ø	Ø	0		
Not at all	(a)     (b)     (c)     (					
B. How often has your ell	bow pain interfered with your s	leeping?				
(4)	3	Ø	0	0		
Not at all	Occasionally	Some of the time	Image: Constraint of the time     Image: Constraint of the time       Image: Constraint of the time     Most of the time       Some of the time     Most of the time       ual work or everyday activities?			
. How much has your elb	ow problem interfered with you	Ir usual work or everyday	activities?	The of the thirt		
(4)	3	0	0	0		
Not at all	Alittle	Moderately	Greatly	Totally		
0. Has your elbow proble	m limited your ability to take p	art in leisure activities that	at you enjoy doing?	iotany		
<b>(A)</b>	3	0		0		
No, not at all	Occasionally	Some of the time	Most of the time	All of the time		
1. How would you descril	be the worst pain you have from	n your elbow?	most of the time	An of the time		
(4)	3	0		0		
No pain	Mild pain	Moderate pain	Severe nain	Unhaarahla		
2. How would you describ	e the pain you usually have fro	m your elbow?	service point	Universitat/le		
(4)	(1)	0	0	0		
No pain	Mild pain	Moderate pain	Severe nain	(0)		
verall, how satisfied area	you with the outcome of your al	how currant?	Service Perm	onocarable		
(A)	Contract the outcome of your el	now surgeryr				
(4) Very satisfied	(3) Somewhat extisting	(2)	(1)	0		
very saustieu	somewhat satisfied	Neutral	Somewhat dissatisfied	Dissatisfied		

**REVISION ELBOW REPLACEMENT QUESTIONNAIRE** Please circle the answer which best describes yourself OVER THE LAST 4 WEEKS 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.

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LEFT	PLEASE CIRCLE THE Si If your surgery was bile	IDE YOUR SURGERY WAS ( ateral, you will need to complete a	ON IN July 2021 questionnaire for each side	RIG	
1. Have you had difficu	lty lifting things in your home, s	uch as putting out the rul	which because of your alberry		
<b>(A</b> )	0	Concerns parting out the ful	mish, because of your elbow	problem?	
No difficulty	A little bit of difficulty	Moderate difficulty	(1)	0	
2. Have you had difficul	Ity carrying bags of shopping, be	ecause of your elbow prol	Extreme difficulty	Impossible to do	
<b>(A)</b>	0			-	
No difficulty	A little bit of difficulty	(2) Moderate difficulty	(1)	0	
3. Have you had any dif	ficulty washing yourself all over	because of your elbow of	Extreme difficulty	Impossible to do	
(4)	(1)	() () () () () () () () () () () () () (	roment:	~	
No difficulty	A little bit of difficulty	Moderate difficulty	(1) Fotosona differente	0	
4. Have you had any diff	ficulty dressing yourself, because	of your elbow problem?	extreme difficulty	Impossible to do	
(4)	3	0	0	0	
No difficulty	A little bit of difficulty	fileulty         Moderate difficulty         Extreme difficulty           If all over, because of your elbow problem?         ①         ①           ficulty         Moderate difficulty         Extreme difficulty           ontrolling your life"?         ①         ①           filme         Some days         Most days           nyour mind"?         ①         ①           ine         Some of the time         Most of the time           bow in bed at night?         ①         ①           Some nights         Most nights         Most nights           ith your sleeping?         ①         ①			
5. Have you felt that you	ar elbow problem is "controlling	your life"?	Extreme diriculty	Impossible to do	
(4)	3	0	0	~	
No, not at all	Occasionally	Some days	(1) Most dawn	0	
6. How much has your el	bow problem "been on your mir	nd"?	most days	Every day	
(4)	0	0	0	~	
Not at all	A little of the time	Some of the time	(1) Mart al that	(0) All of the time	
7. Have you been trouble	ed by pain from your elbow in be	ed at night?	wost of the time	All of the time	
(4)	0	a	0	-	
Not at all	1-2 nights	Some nights	0	0	
3. How often has your el	bow pain interfered with your s	leeping?	most nights	Every night	
(4)	0	0	0	-	
Not at all	Occasionally	Some of the time	(1) Mart 4 (1)	0	
. How much has your elb	oow problem interfered with you	r usual work or everyday	most or the time	All of the time	
(4)	0	isian mont or everyday	activities?	12.7	
Not at all	Alittle	Moderatelu	0	0	
0. Has your elbow proble	em limited your ability to take p	art in leisure activities the	Greatly	Totally	
<b>(A</b> )	,	(a)	at you enjoy doing?		
No, not at all	Occasionally	Come of the time	(1)	0	
1. How would you describ	be the worst pain you have from	vour elbow?	Most of the time	All of the time	
(4)	0			(0220)	
No pain	Mild pain	(2) Moderate pain	(1)	0	
. How would you describ	be the pain you usually have from	m vour elbow?	Severe pain	Unbearable	
(4)	0	0	0		
No pain	Mild pain	Moderate pain	(1) Savara pain		
verall, how satisfied are u	ou with the outcome of		peacte batt	Unbearable	
(A)	Contracting of your eligned of your eligned	now surgery?			
Very satisfied	3 Somewhat entired	(2)	1	0	
	Somewhar Sanzusa	Neutral	Somewhat dissatisfied	Dissatisfied	



## NZJR QUESTIONNAIRES

PRIMARY HIP REPLACEMENT QUESTIONNAIRE

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Please circle the answer which best describes yourself <u>OVER THE LAST 4 WEEKS</u> 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.



LEFT ←	PLEASE CIRCLE THE If your surgery was b	SIDE YOUR SURGERY WAS OF llateral, you will need to complete a q	VINJuly 2021	RIG		
1. How would you descri	be the pain you usually have	from your operated on hip?				
(4) None	3 Very mild	(2) Mild	(1) Moderate	(0) Souere		
2. For how long have you	been able to walk before th	e pain from your operated o	n hip becomes severe? (with	or without a stick)		
(4) No pain/over 30 minutes	3 16 to 30 minutes	② 5 to 15 minutes	(1) Around the house only	0 Unable, severe pa		
3. Have you had any troul	ble getting in and out of a ca	r or using public transport b	ecause of your operated on h	ip?		
(4) No trouble at all	③ Very little trouble	② Moderate trouble	① Extreme difficulty	0 Impossible to do		
4. Have you been able to	put on a pair of socks, stocki	ngs or tights?				
LEFT          PLEASE CIRCLE THE SIDE YOUR SURGERY WAS ON M       Aby 2021         If your suggery was balanced, you will need to complete a questionnate for each side         1. How would you describe the pain you usually have from your operated on hip?         (a)       (b)         (c)       (c)         None       Very mild         (c)       (c)         (c)       (c)		(0) No, impossible				
5. Could you do the house	hold shopping on your own?					
(4) Yes, easily	③ With little difficulty	② With moderate difficulty	① With extreme difficulty	(0) No, impossible		
6. Have you had any troub	le with washing and drying y	ourself (all over) because of	your operated on hip?			
(4) No trouble at all	3 Very little trouble	② Moderate trouble	① Extreme difficulty	(0) Impossible to de		
7. How much has pain from	n your operated on hip interf	ered with your usual work (i	including housework)?			
④ Not at all	(0) Totally					
8. After a meal (sat at a ta	ble), how painful has it been	for you to stand up from a	chair because of your operate	d on hip?		
(4) Not at all painful	(0) Unbearable					
). Have you had any sudde	n, severe pain - 'shooting', 's	tabbing' or 'spasms' - from t	he affected operated on hip?			
(4) No days	③ Only 1 or 2 days	② Some days	① Most days	(0) Every day		
0. Have you been limping	when walking, because of yo	our operated on hip?				
(4) Rarely/never	③ Sometimes, or just at first	② Often, not just at first	① Most of the time	() All of the time		
1. Have you been able to o	limb a flight of stairs?					
(4) Yes, easily	3 With little difficulty	② With moderate difficulty	① With extreme difficulty	(0) No. impossible		
2. Have you been troubled	by pain from your operated	on hip in bed at night?	,	ing impossible		
(4) No nights	3 Only 1 or 2 nights	② Some nights	① Most nights	0 Every night		
verall, how satisfied are yo	ou with the outcome of your	hip surgery?	and the state of the second second			
(4) Very satisfied	③ Somewhat satisfied	(2) Neutral	① Somewhat dissatisfied	() Discatisfied		

REVISION HIP REPLACEMENT QUESTIONNAIRE

The residence of the local data in the local data and the local data a

Please circle the answer which best describes yourself <u>OVER THE LAST 4 WEEKS</u> NB: If there are reasons other than the operation which would stop you doing one of the tasks listed by to answer the question from the joint replacement appear alone.



LEFT ←	PLEASE CIRCLE THE	IDE YOUR SURGERY WAS ON	INJuly 2021			
	n your surgery was bi	ateral, you will need to complete a qu	WAS ON IN       July 2021         uplete a questionnable for each side       Image: Constraint of the side         an hip?       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side         Image: Constraint of the side       Image: Constraint of the side <td< th=""></td<>			
I. How would you describe	e the pain you usually have	from your operated on hip?				
(4)	Image: Construct the subset of the second state of the		0			
None	Very mild	Mild	Moderate	Severe		
?. For how long have you b	een able to walk before the	e pain from your operated o	n hip becomes severe? (with	or without a stick)		
(4)	3	2	1	0		
No pain/over 30 minutes	16 to 30 minutes	5 to 15 minutes	Around the house only	Unable, severe pain		
. Have you had any trouble	e getting in and out of a ca	r or using public transport b	ecause of your operated on h	ip?		
(4)	3	2	(1)	0		
No trouble at all	Very little trouble	Moderate trouble	Extreme difficulty	Impossible to do		
. Have you been able to pu	ut on a pair of socks, stocki	ngs or tights?				
(4)	3	2	(1)	0		
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible		
. Could you do the househ	old shopping on your own?					
(4)	PLEASE CIRCLE THE SIDE YOUR SURGERY WAS ON IM       July 201         If your surgery was bilateral, you will need to complete a questionnable for each side         uild you describe the pain you usually have from your operated on hip?         (a)       (a)         (b) None       (b) None         Import you been able to walk before the pain from your operated on hip becomes severe? (with or will made any trouble getting in and out of a car or using public transport because of your operated on hip?         (a)       (a)       (a)         (b) at all       Very mild       Moderate         (c)       (a)       (b)       (c)         (c)       (c)       (c)       (c)         (c)					
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible		
. Have you had any trouble	e with washing and drying y	ourself (all over) because of	your operated on hip?			
(4)	3	(2)	(I)	0		
No trouble at all	Very little trouble	Moderate trouble	Extreme difficulty	Impossible to do		
How much has pain from	your operated on hip interf	ered with your usual work (i	ncluding housework)?			
(4)	(3)	(2)	①	0		
Not at all	with little announy         with moderate difficulty         with extreme difficulty           the household shopping on your own?         Image: Comparison of the extreme difficulty         Image: Comparison of the extreme difficulty           ily         With little difficulty         With moderate difficulty         With extreme difficulty           any trouble with washing and drying yourself (all over) because of your operated on hip?         Image: Comparison operated on hip interfered with your usual work (including housework)?           at all         Very little trouble         Moderate trouble         Extreme difficulty           at all         Very little trouble         Moderate trouble         Extreme difficulty           g         Image: Comparison operated on hip interfered with your usual work (including housework)?         Image: Comparison operated on hip interfered with your usual work (including housework)?           iii         A little bit         Moderately         Greatly           iii at at a table), how painful has it been for you to stand up from a chair because of your operated inful         Image: Comparison operated on hip inful           iinful         Slightly painful         Moderately painful         Very painful           my sudden, severe pain - 'shooting', 'stabbing' or 'spasms' - from the affected operated on hip image: Complex of adays         Image: Complex of adays         Image: Complex of adays			Totally		
After a meal (sat at a tab	le), how painful has it been	for you to stand up from a	chair because of your operate	d on hip?		
(4)	3	(2)	0			
Not at all painful	Slightly painful	Moderately painful	Very painful	Unbearable		
Have you had any sudden,	, severe pain - 'shooting', 's	tabbing' or 'spasms' - from t	he affected operated on hip?			
(4)	3	Ø	0	0		
No days	Only 1 or 2 days	Some days	Most days	Every day		
. Have you been limping w	when walking, because of yo	our operated on hip?		urcij daj		
(4)	3	0	Ø	0		
Rarely/never	Sometimes, or just at first	Often, not just at first	plete a questionnaite for each side  an hip?			
. Have you been able to cli	imb a flight of stairs?			The of the time		
(4)	3	Very mild     Mild     Moderate       walk before the pain from your operated on hip becomes severe? (with or with     3     2     1       3     2     1     0     0       30 minutes     5 to 15 minutes     Around the house only     Un       and out of a car or using public transport because of your operated on hip?     1     1       3     2     1     1       ittle trouble     Moderate trouble     Extreme difficulty     In       of socks, stockings or tights?     1     1     1       3     2     1     1     1       ittle difficulty     With moderate difficulty     With extreme difficulty     1       ing and drying yourself (all over) because of your operated on hip?     1     1       3     2     1     1     1       ing and drying yourself (all over) because of your operated on hip?     1     1       3     2     1     1     1       intel findulty     With moderate trouble     Extreme difficulty     1       intue on hip interfered with your usual work (including housework)?     2     1       3     2     1     1     1       intue hip interfered with your usual work (including housework)?     3     1       3     2     1				
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No impossible		
. Have you been troubled I	by pain from your operated	on hip in bed at night?				
LEFT <ul> <li>PLEASE CIRCLE THE SIDE YOUR SURGERY WAS ON IN</li> <li>Jupor surgery was bilateral, you will need to complete a questionnable for the pain you usually have from your operated on hip?</li> <li>I how would you describe the pain you usually have from your operated on hip?</li> <li>I how would you describe the pain you usually have from your operated on hip?</li> <li>I how would you describe the pain you usually have from your operated on hip becomes the pain from your operated on hip becomes the pain from your operated on hip becomes to the pain your solution of a car or using public transport because of the pain you been able to put on a pair of socks, stockings or tights?</li> <li>I have you been able to put on a pair of socks, stockings or tights?</li> <li>I have you been able to put on a pair of socks, stockings or tights?</li> <li>I have you been able to put on a pair of socks, stockings or tights?</li> <li>I have you been able to put on a pair of socks, stockings or tights?</li> <li>I have you been able to put on a pair of socks, stockings or tights?</li> <li>I have you been able to put on a pair of socks, stockings or tights?</li> <li>I have you bad any trouble with washing and drying yourself (all over) because of your oper to the torouble at all very little trouble Moderate trouble Extra the trouble at all very little trouble Moderate trouble Extra the to the household shopping on your own?</li> <li>I how much has pain from your operated on hip interfered with your usual work (including here to trouble at all very little trouble Moderate trouble Extra the to the town operated on hip interfered with your usual work (including here to trouble at all be how painful has it been for you to stand up from a chair becar (I how much has pain from your operated on hip inteffered withy our opera</li></ul>		0	0			
No nights	Only 1 or 2 nights	Some nights	Most nights	Every night		
erall, how satisfied are you	u with the outcome of your	hin surgery?				
a	0	0	0	0		
Very satisfied	Somewhat satisfied	Neutral	Somewhat disenticfied	Discaticfied		
. sij sausnua	addition and an and	weatan	somewhat dissatished	Dissatistied		



## NZJR QUESTIONNAIRES

Please circle the ans NB: If there are reasons other th try to answer the question from	wer which best describe: an the operation which would stop yo the joint replacement aspect alone.	s yourself OVER THE LAS u doing one of the tasks listed;	T 4 WEEKS	ZEALÂN Joint Registry
LEFT ←	PLEASE CIRCLE THE If your surgery was bi	SIDE YOUR SURGERY WAS Of Tateral, you will need to complete a q	IN July 2021	RIG
1. How would you descri	be the pain you usually have	from your operated on knee	?	
(4) None	③ Very mild	② Mild	(1) Moderate	(0) Severe
2. For how long have you	t been able to walk before th	e pain from your operated o	n knee becomes severe? (with	n or without a stick)
(4) No pain/over 30 minutes	3 16 to 30 minutes	② 5 to 15 minutes	(1) Around the house only	(0) Unable, severe pai
3. Have you had any trou	ble getting in and out of a ca	r or using public transport b	ecause of your operated on k	nee?
PRIMARY KNEE REPLACEMENT QUESTIONNAIRE PRACE drags drags and the provide system of the precision which has a describes systemed by put obtained are detailed by the obtained b		() Impossible to do		
4. Could you kneel down	and get up again afterwards	on your operated knee?		
(4) Yes, easily	③ With little difficulty	(2) With moderate difficulty	① With extreme difficulty	(0) No. impossible
5. Could you do the house	ehold shopping on your own?			
(4) Yes, easily	③ With little difficulty	(2) With moderate difficulty	① With extreme difficulty	0 No impossible
6. Have you had any trout	ble with washing and drying y	ourself (all over) because of	your operated on knee?	They impossible
④ No trouble at all	3 Very little trouble	② Moderate trouble	1 Extreme difficulty	() Impossible to do
7. How much has pain from	m your operated on knee inte	rfered with your usual work	(including housework)?	informer to de
④ Not at all	3 A little bit	② Moderately	(1) Greatly	(0) Totally
3. After a meal (sat at a ta	able), how painful has it been	for you to stand up from a	chair because of your operate	d on knee?
④ Not at all painful	3 Slightly painful	② Moderately painful	① Very painful	(0) Unbearable
. Have you felt that your	operated on knee might sudd	lenly "give way" or let you d	lown?	
(4) Rarely/never	③ Sometimes, or just at first	② Often, not just at first	① Most of the time	() All of the time
0. Have you been limping	when walking, because of yo	our operated on knee?		
(4) Rarely/never	③ Sometimes, or just at first	(2) Often, not just at first	① Most of the time	(0) All of the time
1. Could you walk down o	one flight of stairs?			
(4) Yes, easily	③ With little difficulty	2 With moderate difficulty	① With extreme difficulty	0 No impossible
2. Have you been troubled	by pain from your operated	on knee in bed at night?	y	and indexagine
(4) No nights	3 Only 1 or 2 nights	2 Some nights	1 Most nights	0 Every night
verall, how satisfied are y	ou with the outcome of your	knee surgery?		
(4) Very satisfied	3 Somewhat satisfied	(2) Neutral	(1) Somewhat directic field	(i) Directified

REVISION KNEE REPLACEMENT QUESTIONNAIRE Please circle the answer which best describes yourself <u>OVER THE LAST 4 WEEKS</u> Nit if there are maxers other than the operation which would stop you doing one of the tasks listed: by to answer the question from the joint replacement appet alone.

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LEFT	PLEASE CIRCLE THE S	SIDE YOUR SURGERY WAS ON lateral, you will need to complete a qu	I IN July 2021			
1. How would you describe	the pain you usually have	from your operated on knee	7			
(4) None	FT <ul> <li>PLEASE CIRCLE THE SIDE YOUR SURGERY WAS ON IN</li> <li>July 2021</li> <li>If your suggry was bilateral, you will need to complete a questionnaire for each side</li> </ul> would you describe the pain you usually have from your operated on knee?           Image: Intermediate the pain you usually have from your operated on knee?           Image: Intermediate the walk before the pain from your operated on knee becomes severe? (with one the own of the two of a car or using public transport because of your operated on knee?           Image: Intermediate the walk before the pain from your operated the bouse only you had any trouble getting in and out of a car or using public transport because of your operated on knee?           Image: Intermediate trouble         Image: Intermediate trouble           Image: Intermediate trouble         Extreme difficulty           Yes, easily         With little difficulty         With moderate difficulty         With extreme difficulty           Yes, easily         With little difficulty         With moderate difficulty         With extreme difficulty           Yes, easily         With little difficulty         With moderate difficulty         With extreme difficulty           Yes, easily         With little difficulty         With moderate difficulty         With extreme difficulty           Yes, easily         With little difficulty         With moderate difficulty         With extreme difficulty					
2. For how long have you b	een able to walk before the	e pain from your operated or	n knee becomes severe? (with	n or without a stick)		
④ No pain/over 30 minutes	③ 16 to 30 minutes	2 5 to 15 minutes	OUR SURGERY WAS ON IN       July 2021         your uperated on knee? <sup>(2)</sup> <sup>(1)</sup>			
3. Have you had any trouble	e getting in and out of a ca	r or using public transport b	ecause of your operated on k	nee?		
④ No trouble at all	3 Very little trouble	2 Moderate trouble	① Extreme difficulty	() Impossible to do		
4. Could you kneel down an	id get up again afterwards	on your operated knee?				
④ Yes, easily	③ With little difficulty	② With moderate difficulty	① With extreme difficulty	(0) No, impossible		
5. Could you do the househo	old shopping on your own?					
(4) Yes, easily	③ With little difficulty	② With moderate difficulty	① With extreme difficulty	(0) No, impossible		
5. Have you had any trouble	with washing and drying y	ourself (all over) because of	your operated on knee?			
④ No trouble at all	3 Very little trouble	② Moderate trouble	① Extreme difficulty	() Impossible to do		
. How much has pain from y	your operated on knee inte	rfered with your usual work	(including housework)?			
(4) Not at all	3 A little bit	(2) Moderately	(1) Greatly	(0) Totally		
. After a meal (sat at a tab	le), how painful has it been	for you to stand up from a o	hair because of your operate	d on knee?		
No trouble at all         Very little trouble         Moderate trouble         Extreme difficulty         I           How much has pain from your operated on knee interfered with your usual work (including housework)?         Image: Comparison of the pain of t						
. Have you felt that your op	erated on knee might sudd	enly "give way" or let you d	own?			
(4) Rarely/never	③ Sometimes, or just at first	② Often, not just at first	(1) Most of the time	(0) All of the time		
0. Have you been limping w	hen walking, because of yo	ur operated on knee?				
LEFT       If your suggery was blateral, you will seed to complete a questformaire for each side.         1. How would you describe the pain you usually have from your operated on knee?       If your suggery was blateral, you will seed to complete a questformaire for each side.         1. How would you describe the pain you usually have from your operated on knee?       If your you was blateral, you will seed to complete a questformaire for each side.         2. For how long have you been able to walk before the pain from your operated on knee becomes seven (Implete you had any trouble getting in and out of a car or using public transport because of your operated (Implete You had any trouble getting in and out of a car or using public transport because of your operated (Implete You had any trouble getting in and out of a car or using public transport because of your operated (Implete You had any trouble getting in and ferwards on your operated knee?         (Implete You had any trouble getting in and each or using public transport because of your operated filliculty with extreme difficulty with moderate difficulty. With extreme diffic 5. Could you do the household shopping on your overs?       Implete (Implete You had the difficulty) with moderate difficulty. With extreme difficulty with extreme difficulty. With extreme difficulty is easily. With hittle difficulty. With moderate difficulty. With extreme difficulty is reashly with hittle touble. Moderate trouble Extreme difficulty. They much has pain from your operated on knee interfered with your usual work (Including houseword). No trouble at all Very little trouble. Moderate trouble. Extreme difficulty. No trouble at all Very little trouble. Moderate trouble. Extreme difficulty. No trouble at all Very little trouble. Moderate trouble is painfol. Very painful 9. Not at all A little bit. Moder			① Most of the time	(0) All of the time		
1. Could you walk down one	e flight of stairs?					
(4) Yes, easily	③ With little difficulty	(2) With moderate difficulty	① With extreme difficulty	(0) No. impossible		
2. Have you been troubled b	y pain from your operated	on knee in bed at night?				
(4) No nights	3 Only 1 or 2 nights	② Some nights	① Most nights	0 Every night		
verall, how satisfied are you	with the outcome of your	knee surgery?		and a subset		
(4)	3	(2)	1	0		



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## NZJR QUESTIONNAIRES

PRIMARY SHOULDER REPLACEMENT QUESTIONNAIRE

Please circle the answer which best describes yourself <u>OVER THE LAST 4 WEEKS</u> NB: If there are reasons other than the operation which would stop you doing one of the tasks listed; by to answer the question from the joint replacement aspect alone.



LEFT ←	PLEASE CIRCLE THE If your surgery was I	SIDE YOUR SURGERY WAS ON ailateral, you will need to complete a qu	IN July 2021	RIG
1. How would you describ	be the worst pain you have	had from your operated on st	oulder?	
a	0			0
None	Mild	Moderate	Severe	Unbearable
2. How would you describ	e the pain you usually have	from your operated on shoul	der?	Statutate
(4)	3	0	0	0
None	Mild	Moderate	rom your operated on shoulder?              (i)         (i)	
3. Have you had any troul	ble getting in and out of a c	ar or using public transport b	ecause of your operated on s	noulder?
(4)	(3)	0	0	0
No trouble at all	Very little trouble	Moderate trouble	Extreme difficulty	Impossible to do
4. Have you been able to	use a knife and fork at the s	ame time?		
(4)	(3)	(2)	1	0
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible
5. Could you do the house	hold shopping on your own	?		
(4)	(3)	(2)	1	0
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible
6. Could you carry a tray c	ontaining a plate of food ac	ross a room?		
(4)	3	(2)	(1)	0
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible
7. Could you brush/comb y	our hair with the operated	on arm?		
(4)	3	(2)	(I)	0
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible
8. Have you had any troub	le dressing yourself becaus	e of your operated on should	er?	
(4)	3	0	1	0
No trouble at all	Very little trouble	Moderate trouble	Impossible to do	
). Could you hang your clo	thes up in a wardrobe – usi	ng the operated on arm?		
None         Mild         Moderate         Severe           3. Have you had any trouble getting in and out of a car or using public transport because of your operated o         Image: Construction of the constreconstruction of the construction of the constructi			1	0
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible
0. Have you been able to	wash and dry yourself unde	r both arms?		
(4)	3	(2)	(I)	0
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible
1. How much has pain from	your operated on shoulder	interfered with your usual wor	k hobbies/recreational activitie	es (including housewo
(4)	(3)	(2)	1	0
Not at all	A little bit	Moderately	Greatly	Totally
2. Have you been troubled	l by pain from your operate	d on shoulder in bed at nighti	1	
(4)	(3)	(2)	(I)	0
No nights	Only 1 or 2 nights	Some nights	Most nights	Every night
verall, how satisfied are y	ou with the outcome of you	r shoulder surgery?		
<b>(A</b> )	(3)	0	0	0
Very satisfied	Somewhat satisfied	Neutral	Somewhat disretirfied	Discatisfied

REVISION SHOULDER REPLACEMENT QUESTIONNAIRE

the start of the s

Please circle the answer which best describes yourself <u>OVER THE LAST 4 WEEKS</u> NB:II there are reasons other than the operation which would itop you doing one of the tasks listed; by to answer the question from the joint replacement appendix appendix.



LEFT ←	PLEASE CIRCLE THE	SIDE YOUR SURGERY WAS ON ilateral, you will need to complete a qu	IN July 2021		
1. How would you describe	e the worst pain you have h	nad from your operated on sh	oulder?		
(4) None	3 Mild	② Moderate	(1) Severe	(0) Unbearable	
2. How would you describe	e the pain you usually have	from your operated on shoul	der?		
(4)	3	2	1		
None	Mild	Moderate	Severe	Unbearable	
3. Have you had any troub	le getting in and out of a ca	ar or using public transport be	ecause of your operated on st	noulder?	
(4) No trouble at all	(3) Very little trouble	(2) Moderate trouble	1 Extreme difficulty	(0) Impossible to do	
4. Have you been able to u	ise a knife and fork at the s	ame time?			
(4) Yos easily	(3) With little difficulty	(2) With moderate difficulty	1 With extreme difficulty	() Na impossible	
5 Could you do the hoursel	and shopping on your own	7	with extreme unitary	No, impossible	
(4)	3	2	1	0	
Yes, easily	With little difficulty	With moderate difficulty	With extreme difficulty	No, impossible	
6. Could you carry a tray co	ontaining a plate of food ac	cross a room?			
(4) Yes, easily	③ With little difficulty	(2) With moderate difficulty	1 With extreme difficulty	(0) No, impossible	
7. Could you brush/comb y	our hair with the operated	on arm?			
(4) Yes, easily	3 With little difficulty	② With moderate difficulty	① With extreme difficulty	0 No. impossible	
3. Have you had any troub	le dressing vourself becaus	e of your operated on should	er?		
4	3	2	1	0	
No trouble at all	Very little trouble	Moderate trouble	Extreme difficulty	Impossible to do	
). Could you hang your clo	thes up in a wardrobe usi	ng the operated on arm?			
(4) Yes, easily	③ With little difficulty	everst pain you have had from your operated on shoulder?         ③       ④         Mild       Moderate         Severe         e pain you usually have from your operated on shoulder?         ④       ②         Mild       Moderate         Severe         ee pain you usually have from your operated on shoulder?         ④       ②         Mild       Moderate         Severe         eetting in and out of a car or using public transport because of your operated on shoulder         ③       ②         ③       ②         With little difficulty       With moderate difficulty         With little difficulty       With moderate trouble         Extreme difficulty       With extreme difficulty         With little difficulty       With moderate difficulty         With little difficulty       With moderate difficulty         With little difficulty       With moderate difficulty			
0. Have you been able to	wash and dry yourself unde	r both arms?			
(4) Yes, casily	③ With little difficulty	2 With moderate difficulty	① With extreme difficulty	(0) No. impossible	
1. How much has pain from	your operated on shoulder	interfered with your usual wo	k hobbies/recreational activiti	es (including housework)?	
@		0	0		
Not at all	If year surgery was bilateral, you will need to complete a questionnate for each si ascribe the worst pain you have had from your operated on shoulder? (3) (2) (1) Mild Moderate Seven escribe the pain you usually have from your operated on shoulder? (3) (2) (1) Mild Moderate Seven trouble getting in and out of a car or using public transport because of your of (3) (2) (1) With Moderate Seven trouble getting in and out of a car or using public transport because of your of (3) (2) (1) Wery little trouble Moderate trouble Extreme di le to use a knife and fork at the same time? (3) (2) (1) With little difficulty With moderate difficulty With extreme trousehold shopping on your own? (3) (2) (1) With little difficulty With moderate difficulty With extreme tray containing a plate of food across a room? (3) (2) (1) With little difficulty With moderate difficulty With extreme trouble dressing yourself because of your operated on shoulder? (3) (2) (1) With little difficulty With moderate difficulty With extreme trouble dressing yourself because of your operated on shoulder? (3) (2) (1) With little difficulty With moderate difficulty With extreme trouble dressing yourself because of your operated on shoulder? (3) (2) (1) With little difficulty With moderate difficulty With extreme trouble dressing yourself because of your operated on arm? (3) (2) (1) With little difficulty With moderate difficulty With extreme to uble dressing yourself under horth arms? (3) (2) (1) With little difficulty With moderate difficulty With extreme a to wardrobe – using the operated difficulty With extreme a towash and dry yourself under horth arms? (3) (2) (1) With little difficulty With moderate difficulty With extreme. A little bit Moderate difficulty With moderate difficulty With extreme. (4) to wash and dry yourself under horth arms? (3) (2) (1) Only 1 or 2 nights Some nights Moot night are you with the outcome of your shoulder in bed at night? (3) (2) (1) Somewhat satisfied Neutral Somewhat di			Totally	
2. Have you been troubled	by pain from your operate	d on shoulder in bed at night	7		
	0	0	0	0	
No nights	If your surgery was bilateral, you will need to complete a q lescribe the worst pain you have had from your operated on sh     3		Most nights	Every night	
verall, how satisfied are y	ou with the outcome of you	ır shoulder surgery?			
(4) Very satisfied	3 Somewhat satisfied	(2) Neutral	(1) Somewhat dissatisfied	() Discatisfied	
very sausneu	Somewildr sausifed	neuua	somewhat dissoushed	pissaustica	



## NZJR QUESTIONNAIRES

## Hand Rehab

## Patient Rated Wrist/Hand Evaluation Form

Full Name:	
ACC Number:	
Today's Date:	

The questions below will help us understand how much difficulty you have had with your wrist/hand in the past week

- You will be describing your <u>average</u> wrist/hand symptoms <u>over the past week</u> on a scale of 0-10
- Please provide an answer for all questions
- If you did not perform an activity, please estimate the pain or difficulty you would expect

#### 1. Pain

Rate the average amount of pain in your wrist/hand over the past week by selecting the number that best describes your pain on a scale from 0-10

- A zero (0) means that you did not have any pain
- A ten (10) means that the pain is the worst possible (i.e. worst you have ever experienced or that you could not do the activity because of pain)
- If you are unable to use your hand because it is immobilised or movement is prohibited, score 10

Flease rate your pain on the scale below	Please rat	e your pain	on the scale	below
--	------------	-------------	--------------	-------

(0 = none, 10 = worst)

At rest	0	1	2	3	4	5	6	7	8	9	10
When doing a task with a repeated wrist/hand movement	0	1	2	3	4	5	6	7	8	9	10
When lifting a heavy object	0	1	2	3	4	5	6	7	8	9	10
When it is at its worst	0	1	2	3	4	5	6	7	8	9	10
How often do you have pain? (0 = never, 10 = always)	0	1	2	3	4	5	6	7	8	9	10

Please turn over...

### Hand Rehab

## Patient Rated Wrist/Hand Evaluation Form

#### 2. Function

Rate the <u>amount of difficulty</u> you experienced performing each of the items below – over the past week

- A zero (0) means that you did not experience any difficulty
- A ten (10) means it was so difficult you were unable to do it at all

Rate your difficulty

(0 = no difficulty, 10 = unable to do)

#### A. Specific Activities

Turn a door knob using my affected hand	0	1	2	3	4	5	6	7	8	9	10
Cut food using a knife in my affected hand	0	1	2	3	4	5	6	7	8	9	10
Fasten buttons on my shirt	0	1	2	3	4	5	6	7	8	9	10
Use my affected hand to push up from a chair	0	1	2	3	4	5	6	7	8	9	10
Carry a 5kg object in my affected hand	0	1	2	3	4	5	6	7	8	9	10
Use toilet tissue with my affected hand	0	1	2	3	4	5	6	7	8	9	10

**B. Usual Activities** 

Personal care activities (dressing, washing)	0	1	2	3	4	5	6	7	8	9	10
Household work (cleaning, maintenance)	0	1	2	3	4	5	6	7	8	9	10
Work (your job or usual everyday work)	0	1	2	3	4	5	6	7	8	9	10
Recreational activities	0	1	2	3	4	5	6	7	8	9	10

Any other comments?

