ACORN
Arthroplasty Clinical Outcomes Registry

2014 ANNUAL REPORT

ARTHROPLASTY CLINICAL OUTCOMES REGISTRY

1 JANUARY 2014 TO 31 DECEMBER 2014

Arthroplasty Clinical Outcomes Registry

2014 ANNUAL REPORT | APRIL 2015

Prepared on behalf of the Steering Committee of the Arthroplasty Clinical Outcomes Registry

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- South Eastern Sydney Local Health District
- Whitlam Orthopaedic Research Centre
- Liverpool Hospital Orthopaedic Department
- Fairfield Hospital

PARTICIPATING HOSPITALS

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EXECUTIVE SUMMARY

The Arthroplasty Clinical Outcomes Registry, National (ACORN) was established in 2012 to improve the quality and effectiveness of arthroplasty surgery by monitoring, evaluating and reporting clinical outcomes. By producing an Annual Report on the effectiveness of this common and resource-intensive procedure that is available to patients, surgeons, and hospital departments, the registry aims to inform future decision-making in order to improve the outcomes after hip and knee arthroplasty surgery.

ACORN covers all hip and knee arthroplasty (arthroplasty) surgery performed as an elective procedure in participating institutions. The outcomes measured include general health and measures of pain and function in the hip or knee. The registry also reports on complications (such as readmission, reoperation, infection and blood clot), patient satisfaction and patient-rated recovery.

Many clinical units see the significant value obtained from the measurement of clinical outcomes for the interventions they provide, and have instituted their own follow-up of people who undergo surgery at their units. The value of ACORN is the provision of a standardised and centralised collection of patient-reported outcomes and complications after arthroplasty. The benefit of this method of data collection is that the analysis and reporting from multiple units provides the ability to undertake risk-adjusted comparisons.

This report uses data from six institutions. Although ACORN now recruits from more sites, the report is restricted to reporting on sites with outcome data for the 2014 calendar year. The report includes data from 1307 people who underwent elective hip and knee arthroplasty surgery. As reflected in other reports, knee arthroplasty outnumbered hip arthroplasty by over two to one. Revision surgeries made up only 4% of all procedures recorded in the registry.

Overall, satisfaction and success after hip and knee arthroplasty were high, although patient-reported satisfaction was higher after primary hip arthroplasty than after knee arthroplasty. There was also substantial improvement in pain and function, as measured by the Oxford Hip or Knee Score, and in health-related quality of life. Overall, these improvements were greater in people who had a primary hip arthroplasty compared to primary knee arthroplasty. However, the proportion of people reporting no problems with mobility, self-care, their usual activities, pain or discomfort, and anxiety or depression, increased after surgery at similar levels for primary hip and knee arthroplasty. Health improvements and satisfaction after revision surgery were less than for primary surgery.

The Annual Report contains only summary data. Reports providing hospital comparisons are made available to individual departments every six months, and surgeon-level reports are available to participating surgeons on an ad hoc basis. Furthermore, statistical analyses of predictors of outcome are currently withheld from the Annual Report.

1. SNAPSHOT OF PARTICIPANTS AND OUTCOMES INCLUDED IN ACORN

29%	had primary hip arthroplasties; 47% of them were men and 53% were women; the youngest person to have their hip replaced was 29 years and the oldest person was 90 years; their average age was 66 and their average BMI was 30.1.
	94% of people reported the outcome of their hip arthroplasty as excellent, very good, or good; and 96% felt their hip was better than before the operation.
66%	had primary knee arthroplasties of which 6% were bilateral; 36% were men and 64% were women; the youngest person to have their knee replaced was 36 years old and the oldest person 92 years; their average age was 69 and their average BMI was.33.2.
	89% of people reported the outcome of their knee arthroplasty as excellent, very good, or good; and 91% felt their knee was better than before the operation.
2%	had an existing hip arthroplasty revised; the youngest person to have their hip revised was 46 years and the oldest person was 85 years.
	94% of people reported the outcome of their revision surgery as excellent, very good, or good; and 83% felt their hip was better than before the operation.
2%	had an existing knee arthroplasty revised; the youngest person to have their knee revised was 48 years and the oldest person was 87 years.
	81% of people reported the outcome of their revision surgery as excellent, very good, or good; and 84% felt their knee was better than before the operation.

2. INTRODUCTION

Arthroplasty surgery has been shown to be an effective intervention to improve pain, function, and quality of life in people with severe joint disease of the hip or knee. Since 2003, the number of hip procedures performed in Australia has increased by over 45% and knee procedures by over 75%[1] In 2013, more than 80,000 primary and revision hip and knee arthroplasties were undertaken in Australia, and the vast majority of these surgeries were undertaken in Australia's older population.

Two of the primary reasons for a person to choose hip or knee arthroplasty are increasing pain and decreasing functional ability. In the Australian context, measurement of the effectiveness of surgery in addressing these indicators is not undertaken in a standardised, systematic way. While patient-reported measures are considered subjective, they constitute the most direct measurement of the achievement of the goals of surgery. Internationally, there has been an increasing emphasis on the inclusion of patient reported outcomes or experiences after hip and knee arthroplasty. Most notably, Sweden, England, New Zealand, and a number of projects within the USA, have developed and implemented methods to measure the impact of arthroplasty from the perspective of the person who has undergone the procedure.

Domestically, the Australian Orthopaedic Association National Joint Replacement Registry (NJRR) is a recognised leader in the surveillance of procedures and implants used in arthroplasty. The NJRR uses revision surgery (reoperation) as the primary indicator of surgical failure and this has led to improvements by the identification of poorly performing prostheses. It is agreed that avoidance of surgical revision is important, however reoperation does not in itself provide a complete picture of the effectiveness of arthroplasty with respect to relief of pain, functional improvement, and improvements in quality of life for the recipient.

ACORN (The Arthroplasty Clinical Outcomes Registry National) was formed to address the gap in clinical outcome measurement after hip and knee arthroplasty, and to use that information to drive improvements in the clinical outcomes being measured. The outcomes measured by ACORN can be broadly grouped into general health, joint (hip or knee) pain and function, patient-rated satisfaction, and complications.

This second Annual Report maintains the template established in the first report. The aim is to make the report accessible for all stakeholders, including members of the public. We have done this by avoiding medical jargon where possible and by restricting reporting of statistical methods to the minimum required for an understanding of the data presented.

3. BACKGROUND

In 2012, a multidisciplinary team of health care professionals initiated the ACORN project to pilot the feasibility of monitoring, evaluating, and reporting outcomes after hip and knee arthroplasty surgery. The project was titled 'Arthroplasty Clinical Outcomes Registry NSW/National' to provide a daily reminder of the project vision: an Australian clinical outcomes registry that will be able to provide the person's perspective of their recovery after hip or knee arthroplasty and by doing so, contribute to improved outcomes in the future.

In 2012, existing post-arthroplasty outcomes registries, such as England's PROMs program and the New Zealand Joint Registry, were reviewed as well as other Australian outcome registries and this provided a solid foundation for the development of ACORN. In addition, the recent work of the Australian Commission of Safety and Quality in Health Care in developing National Operating Principles and Technical Standards for Australian Clinical Quality Registries provided guidance towards the development of systematic collection of outcome data after hip and knee arthroplasty. A Steering Committee with defined terms of reference (Appendix 1) was established to oversee the development, implementation, and growth of ACORN. The committee members include arthroplasty surgeons, senior nursing managers, allied health clinicians, and researchers, with processes developed for consultation with consumer organisations and health service executives where required.

The Hunter New England Human Research Ethics Committee (HNE HREC) provided ethics approval for ACORN and site-specific approvals from the relevant Research Governance Offices were received prior to the project commencing at any site. To protect the privacy of participants, all records are securely stored and only accessed by approved staff. In addition, policies and procedures have been developed to ensure complicity with the new Australian Privacy Principles relating to the collection, storage, access to, and use of personal information.

ACORN has been supported by the collaborative efforts of several government, non-government, and research organisations. These organisations include UNSW South Western Sydney Clinical School, the Ingham Institute for Applied Medical Research, Nepean Blue Mountains Local Health District, South Eastern Sydney Local Health District, Fairfield Hospital, Liverpool Hospital Orthopaedic Department, and the Whitlam Orthopaedic Research Centre.

4. HOW DOES ACORN FUNCTION?

4.1 Participation

Hospitals that perform hip and/or knee arthroplasty are eligible to participate. Participation is voluntary and in the public sector hospitals, agreement of all surgeons within the orthopaedic department is required in addition to in-principle support for the registry from the hospital executive. ACORN utilises an opt-out consent process and hospitals nominate a specific person to act as the Site Coordinator, who is responsible for: provision of patient information sheets to all eligible people; explanation of the purpose of ACORN; and data collection in the preoperative and perioperative stages of surgery. Eligible participants are identified during the preoperative admission process, which occurs up to eight weeks prior to a person's admission for surgery. Inclusion is based firstly on the principal procedure responsible for admission (Appendix 2) and then secondly on the criteria outlined in Tables 4.1 and 4.2 below.

During the preadmission process, preoperative data are prospectively collected and the Site Coordinator securely stores the data until matched with the perioperative data on completion of a person's admission. The Head of Orthopaedics and the Site Coordinator determine the data collection process suited to their individual context. This usually requires contributions by two or three clinicians across the continuum of care, with the Coordinator taking overall responsibility for data completeness and accuracy. Site Coordinators forward records to the registry at the end of each calendar month and the records are entered into the registry to enable six-month follow-up to be undertaken.

Table 4.1: ACORN Inclusion Criteria

1.	Person aged 18 years of age or over
2.	Planned (elective) primary or revision hip or knee arthroplasty
3.	Surgery is undertaken at a hospital participating in ACORN

Table 4.2: ACORN Exclusion Criteria

1.	Person is under 18 years of age
2.	Surgery is unplanned, such as hip arthroplasty for acute fracture
3.	Person is cognitively impaired or is unable to understand the process for participation
4.	Surgery is undertaken at a hospital that is not participating in ACORN

4.2 Overview of the Data Set

For each person included in ACORN, the data collected include:

- Identifiable demographic information used for follow-up, data quality processes, and any linkage with other data sets;
- Baseline clinical status including co-morbid conditions;
- A condition-specific measure of joint pain and function completed preoperatively and at six-months post-surgery;
- A generic measure of self-reported health status completed preoperatively and at six-months post-surgery;
- Global perceptions of recovery and the impact of surgery;
- Acute surgical recovery and recovery at six months post-surgery.

ACORN does not collect data on the specific types of prosthesis used.

4.3 Data Collection and Verification

Site Coordinator training is provided to ensure consistent, complete, and accurate data collection between sites, and one-to-one onsite training is included as part of the hospital participation process. The Registry Coordinator/ Data Manager provides on-going support for Site Coordinators and each Coordinator is provided with an ACORN Project Manual for ongoing reference.

ACORN has developed processes for checking data completeness and accuracy when sites submit their data centrally. This ensures that the data captured and held by the registry are as complete and accurate as possible. Data quality is assessed on receipt of data from each site. Data fields are checked for completeness and inconsistencies as the data are entered into the registry. Requests for clarification are sent to the appropriate Site Coordinator when necessary. The Registry and Site Coordinators liaise to ensure the fields are reviewed and completed. If specific data fields are frequently identified as incomplete or inaccurate, strategies are agreed to improve these issues for future data collection. As part of the registry's data quality processes, participating sites have a routine audit of submitted data against source documents within the first 12 months of participation.

4.4 Follow-up Data Collection

Measurement of outcomes after arthroplasty allows us to understand how effective the surgery is in addressing the primary indicators for surgery, that is, pain and functional limitation as well as health-related quality of life. It also enables quantification of outcomes and allows individuals to report their perception of surgical success and recovery. In determining the tools to be used, consideration was given to data collection tools used by other registries as well as acceptability to clinicians and the burden on participants and clinical staff.

The follow-up of participants is undertaken by telephone at 6 months (+/- 1 month) by ACORN. The option of using postal follow-up is available, however this is only used after telephone attempts have been exhausted. Six-months was determined as the best balance between stabilised clinical recovery and minimisation of loss to follow-up. [2]

The tools used by ACORN are outlined in table 4.3 below.

*Table 4.3: Tools to Measure Outcomes**

Pain and Function Measure	Oxford Hip or Knee Score (OHS, OKS)
Health-Related Quality of Life	EuroQol Health-Related Quality of Life: 5-Dimensions and Visual Analogue Scale (VAS)
Satisfaction and Success	UK PROMs satisfaction and success questions
Person Perceived Problems	Readmission, Reoperation, Complications

*Permissions have been received for the use of these outcome measures

4.5 Achievements in 2014

2014 saw ACORN complete it's second successful year of operation following implementation in November 2012. There has been continuation of the initial high level of activity within ACORN during 2014 and the early months of 2015. Achievements for ACORN during its second year included:

- Recruitment of additional participating sites (from six sites to ten sites)
- Obtaining a greater number of annual records held by the registry
- Maintaining a high level of data recording quality
- Publication of the first Annual Report
- Publication of data quality audit
- Facilitating a funding stream to enable continuation and expansion
- Attaining an improved rate of follow-up of patients
- Continuing to promote ACORN, particularly at state and national level conferences.

Table 4.4: Publications, Presentations, and Projects in 2014

Presentations

Forum	Presenter	Date	Title
Arthroplasty Society of Australia Annual Scientific Meeting	R Molnar, on behalf of ACORN Steering Committee	22-24 May 2014	ACORN: What's in it for me?
Knee Master Class Zimmer Knee Institute	S Macdessi, on behalf of ACORN Steering Committee	28 August 2014	ACORN: What's in it for me?
St George Osteoarthritis Symposium	I Harris, on behalf of ACORN Steering Committee	6 September 2014	ACORN: What's in it for me?
OA Summit	E Armstrong, on behalf of ACORN Steering Committee	9-10 October 2014	ACORN: From little things big things grow…
AOA Annual Scientific Meeting	I Harris, on behalf of ACORN Steering Committee	13-18 October 2014	ACORN: First Annual Report
Ingham Institute Research Showcase	R Chatterji	28 November 2014	Are patient completed and telephone interview equivalent modes of administration for the EuroQol Health-Related Quality of Life survey?
NSW Agency for Clinical Innovation Musculoskeletal Network	J Naylor, on behalf of ACORN Steering Committee	5 December 2014	ACORN: From little things big things grow…

Projects

Forum	Presenter	Date	Title
UNSW Australia, Faculty of Medicine Independent Learning Project	R Chatterji	October 2014	Direct completion versus telephone interview reliability for the EQ5D general health questionnaire

Publications

Journal	Author	Reference	Title
BMC Health Services Research	K Seagrave et al	2014, Vol.14, p.512.	Data quality audit of the arthroplasty clinical outcomes registry NSW

4.6 Funding

The past year has seen progress in the development of a sustainable funding model and ACORN would like to acknowledge the direct support of Nepean Blue Mountains Local Health District, South Eastern Sydney Local Health District, and Fairfield Hospital. Continued support has been received from the Whitlam Orthopaedic Research Centre and the UNSW South Western Sydney Clinical School. In-kind support is provided by: UNSW Faculty of Medicine; the Ingham Institute for Applied Medical Research; South Western Sydney Local Health District; Sydney Local Health District; and Mid North Coast Local Health District.

Committee members are not paid. Intellectual property developed by ACORN is available to others without cost.

4.7 Future Directions

Looking to the future, ACORN will utilise the data it obtains to identify factors that may predict outcomes following arthroplasty. The second year of ACORN has seen an improvement in the rate of follow-up of people from Non-English Speaking Backgrounds (NESB); the loss to follow-up has decreased from ~44% of participants in 2013 to ~25% of participants in 2014. While improved, the loss to follow-up is still more than three times higher than those participants who speak English. Continued efforts will be made to address this gap over the next year.

Six-month outcomes are predictive of later, short-term outcomes, however it is intended for ACORN to collect 5-year follow-up data of patients to provide information on medium-term clinical outcomes.

4.8 Coverage in 2014

*Table 4.5: Coverage in 2014**

	Operated 01.07.2013 to 30.06.2014	Followed up 01.01.2014 to 31.12.2014	Lost to follow-up 01.01.2014 to 31.12.2014
	N (%)	N (%)	N (%)
Hips, primary (total)	377 (29)	342 (26)	35 (3)
Hips, revision	22 (2)	19 (1)	3 (0.2)
Knees, primary (total)	862 (66)	763 (58)	99 (8)
Knees, primary (uni compartment)	15 (1)	14 (1)	1 (0)
Knees, revision	31 (2)	27 (2)	4 (0.3)
TOTAL	1307 (100)	1165 (89)	142 (11)

* Data were collected from six (6) hospitals and follow-up of all participants undertaken centrally at six months after date of surgery

5. DEMOGRAPHIC PROFILE

5.1 Hip Arthroplasty

Hip arthroplasties are either an initial (primary) procedure on a joint, or they are a subsequent (revision) surgery on a previously replaced joint. ACORN collects information on primary total hip arthroplasty and revision hip arthroplasty. A primary total hip arthroplasty involves replacing both surfaces of the hip joint and revision hip arthroplasty surgery is where one or more of the previously implanted components are removed and/or replaced. ACORN only collects information on elective primary and revision total hip arthroplasty procedures.

In 2014, of those included in ACORN, primary total hip arthroplasty surgery accounted for 95% of hip arthroplasty procedures. The average age of all people having a hip procedure was 66 years. The most common reason for primary surgery was osteoarthritis. Hip arthroplasty surgery was more common in women (53.9%). ACORN followed up 90% of people who had undergone a hip arthroplasty and who were included in the registry.

5.1.1 Age

Table 5.1: Primary Hip Arthroplasty: Age by Gender

Primary Hips	Age in Years (N = 377)					Age Categories (%)				
	N (%)	Mean	SD	Min	Max	<55	55-64	65-74	75-84	>=85
Male	177 (47)	64	11.1	29	86	22	28	31	19	1
Female	200 (53)	67	10.9	36	90	14	31	31	22	4.0
ALL	377 (100)	66	11.1	29	90	17	29	31	20	2

Table 5.2: Revision Hip Arthroplasty: Age by Gender

Revision Hips	Age in Years (N = 22)					Age Categories (%)				
	N (%)	Mean	SD	Min	Max	<55	55-64	65-74	75-84	>=85
Male	7 (32)	69	8.2	58	79	0	29	43	29	0
Female	15 (68)	67	12.4	46	85	27	7	40	20	7
ALL	22 (100)	67	11.1	46	85	18	14	41	23	5

5.1.2 BMI

Table 5.3: Primary Hip Arthroplasty: BMI by Gender

Primary Hips	BMI (N = 344)				
	N (%)	Mean	SD	Min	Max
Male	165 (48)	30	5.8	18	53
Female	179 (52)	30	6.6	16	57
ALL	344 (100)	30	6.2	16	57

Table 5.4: Revision Hip Arthroplasty: BMI by Gender

Revision Hips	BMI (N = 22)				
	N (%)	Mean	SD	Min	Max
Male	7 (32)	36	3.8	30	42
Female	15 (68)	31	12.2	20	57
ALL	22 (100)	32	10.4	20	57

5.1.3 English Proficiency

Table 5.5: Primary Hip Arthroplasty: English Proficiency by Gender

Primary Hips	English Proficiency (N = 352)	
	High N (%)	Low N (%)
Male	146 (87)	22 (13)
Female	170 (92)	14 (8)
ALL	316 (90)	36 (10)

Table 5.6: Revision Hip Arthroplasty: English Proficiency by Gender

Revision Hips	English Proficiency (N = 22)	
	High N (%)	Low N (%)
Male	5 (71)	2 (29)
Female	14 (93)	1 (7)
ALL	19 (86)	3 (14)

5.1.4 Level of Education

Table 5.7: Primary Hip Arthroplasty: Education by Gender

Primary Hips	Level of Education (N = 345)				
	No school N (%)	Year 8 or below N (%)	Year 9 or 10 N (%)	Year 11 or 12 N (%)	Any non-school qualification N (%)
Male	1 (1)	26 (16)	69 (42)	11 (7)	59 (36)
Female	3 (2)	24 (13)	86 (48)	16 (9)	50 (28)
ALL	4 (1)	50 (15)	155 (45)	27 (8)	109 (32)

Table 5.8: Revision Hip Arthroplasty: Education by Gender

Revision Hips	Level of Education (N = 22)				
	No school N (%)	Year 8 or below N (%)	Year 9 or 10 N (%)	Year 11 or 12 N (%)	Any non-school qualification N (%)
Male	1 (14)	1 (14)	0 (0)	2 (29)	3 (43)
Female	0 (0)	3 (20)	11 (73)	0 (0)	1 (7)
ALL	1 (5)	4 (18)	11 (50)	2 (9)	4 (18)

5.1.5 Co-Morbid Conditions

Table 5.9: Primary Hip Arthroplasty: Co-morbidities by Gender

Primary Hips	Number of Co-morbidities (N = 375)			
	0 N (%)	1 N (%)	2 N (%)	≥3 N (%)
Male	46 (26)	41 (23)	45 (26)	44 (25)
Female	47 (24)	41 (21)	52 (26)	59 (30)
ALL	93 (25)	82 (22)	97 (26)	103 (28)

Table 5.10: Revision Hip Arthroplasty: Co-morbidities by Gender

Revision Hips	Number of Co-morbidities (N = 21)			
	0 N (%)	1 N (%)	2 N (%)	≥3 N (%)
Male	1 (14)	2 (29)	2 (29)	2 (29)
Female	1 (7)	1 (7)	4 (29)	8 (57)
ALL	2 (10)	3 (14)	6 (29)	10 (48)

5.1.6 Reason for Surgery

Table 5.11: Primary Hip Arthroplasty: Reason for Surgery by Gender

Primary Hips	Reason for Surgery (N = 375)					
	OA N (%)	RA N (%)	DDH N (%)	Other inflammatory arthritis N (%)	Osteonecrosis/AVN N (%)	Other N (%)
Male	161 (92)	0 (0)	2 (1)	0 (0)	12 (7)	1 (1)
Female	183 (92)	3 (2)	2 (1)	3 (2)	7 (4)	1 (1)
ALL	**344 (92)**	**3 (1)**	**4 (1)**	**3 (1)**	**19 (5)**	**2 (1)**

Table 5.12: Revision Hip Arthroplasty: Reason for Surgery by Gender

Revision Hips	Reason for Surgery (N = 22)				
	Loosening N (%)	Lysis N (%)	Implant breakage N (%)	Infection N (%)	Other N (%)
Male	0 (0)	3 (43)	0 (0)	1 (14)	3 (43)
Female	6 (40)	4 (27)	2 (13)	1 (7)	2 (13)
ALL	**6 (27)**	**7 (32)**	**2 (9)**	**2 (9)**	**5 (23)**

5.2 Knee Arthroplasty

Knee arthroplasties are either an initial (primary) procedure on a joint or they are a subsequent (revision) procedure on a previously replaced joint. ACORN collects information on primary total or partial knee arthroplasties and revision knee arthroplasties. A primary total knee arthroplasty involves replacing both surfaces of the knee joint with or without resurfacing of the patella, and a partial arthroplasty involves arthroplasty of only part of the joint. Revision knee arthroplasty surgery is where one or more of the components are removed and/or replaced.

In 2014, of those included in ACORN, primary total knee arthroplasty surgery accounted for 95% of knee arthroplasty procedures. The average age of all people having a knee procedure was 69 years. The most common reason for primary surgery was osteoarthritis. Total knee arthroplasty surgery was more common in women (63.8%). ACORN followed up 89% of people who had undergone a knee arthroplasty and who were included in the registry.

5.2.1 Age

Table 5.13: Primary Knee Arthroplasty: Age by Gender

Primary Knees	Age in Years (N = 862)					Age Categories (%)				
	N (%)	Mean	SD	Min	Max	<55	55-64	65-74	75-84	>=85
Male	307 (36)	69	9.0	42	92	6	26	39	25	4
Female	555 (64)	69	9.1	36	90	7	25	40	26	3
ALL	**862 (100)**	**69**	**9.1**	**36**	**92**	**6**	**25**	**40**	**26**	**3**

Table 5.14: Revision Knee Arthroplasty: Age by Gender

Revision Knees	Age in Years (N = 31)					Age Categories (%)				
	N (%)	Mean	SD	Min	Max	<55	55-64	65-74	75-84	>=85
Male	16 (52)	68	11.0	48	87	19	13	50	6	13
Female	15 (48)	71	12.0	48	85	7	27	13	47	7
ALL	31 (100)	69	12.0	48	87	13	19	32	26	10

5.2.2 BMI

Table 5.15: Primary Knee Arthroplasty: BMI by Gender

Primary Knees	BMI (N = 787)				
	N	Mean	SD	Min	Max
Male	280 (36)	32	5.9	21	53
Female	507 (64)	34	7.6	18	76
ALL	**787 (100)**	**33**	**7.1**	**18**	**76**

Table 5.16: Revision Knee Arthroplasty: BMI by Gender

Revision Knees	BMI (N = 25)				
	N	Mean	SD	Min	Max
Male	13 (52)	31	4.8	25	42
Female	12 (48)	35	8.6	22	52
ALL	**25 (100)**	**33**	**7.0**	**22**	**52**

5.2.3 English Proficiency

Table 5.17: Primary Knee Arthroplasty: English Proficiency by Gender

Primary Knees	English Proficiency (N = 808)	
	Yes N (%)	No N (%)
Male	260 (90)	28 (10)
Female	406 (78)	114 (22)
ALL	**666 (82)**	**142 (18)**

Table 5.18: Revision Knee Arthroplasty: English Proficiency by Gender

Revision Knees	English Proficiency (N = 29)	
	Yes N (%)	No N (%)
Male	13 (93)	1 (7)
Female	11 (73)	4 (27)
ALL	**24 (83)**	**5 (5)**

5.2.4 Level of Education

Table 5.19: Primary Knee Arthroplasty: Education by Gender

Primary Knees	Level of Education (N = 787)				
	No school N (%)	Year 8 or below N (%)	Year 9 or 10 N (%)	Year 11 or 12 N (%)	Any non-school qualification N (%)
Male	2 (1)	46 (17)	92 (33)	16 (6)	123 (44)
Female	23 (5)	125 (25)	217 (43)	32 (6)	111 (22)
ALL	**25 (3)**	**171 (22)**	**309 (40)**	**48 (6)**	**234 (30)**

Table 5.20: Revision Knee Arthroplasty: Education by Gender

Revision Knees	Level of Education (N = 27)				
	No school N (%)	Year 8 or below N (%)	Year 9 or 10 N (%)	Year 11 or 12 N (%)	Any non-school qualification N (%)
Male	1 (7)	3 (21)	3 (21)	1 (7)	6 (43)
Female	1 (8)	5 (39)	3 (23)	1 (8)	3 (23)
ALL	**2 (7)**	**8 (30)**	**6 (22)**	**2 (7)**	**9 (33)**

5.2.5 Co-morbid Conditions

Table 5.21: Primary Knee Arthroplasty: Co-morbidities by Gender

Primary Knees	Number of Co-morbidities (N = 853)			
	0 N (%)	1 N (%)	2 N (%)	≥3 N (%)
Male	58 (19)	94 (31)	78 (26)	74 (24)
Female	108 (20)	137 (25)	131 (24)	173 (32)
ALL	**166 (20)**	**231 (27)**	**209 (25)**	**247 (29)**

Table 5.22: Revision Knee Arthroplasty: Co-morbidities by Gender

Revision Knees	Number of Co-morbidities (N = 24)			
	0 N (%)	1 N (%)	2 N (%)	≥3 N (%)
Male	4 (25)	5 (31)	2 (123)	5 (31)
Female	3 (20)	3 (20)	5 (33)	4 (27)
ALL	**7 (23)**	**8 (26)**	**7 (23)**	**9 (29)**

5.2.6 Reason for Surgery

Table 5.23: Primary Knee Arthroplasty: Reason for Surgery by Gender

Primary Knees	Reason for Surgery (N =856)				
	OA N (%)	RA N (%)	Other inflammatory arthritis N (%)	Osteonecrosis/AVN N (%)	Other N (%)
Male	303 (99)	0 (0)	1 (<1)	1 (<1)	2 (1)
Female	542 (99)	3 (1)	1 (<1)	3 (1)	0 (0)
ALL	**845 (99)**	**3 (<1)**	**2 (<1)**	**4 (1)**	**2 (<1)**

Table 5.24: Revision Knee Arthroplasty: Reason for Surgery by Gender

Revision Knees	Reason for Surgery (N = 30)				
	Loosening	Lysis	Implant breakage	Infection	Other
	N (%)	N (%)	N (%)	N (%)	N (%)
Male	7 (44)	3 (19)	0 (0)	2 (13)	4 (25)
Female	9 (64)	0 (0)	0 (0)	0 (0)	5 (36)
ALL	**16 (53)**	**3 (10)**	**0 (0)**	**2 (7)**	**9 (30)**

6. ACUTE CARE MEASURES

During the admitted period of care, the specific measures of interest were: any requirement for a high care bed and whether this was a planned or unplanned admission; any complication experienced during the admitted acute care stay; the need for a blood transfusion; and discharge destination from the acute care ward.

Complications are required to have been documented in the medical record. They include delirium, surgical site infection, DVT, PE, respiratory infection, cardiovascular events, dislocation, fracture, nerve injury, bladder infection or retention, wound dehiscence, or death.

6.1 Hip Arthroplasty

6.1.1 High Care Bed

Table 6.1: Primary Hip Arthroplasty: High Care Bed by Gender

Primary Hips (N = 373)	High Care Bed	Unplanned High Care Bed*
	N (%)	N (%)
Male	17 (10)	5 (31)
Female	12 (6)	4 (33)
ALL	29 (8)	9 (32)

*The proportion of those utilising a high care bed where the use was unplanned

Table 6.2: Revision Hip Arthroplasty: High Care Bed by Gender

Revision Hips (N = 22)	High Care Bed	Unplanned High Care Bed*
	N (%)	N (%)
Male	1 (14)	0 (0)
Female	3 (20)	0 (0)
ALL	4 (18)	0 (0)

*The proportion of those utilising a high care bed where the use was unplanned

6.1.2 Transfusion

Table 6.3: Primary Hip Arthroplasty: Transfusion by Gender

Primary Hips	Transfusion (N = 374)		
	Transfused	Units transfused	
	N (%)	Mean	SD
Male	10 (6)	2.1	0.9
Female	27 (14)	2.3	1.6
ALL	37 (10)	2.24	1.4

Table 6.4: Revision Hip Arthroplasty: Transfusion by Gender

Revision Hips	Transfusion (N = 21)		
	Transfused	Units transfused	
	N (%)	Mean	SD
Male	1 (17)	4	-
Female	5 (33)	2.2	0.5
ALL	6 (29)	2.5	0.8

6.1.3 Complications During Index Admission

Table 6.5: Primary Hip Arthroplasty: Any Complication During Index Admission by Gender

Primary Hips	Complications (N = 375)	
	Yes N (%)	No N (%)
Male	17 (10)	159 (90)
Female	24 (12)	175 (88)
ALL	41 (11)	334 (89)

Table 6.6: Revision Hip Arthroplasty: Any Complication During Index Admission by Gender

Revision Hips	Complications (N = 22)	
	Yes N (%)	No N (%)
Male	1 (14)	6 (86)
Female	2 (13)	13 (87)
ALL	3 (14)	19 (86)

6.1.4 Length of Stay

Table 6.7: Primary Hip Arthroplasty: Length of Stay by Gender

Primary Hips	Length of Stay (Days) (N = 377)		
	N (%)	Mean	SD
Male	177 (47)	4.5	2.1
Female	200 (53)	5.5	2.9
ALL	377 (100)	5.0	2.6

Table 6.8: Revision Hip Arthroplasty: Length of Stay by Gender

Revision Hips	Length of Stay (Days) (N = 21)		
	N (%)	Mean	SD
Male	6 (29)	13.5	15.7
Female	15 (71)	9.1	9.4
ALL	21(100)	10.3	11.3

6.1.5 Discharge Destination

Table 6.9: Primary Hip Arthroplasty: Discharge Destination by Gender

Primary Hips	Discharge Destination (N = 377)			
	Usual residence or residence of relative/friend N (%)	Inpatient rehabilitation same hospital N (%)	Inpatient rehabilitation another hospital N (%)	Other N (%)
Male	160 (90)	9 (5)	7 (4)	1 (1)
Female	153 (77)	27 (14)	18 (9)	2 (1)
ALL	313 (83)	36 (10)	25 (7)	3 (1)

Table 6.10: Revision Hip Arthroplasty: Discharge Destination by Gender

Revision Hips	Discharge Destination (N = 22)			
	Usual residence or residence of relative/friend N (%)	Inpatient rehabilitation same hospital N (%)	Inpatient rehabilitation another hospital N (%)	Other N (%)
Male	6 (86)	0 (0)	1 (14)	0 (0)
Female	9 (60)	5 (33)	1 (7)	0 (0)
ALL	15 (68)	5 (23)	2 (9)	0 (0)

6.2 Knee Arthroplasty

6.2.1 High Care Bed

Table 6.11: Primary Knee Arthroplasty: High Care Bed by Gender

Primary Knees (N = 856)	High Care Bed	Unplanned High Care Bed*
	N (%)	N (%)
Male	26 (9)	8 (31)
Female	35 (6)	14 (41)
ALL	61 (7)	22 (37)

Table 6.12: Revision Knee Arthroplasty: High Care Bed by Gender

Revision Knees (N = 31)	High Care Bed	Unplanned High Care Bed*
	N (%)	N (%)
Male	1 (6)	0 (0)
Female	2 (13)	0 (0)
ALL	3 (10)	0 (0)

6.2.2 Transfusion

Table 6.13: Primary Knee Arthroplasty: Transfusion by Gender

Primary Hips	Transfusion (N = 851)		
	Transfused	Units transfused	
	N (%)	Mean	SD
Male	20 (7)	2.4	0.9
Female	53 (10)	2.0	0.6
ALL	73 (9)	2.1	0.7

Table 6.14: Revision Knee Arthroplasty: Transfusion by Gender

Revision Hips	Transfusion (N = 30)		
	Transfused	Units transfused	
	N (%)	Mean	SD
Male	3 (20)	3.0	1.0
Female	2 (13)	1.5	0.7
ALL	5 (17)	2.4	1.1

6.2.3 Complications During Index Admission

Table 6.15: Primary Knee Arthroplasty: Any Complication during Index Admission by Gender

Primary Knees	Complications (N = 861)	
	Yes	No
	N (%)	N (%)
Male	52 (17)	255 (83)
Female	66 (12)	488 (88)
ALL	118 (14)	743 (86)

Table 6.16: Revision Knee Arthroplasty: Any Complication during Index Admission by Gender

Revision Knees	Complications (N = 31)	
	Yes	No
	N (%)	N (%)
Male	1 (6)	15 (94)
Female	0 (0)	15 (100)
ALL	1 (3)	30 (97)

6.2.4 Length of Stay

Table 6.17: Primary Knee Arthroplasty: Length of Stay by Gender

Primary Knees	Length of Stay in Days (N = 860)		
	N (%)	Mean	SD
Male	306 (36)	5.3	3.3
Female	554 (64)	5.5	2.8
ALL	860 (100)	5.5	3.0

Table 6.18: Revision Knee Arthroplasty: Length of Stay by Gender

Revision Knees	Length of Stay in Days (N = 31)		
	N (%)	Mean	SD
Male	16 (52)	6.5	5.5
Female	15 (48)	5.7	1.9
ALL	31 (100)	6.1	4.1

6.2.5 Discharge Destination

Table 6.19: Primary Knee Arthroplasty: Discharge Destination by Gender

Primary Knees	Discharge Destination (N = 862)			
	Usual residence or residence of relative/friend N (%)	Inpatient rehabilitation same hospital N (%)	Inpatient rehabilitation another hospital N (%)	Other N (%)
Male	255 (83)	27 (9)	23 (8)	2 (1)
Female	414 (75)	77 (14)	63 (11)	1 (<1)
ALL	**669 (78)**	**104 (12)**	**86 (10)**	**3 (<1)**

Table 6.20: Revision Knee Arthroplasty: Discharge Destination by Gender

Revision Knees	Discharge Destination (N = 31)			
	Usual residence or residence of relative/friend N (%)	Inpatient rehabilitation same hospital N (%)	Inpatient rehabilitation another hospital N (%)	Other N (%)
Male	14 (88)	2 (13)	0 (0)	0 (0)
Female	11 (73)	3 (20)	1 (7)	0 (0)
ALL	**25 (81)**	**5 (16)**	**1 (3)**	**0 (0)**

7. PATIENT-REPORTED OUTCOME MEASURES

Patient-reported outcome measures (PROMs) are measures of health status collected directly from the person. In ACORN, they provide a personal perspective of the impact of surgery by comparing health status at two different points in time, therefore allowing comparison of not only clinical measures but also the perceptions of the individual[3].

Since March 2013, ACORN has included measures of the individual's expectations of surgical outcome. Prior to admission, each person is asked "what are your expectations of your hip/knee pain six months after your surgery?" and "what are your expectations of your functional ability six months after your surgery?" At follow-up, questions to measure perceived satisfaction and success are asked. These replicate the questions used by the PROMs programme in England and Wales. They have been incorporated into ACORN's postoperative follow-up with permission.

For satisfaction, the question asked is "how would you describe the results of your operation?" with five options provided: excellent; very good; good; fair; or poor.

For success, the question asked is "overall, how are the problems now with your hip/knee on which you had surgery, compared to before your operation?" This question also allows the person to choose one of five options: much better; a little better; about the same; a little worse; and much worse.

In addition, ACORN asks participants whether they have been readmitted to hospital since discharge, had another operation on the joint that was replaced six months earlier, and asked whether they have experienced any other problem not requiring readmission or reoperation. By asking this additional question about problems not requiring readmission or reoperation, ACORN is able to capture those outcomes that continue to impact the individual or have resulted in additional services being utilised in the primary or community care setting, although they have not resulted in additional utilisation of admitted hospital services.

The Oxford Hip Score (OHS)[4] and the Oxford Knee Score (OKS)[5] are 12-item, person-reported tools developed to assess pain and function in people undergoing hip or knee arthroplasty. The questionnaires explore a person's perception of their pain and functional impairment in tasks of daily living over the previous 4 weeks. The least difficulty undertaking tasks or the least severity of symptoms scores four points, and the most severe symptoms and dysfunction scores zero. The individual scores are summed to achieve a single score with the highest attainable score of 48 indicating a person perceives no functional impairment and no pain. The lowest score of 0 means the person has severe pain and functional impairment as a result of their joint problems. In reporting the Oxford Hip and Knee Scores, outcomes were grouped into four score categories[6] as reported by the New Zealand Joint Registry[7]. Prior to surgery, the surveys are patient-completed. After surgery, an interviewer completes the surveys over the telephone. The error associated with changing the mode of survey administration is comparable to the test-retest error in persons reporting no change in their status[8].

The EQ-VAS records a person's self-rated health on a 20cm vertical scale with 0 at the bottom representing 'worst health imagined' and 100 at the top representing 'best health imagined'. The EQ-VAS requires respondents to mark an X on the scale to indicate how their health is on the day the survey is completed and then to write the number marked on the scale in the box below. Prior to surgery, the surveys are patient-completed. After surgery, the surveys are completed over the telephone by an interviewer. The error associated with changing the mode of survey administration is comparable to the test-retest error in persons reporting no change in their status assessed twice over a one-week period (unpublished data, ACORN 2014).

The EQ-5D-5L is a descriptive system of five dimensions of a person's general health. The dimensions are Mobility, Self-care, Usual Activities, Pain or Discomfort, and Anxiety or Depression. Each dimension has five levels: no problems, slight problems, moderate problems, severe problems, or extreme problems. A person is asked to indicate his/her health state by marking the box beside the most appropriate statement in each of the five dimensions on the day the survey is administered[9]. Prior

to surgery, the surveys are patient-completed. After surgery, the surveys are completed over the telephone by an interviewer. There is considerable variation in how patients respond to the individual items between the two methods when assessed one-week apart in stable patients thus, interpretation of change in these items across time is more difficult than it is for the EQ-VAS scale (unpublished data, ACORN 2014).

7.1 Hip Arthroplasty

7.1.1 Expectations of Recovery

Table 7.1: Primary Hip Arthroplasty: Expectation of Pain at 6-months by Gender

Primary Hips	Expectation of Pain at 6-months (N = 344)			
	Nil N (%)	Slight N (%)	Moderate N (%)	Severe N (%)
Male	119 (72)	41 (25)	5 (3)	0 (0)
Female	115 (64)	55 (31)	8 (5)	1 (1)
ALL	234 (68)	96 (28)	13 (4)	1 (<1)

Table 7.2: Primary Hip Arthroplasty: Expectation of Function at 6-months by Gender

Primary Hips	Expectation of Function at 6-months (N = 343)			
	No limitation N (%)	Slight limitation N (%)	Moderate limitation N (%)	Severe limitation N (%)
Male	106 (64)	49 (30)	10 (6)	0 (0)
Female	103 (58)	67 (38)	8 (5)	0 (0)
ALL	209 (61)	116 (34)	18 (5)	0 (0)

Table 7.3: Revision Hip Arthroplasty: Expectation of Pain at 6-months by Gender

Revision Hips	Expectation of Pain at 6-months (N = 21)			
	Nil N (%)	Slight N (%)	Moderate N (%)	Severe N (%)
Male	3 (50)	3 (50)	0 (0)	0 (0)
Female	9 (60)	4 (26)	2 (13)	0 (0)
ALL	12 (57)	7 (33)	2 (10)	0 (0)

Table 7.4: Revision Hip Arthroplasty: Expectation of Function at 6-months by Gender

Revision Hips	Expectation of Function at 6-months (N = 21)			
	No limitation N (%)	Slight limitation N (%)	Moderate limitation N (%)	Severe limitation N (%)
Male	3 (50)	3 (50)	0 (0)	0 (0)
Female	8 (53)	6 (40)	1 (7)	0 (0)
ALL	11 (52)	9 (43)	1 (5)	0 (0)

7.1.2 Satisfaction and Success

Table 7.5: Primary Hip Arthroplasty: Satisfaction at 6-months by Gender

Primary Hips	Satisfaction at 6-months (N = 335)				
	Excellent N (%)	Very Good N (%)	Good N (%)	Fair N (%)	Poor N (%)
Male	91 (59)	44 (28)	14 (9)	5 (3)	1 (1)
Female	92 (51)	54 (30)	20 (11)	9 (5)	5 (3)
ALL	183 (55)	98 (29)	34 (10)	14 (4)	6 (2)

Table 7.6: Primary Hip Arthroplasty: Success at 6-months by Gender

Primary Hips	Success at 6-months (N = 335)				
	Much better N (%)	A little better N (%)	About the same N (%)	A little worse N (%)	Much worse N (%)
Male	138 (89)	13 (8)	4 (3)	0 (0)	0 (0)
Female	160 (89)	10 (6)	8 (4)	1 (1)	1 (1)
ALL	298 (89)	23 (7)	12 (4)	1 (<1)	1 (<1)

Table 7.7: Revision Hip Arthroplasty: Satisfaction at 6-months by Gender

Revision Hips	Satisfaction at 6-months (N = 18)				
	Excellent N (%)	Very Good N (%)	Good N (%)	Fair N (%)	Poor N (%)
Male	1 (20)	1 (20)	2 (40)	1 (20)	0 (0)
Female	6 (46)	3 (23)	4 (31)	0 (0)	0 (0)
ALL	7 (39)	4 (22)	6 (33)	1 (6)	0 (0)

Table 7.8: Revision Hip Arthroplasty: Success at 6-months by Gender

Revision Hips	Success at 6-months (N = 18)				
	Much better N (%)	A little better N (%)	About the same N (%)	A little worse N (%)	Much worse N (%)
Male	3 (60)	0 (0)	1 (20)	1 (20)	0 (0)
Female	9 (69)	3 (23)	1 (8)	0 (0)	0 (0)
ALL	**12 (67)**	**3 (17)**	**2 (11)**	**1 (6)**	**0 (0)**

7.1.3 Reported Recovery

Table 7.9: Hip Arthroplasty: Person Reported Recovery at 6-months

All Hips	Readmission N (% of total)	Reoperation N (% of total)
Primary hip arthroplasty (N = 336)	9 (3)	4 (1)
Revision hip arthroplasty (N = 18)	4 (22)	3 (17)

7.1.4 Complications Not Requiring Readmission or Reoperation

Table 7.10: Hip Arthroplasty: Any Complication Reported Since Discharge

All Hips	Any Complication Reported Since Discharge*	
	Yes N (% of total)	No N (% of total)
Primary hip arthroplasty (N = 337)	40 (12)	297 (88)
Revision hip arthroplasty (N = 18)	2 (11)	16 (89)

*Type of complication reported includes unexpected pain at 6-months, prescribed oral or IV antibiotics since discharge, ongoing joint stiffness; a cardiovascular event; VTE (either DVT or PE); ongoing paraesthesia/anaesthesia; muscle weakness causing functional impairment; neuropathy; a leg length discrepancy; or cellulitis. A person may report more than one complication

7.1.5 Oxford Hip Scores

Table 7.11: Primary Hip Arthroplasty: Oxford Hip Score

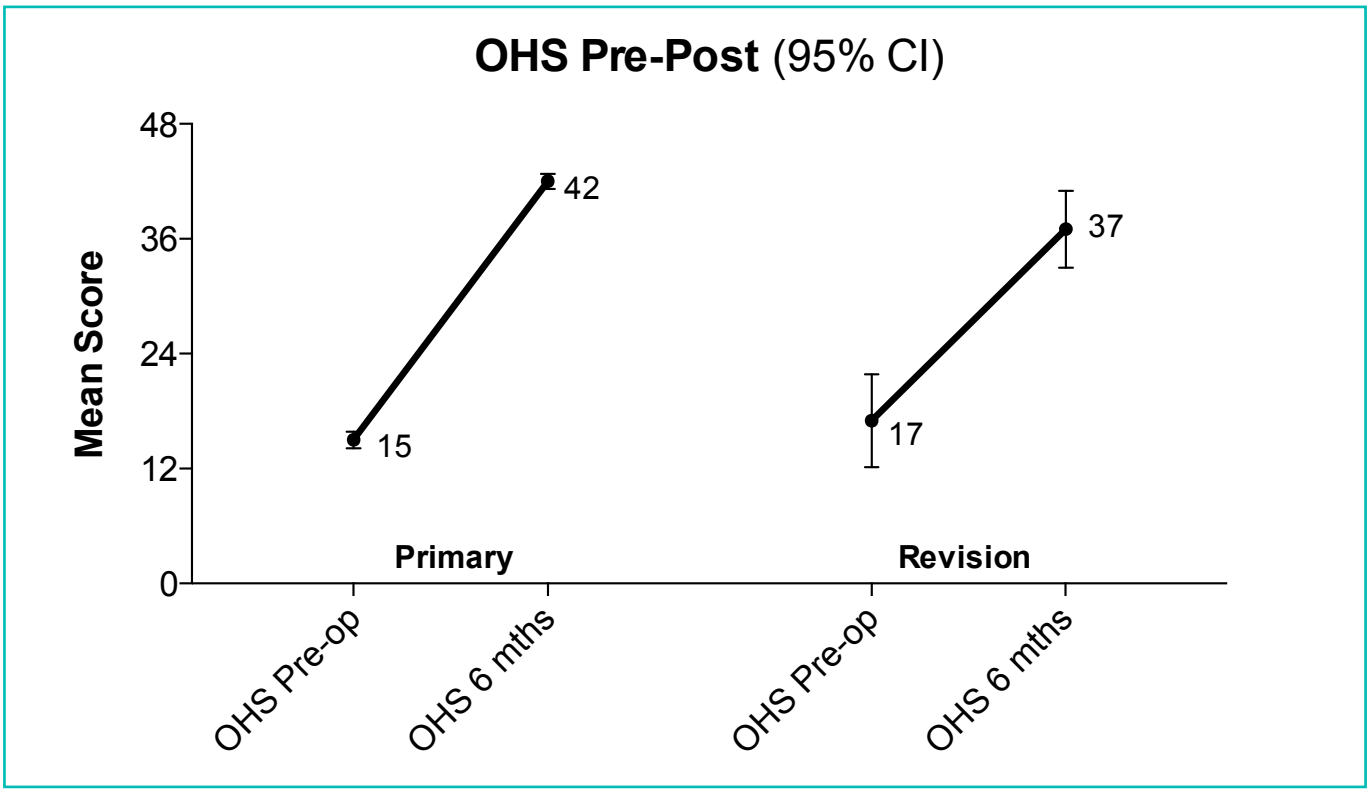
Primary Hips	OHS Responses Primary Surgery							
	Poor (<27) N (%)	Fair (27-33) N (%)	Good (34-41) N (%)	Excellent (>41) N (%)	Min	Max	Mean	SD
Preoperative Responses (N = 337)	303 (90)	23 (7)	11 (3)	0 (0)	0	41	15	8.2
Postoperative Responses (N = 333)	19 (6)	20 (6)	64 (19)	230 (70)	10	48	42	7.3

Table 7.12: Revision Hip Arthroplasty: Oxford Hip Score Responses

Revision Hips	OHS Responses Revision Surgery							
	Poor (<27) N (%)	Fair (27-33) N (%)	Good (34-41) N (%)	Excellent (>41) N (%)	Min	Max	Mean	SD
Preoperative Responses (N = 22)	16 (80)	1 (5)	3 (15)	0 (0)	2	38	17	11
Postoperative Responses (N = 18)	1 (6)	6 (33)	4 (22)	7 (39)	22	48	37	8.1

Figure 7.1: Hip Arthroplasty: Pre-and Post-operative Oxford Hip Scores All Hospitals

(with 95% Confidence Interval) [see Appendix 4 for data notes]



7.1.6 EQ-5D

Table 7.13: Primary Hip Arthroplasty: Pre- and Post-operative EQ-5D

Primary Hips	Preoperative Responses		Postoperative Responses	
	% No problems	% Some problems*	% No problems	% Some problems*
Mobility	2	98	50	50
Personal Care	14	86	75	25
Usual Activities	4	97	55	45
Pain or Discomfort	<1	>99	45	55
Anxiety or Depression	29	71	75	25

*Some problems include slight, moderate, severe problems and unable to do

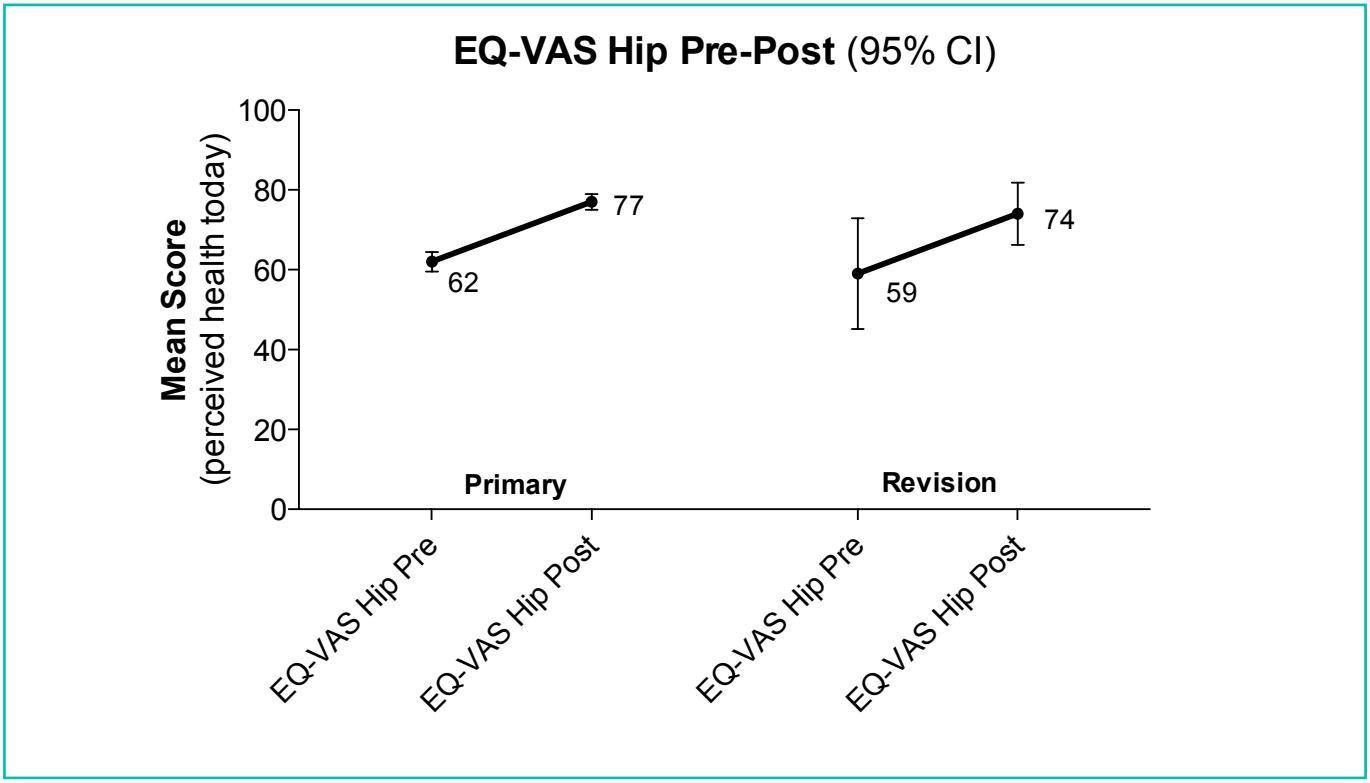
Table 7.14: Revision Hip Arthroplasty: Pre- and Post-operative EQ-5D

Revision Hips	Preoperative Responses		Postoperative Responses	
	% No problems	% Some problems*	% No problems	% Some problems*
Mobility	16	84	18	82
Personal Care	21	79	59	41
Usual Activities	21	79	12	88
Pain or Discomfort	0	100	35	65
Anxiety or Depression	37	63	65	35

*Some problems include slight, moderate, severe problems and unable to do

Figure 7.2: Hip Arthroplasty: Pre- and Post-operative EQ VAS All Hospitals

(with 95% Confidence Interval) [see Appendix 4 for data notes]



7.2 Knee Arthroplasty

7.2.1 Expectations of Recovery

Table 7.15: Primary Knee Arthroplasty: Expectation of Pain at 6-months by Gender

Primary Knees	Expectation of Pain at 6-months (N = 787)			
	Nil N (%)	Slight N (%)	Moderate N (%)	Severe N (%)
Male	189 (68)	76 (27)	12 (4)	2 (1)
Female	297 (59)	184 (36)	25 (5)	2 (<1)
ALL	486 (61)	260 (33)	37 (5)	4 (1)

Table 7.16: Primary Knee Arthroplasty: Expectation of Function at 6-months by Gender

Primary Knees	Expectation of Function at 6-months (N = 788)			
	No limitation N (%)	Slight limitation N (%)	Moderate limitation N (%)	Severe limitation N (%)
Male	162 (58)	96 (34)	21 (8)	0 (0)
Female	292 (57)	176 (35)	41 (8)	0 (0)
ALL	454 (58)	272 (35)	62 (8)	0 (0)

Table 7.17: Revision Knee Arthroplasty: Expectation of Pain at 6-months by Gender

Revision Knees	Expectation of Pain at 6-months (N = 28)			
	Nil N (%)	Slight N (%)	Moderate N (%)	Severe N (%)
Male	5 (36)	7 (50)	2 (14)	0 (0)
Female	5 (36)	9 (64)	0 (0)	0 (0)
ALL	10 (36)	16 (57)	2 (7)	0 (0)

Table 7.18: Revision Knee Arthroplasty: Expectation of Function at 6-months by Gender

Revision Knees	Expectation of Function at 6-months (N = 29)			
	No limitation N (%)	Slight limitation N (%)	Moderate limitation N (%)	Severe limitation N (%)
Male	6 (43)	6 (43)	2 (14)	0 (0)
Female	5 (36)	9 (64)	0 (0)	0 (0)
ALL	11 (39)	15 (54)	2 (7)	0 (0)

7.2.2 Satisfaction and Success

Table 7.19: Primary Knee Arthroplasty: Satisfaction at 6-months by Gender

Primary Knees	Satisfaction at 6-months (N = 752)				
	Excellent N (%)	Very Good N (%)	Good N (%)	Fair N (%)	Poor N (%)
Male	102 (38)	88 (33)	58 (21)	15 (6)	8 (3)
Female	181 (38)	143 (30)	96 (20)	36 (8)	25 (5)
ALL	283 (38)	231 (31)	154 (21)	51 (7)	33 (4)

Table 7.20: Primary Knee Arthroplasty: Success at 6-months by Gender

Primary Knees	Success at 6-months (N = 753)				
	Much better N (%)	A little better N (%)	About the same N (%)	A little worse N (%)	Much worse N (%)
Male	217 (80)	38 (14)	8 (3)	5 (2)	4 (2)
Female	371 (77)	62 (13)	23 (5)	12 (3)	13 (3)
ALL	588 (78)	100 (13)	31 (4)	17 (2)	17 (2)

Table 7.21: Revision Knee Arthroplasty: Satisfaction at 6-months by Gender

Revision Knees	Satisfaction at 6-months (N = 27)				
	Excellent N (%)	Very Good N (%)	Good N (%)	Fair N (%)	Poor N (%)
Male	0 (0)	5 (42)	3 (25)	2 (17)	2 (17)
Female	3 (20)	6 (40)	5 (33)	0 (0)	1 (7)
ALL	3 (11)	11 (41)	8 (30)	2 (7)	3 (11)

Table 7.22: Revision Knee Arthroplasty: Success at 6-months by Gender

Revision Knees	Success at 6-months (N = 25)			
	Much better N (%)	A little better N (%)	About the same N (%)	A little worse N (%)
Male	6 (55)	2 (18)	3 (27)	0 (0)
Female	10 (71)	3 (21)	0 (0)	1 (7)
ALL	16 (64)	5 (20)	3 (12)	1 (4)

7.2.3 Reported Recovery

Table 7.23: Knee Arthroplasty: Person Reported Recovery at 6-months by Type

All Knees	Readmission N (% of total)	Reoperation N (% of total)
Primary knee arthroplasty (N = 759)	56 (7)	17 (2)
Revision knee arthroplasty (N = 27)	2 (7)	1 (4)

7.2.4 Complications Reported Since Discharge Not Requiring Readmission or Reoperation

Table 7.24: Knee Arthroplasty: Any Complication reported Since Discharge

All Knees	Any Complication Reported Since Discharge*	
	Yes N (% of total)	No N (% of total)
Primary knee arthroplasty (N = 758)	152 (20)	606 (80)
Revision knee arthroplasty (N = 27)	8 (30)	19 (70)

*Type of complication reported includes unexpected pain at 6-months; prescribed oral or IV antibiotics since discharge; ongoing joint stiffness; a cardiovascular event; VTE (either DVT or PE); ongoing paraesthesia/anaesthesia; muscle weakness causing functional impairment; neuropathy; a leg length discrepancy; or cellulitis. A person may report more than one complication.

7.2.5 Oxford Knee Scores

Table 7.25: Primary Knee Arthroplasty: Oxford Knee Score Responses

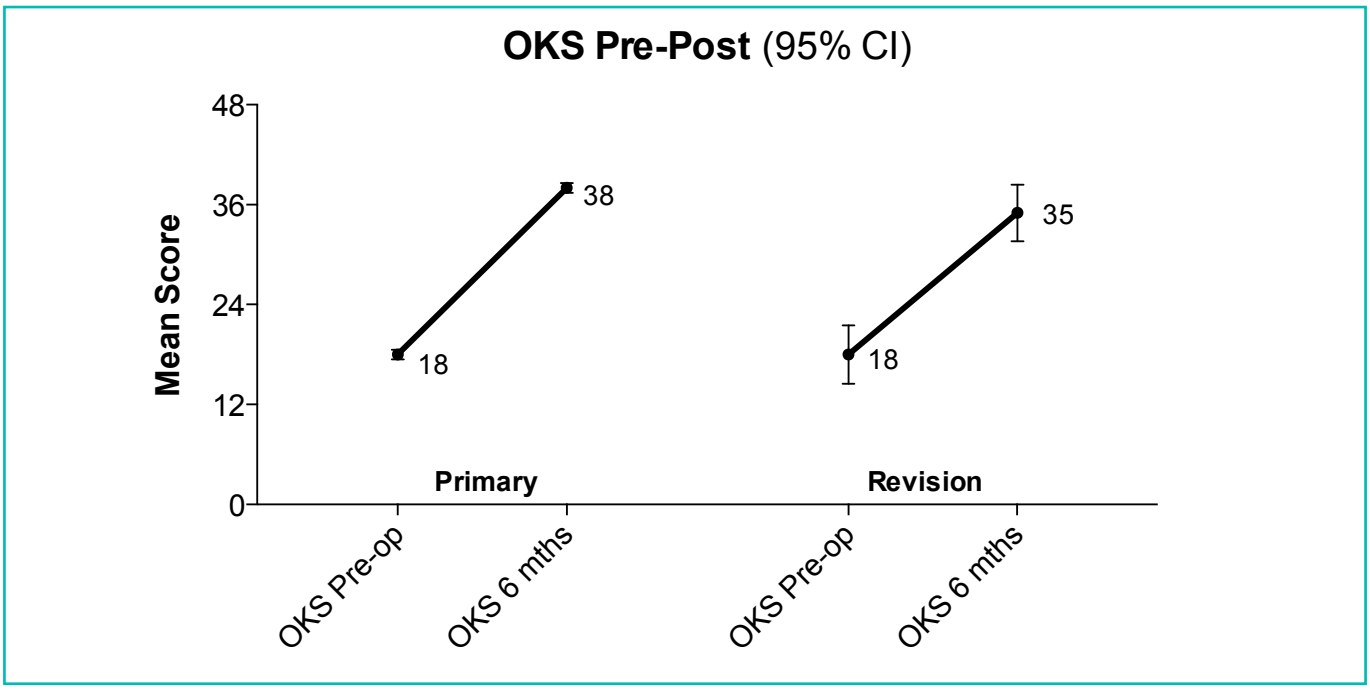
Primary Knees	OKS Responses Primary Surgery							
	Poor (<27) N (%)	Fair (27-33) N (%)	Good (34-41) N (%)	Excellent (>41) N (%)	Min	Max	Mean	SD
Preoperative Responses (N = 776)	661 (85)	83 (11)	31 (4)	1 (<1)	2	43	18	8
Postoperative Responses (N = 748)	77 (10)	88 (12)	227 (30)	356 (48)	4	48	38	8.2

Table 7.26: Revision Knee Arthroplasty: Oxford Knee Score Responses

Revision Knees	OKS Responses Revision Surgery							
	Poor (<27) N (%)	Fair (27-33) N (%)	Good (34-41) N (%)	Excellent (>41) N (%)	Min	Max	Mean	SD
Preoperative Responses (N = 27)	23 (85)	3 (11)	1 (4)	0 (0)	3	37	18	8.8
Postoperative Responses (N = 27)	3 (11)	6 (22)	11 (41)	7 (26)	12	45	35	8.5

Figure 7.3: Knee Arthroplasty: Pre-and Post-operative Oxford Knee Scores All Hospitals

(with 95% Confidence Interval) [see Appendix 4 for data notes]



7.2.6 EQ-5D

Table 7.27: Primary Knee Arthroplasty: Pre- and Post-operative EQ-5D

Primary Knees	Preoperative Responses		Postoperative Responses	
	% No problems	% Some problems*	% No problems	% Some problems*
Mobility	4	96	47	53
Personal Care	37	63	76	24
Usual Activities	7	93	50	50
Pain or Discomfort	1	99	34	66
Anxiety or Depression	37	63	70	30

*Some problems include slight, moderate, severe problems and unable to do

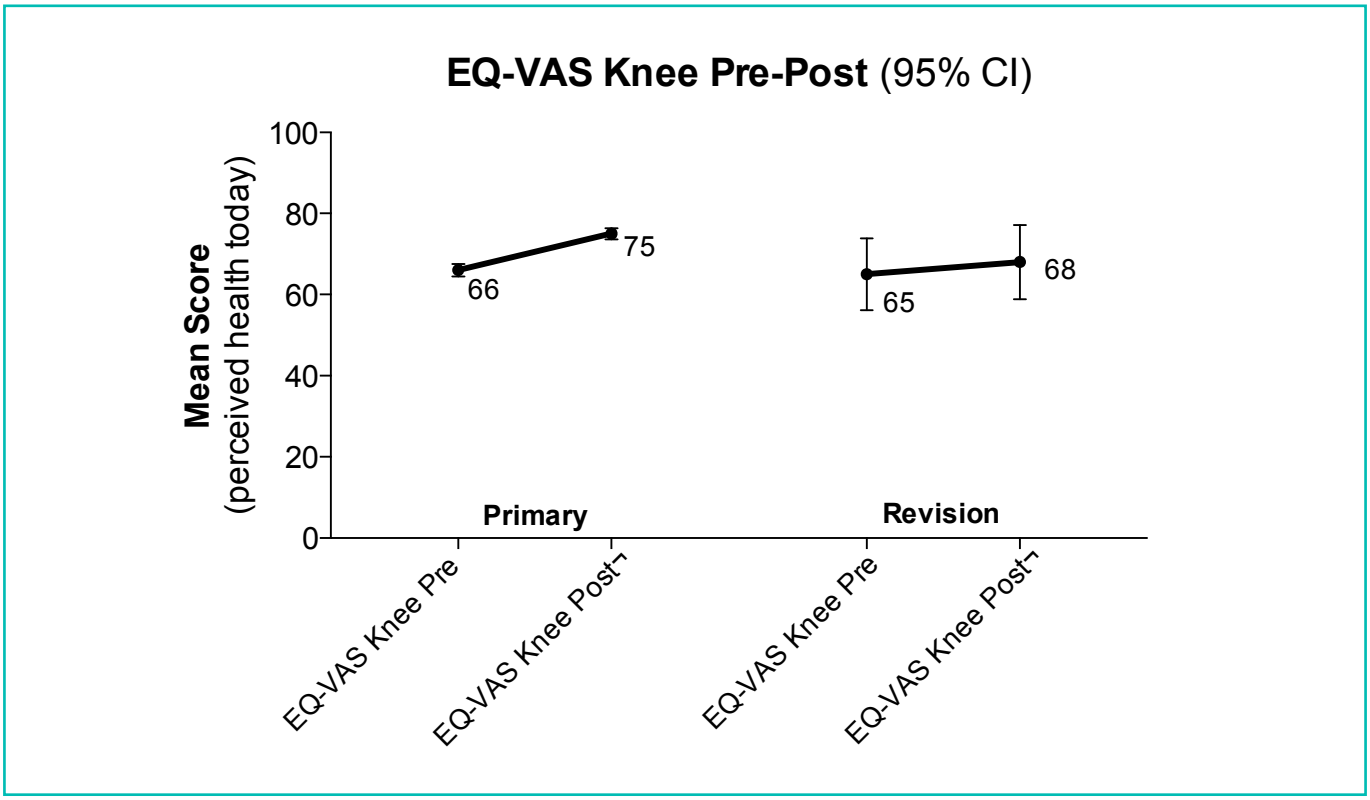
Table 7.28: Revision Knee Arthroplasty: Pre- and Post-operative EQ-5D

Revision Knees	Preoperative Responses		Postoperative Responses	
	% No problems	% Some problems*	% No problems	% Some problems*
Mobility	21	79	41	59
Personal Care	41	59	78	22
Usual Activities	15	85	59	41
Pain or Discomfort	4	96	22	78
Anxiety or Depression	41	59	70	30

*Some problems include slight, moderate, severe problems and unable to do

Figure 7.4: Knee Arthroplasty: Pre- and Post-operative EQ VAS All Hospitals

(with 95% Confidence Interval) [see Appendix 4 for data notes]



APPENDICES

Appendix 1: ACORN Steering Committee Terms of Reference 2014

Role

The role of the Steering Committee is to promote participation in the registry and to provide oversight and direction to the initiation, implementation and ongoing development of the Arthroplasty Clinical Outcomes Registry NSW (ACORN).

Philosophy

Joint replacement surgery is a cost-effective intervention for people experiencing pain and poor function as a consequence of end-stage joint disease from a variety of conditions. The Steering Committee for the Arthroplasty Clinical Outcomes Registry will develop and maintain a registry that improves the outcomes of joint replacement surgery by monitoring, evaluating and reporting on outcomes after surgery.

Purpose

- Identify characteristics that place people at risk of poor outcome after joint replacement surgery and develop predictors of outcome after surgery.
- Monitor rates of key complications requiring readmission, reoperation, and/or intervention and identify variation of outcomes.
- Provide feedback to participating orthopaedic departments and individual surgeons of the clinical outcomes of joint replacement surgery.
- Provide information on the effect of joint replacement surgery on health outcomes that patients may use to inform their decisions about joint replacement surgery.

Functions

- Advise and agree on the scope, development and implementation of the Arthroplasty Clinical Outcomes Registry.
- Advise and agree on strategies for sustainability of the registry.
- Provide oversight of the activities of the registry and its management committee.
- Continually review the objectives of the registry and assess the registry's ability to continue to meet these objectives.
- Develop a risk management plan and continually monitor and review risks to the sustainability of the registry.
- Develop a communication strategy with the management team that is appropriate to each stakeholder.
- Provide strategy and oversight for the development of policies to address clinical issues identified by the registry, including outliers and adverse clinical outcomes.
- Use the data collected to inform clinical practice at participating sites and more generally across the health system.
- Monitor and advise on the registry's data collection processes, management of data quality and the analysis and reporting of data to ensure consistency, completeness and standardisation of data processes.
- Oversee the establishment of policies for review of access to, and use of, registry data, and oversee all requests for research using the registry data.
- Review all publications arising from the use of the registry data.

Membership

Steering Committee membership will consist of:

- Clinical/Academic Orthopaedic Surgeon
- Clinical Researcher Orthopaedics
- ≥4 Orthopaedic Surgeon representatives who are clinically active in lower limb arthroplasty
- Nurse Representative
- Registry Representative
- Others as agreed by the Steering Committee

The Committee will have no fewer than 5 members. The appointment of a new member, or replacement of a departing member, will require the agreement of a 2/3 majority of the committee members. Membership will be reviewed annually with the Terms of Reference.

Meetings

The Steering Committee will meet at regular intervals, at least quarterly, and arrange extraordinary meetings if required. At other times communication will be by email, teleconference or web conference as needed. Minutes of the previous meeting are to be confirmed at the next ordinary meeting and no business is to be transacted until the previous meetings minutes have been confirmed or otherwise addressed.

Quorum

≥ 50% of members

Secretariat

A member of the Registry Management Committee will provide secretariat functions and the Chair of the committee will ensure minutes are kept of all meetings.

Declarations of Conflict of Interest

All members are asked to declare any perceived, potential or actual conflict of interest at the commencement of their term on the committee, or during the course of their membership term if necessary.

Review of the Terms of Reference

12 monthly. Review of the Arthroplasty Clinical Outcomes Registry NSW (ACORN) Terms of Reference will be January 2015.

Appendix 2: Australian Classification of Health Interventions (ACHI) codes

Table 3: Codes eligible for inclusion in ACORN

Block 1489	Arthroplasty of hip
49312-00	Excision arthroplasty of hip
49318-00	Total arthroplasty of hip, unilateral
49319-00	Total arthroplasty of hip, bilateral
Block 1492	**Revision arthroplasty of hip**
49324-00	Revision of total arthroplasty of hip
49327-00	Revision of total arthroplasty of hip with bone graft to acetabulum
49330-00	Revision of total arthroplasty of hip with bone graft to femur
49333-00	Revision of total arthroplasty of hip with bone graft to acetabulum and femur
49339-00	Revision of total arthroplasty of hip with anatomic specific allograft to acetabulum
49342-00	Revision of total arthroplasty of hip with anatomic specific allograft to femur
49345-00	Revision of total arthroplasty of hip with anatomic specific allograft to acetabulum and femur
Block 1518	**Arthroplasty of knee**
49517-00	Hemi-arthroplasty of knee
49518-00	Total arthroplasty of knee, unilateral
49519-00	Total arthroplasty of knee, bilateral
49534-01	Total replacement arthroplasty of patellofemoral joint of knee
Block 1519	**Arthroplasty of knee with bone graft to femur or tibia**
49521-00	Total arthroplasty of knee with bone graft to femur, unilateral
49521-01	Total arthroplasty of knee with bone graft to femur, bilateral
49521-02	Total arthroplasty of knee with bone graft to tibia, unilateral
49521-03	Total arthroplasty of knee with bone graft to tibia, bilateral
49524-00	Total arthroplasty of knee with bone graft to femur and tibia, unilateral
49524-01	Total arthroplasty of knee with bone graft to femur and tibia, bilateral
Block 1523	**Revision of total arthroplasty of knee with bone graft to femur or tibia**
49530-00	Revision of total arthroplasty of knee with bone graft to femur
49530-01	Revision of total arthroplasty of knee with bone graft to tibia
49533-00	Revision of total arthroplasty of knee with bone graft to femur and tibia
49554-00	Revision of total arthroplasty of knee with anatomic specific allograft
Block 1524	**Other revision procedures on knee**
49527-00	Revision of total arthroplasty of knee
90562-00	Patella resurfacing

Table 4: Codes excluded from ACORN

Block 1489	Arthroplasty of hip
47522-00	Hemi-arthroplasty of femur
49315-00	Partial arthroplasty of hip
90607-00	Resurfacing of hip, unilateral
90607-01	Resurfacing of hip, bilateral
Block 1492	**Revision arthroplasty of hip**
49346-00	Revision of partial arthroplasty of hip

Block 1501	Other incision procedures on knee
49515-00	Removal of knee prosthesis
Block 1518	**Arthroplasty of knee**
49534-01	Total replacement arthroplasty of patellofemoral joint of knee
Block 1524	**Other revision procedures on knee**
49545-00	Revision arthrodesis of knee

Appendix 3: List of Abbreviations

ACORN	Arthroplasty Clinical Outcomes Registry National
BMI	Body Mass Index
DDH	Developmental Dysplasia Hip
DVT	Deep Venous Thrombosis
HNE HREC	Hunter New England Human Research Ethics Committee
NESB	Non-English Speaking Background
NJRR	National Joint Replacement Registry
OA	Osteoarthritis
OHS	Oxford Hip Score
OKS	Oxford Knee Score
PE	Pulmonary Embolism
PROMs	Patient-Reported Outcome Measures
RA	Rheumatoid Arthritis
TJA	Total Joint Arthroplasty
TJR	Total Joint Replacement

Appendix 4: Data Notes

Section 7: Patient-Reported Outcome Measures

Figure 7.1: Hip Arthroplasty: Pre-and Post-operative Oxford Hip Scores All Hospitals
Figure 7.2: Hip Arthroplasty: Pre- and Post-operative EQ VAS All Hospitals
Figure 7.3: Knee Arthroplasty: Pre-and Post-operative Oxford Knee Scores All Hospitals
Figure 7.4: Knee Arthroplasty: Pre- and Post-operative EQ VAS All Hospitals

- In calculating the change between pre-operative and 6-month post-operative scores, the difference in the mean scores for each time point has been used. This method represents the difference in mean scores.
- The alternative method of calculation is to use the average change score, using only paired data (for each individual patient). The alternative method represents the mean difference in scores.
- With a complete dataset, the two methods are equal.
- The former method has been chosen as it includes all data collected, and incentivises ACORN to aim for data completeness. We have conducted the alternative calculation for each outcome and found no more than one point difference in the change scores for any group. This suggests that data loss is random, rather than biased.

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