National Joint Registry

Working for patients, committed to excellence

HIPS

National Joint Registry

21st Annual Report 2024

Surgical data to 31 December 2023

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Introduction

The National Joint Registry (NJR) collects information about hip, knee, ankle, elbow and shoulder joint replacement operations from all participating hospitals in England, Wales, Northern Ireland, the Isle of Man and Guernsey. The registry records patient information and provides data, analysis and reporting on the performance and longevity of replacement joint implants; the surgical outcomes for the hospitals where these operations are carried out, and on the performance outcomes of the surgeons who conduct the procedures.

The NJR produces this Annual Report which summarises its work and shares the analysis of data for the past year, visually in tables and graphs, for procedures across each of the joints, as well as implant and hospital outcomes. The purpose and work of the NJR is for clinical improvement; to improve clinical standards, for the benefit of patients, clinicians, and the orthopaedic sector as a whole.

Described as a global exemplar of an implantable medical device registry, the NJR continues to be the largest orthopaedic registry in the world, with an international reputation. The most notable statistic this year has been the 4 millionth record being submitted to the registry, for a patient at Wrightington Hospital, which is fitting due to the pioneering work of Professor Sir John Charnley having performed the first ever hip-replacement operations at Wrightington in the early 1960s.

The NJR supports the use of its rich data pool for use in research for a wide range of studies, highlighting and informing best practice in joint replacement surgery, for the benefit of patients.

The NJR research programme supports fellowships and application requests to use NJR data and this report contains some short research paper abstracts, and also recent research which looks at the extent of COVID recovery and whether the NHS has resumed to previous surgical volume levels.

The NJR has shown that orthopaedic surgery, as one of the main users of implant devices in the UK, is demonstrating the highest standards of patient safety with regard to their use. A key message from the report is that safety and clinical outcomes continue to improve, as identified through the reduction of revision surgery.

The NJR is ever grateful to patients undergoing joint replacement surgery in providing consent for their data to be added to the registry and made available to the NJR for analysis and thus enabling the NJR to develop such a rich and valuable data source. The registry is also appreciative of the work of data entry staff in all participating hospitals, who willingly engage in stringent data quality award programmes to ensure the data submitted is of high quality, accurate and as complete as is possible.

*use MY data

This work uses data provided by patients and collected by hospitals as part of their care and support.

Patient Reported Outcome Measures (PROMs) and the work of the NJR

PROMs data for hip and knee replacement surgery collection forms part of a separate programme, previously managed by NHS Digital (now part of NHSE) and are not routinely collected by the NJR. We have had annual access to the cumulative national PROMs data retrospectively, through an application to NHS England's Data Access Request Service.

Our 2022 NJR Annual Report contained an exploration of the level of completeness and quality of data from the national PROMs programme and a proposal for how we might present implant level PROMs in future reports. Thereafter, we consulted with our stakeholders, including patients, orthopaedic surgeons and representatives of the implant manufacturing industry and received broad support for inclusion of implant level PROMs using the tables we had proposed.

Unfortunately, due to circumstances beyond our control, we have been unable to secure access from NHSE to these datasets. We are therefore extremely disappointed that we are unable to use PROMs to assess knee and hip implant performance. We know this will also be of concern to many of our stakeholders. We hope to be able to report some positive feedback from NHSE on this matter soon and be able to re-address the reporting of PROMs across our work and in the associated reports we create for surgeons, hospitals and the public.

Shoulder PROMs data collection is overseen directly by the NJR within our geographical areas of operation and so that service is uninterrupted and continuity of analysis and reporting unimpacted by the halt in the NHSE PROMs data-sharing.

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1. Chair's Foreword

Chair's Foreword

Professor Sir Paul Curran, Chair of the National Joint Registry

During the past year, I have been delighted to join colleagues in our celebration of the National Joint Registry's (NJR) twentieth anniversary. We have reflected proudly on the evolution of the registry since data collection began in 2003 and the significance of our achievements. We are now the largest registry of joint replacement surgery in the world (the 4 millionth operation was recorded on our database in May) and a recognised 'global exemplar' of an implantable medical devices registry.

A highlight of our anniversary celebrations was an event held in central London that provided a wonderful opportunity to look back over twenty years of registry work. It was a pleasure to be joined by colleagues, past and present, and representatives from our diverse range of stakeholders, to enjoy a programme of presentations. These showcased significant milestones in the development of the NJR, and our contribution to patient safety and improved patient outcomes. We were honoured to hear Professor Sir Stephen Powis (National Medical Director), our guest speaker, describe the NJR as 'the jewel in the crown of patient safety initiatives', a clear endorsement of the importance NHS England (NHSE) attaches to the contribution the NJR makes to patient safety.

Over the last year we have delivered an ambitious programme of work, and both funded and facilitated world-leading research. The NJR Annual Report provides the opportunity for us to reflect on our achievements. Further details of this year's developments can be found here: **Developments**. It also provides a valuable opportunity to look to the year ahead, where we aim to build on our success and seek new opportunities to develop the registry further. Highlights for the coming year include collaboration with the NHSE Outcomes and Registries Programme, development of the NJR Patient Network, and implementation of an ambitious development programme. This multi-year and multi-million-pound programme will see the NJR undertake exciting new initiatives that will enable us to further enhance patient safety and maintain our global leadership position.

NJR's standing is, of course, due to a dedicated team of committed professionals, who strive tirelessly to ensure its success. There are some important individual contributions which I would like to acknowledge. First, during the year there have been three changes to the NJR Board (NJRB, previously NJR Steering Committee). It has been a pleasure to welcome co-opted members, Mr Chris Gush, HQIP CEO, who succeeded Ms Jane Ingham in August 2023 and Mr Simon Hodkinson, who succeeded Professor Deborah Eastwood as BOA President in September 2023. We look forward to welcoming his successor, Mr Mark Bowditch, who takes up post in September 2024, and continuing our much-valued relationship with the orthopaedic profession. I would like to thank Chris and Simon for their valuable contributions. I would also like to thank NJRB orthopaedic surgeon member, Professor Amar Rangan, who stepped down at the end of his final term of office in May, after nine years of dedicated service to the NJR. I am delighted that Amar will continue to be involved with NJR work.

My grateful thanks also go to the NJR Regional Clinical Coordinators (RCCs) who underpin and champion NJR's work locally. There have been some changes to RCC committee membership, as terms of office expire, and new members are recruited. I would like to thank all those who left us over the year, for their valuable contributions and welcome their successors. I look forward to working with you.

I would particularly like to thank all members of the NJRB and NJR committees, and specifically the chairs of those committees for their clinical expertise and leadership: Mr Tim Wilton - Chair, NJR Medical Advisory Committee (and NJR Medical Director and Vice Chair); Mr Peter Howard - Chair, NJR Surgeon Performance and NJR Implant Scrutiny Committees; Professor Mike Reed - Chair, NJR Editorial Committee; Professor Mark Wilkinson - Chair, NJR Research Committee (and PROMs Working Group); and Mr Derek Pegg - Chair, NJR Data Quality and NJR RCC Committees (and MDSv8 Working Group). Also, my sincere thanks to NJRB patient representatives and new joint chairs of the NJR Patient Network, Ms Gillian Coward and Mr Robin Brittain. Without the dedication and commitment of these members the NJR would simply not be a world-leading joint replacement registry. I would encourage you to read the reports from each of the committee chairs at **Work of the NJR Committees**, as these provide strategic overview of their main areas of work.

My appreciation also goes to our contract partners NEC Software Solutions UK Limited and the Universities of Bristol and Oxford. They provide the high-quality and professional data collection and outcome analysis that enables us to serve patients, surgeons, hospitals and industry.

I would like to end by extending my thanks to the NJR Management Team, for supporting us in our work and providing sound operational, contractual and financial management.

Finally, at the beginning of my third year as NJR Chair, it continues to be a great honour to lead this organisation and work with such dedicated professionals. I look forward to the coming year and continued evolution of the NJR.

Professor Sir Paul Curran
Chair, National Joint Registry

2. Executive Summary

Executive summary

Professor Mike Reed
Chair, NJR Editorial Committee

Mr Tim Wilton
NJR Medical Director

The year commenced 20 years after the first patient details were submitted to the NJR in 2003 and shortly after our 21st anniversary we have celebrated the submission of the four millionth case. As usual we attended the BHS, BASK and BESS specialist society events and in addition we have also celebrated at an event for our wide range of stakeholders recently in Westminster, at which many important development milestones were highlighted by a variety of members of the NJR team and our guests. The registry is the largest such database of joint replacement cases in the world, but more important is that the database is so complete, especially over the last 15 years. There have of course been some challenges along the way.

One such challenge has been the long-planned development of the new NJR Data Warehouse which has now been completed by NEC and which should afford a great deal of improvement in many of the NJR activities. This enhanced system puts many of the associated data streams in the same computer environment so that they can be analysed and integrated in a much more straight-forward way. It is difficult, though, to make an omelette without breaking a few eggs and there have been inevitable complexities and delays involved in overcoming some of the teething difficulties with the new system. We believe that the new system will now allow us to do things more quickly, more smoothly and to add new mechanisms to our repertoire, so the disruption should prove to have been worthwhile. The introduction of the new system has, however, contributed to the staggered appearance of parts of this year's report because of the delays in the analysis of hip and knee data, while some of the database changes were ironed out.

We have been developing an elaborate classification system with the German Arthroplasty Registry for some years and this year has not only seen this completed but the classification has also been accepted and adopted by the International Society of Arthroplasty Registries. This will now form the basis for specifying hip and knee implant characteristics for this whole international group. This is a major step forward which should enable all registries using the system to be very precise about exactly which variant of an implant they are describing. Hitherto this has been difficult because of the variety of types of implant available in different geographical areas and the fact that sometimes different names have been used for the same device. We should now be able to be confident that an implant which has either much better (or much worse!) outcomes than another implant is clearly defined. Similarly, this system will allow the pooling of cases from different registries to enable more powerful analysis of outcomes in the knowledge that those pooled implants are all the same variant. This will be welcomed by the regulatory bodies, as well as clinical and patient organisations, as a significant step forward.

Embedding this new classification system has also been the cause for some of the delay in our analysis of hip and knee data this year with the result that the production of our Annual Clinical Reports (ACRs) for hospitals, and Consultant Level Reports (CLRs) for surgeons have been delayed somewhat, as well as those respective joint sections of the Annual Report. On a more positive note, we look forward to seeing the wider variety of data in those and other reports as a result of this development.

Every few years we have a review of the Minimum Data Set (MDS), and this most recent review going on during 2023, has now been completed. The resulting version MDSv8 has now been implemented and allows us to collect more details about aspects of the patients, more complexity details for revision cases, and to collect data about complications and re-operations other than revision procedures. Although our primary outcome measure continues to be revision, with the same definition maintained, it is clearly important for patients when they have some other operation in relation to their replaced joint and we have greatly increased the scope of the data collected about these other re-operations.

An important development over the last year has also been to start collecting the same sort of data about hemiarthroplasty for hip fractures that we have previously collected for planned joint replacement. Previously we collected data about Total Hip Replacement for hip fractures but were not collecting hemiarthroplasty cases. These have a similar potential to have variation in the outcome depending upon the specific implant used and it is therefore a welcome development that we should now be able to perform suitable analysis to enable the improved treatment of these many thousands of frail and elderly patients.

A very significant problem over the last two years has been the breakdown in the provision of data feeds from the NHS data sources which has affected Hospital Episode Statistics (HES) data, civil registration data (death information) and national hip and knee Patient Reported Outcome Measures (PROMs) data. These are collected by the central NHS systems but are integral to the work of the NJR, as without these other data feeds the data collected specifically by the NJR can only be partially analysed. Some of these data have been supplied, but have arrived very late so could not be included in some of the reports.

The PROMs data have been an even greater problem as not only have they been greatly delayed but the data files have not been usable or complete when they have finally arrived. These matters have been completely outside the control of the NJR, but a solution is being actively pursued by the team at NEC Software Solutions and the NHS England Medical Directorate. In the meantime, the analysis of PROMs outcomes, which is so important to provide a comprehensive assessment of implants and hospital services alike, has not been possible for the last two years and we are therefore relying on primary outcomes such as revision rates and mortality.

There had been a delay to our development programme caused by the pandemic, as the funding of those projects was put on hold for two years. The programme has now been restarted and some of these developments will be specifically targeted at the data feeds and other issues outlined above.

Our continuing work in specific areas where the data were less complete have included: audits of elbow replacements to achieve full coverage particularly of trauma cases; audit of dual mobility hips to capture those with unusual combinations of components; and audit of shoulder replacements where historic missing cases are being picked up. These joint specific audits have greatly improved volumes on the registry and therefore our ability to analyse the relevant implant ranges and the accuracy of those analyses.

Hip replacement

This year's Annual Report is based on over 1.5 million primary hip replacements performed by over 4,000 surgeons in almost 500 hospitals.

We are now at 21 years since the NJR's data collection commenced and we are reporting a maximum of 20 years of follow-up, although the sizes of some of the groups at longer follow-up are modest.

Looking at caseload over the latest three-year period, as we continue to recover from the effects of COVID, the median number of primary procedures per consultant surgeon was 68 (around 22 per annum) and the median number of procedures per unit was 626. Pre-COVID, surgeons performed a median of around 21 primary hip replacement per annum. Hybrid fixations are the most popular choice in 2023, making up over 40% of primary procedures (see Table 3.H2).

In terms of bearing surface, ceramic-on-polyethylene (CoP) is again dominating in both hybrid and uncemented fixations (see Table 3.H2). Metal-on-polythene still dominates in cemented fixations, although fully cemented fixation is now used in less than 18% of cases – its lowest proportion ever in the registry. However, across the whole life of the registry around 24% of hip primaries have been cemented metal-on-polythene. Ceramic-on-ceramic bearings are now infrequently used, contributing about 3% of the total in 2023.

The number of dual mobility implants recorded in the registry has increased this year. This is in part due to better coding and capturing of this articulation, but is also due to a year-on-year increase in use. They are categorised by the material of each part of the bearing surface e.g. metal-on-polyethylene-on-metal (MoPoM) and ceramic-on-polyethylene-on-metal (CoPoM).

This year, 2023, saw the highest number of primary total hip replacements (THR) performed since the registry began, and this is almost 10% above 2019 levels (Table 3.H2). If surgical teams can continue at those levels, it will take until approximately 2031 to eliminate the backlog of hip replacement surgery (**French et al 2024**). An increase in volumes beyond this will improve the picture further.

Figure 3.H1 (b) shows that after declining substantially in popularity, resurfacing has remained relatively stable over the past five years, with a slight increase in absolute numbers in 2021 and 2022, but this reduced in 2023. In 2023, around half of the resurfacing procedures were performed by consultants who used resurfacing in more than 25 cases per year.

In terms of the volume of primary hip replacements performed, we are just above 2008 levels for procedures in NHS hospitals, despite overall activity having hugely increased in that time (Figure 3.H1(d)). The independent sector numbers have increased hugely, mainly through NHS-funded procedures.

In 2023, the three most common head sizes are 32mm (1st), 36mm (2nd) and 28mm (3rd). Only ten procedures used 26mm heads in 2023. Ceramic-on-polyethylene bearings with 32mm and 36mm heads now dominate.

A total of 47,090 first revisions of a hip replacement have been linked to a previous primary hip replacement recorded in the registry between 2003 and 2023. Figure 3.H4 (b) illustrates that revision rates increased between 2003 and 2007/8 and then declined between 2007/8 and 2023. A similar effect is shown in knees (which didn't suffer from metal-on metal bearing revisions) and this improvement is felt to be, at least in part, due to the introduction of NJR Clinician Feedback reporting. A hip replacement performed in 2012 has a 10-year revision estimate of 3%, already better than the NICE threshold of 5% at 10 years (NICE 2014).

The revision rate of metal-on-polyethylene-on-metal dual mobility bearings appears higher up to five years across all fixation types than that of most of the unipolar bearing combinations, except metal-on-metal and ceramic-on-metal. The ceramic-on-polyethylene-

French JMR, Deere K, Jones T, et al. An analysis of the effect of the COVID-19-induced joint replacement deficit in England, Wales, and Northern Ireland suggests recovery will be protracted. Bone Joint J. 2024;106-B(8):834-841.
https://www.nice.org.uk/guidance/ta304

on-metal dual mobility bearings show lower revision estimates for cemented and uncemented THRs than the metal-on-polyethylene-on-metal combinations but with overlapping confidence intervals (Table 3.H5).

The 1- and 3-year revision rates for ceramic-on-ceramic resurfacing appear similar to those for metal-on-metal resurfacing which are generally higher than for other unipolar variants. The revision rates at five years appear lower (3%), but the numbers at risk at all time points in the ceramic-on-ceramic resurfacing group are low, so this should be interpreted with caution. This should also be weighed against unipolar hip replacement which for the first time has a combination with an estimated revision rate of less than 1% at ten years. This is the cementless Polar Stem with an R3 shell, and a ceramic-on-ceramic bearing (Table 3.H8 (b)). The same table shows that there are 11 cemented, ten uncemented, two hybrid and two reverse hybrid stem / head / cup (or liner / shell) / bearing combinations with revision rates of less than 2% at ten years, where there are at least 250 cases left at risk at that time point; and more combinations are on track to achieve the same.

For the 25% of primary replacements now performed as hybrid ceramic-on-polyethylene hip replacements, the analysis by head size (Figure 3.H10 (h)) shows bearings with 28mm heads had higher revision rates than those with 32mm and 36mm heads (P<0.001).

For the 21% of hip replacements now performed as uncemented ceramic-on-polyethylene (CoP), Figure 3.H10 (e) shows that 28mm and 40mm heads have higher revision estimates than 32mm and 36mm heads.

For the 11% of hip replacement now performed as cemented metal-on-polyethylene (MoP), Figure 3.H10 (a) shows the effect of head size on revision estimates over the follow-up period. Overall, implants with head size 22.25mm had the worst revision estimates over the entire duration of follow-up, but implants with head size 36mm had marginally worse revision estimates in the first six years of follow-up.

The use of total hip replacement for hip fracture appears to have peaked in 2019. The proportion of THRs for a fractured neck of femur using a dual mobility bearing has increased in comparison with previous reports. This may at least partly be due to the increased granularity of the data in the new component database which has been introduced for this year's report and allows better identification of the bearings used. For patients with a hip fracture the use of dual mobility hip replacement has continued to increase with just over 18% of hip replacements being dual mobility in 2023. Last year saw a stabilising in the proportion of dual mobility after 15 years of increase. The results of total hip replacement in this group appear broadly similar with unipolar and dual mobility implants (Figure 3.H12 (b)). Hip replacement for trauma indications still has over a quarter of dual mobility hip replacements being performed by surgeons with an annual volume of four or fewer procedures (Figure 3.H1 (c)).

2023 Data:

Hips recorded by the NJR since April 2003

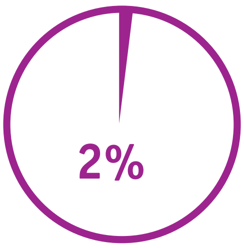
108,558

primary replacement procedures

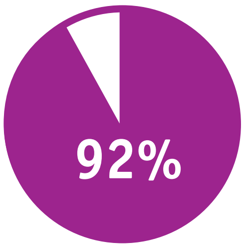
average ages:

67.3 69.5

60%



Acute trauma



Osteoarthritis

average BMI

28.7

Acknowledgements

The NJR continues to work collaboratively with our many stakeholders; the most important, of course, are the patients we serve, and whom we would like to thank for allowing us to use their data.

The NJR operational collaboration is a huge team effort. Elaine Young, NJR Director of Operations, has demonstrated the great versatility of her leadership and her team.

Many thanks also to the following without which the NJR could not function:

All members of the NJR Board and members of the NJR committees:

- Executive
- Data Quality
- Editorial
- Implant Scrutiny
- Medical Advisory
- Regional Clinical Coordinators
- Research
- Surgical Performance

Members of the Data Access Review Group

Members of the NJR Patient Network

Other organisations:

- Medicines and Healthcare products Regulatory Agency (MHRA)
- Care Quality Commission (CQC)
- NHS England (NHSE)
- Welsh Government
- Northern Ireland Executive
- Isle of Man Department of Health
- States of Guernsey
- Independent Healthcare Providers Network Services
- Getting It Right First Time (GIRFT)
- British Orthopaedic Association (BOA)
- British Hip Society (BHS)
- British Association for Surgery of the Knee (BASK)
- British Elbow and Shoulder Society (BESS)
- British Orthopaedic Foot and Ankle Society (BOFAS)
- European Orthopaedic Research Society (EORS)
- Healthcare Quality Improvement Partnership (HQIP)
- Confidentiality Advisory Group (CAG)
- Association of British HealthTech Industries (ABHI)

We are most grateful to our NJR delivery contractors for their very valuable input into the NJR Annual Report and their many other functions. NEC Software Solutions, University of Bristol and University of Oxford teams help us refine and improve each year.

We offer our personal thanks to Vicky McCormack, Report Project Manager, NEC; and Deirdra Taylor, Associate Director of Communication and Stakeholder Engagement, for getting the final report into shape.

Professor Mike Reed
Chair, NJR Editorial Committee

Mr Tim Wilton
NJR Medical Director

3. Outcomes after joint replacement 2003 to 2023

Summary of data sources, linkage and methodology

The main outcome analyses in this report relate to primary and revision joint replacements, unless otherwise indicated. We have included all patients with at least one primary joint replacement carried out between 1 April 2003 and 31 December 2023 inclusive, whose records had been submitted to the registry before 1 March 2024.

Information governance and patient confidentiality:

Data are collected via a secure web-based data entry application, then stored and processed in the NEC Software Solutions (NEC) data centre. NEC is ISO 27001 and ISO 9001 accredited and compliant with the NHS Data Security and Protection Toolkit. Data linkage to other datasets is approved by the Health Research Authority under Section 251 of the NHS Act 2006. Please visit **https://www.hra.nhs.uk/about-us/committees-and-services/confidentiality-advisory-group/**.

Missing data:

It is expected that neither the registry nor a local hospital's system alone could be regarded as a definitive list of joint replacements, however the union of both registry and local hospital data can be considered the gold standard from which to calculate voluntary unprompted compliance at upload. This figure is important for healthcare providers as a measure of compliance with data entry processes but does not represent the final data completeness of records in the registry.

The effect of missing data on the statistical analysis of a dataset is well documented. Data which is systematically missing (Missing Not at Random) has the potential to induce bias i.e. to distort the truth. This is why compliance of reporting data to the registry by a specific surgeon or hospital is essential to the quality assurance process of surgeons and hospitals.

Analysis of data which are missing in either a random (Missing Completely At Random) fashion or random within known strata (Missing At Random), e.g. method of fixation, is known to yield unbiased results. We believe that a coordinated systematic agreement of individuals across the registry to under-report the failure of a specific implant is exceedingly unlikely. Nevertheless, we believe if this did happen the issue would be identified and corrected by the **NJR's data quality audit process**. The low revision rates of some replacements also make it difficult to predict which is likely to fail. Therefore, planning to omit selected primary joint replacements which are anticipated to fail within ten years following surgery would be unlikely to succeed. Increased centralisation of some revision joint replacement, by specialist revision surgeons, also means there is little motivation to omit revisions, which would largely have been primary cases of another surgeon or another hospital.

We believe that missing data within the registry can be considered missing completely at random. We propose that this missing data mechanism will ensure that the quality assurance process of implants and procedures entered into the registry is statistically unbiased.

Patient-level data linkage:

Documentation of implant survivorship and mortality requires linkage of person-level identifiers in order to identify primary and revision procedures and mortality events for the same individual.

Starting with all NJR-sourced records, some were excluded because no suitable person-level identifier was found. Full details of the inclusion and exclusion criteria can be seen at the beginning of our analysis. Cases from Northern Ireland and Guernsey were also excluded because of unresolved issues around tracing mortality; and cases from the Isle of Man were also excluded due to the inability to audit them against local hospital data. Patients with longer follow-up may be less representative of the whole cohort of patients undergoing primary joint replacement than those patients with shorter follow-up, due to difficulties with data linkage and differential rates of reporting over time.

Linkage between primaries and any associated revisions (the 'linked files'):

Implant survivorship is first described with respect to the lifetime of the primary joint. Where volumes allow, we also provide an overview of further revisions following a first revision procedure.

The unit of observation for all sets of survivorship analysis has been taken as the individual primary joint replacement. A patient with left and right replacements of a particular type, therefore, will have two entries, and an assumption is made that the survivorship of a replacement on one side is independent of the other. In practice, this would be difficult to validate, particularly given that some patients will have had primary replacements of other joints that were not recorded in the registry. Established risk factors, such as age, are recorded at the time of primary operation and will therefore be different for the two procedures unless the two operations are performed on the same date.

A revision is defined as any operation where one or more components are added to, removed from or modified in a joint replacement, or if a Debridement And Implant Retention (DAIR) with or without modular exchange is performed. Capturing DAIR with or without modular exchange commenced with the introduction of MDSv7 (June 2018). Prior to this, DAIR with modular exchange was included as a single-stage revision, but DAIR without modular exchange was not captured. Within the report each of these procedure types is included in the analyses as a revision episode. This is distinct from the analyses in the surgeon, hospital, and implant performance workstreams where DAIR without modular exchange is not currently included as a revision outcome.

Analytical methods and terminology

The report uses a variety of statistical methods to reflect the diversity and range of performance within joint replacement. Analyses are tailored to ensure results are reported in units that can be easily interpreted. Here we define important concepts which underpin the analyses.

All cause / all construct revision

All cause revision is used as the primary outcome in the majority of analyses due to the difficulties in defining cause-specific failure i.e. several indications may have been given for a particular revision. In addition, we consider the construct as a single entity; for example, in hips we do not differentiate between femoral and acetabular component failure as it is sometimes difficult to identify which prosthetic element failed first or is causally responsible for the failure. It is incorrect to assume that the failure of components that make up a construct are independent of each other.

Debridement And Implant Retention

Debridement And Implant Retention (DAIR) without modular exchange was included in the registry data for MDSv7. DAIRs with modular exchange should have been collected (as a type of single-stage revision) from inception and their reporting in hips, knees, shoulders and elbows, along with all other procedures captured by the NJR, has been mandatory in the NHS since 1 April 2011. Before MDSv7, DAIRs with modular exchange were considered to be a single-stage revision in hip, knee, shoulder and elbow replacements. Ankle replacement DAIRs were not consistently collected prior to MDSv7. In MDSv7, all joint types are treated the same and a DAIR with modular exchange is considered to be a revision in all recorded joint replacements for the purposes of this report. Future reports will reflect changes to the recording of DAIRs introduced in MDSv8 whereby DAIRs with modular exchange are included as revision procedures and DAIRs without modular exchange are included as reoperations.

Descriptive statistics

In simple cases we tend to report simple descriptive statistics including: numbers (n), frequencies (N=), percentages (%), minimums (min), maximums (max), interquartile ranges (IQR) (25th centile, 75th centile), means (SD) and medians (50th centile) of the data.

Survival analysis methods

In more complex analyses that focus on implant failure (denoted revision), recurrent implant failure (re-revision) or mortality we use 'survival analysis methods' which are also known as 'time to event' methods.

Survival analysis methods are necessary in joint replacement data due to a process known as 'censoring'. There are two forms of censoring which are important to consider in joint replacement registry data: administrative censoring and censoring due to events, such as death.

Administrative censoring creates differential amounts of follow-up time, i.e. patients from 2003 will have been followed up for more than 20 years, whilst patient data collected last year will have one year of follow-up or less. Survival analyses methods enable us to include all patients in one analysis without being concerned if patients have one day, one year or one decade of observed follow-up time; these methods automatically adjust analyses for the amount of follow-up time.

In the case of analyses which estimate implant failure, death events are also censored, specifically they are considered non-informative censoring events. This assumes that death is unrelated to a failing implant, and can be safely ignored whilst estimating implant failure (revision). See Sayers et al. 2018 for an extensive discussion on this issue.

The survival tables in this report show 'Kaplan-Meier' estimates of the cumulative chance (probability) of failure (revision) or death, at different times from the primary operation. In the joint replacement literature they are often referred to as KM or simply survival estimates. We additionally show 95% Confidence Intervals for each estimate (95% CI). Confidence intervals illustrate the uncertainty around the estimate, with wide confidence intervals indicating greater uncertainty than narrow ones. Strictly they are interpreted in the context of repeated sampling i.e. if the data were collected in repeated samples we would expect 95% CIs generated to contain the true estimate in 95% of samples. However, confidence intervals are strongly influenced by the numbers of prosthesis constructs at risk and can become unreliable when the numbers at risk become low. In tables, including risk tables within figures, we highlight in *blue italics* all estimates where there are 250 or fewer prosthesis constructs at risk, or remaining at risk, at that particular time point.

Kaplan-Meier estimates can also be displayed graphically using a connected line plot. Figures are joined using a 'stair-step' function. Each 'stair' is flat, reflecting the constant nature of the estimate between the events of interest. When a new event occurs the survival estimate changes, creating a 'step'. Changes in the numbers at risk because of censoring do not themselves cause a step change but if the numbers at risk become low, when an event does occur, the stair-step might appear quite dramatic. Whenever possible, the numbers at risk at each time point have been included in the figures, allowing the reader to more appropriately interpret the data given the number of constructs at risk. We highlight in *blue italics* all estimates where there are 250 or fewer prosthesis constructs at risk or remaining at risk at that particular time point. The Kaplan-Meier estimates shown are technically 1 minus the Kaplan-Meier estimate multiplied by 100, therefore they estimate the cumulative percentage probability of construct failure.

In the case of revisions, no attempt has been made to adjust for the risk of death, as analyses attempt to estimate the underlying implant failure rate in the absence of death, see Sayers et al. 2018 for an extensive discussion on competing risks. Briefly, the Kaplan-Meier estimator estimates the probability of implant failure (revision) assuming the patient is still alive.

Sayers A, Evans JT, Whitehouse MR, Blom AW: Are competing risks models appropriate to describe implant failure? Acta Orthop. 2018 Jun; 89(3): 256-258.

Prosthesis Time Incidence Rates

Prosthesis Time Incidence Rates (PTIR) are used to describe the incidence (the rate of new events) of specific modes of failure in joint replacement. The PTIR expresses the number of revisions divided by the total of the individual prosthesis-years at risk. Figures here show the numbers of revisions per 1,000 years at risk. PTIR in other areas of research are often known as ‘person-time’ incident rates, however, in joint replacement registries the base unit of analysis is the ‘prosthesis construct’.

Note: This method is only appropriate if the hazard rate (the rate at which revisions occur in the unrevised cases) remains constant across the follow-up period. The latter is further explored by sub-dividing the time interval from the primary operation into smaller intervals and calculating PTIRs for each smaller interval.

Terminology note

There are four distinctive categories reflected in the analysis of data collected in the registry and these are: 1) the type of hip replacement i.e. total hip replacements (THR) and hip resurfacings (the NJR does not currently report data on hip hemiarthroplasty); 2) the fixation of the replacement i.e. cemented, uncemented, hybrid and reverse hybrid; 3) the bearing surfaces of the hip replacement; and 4) the size of femoral head/ internal diameter of the acetabular bearing.

Cemented constructs are fixed using bone cement in both the femoral stem and acetabulum. Uncemented constructs rely on press fit and osseous integration within the femur and acetabulum that may be supplemented (e.g. by screw fixation). Hybrid constructs contain a cemented femoral stem and an uncemented acetabulum. Reverse hybrid constructs contain an uncemented femoral stem and a cemented acetabulum.

Currently, the seven main categories of bearing surfaces for total hip replacements are ceramic-on-ceramic (CoC), ceramic-on-metal (CoM), ceramic-on-polyethylene (CoP), metal-on-metal (MoM), metal-on-polyethylene (MoP), metal-on-polyethylene-on-metal (MoPoM), ceramic-on-polyethylene-on-metal (CoPoM), and for resurfacing procedures there are MoM, MoP and CoC. By convention, the bearing material of the femoral head is listed before the acetabulum. Three bearing materials being listed indicates the use of dual mobility bearing devices, in which there are two articulating bearing surfaces. In contrast, a device with two listed bearing materials indicates a standard unipolar replacement. The size of the femoral head or inner diameter of a component is expressed in millimetres.

The metal-on-metal group in this report refers to patients with a stemmed prosthesis (THR) and metal bearing surfaces (a monobloc metal acetabular cup or a metal acetabular cup with a metal liner). Although they have metal-on-metal bearing surfaces, resurfacing procedures, which have a surface replacement femoral prosthesis combined with a metal acetabular cup, are treated as a separate category. Ceramic-on-ceramic and metal-on-polyethylene resurfacings are now being implanted.

3.H Outcomes after hip replacement

3.H.1 Overview of primary hip replacement surgery

In this report we address revision and mortality outcomes for all primary hip operations performed between 1 April 2003 and 31 December 2023, and submitted before 1 March 2024. Patients operated on at the commencement of the collection of data in the registry therefore had a potential 20.75 years of follow-up. This year, follow-up is reported at a maximum of 20 years in the tables and figures, although beyond 15 years the numbers at risk are particularly low in some categories.

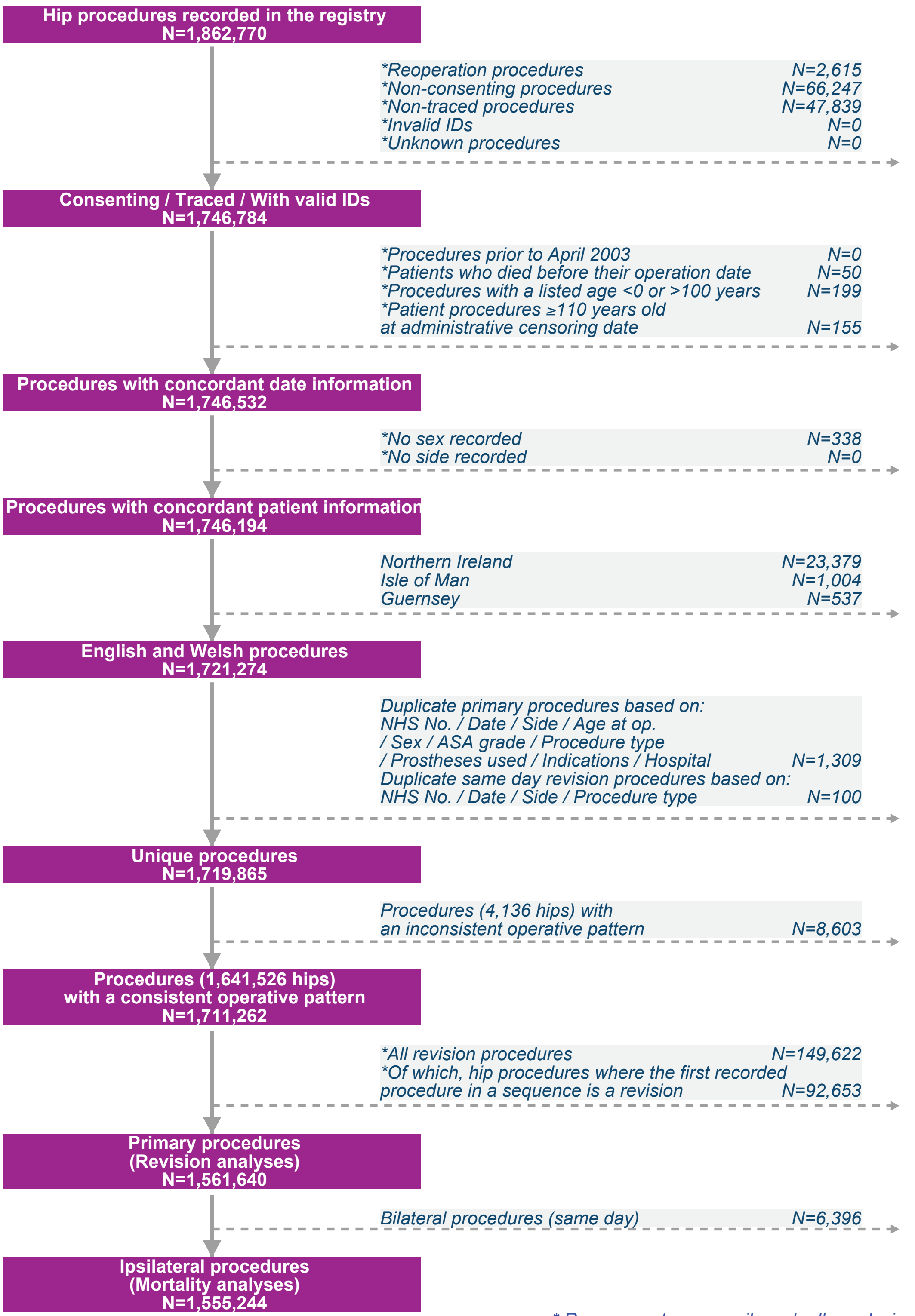
Figure 3.H1 (a) (page 28) describes the data cleaning methodology applied to produce the total of 1,561,640 primary hip procedures included in the analyses presented in this report.

Over the lifetime of the registry, the 1,561,640 primary hip replacement procedures contributing to our revision analyses were carried out by a total of 4,176 unique consultant surgeons working across 489 hospitals. Over the last three years (1 January 2021 to 31 December 2023), 301,035 primary hip procedures (representing 19.3% of the current registry volume) were performed by 2,185 unique consultant surgeons working across 415 hospitals.

Looking at caseload over this three-year period, the median number of primary procedures per consultant surgeon was 68 (interquartile range (IQR) 4 to 211) and the median number of procedures per hospital was 626 (IQR 268 to 1,023). A proportion of surgeons will have commenced practice as a consultant during this period, some may have retired, and some surgeons may have periods of surgical inactivity within the time of coverage of the registry, therefore their apparent caseload would be lower.

The majority of primary hip procedures were carried out on females (females 59.8%; males 40.2%). The median age at primary operation was 69 (IQR 61 to 76) years. Osteoarthritis was given as a documented indication for surgery in 1,424,214 cases (91.2% of the cohort) and was the sole indication given in 1,372,840 (87.9%) primary hip replacements.

Figure 3.H1 (a) Hip cohort flow diagram.



** Reasons not necessarily mutually exclusive*

Table 3.H1 Number and percentage of primary hip replacements by fixation and bearing.

Fixation and bearing surface	Number of primary hip operations	Percentage of each bearing type used within each method of fixation	Percentage of all primary hip operations
All cases	1,561,640		100
All cemented	451,547		28.9
MoP	378,851	83.9	24.3
MoM	427	0.1	<0.1
CoP	64,504	14.3	4.1
MoPoM	6,599	1.5	0.4
CoPoM	1,151	0.3	0.1
Others	15	<0.1	<0.1
All uncemented	578,399		37.0
MoP	217,547	37.6	13.9
MoM	29,197	5.0	1.9
CoP	180,323	31.2	11.5
CoC	143,495	24.8	9.2
CoM	2,133	0.4	0.1
MoPoM	3,318	0.6	0.2
CoPoM	2,279	0.4	0.1
Others	107	<0.1	<0.1
All hybrid	408,753		26.2
MoP	202,851	49.6	13.0
MoM	2,289	0.6	0.1
CoP	161,571	39.5	10.3
CoC	28,101	6.9	1.8
MoPoM	10,256	2.5	0.7
CoPoM	3,565	0.9	0.2
Others	120	<0.1	<0.1
All reverse hybrid	39,653		2.5
MoP	26,103	65.8	1.7
CoP	12,898	32.5	0.8
MoPoM	509	1.3	<0.1
Others	143	0.4	<0.1
All resurfacing	42,703		2.7
MoM	42,313	99.1	2.7
CoC	266	0.6	<0.1
MoP	124	0.3	<0.1
Unconfirmed	40,585		2.6

Table 3.H1 shows the breakdown of cases by the method of fixation and within each fixation sub-group, by bearing surfaces. Bearing surface combinations are reported as a separate group where there were 250 or more cases, unless there was only one type of bearing surface combination with a group size of fewer than 250. The most commonly used operation type over the life of the registry (2003 to present) remains as cemented metal-on-polyethylene (83.9% of all cemented primaries, 24.3% of all primaries). Dual mobility bearings are described either as dual mobility, to contrast to standard unipolar bearings, or where numbers allow, are categorised by the material of each part of the bearing surface (e.g. metal-on-polyethylene-on-metal (MoPoM) and ceramic-on-polyethylene-on-metal (CoPoM)). The numbers of other combinations of dual mobility (such as ceramic-on-polyethylene-on-ceramic (CoPoC)) were too small to include as separate groups this year.

Figure 3.H1 (b) Frequency of primary hip replacements within elective cases stratified by procedure type, bars stacked by volume per consultant per year. Graphs by confirmed procedure type.

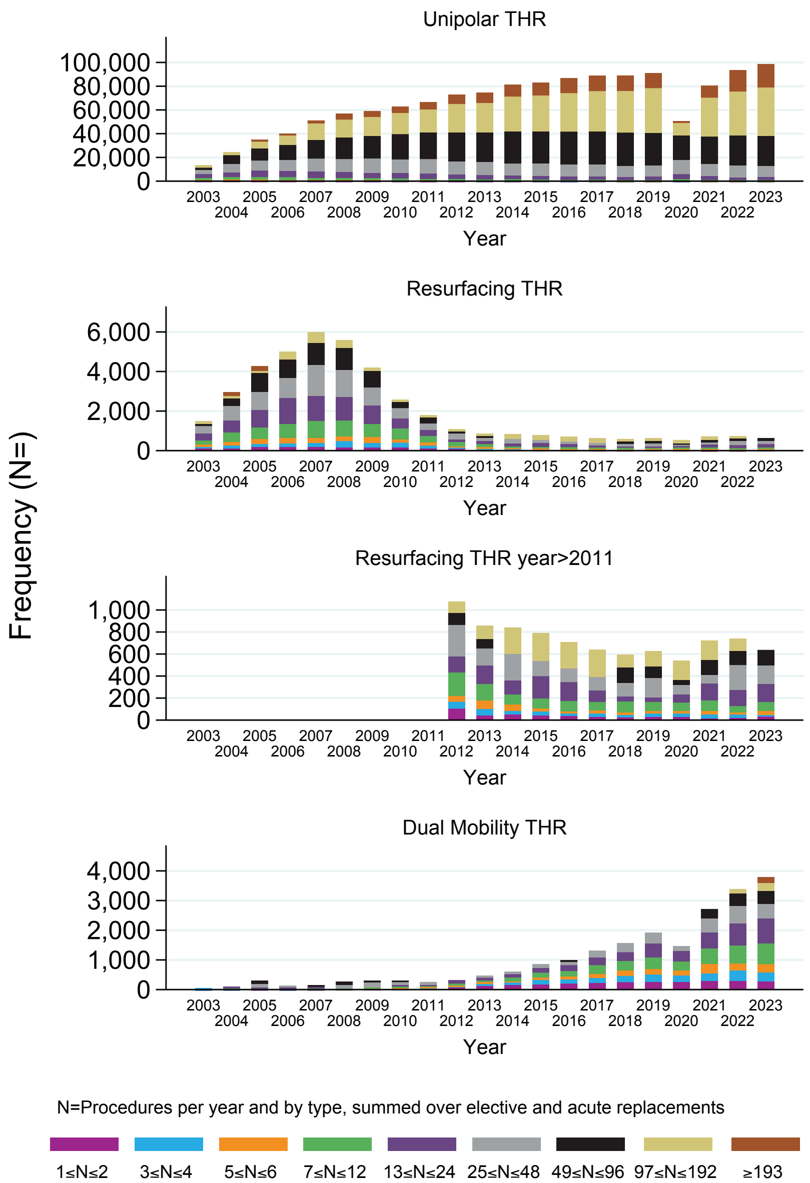


Figure 3.H1 (c) Frequency of primary hip replacements within acute trauma cases stratified by procedure type, bars stacked by volume per consultant per year. Graphs by confirmed procedure type.

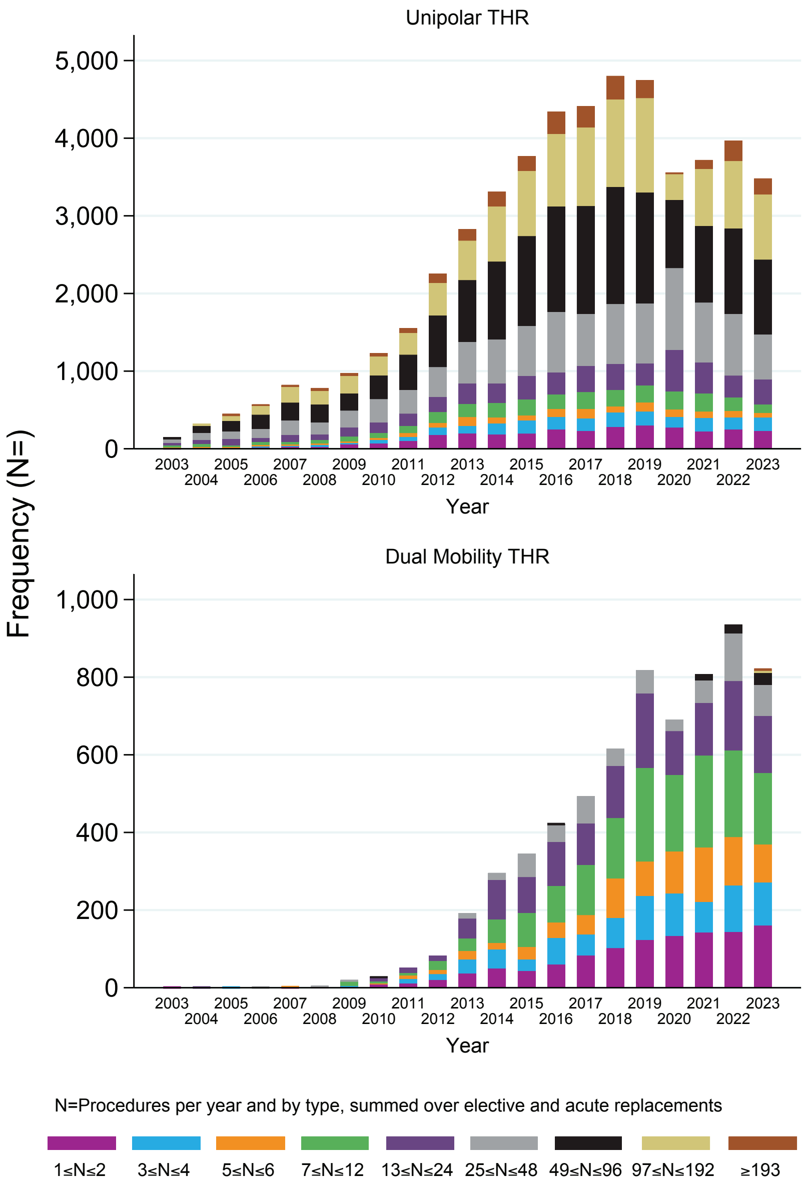
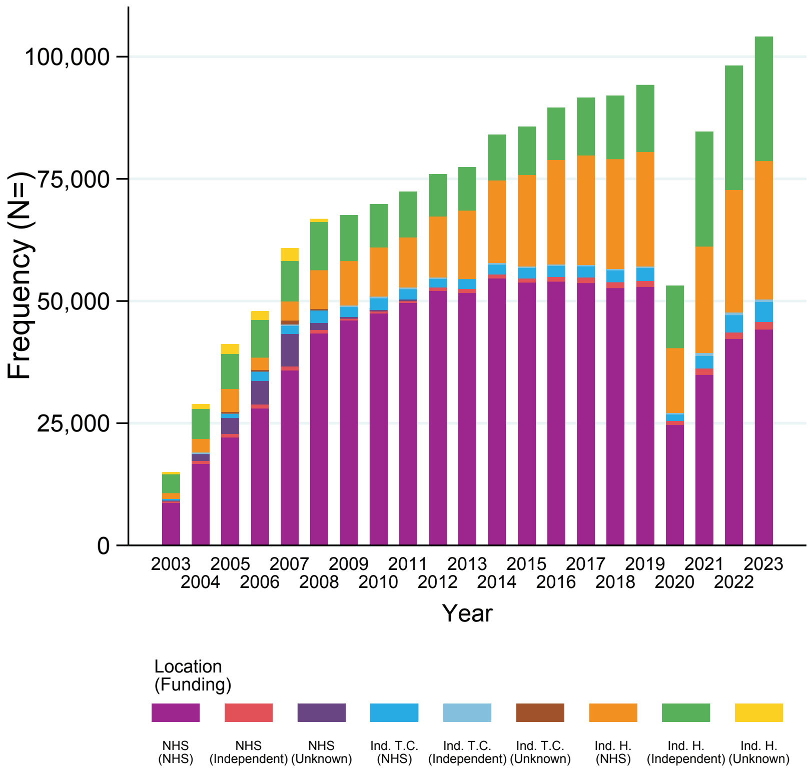


Figure 3.H1 (d) Frequency of elective primary hip replacements by funding status and organisation type, per year.



Note: Ind.=Independent; T.C.=Treatment Centre; H.=Hospital.

Figure 3.H1 (b) and Figure 3.H1 (c) (pages 30 and 31) show the yearly number of primary total hip replacements performed for elective and acute trauma indications respectively. Elective procedures have been stratified by unipolar, resurfacing and dual mobility total hip replacements. Acute trauma procedures have been stratified by unipolar and dual mobility total hip replacements. Please note the difference in scale of the y-axis between each sub-plot.

Each bar is further stratified by the volume of procedures that the consultant conducted in that year across both elective and acute trauma settings i.e. if a surgeon performed 25 elective unipolar THR procedures and 25 acute trauma unipolar procedures their annual total volume would be 50 procedures. Those 50 procedures would contribute to the black sub-division in both elective and acute trauma figures.

Figure 3.H1 (b) shows the annual rates of elective unipolar THR increasing, (with the exception of 2020 due to the COVID pandemic with rates partially recovered in 2021 and fully recovered by 2022), with the majority of additional procedures contributed by higher-volume surgeons i.e. those performing more than 49 hip procedures a year. In the acute trauma setting (Figure 3.H1 (c)) there was a rapid expansion of unipolar THRs recorded in the registry from 2011 until 2018, with a plateau in 2019 and then lower rates during the COVID pandemic, which have persisted but are partially compensated for by the volume of dual mobility THRs being performed for trauma.

Figure 3.H1 (b) also shows that after declining substantially in popularity, resurfacing has remained relatively stable over the past five years, with a slight increase in absolute numbers in 2021 and 2022. In 2023 around half of the resurfacing procedures were performed by consultants who used it in more than 25 cases per year.

Figure 3.H1 (b) and Figure 3.H1 (c) also illustrate the emerging use of dual mobility THR in the elective and acute trauma settings. Prior to 2013, dual mobility THR was relatively rare, but since 2013 its use has increased in both settings, other than in 2020 where COVID had an impact on case numbers, and it is now more common than hip resurfacing. Over half of dual mobility operations are performed by consultants who conduct 13 or more elective dual mobility hip replacements per year (seven or more for trauma cases), however, a greater proportion of dual mobility THRs are performed by lower-volume surgeons than other types of THR, in both the elective and acute trauma setting.

Figure 3.H1 (d) describes the funding status and organisation-type (based on organisation-type in 2023) of primary hip procedures collected by the NJR. The figure shows a steady increase in the number of THRs that were NHS-funded and performed in NHS hospitals from the beginning of the registry until 2014. After this time, this number plateaued up until 2019 and then reduced substantially due to the impact of COVID. The growth in the total number of THRs performed from 2014 to 2019 was largely driven by growth in the number of NHS-funded procedures being performed in independent hospitals. Although the total number of THRs performed in 2022 and 2023 have recovered to exceed 2019 levels, the recovery of NHS-funded procedures being performed in NHS hospitals is only partial with an increase in the number of NHS-funded procedures performed in independent hospitals and independently-funded procedures performed in independent hospitals accounting for the overall volume recovery.

Table 3.H2 Percentage of primary hip replacements by fixation, bearing and year.

Fixation and bearing surface	2004 n= 44,369	2005 n= 41,697	2006 n= 48,561	2007 n= 61,716	2008 n= 67,714	2009 n= 68,663	2010 n= 71,199	2011 n= 74,138	2012 n= 78,355	2013 n= 80,510	2014 n= 87,761	2015 n= 89,920	2016 n= 94,471	2017 n= 96,620	2018 n= 97,549	2019 n= 99,907	2020 n= 57,455	2021 n= 89,244	2022 n= 103,233	2023 n= 108,558
All cemented	53.2	45.7	40.0	36.9	31.6	29.6	29.2	30.0	31.7	32.1	31.1	30.1	28.6	27.4	27.2	26.1	22.8	21.7	19.2	17.1
MoP	50.3	42.6	37.1	34.3	28.9	26.9	26.0	26.5	27.7	27.6	26.3	25.0	23.4	21.9	21.7	20.2	17.1	15.3	13.1	11.3
MoM	0.2	0.1	0.2	0.2	0.1	<0.1	<0.1	0	0	0	<0.1	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1
CoP	2.7	2.9	2.7	2.4	2.5	2.6	3.1	3.3	3.8	4.3	4.5	4.6	4.7	4.9	4.9	5.1	4.7	5.2	5.0	4.7
MoPoM	0.1	0.2	<0.1	0.1	0.1	<0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.5	0.6	0.6	0.7	0.9	0.9	0.9	0.7
CoPoM	0	0	0	0	0	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	0.2	0.3
Others	0	<0.1	0	0	0	0	0	<0.1	<0.1	<0.1	0	0	0	<0.1	0	<0.1	0	<0.1	<0.1	<0.1
All uncemented	18.0	24.0	28.1	31.3	37.1	40.6	43.0	42.7	44.0	42.0	40.3	39.1	38.3	37.6	36.6	35.2	34.9	35.6	36.3	37.4
MoP	7.5	9.3	9.6	10.1	12.2	14.2	15.8	16.3	17.4	17.1	16.7	16.1	15.9	15.5	15.2	13.5	12.3	12.0	11.9	12.2
MoM	1.8	5.3	8.3	10.3	11.1	7.9	3.3	0.5	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
CoP	4.9	5.0	4.5	4.0	3.8	4.4	5.3	5.8	7.2	8.3	9.5	11.4	12.5	14.1	14.8	15.9	17.1	19.1	20.3	21.5
CoC	3.8	4.2	5.7	6.9	9.6	13.0	17.4	19.4	19.1	16.3	14.0	11.4	9.7	7.6	6.2	5.3	4.8	3.8	3.2	2.7
CoM	<0.1	<0.1	<0.1	0.1	0.4	0.9	1.0	0.5	0.1	<0.1	0	0	<0.1	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1
MoPoM	0.1	0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
CoPoM	0	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.5	0.6
Others	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	0	<0.1	0	<0.1
All hybrid	12.5	13.9	14.9	14.6	14.5	15.2	15.7	16.7	17.5	20.0	22.9	25.5	27.8	30.0	31.7	34.9	38.0	38.5	40.7	41.6
MoP	8.7	9.0	9.6	9.8	9.6	10.0	10.4	11.2	11.3	11.8	13.1	13.9	14.8	15.4	15.0	16.4	16.0	15.2	15.0	13.8
MoM	0.7	0.6	0.7	0.8	0.7	0.3	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<0.1	<0.1
CoP	1.4	1.2	1.2	1.0	1.3	1.7	1.9	2.2	3.1	5.1	7.0	8.9	10.7	12.3	14.4	16.1	19.4	20.9	23.2	25.4
CoC	1.7	2.7	3.2	3.0	2.7	2.9	2.9	3.1	2.9	2.7	2.4	2.1	1.6	1.4	1.0	0.9	0.7	0.5	0.4	0.3
MoPoM	0.1	0.4	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.3	0.4	0.6	0.6	0.8	0.9	1.1	1.4	1.2	1.2	1.2
CoPoM	0	0	0	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.4	0.5	0.6	0.8	0.9
Others	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes:
Data from 2003 have been included in 2004 since 2003 was not a complete year. Percentages are calculated as a percentage of total yearly operations.
A zero represents no procedures by this bearing type.

Table 3.H2 (continued)

Fixation and bearing surface	2004 n= 44,369	2005 n= 41,697	2006 n= 48,561	2007 n= 61,716	2008 n= 67,714	2009 n= 68,663	2010 n= 71,199	2011 n= 74,138	2012 n= 78,355	2013 n= 80,510	2014 n= 87,761	2015 n= 89,920	2016 n= 94,471	2017 n= 96,620	2018 n= 97,549	2019 n= 99,907	2020 n= 57,455	2021 n= 89,244	2022 n= 103,233	2023 n= 108,558
All reverse hybrid	0.7	0.9	1.0	1.6	2.4	2.6	2.7	3.0	3.1	3.0	3.1	3.2	3.2	3.2	2.9	2.4	2.2	2.4	2.2	2.3
MoP	0.5	0.6	0.8	1.0	1.6	1.8	1.9	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.0	1.6	1.4	1.4	1.3	1.2
CoP	0.2	0.2	0.2	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.0	1.0	0.9	0.8	0.7	0.7	0.9	0.9	1.0
MoPoM	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.1	0.1
Others	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
All resurfacing	10.0	10.3	10.3	9.7	8.3	6.1	3.6	2.4	1.4	1.1	1.0	0.9	0.8	0.7	0.6	0.6	0.9	0.8	0.7	0.6
MoM	10.0	10.3	10.3	9.7	8.3	6.1	3.6	2.4	1.4	1.1	1.0	0.9	0.8	0.6	0.5	0.6	0.8	0.7	0.7	0.6
CoC	0	0	0	0	0	0	0	0	0	0	0	0	0	<0.1	0.1	0	0.1	0.1	<0.1	<0.1
MoP	0	<0.1	<0.1	<0.1	0	0	0	0	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0
Unconfirmed	5.4	5.2	5.6	5.8	6.2	5.9	5.8	5.2	2.3	1.9	1.6	1.3	1.3	1.0	0.9	0.9	1.1	1.0	0.9	1.0
All	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:
Data from 2003 have been included in 2004 since 2003 was not a complete year. Percentages are calculated as a percentage of total yearly operations.
A zero represents no procedures by this bearing type.

Table 3.H2 (page 34) shows the annual rates by fixation and bearing groups for each year for primary hip replacements. Hybrid fixation is the most common, accounting for 41.6% of all primary hip replacements undertaken in 2023. The percentage of hybrid implants used has increased by more than 2.5 times between 2006 and 2023, whilst the proportion of all hips that are cemented has more than halved, to 17.1% over the same period. The percentage of uncemented implants used increased from 18% to 42.7% in the first nine years of the registry, but then steadily declined to 35.2% over the next eight years, before plateauing and then rising slightly in the latest figures (Figure 3.H2 (a)). Ceramic-on-polyethylene hybrid THR was the most common type in 2023, being used in 25.4% of cases, but ceramic-on-polyethylene uncemented THR is nearly as popular, accounting for 21.5% of cases.

Figure 3.H2 (a) Primary hip type percentages by year of replacement.

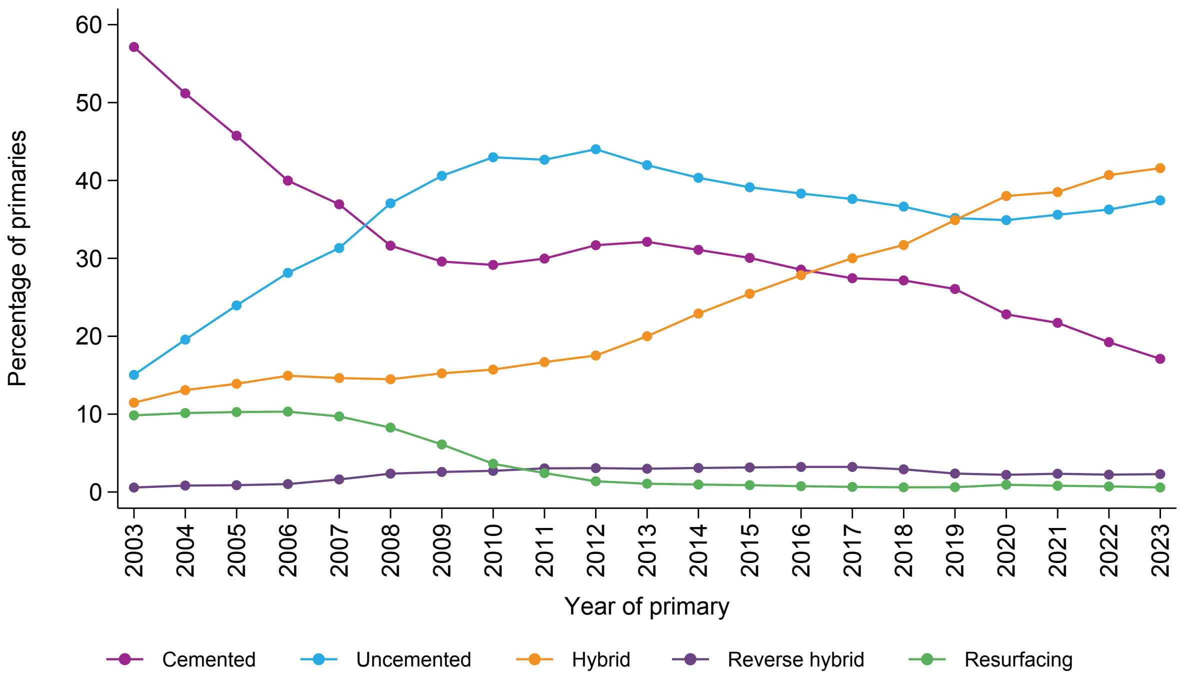


Figure 3.H2 (b) Primary hip type percentages by year of replacement, with dual mobility as a separate category.

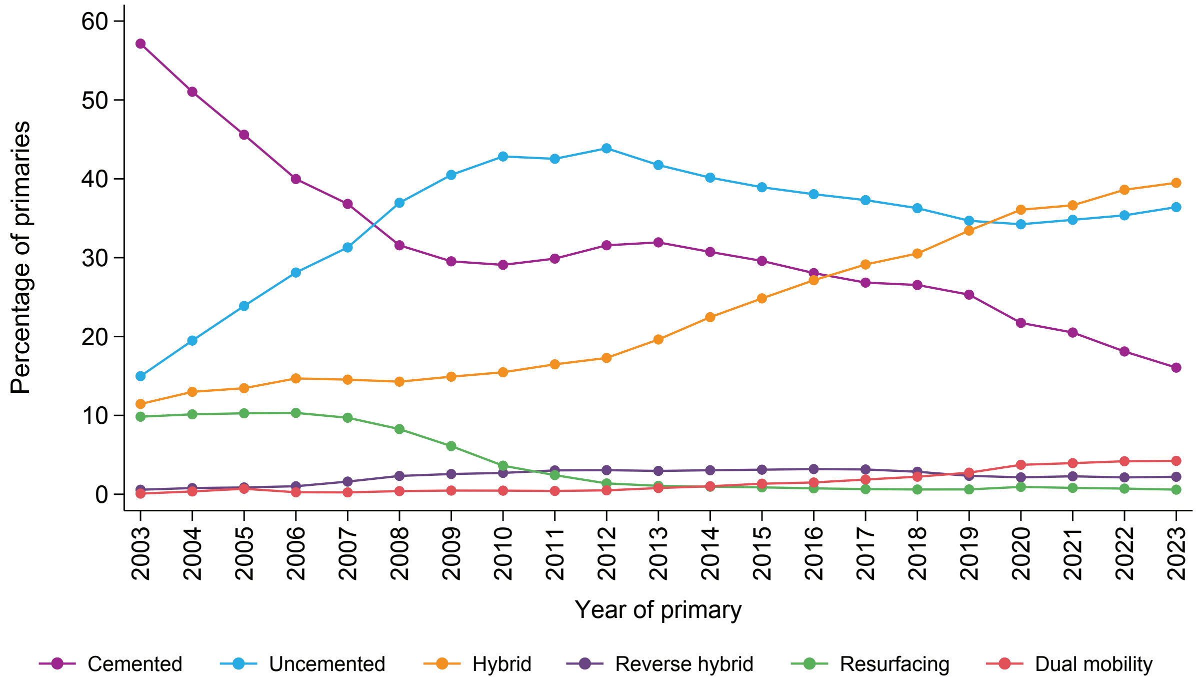
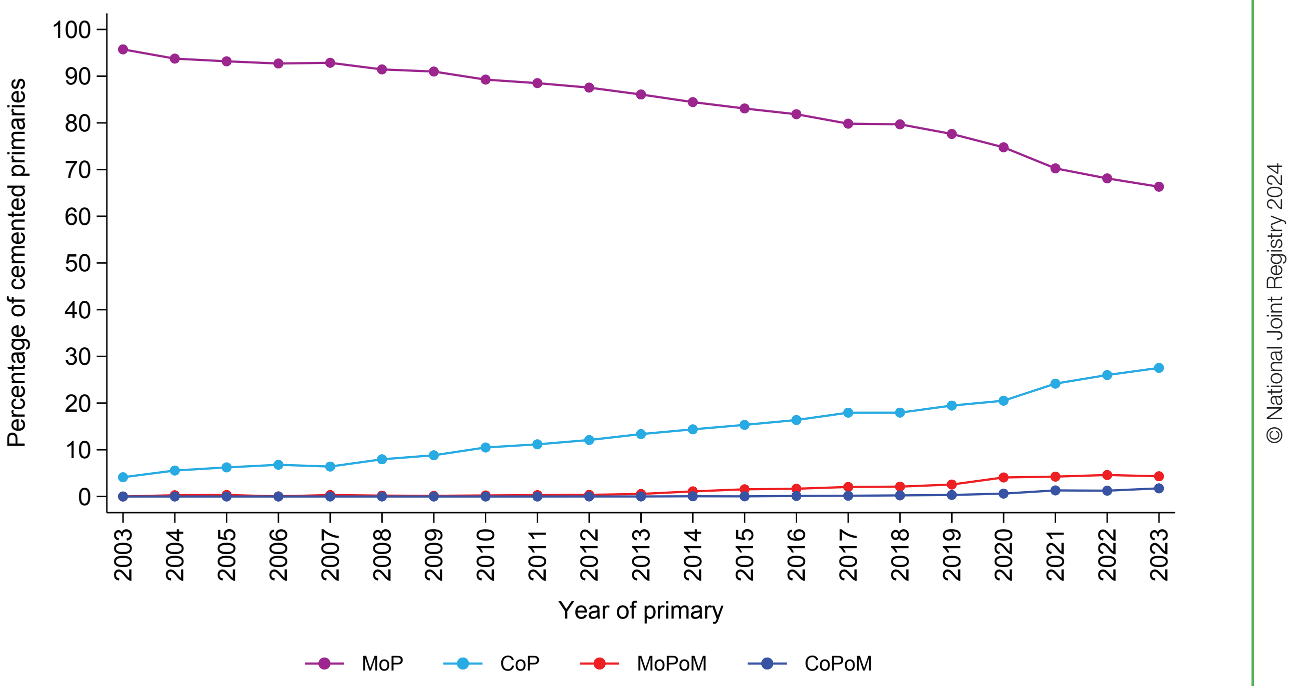


Figure 3.H3 (a) Cemented primary hip replacement bearing surface by year.



Figures 3.H3 (a) to (d) illustrate the temporal changes in the bearing surface combinations used with the type of total hip replacement fixation. Groups that contain more than 500 procedures are plotted separately. Since 2012 there has been a steady increase in the use of ceramic-on-polyethylene bearings. The greatest variation in bearing use over time is noted in the uncemented fixation group.

Figure 3.H3 (b) Uncemented primary hip replacement bearing surface by year.

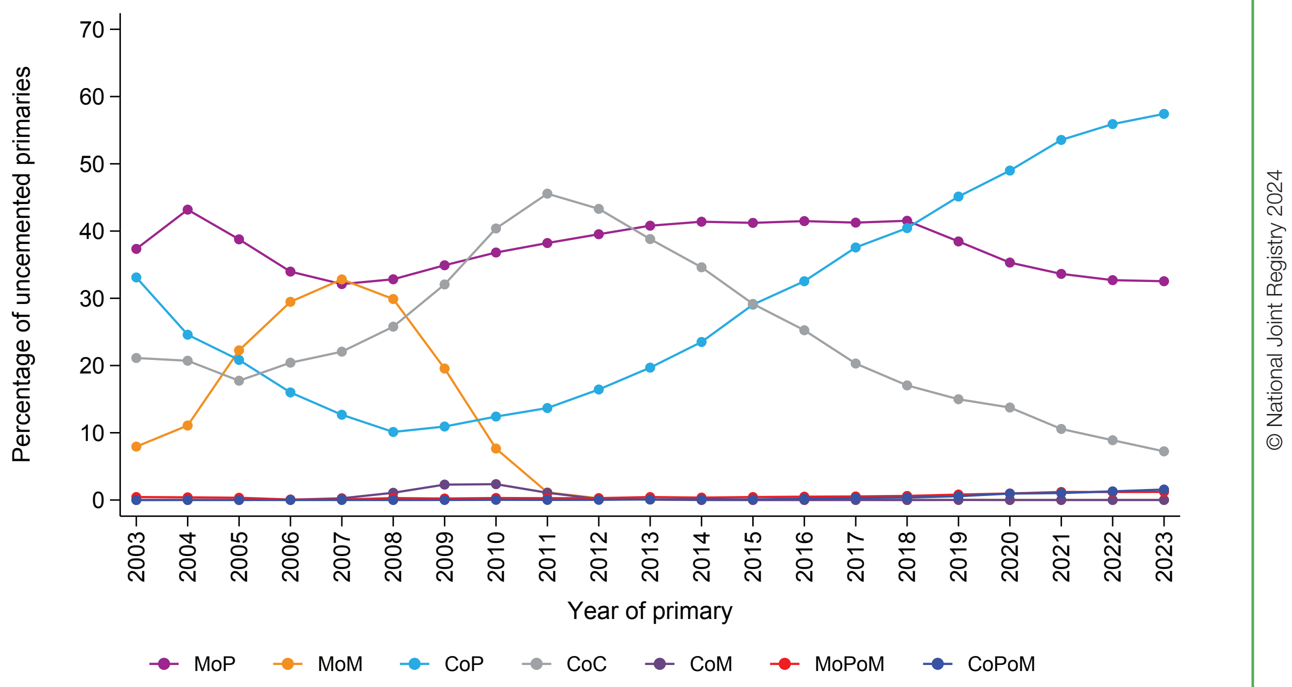


Figure 3.H3 (c) Hybrid primary hip replacement bearing surface by year.

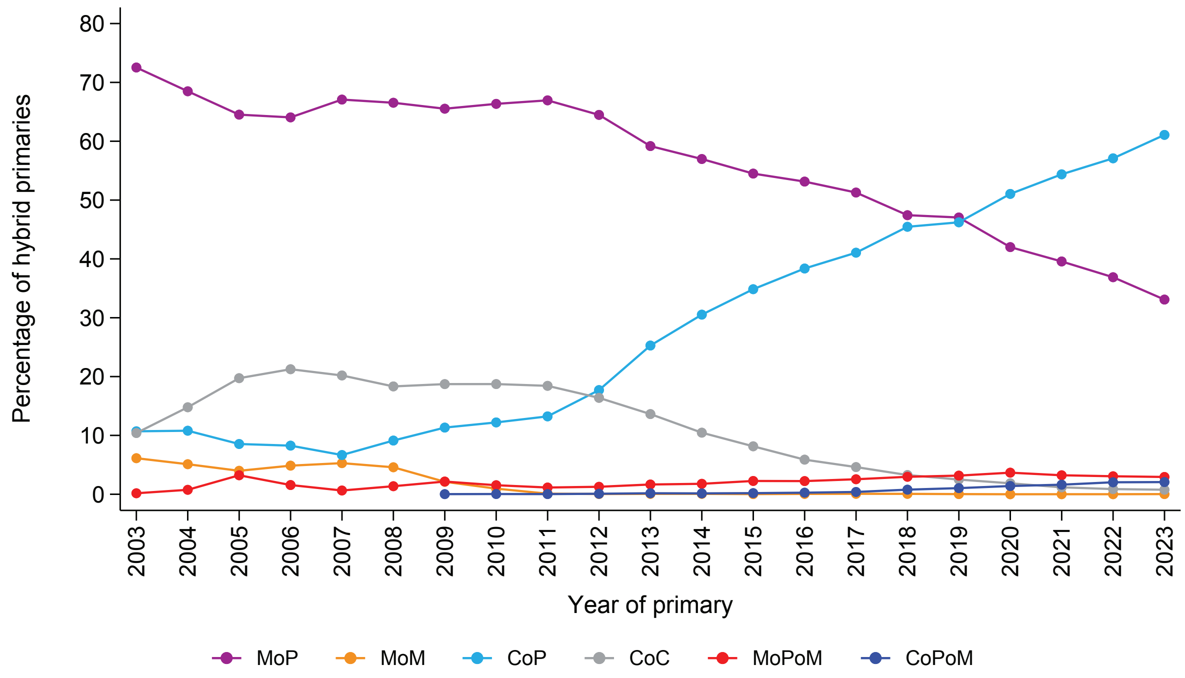


Figure 3.H3 (d) Reverse hybrid primary hip replacement bearing surface by year.

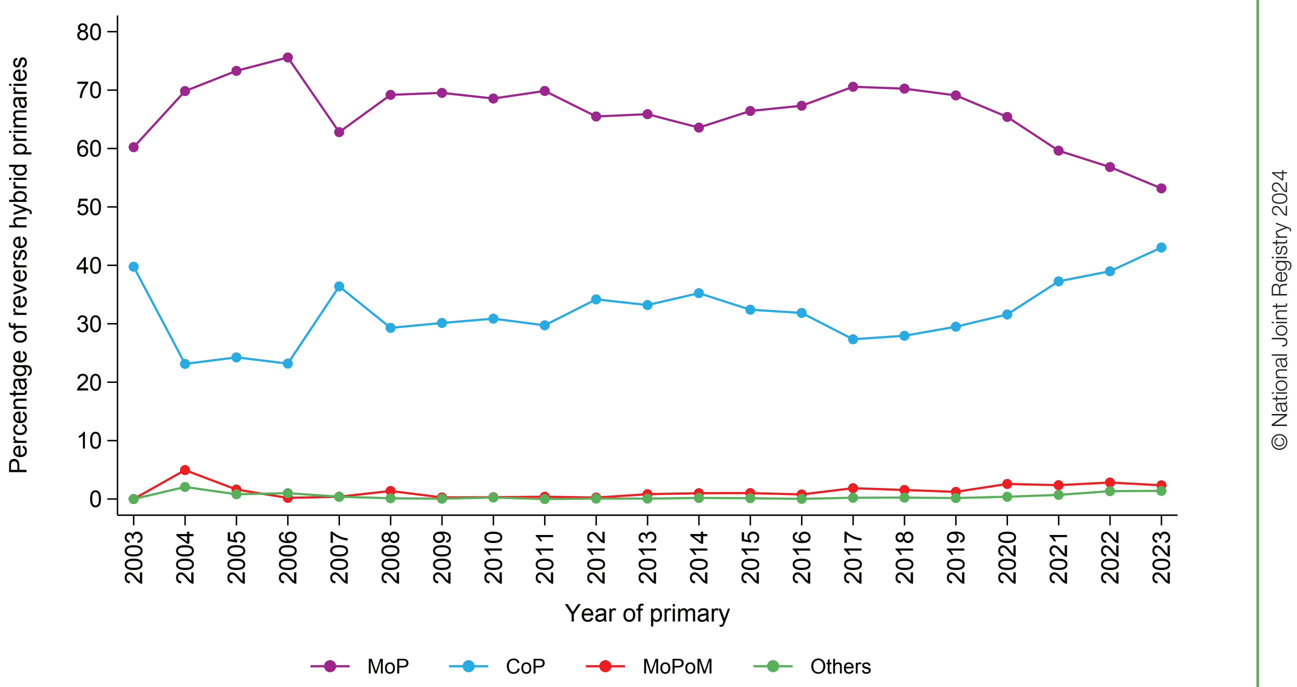
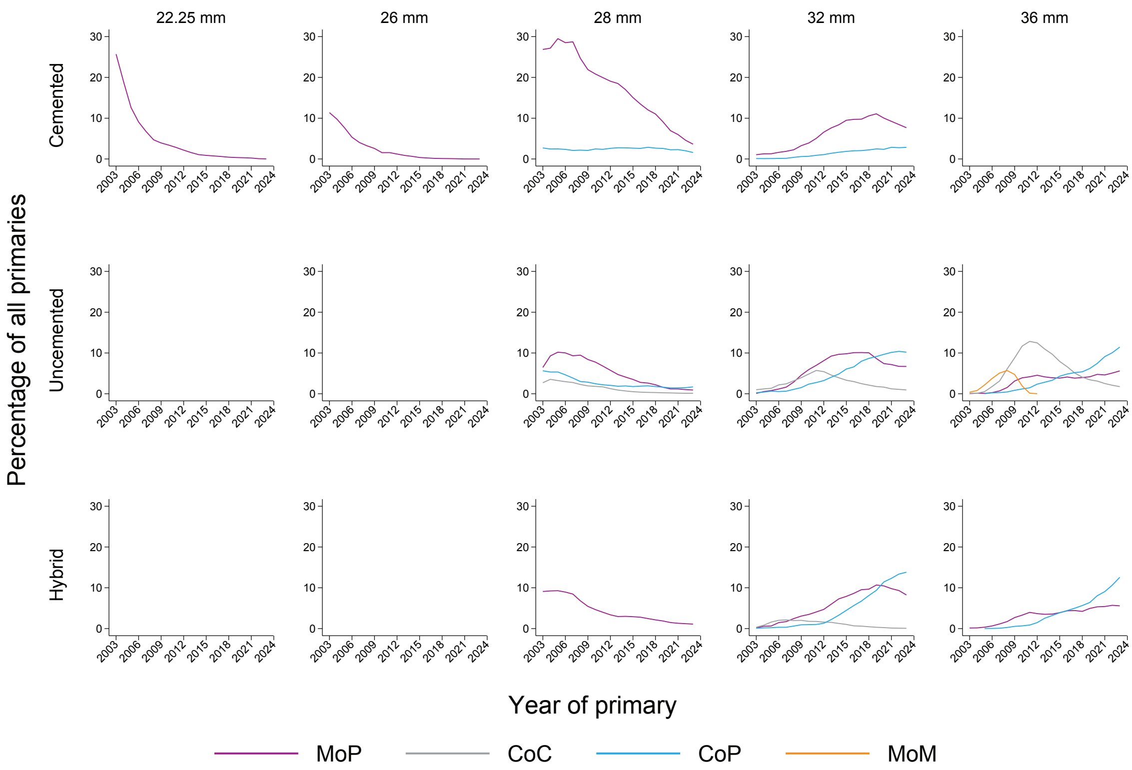


Figure 3.H3 (e) Trends in fixation, bearing and head size in primary unipolar total hip replacement by year.



Note: Only combinations with ≥2% use in any year are plotted.

Figure 3.H3 (e) illustrates the temporal changes in common head sizes, by method of fixation and bearing type in primary unipolar total hip replacement. In 2003, the vast majority of hip replacements utilised heads of 28mm or smaller, across all fixation methods. Since 2003, a progressive shift away from small (22.25mm or 26mm) heads in cemented hip replacements to larger head sizes (>28mm) with alternative fixation methods (uncemented or hybrid) has been observed.

In 2023, as in 2022, the three most common head sizes are 32mm (1st), 36mm (2nd) and 28mm (3rd), with 22.25mm and 26mm rarely (<1000) being used. Only ten cases of 26mm head usage were recorded for 2023. The use of ceramic-on-ceramic bearings across all head sizes, but most notably 36mm, has declined since 2011. This decline, conversely, corresponds with an increase in ceramic-on-polyethylene bearings with 32mm heads. The choice of bearing, head size and fixation method was much more heterogeneous in 2023 compared to 2003. The dominant choices in 2023 were 32mm and 36mm ceramic-on-polyethylene bearings.

Table 3.H3 (page 43) provides a breakdown by fixation type and bearing surface, describing the age and sex profile of recipients of primary hip replacements. Patients receiving resurfacing and ceramic-on-ceramic bearings tended to be younger and those receiving metal-on-polyethylene-on-metal dual mobility bearings tended to be older than those in the other groups. Those receiving resurfacings were more likely to be younger males.

Table 3.H3 Age at primary hip replacement by fixation and bearing.

Fixation and bearing surface	N	Age (years) Median (IQR*)	Age (years) Mean (SD)	Male (%)
All cases	**1,561,640**	**69 (61 to 76)**	**68.2 (11.4)**	**40.2**
All cemented	**451,547**	**74 (68 to 80)**	**73.3 (9.1)**	**33.2**
MoP	378,851	75 (70 to 80)	74.6 (8.1)	32.6
MoM	427	72 (65 to 78)	71.4 (9.5)	33.3
CoP	64,504	66 (59 to 73)	65.5 (10.5)	36.8
MoPoM	6,599	77 (71 to 83)	75.9 (10.2)	29.2
CoPoM	1,151	75 (67 to 82)	73.7 (11.0)	31.4
Others	15	64 (45 to 76)	58.8 (17.7)	46.7
All uncemented	**578,399**	**65 (58 to 72)**	**64.3 (11.3)**	**45.5**
MoP	217,547	70 (64 to 76)	69.7 (9.6)	42.0
MoM	29,197	63 (56 to 70)	62.8 (11.2)	50.8
CoP	180,323	63 (57 to 70)	62.8 (10.1)	47.4
CoC	143,495	60 (52 to 66)	58.5 (11.3)	47.4
CoM	2,133	63 (56 to 69)	62.1 (10.6)	41.5
MoPoM	3,318	72 (63 to 79)	70.0 (12.5)	35.9
CoPoM	2,279	62 (53 to 71)	61.7 (13.2)	51.5
Others	107	61 (52 to 69)	59.6 (13.7)	45.8
All hybrid	**408,753**	**71 (63 to 77)**	**69.5 (10.8)**	**37.2**
MoP	202,851	74 (69 to 79)	73.6 (8.5)	34.6
MoM	2,289	64 (56 to 73)	63.9 (12.2)	47.7
CoP	161,571	67 (59 to 73)	65.9 (10.6)	40.0
CoC	28,101	60 (53 to 66)	59.1 (11.3)	40.7
MoPoM	10,256	76 (69 to 81)	74.2 (10.3)	32.5
CoPoM	3,565	71 (61 to 78)	68.9 (12.3)	41.7
Others	120	68 (59 to 73)	66.1 (12.2)	45.0
All reverse hybrid	**39,653**	**70 (64 to 76)**	**69.7 (9.7)**	**37.3**
MoP	26,103	73 (68 to 78)	72.9 (7.9)	36.0
CoP	12,898	64 (58 to 69)	63.1 (9.5)	40.1
MoPoM	509	74 (66 to 81)	72.2 (12.3)	32.4
Others	143	65 (53 to 76)	64.8 (13.8)	42.0
All resurfacing	**42,703**	**55 (48 to 60)**	**53.8 (9.2)**	**74.4**
MoM	42,313	55 (48 to 60)	53.8 (9.2)	74.6
CoC	266	53 (47 to 59)	52.4 (9.2)	69.9
MoP	124	56 (49 to 63)	55.4 (11.6)	23.4
Unconfirmed	**40,585**	**69 (61 to 77)**	**67.8 (12.3)**	**38.9**

Notes:
*IQR=interquartile range.

Table 3.H4 Primary hip replacement patient demographics.

		Male N (%)		Female N (%)		All N (%)
Total		**627,134**		**934,506**		**1,561,640**
ASA 1		104,194 (16.6)		120,236 (12.9)		224,430 (14.4)
ASA 2		410,000 (65.4)		649,505 (69.5)		1,059,505 (67.8)
ASA 3		108,637 (17.3)		159,673 (17.1)		268,310 (17.2)
ASA 4		4,228 (0.7)		4,982 (0.5)		9,210 (0.6)
ASA 5		71 (<0.1)		105 (<0.1)		176 (<0.1)
Osteoarthritis as the sole reason for primary		560,707 (89.4)		812,133 (86.9)		1,372,840 (87.9)
Osteoarthritis as a reason for primary		579,947 (92.5)		844,267 (90.3)		1,424,214 (91.2)
Age	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
	66.7 (11.6)	68 (60 to 75)	69.2 (11.1)	71 (63 to 77)	68.2 (11.4)	69 (61 to 76)

Table 3.H4 shows the American Society of Anesthesiologists (ASA) grade and indication for primary hip replacement by sex. A greater number of females than males undergo primary hip replacement and two-thirds of patients are ASA grade 2. Only a small number of patients with a grade greater than ASA 3 undergo a primary hip replacement.

The majority of cases are performed for osteoarthritis. A total of 1,372,840 (87.9%) primary hip replacements have been recorded in the registry where the sole indication was osteoarthritis.

3.H.2 First revisions after primary hip surgery

A total of 47,090 first revisions of a hip replacement have been linked to a previous primary hip replacement recorded in the registry between 2003 and 2023. Figures 3.H4 (a) and (b) (page 46) illustrate temporal changes in the overall revision rates using Kaplan-Meier estimates; procedures have been grouped by the year of the primary operation. Figure 3.H4 (a) plots each Kaplan-Meier survival curve with a common origin, i.e. time zero is equal to the year of operation. This illustrates that revision rates increased between 2003 and 2007/8 and then declined between 2007/8 and 2023.

Figure 3.H4 (a) KM estimates of cumulative revision by year, in primary hip replacements.

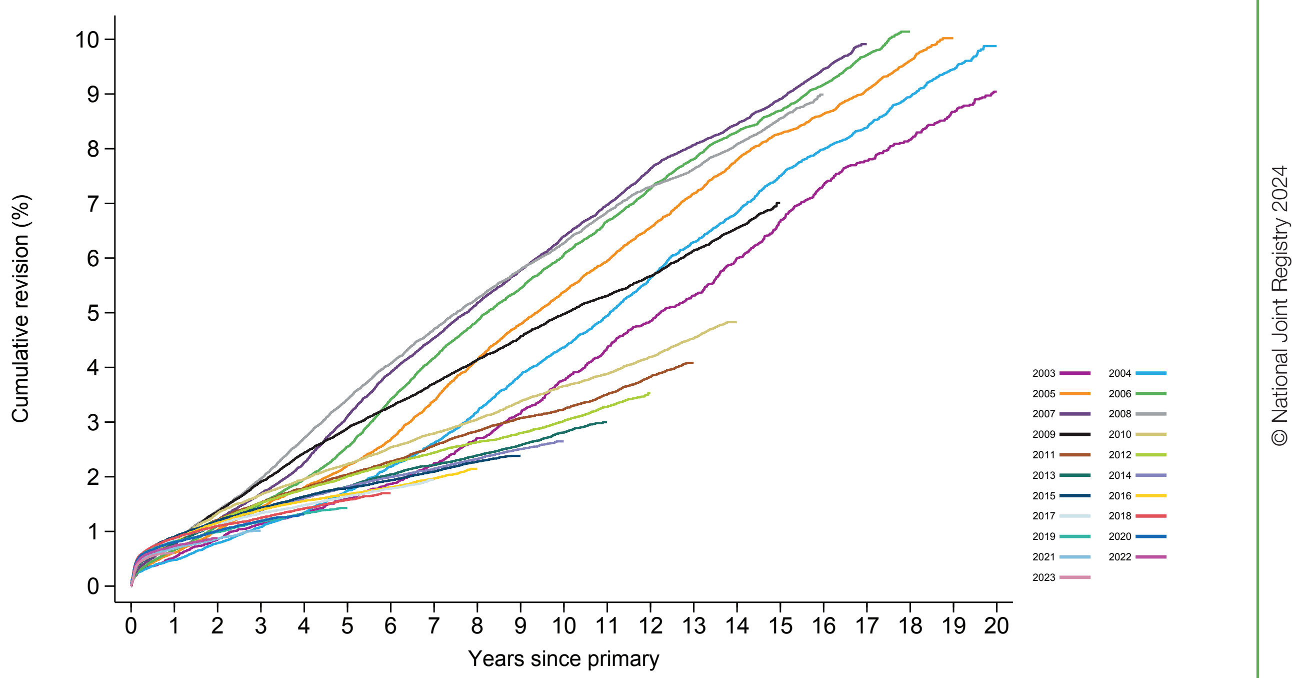


Figure 3.H4 (b) KM estimates of cumulative revision by year, in primary hip replacements plotted by year of primary.

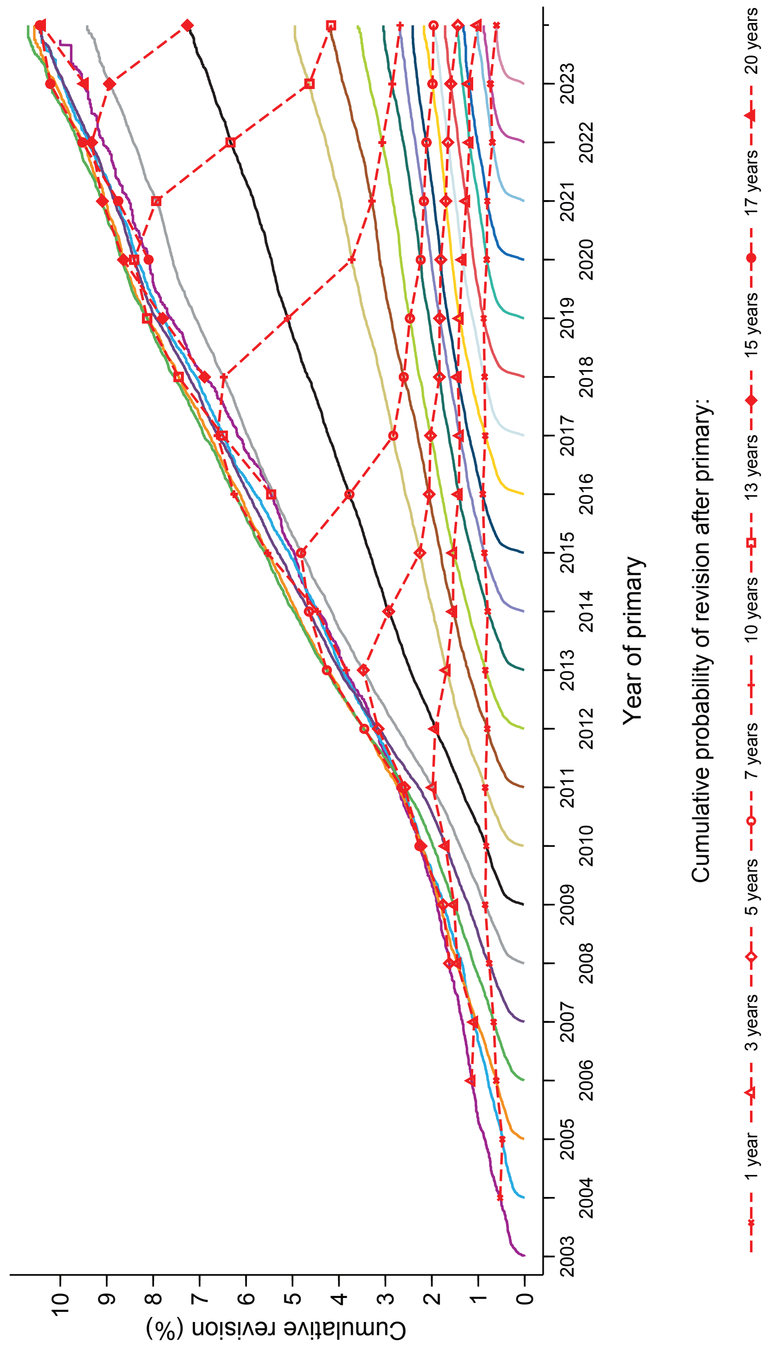


Figure 3.H4 (c) KM estimates of cumulative revision by year, in primary hip replacements (excluding metal-on-metal bearings) plotted by year of primary.

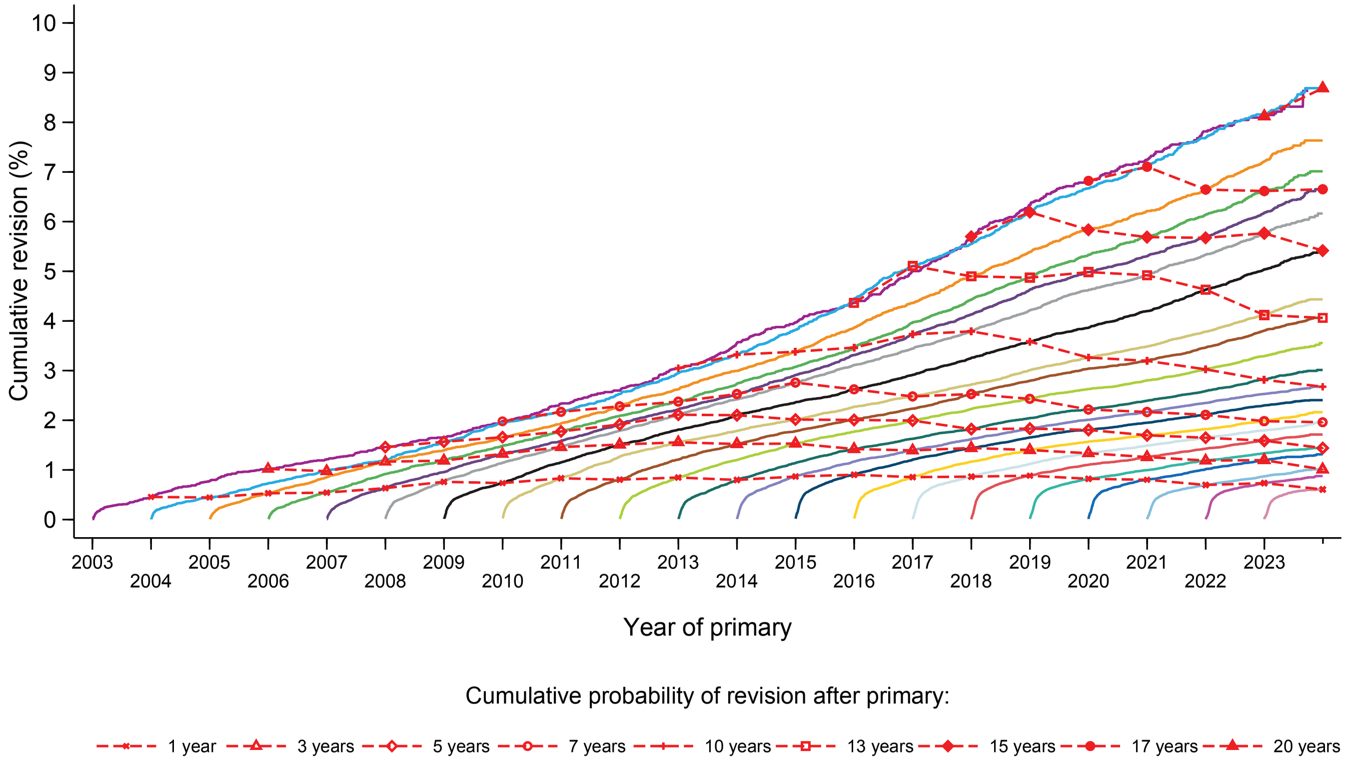


Figure 3.H4 (b) shows the same curves plotted against calendar time, where the origin of each curve is the year of operation. In addition, we have highlighted the revision rate at 1, 3, 5, 7, 10, 13, 15, 17 and 20 years. Figure 3.H4 (b) separates each year, enabling changes in revision estimates over time to be clearly identified. If revision surgery and timing of revision surgery were static across time, it would be expected that all the revision curves would be the same shape and equally spaced; departures from this indicate a change in the number and timing of revision procedures. It is also very clear that the 3, 5, 7, 10, 13 and 15-year rate of revision increases for operations occurring between 2003 and 2007 and then reduces for operations occurring between 2008 and 2023. The early increases may be partly a result of under-reporting in the earlier years of the registry as this wasn't mandatory at that time but is also contributed to by the usage of metal-on-metal bearings, which peaked in 2008 and then fell (see Table 3.H2 on page 34).

A similar pattern, although smaller in effect, is also observed in knees. Knees were not affected by the high revision rates of metal-on-metal bearings, and thus the decreases observed since 2009 indicate a broader improvement in revision outcomes overall. It appears that this secular decline in revision rate is still ongoing. This improvement suggests the adoption of evidence-based practice to which the NJR's Clinician Feedback reporting has contributed. For example, for a primary hip replacement performed in 2012, the 10 year revision estimate is 3.0% (95% CI 2.9-3.2) which is below the current NICE recommended threshold of 5% at ten years (NICE, 2014). Prior to 2014, the revision threshold recommended by NICE was 10% at ten years.

Figure 3.H4 (c) illustrates the removal of all primary hips with a metal-on-metal bearing from Figure 3.H4 (b). The comparison between these charts illustrates the burden of revision which can be attributed to the revision of metal-on-metal bearings. We observe a secular decline in the rate of revision in the 3, 5, 7, 10 and 13-year revision estimates originating in 2008-2009 through to the present day which excludes the effect of metal-on-metal bearings.

Table 3.H5 (page 49) provides Kaplan-Meier estimates of the cumulative percentage probability of first revision for any cause, firstly for all cases combined and then by type of fixation and by bearing surface within each fixation group. The table shows updated estimates at 1, 3, 5, 10, 15 and 20 years from the primary operation together with 95% Confidence Intervals (95% CI). Estimates in blue italics indicate time points where 250 or fewer cases remained at risk, meaning that the estimates are less reliable and should be treated with some caution. Kaplan-Meier estimates are not shown at all when the numbers at risk fell below ten cases.

Further revisions in the blue-italicised groups would be unlikely (due to such small numbers at risk) and, when they do occur, they may appear to have a disproportionate impact on the Kaplan-Meier estimate, i.e. the step upwards may seem disproportionately large. Furthermore, the upper 95% CI at these time points may be underestimated. Although a number of statistical methods have been proposed to deal with this, they typically give different values and as yet, there is no clear consensus for the large datasets presented here.

The revision rate of metal-on-polyethylene-on-metal dual mobility bearings appears higher, up to five years across all fixation types, than that of most of the unipolar bearing combinations, except metal-on-metal and ceramic-on-metal. The ceramic-on-polyethylene-on-metal dual mobility bearings show lower revision estimates for cemented and uncemented THRs than the metal-on-polyethylene-on-metal combinations, but with overlapping confidence intervals. The currently relatively small numbers at risk in the dual mobility groups make it difficult to draw firm conclusions. The 1- and 3-year revision rates for ceramic-on-ceramic resurfacing appear similar to those for metal-on-metal resurfacing which are generally higher than for other unipolar variants. The revision rates at five years appear lower, but the numbers at risk at all time points in the ceramic-on-ceramic resurfacing group are low, so this report should be interpreted with caution.

https://www.nice.org.uk/guidance/ta304

Table 3.H5 KM estimates of cumulative revision (95% CI) by fixation and bearing, in primary hip replacements. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Fixation and bearing surface	N	Time since primary: 1 year	3 years	5 years	10 years	15 years	20 years
All cases*	**1,561,640**	**0.79 (0.78-0.81)**	**1.42 (1.40-1.44)**	**2.00 (1.97-2.02)**	**3.74 (3.70-3.78)**	**6.02 (5.95-6.09)**	**8.45 (8.26-8.63)**
All cases* (excluding MoM)	**1,487,382**	**0.78 (0.76-0.79)**	**1.32 (1.30-1.34)**	**1.74 (1.72-1.76)**	**2.94 (2.91-2.98)**	**4.86 (4.79-4.93)**	**7.08 (6.89-7.28)**
All cemented	**451,547**	**0.58 (0.56-0.60)**	**1.08 (1.05-1.11)**	**1.49 (1.45-1.52)**	**2.76 (2.70-2.82)**	**4.94 (4.82-5.06)**	**7.33 (7.03-7.65)**
MoP	378,851	0.58 (0.56-0.61)	1.09 (1.06-1.13)	1.51 (1.46-1.55)	2.82 (2.75-2.88)	5.03 (4.91-5.16)	7.44 (7.13-7.77)
MoM	427	0.95 (0.36-2.51)	1.99 (1.00-3.94)	2.81 (1.56-5.03)	6.03 (3.96-9.13)	*8.05 (5.51-11.68)*	
CoP	64,504	0.53 (0.47-0.59)	0.93 (0.85-1.01)	1.29 (1.20-1.39)	2.25 (2.10-2.41)	4.07 (3.75-4.42)	*6.32 (5.44-7.34)*
MoPoM	6,599	0.90 (0.69-1.17)	1.62 (1.31-2.01)	2.37 (1.94-2.90)	4.30 (3.19-5.79)	*8.31 (5.41-12.66)*	
CoPoM	1,151	0.56 (0.25-1.24)	0.85 (0.42-1.71)	*0.85 (0.42-1.71)*			
Others	15**	*0*	*0*	*0*			
All uncemented	**578,399**	**0.92 (0.89-0.94)**	**1.63 (1.60-1.66)**	**2.30 (2.26-2.34)**	**4.24 (4.18-4.31)**	**6.60 (6.48-6.71)**	**8.96 (8.64-9.30)**
MoP	217,547	0.97 (0.93-1.02)	1.55 (1.49-1.60)	1.93 (1.87-2.00)	3.21 (3.12-3.31)	5.41 (5.21-5.61)	8.26 (7.63-8.95)
MoM	29,197	1.08 (0.97-1.21)	3.50 (3.29-3.72)	7.71 (7.40-8.02)	17.76 (17.30-18.22)	22.50 (21.99-23.03)	*25.51 (24.38-26.69)*
CoP	180,323	0.77 (0.73-0.81)	1.24 (1.18-1.29)	1.59 (1.52-1.66)	2.49 (2.38-2.59)	3.95 (3.73-4.19)	5.51 (4.95-6.13)
CoC	143,495	0.95 (0.90-1.00)	1.71 (1.64-1.78)	2.20 (2.12-2.28)	3.27 (3.17-3.37)	4.61 (4.45-4.78)	6.17 (5.72-6.65)
CoM	2,133	0.61 (0.36-1.05)	2.81 (2.19-3.62)	4.88 (4.03-5.90)	8.48 (7.34-9.79)	*12.34 (10.79-14.09)*	
MoPoM	3,318	2.06 (1.62-2.61)	2.74 (2.20-3.41)	3.00 (2.42-3.73)	3.87 (3.00-4.99)	*10.77 (7.31-15.73)*	
CoPoM	2,279	1.01 (0.66-1.53)	2.01 (1.39-2.89)	2.21 (1.51-3.21)	*2.21 (1.51-3.21)*		
Others	107**	*2.80 (0.91-8.44)*	*5.69 (2.60-12.23)*	*6.69 (3.25-13.54)*	*12.63 (7.32-21.31)*	*12.63 (7.32-21.31)*	
All hybrid	**408,753**	**0.78 (0.75-0.81)**	**1.25 (1.22-1.29)**	**1.66 (1.62-1.71)**	**2.86 (2.78-2.93)**	**4.46 (4.31-4.60)**	**6.32 (5.92-6.73)**
MoP	202,851	0.84 (0.80-0.88)	1.32 (1.27-1.38)	1.74 (1.68-1.80)	2.88 (2.78-2.98)	4.36 (4.17-4.55)	6.36 (5.79-6.97)
MoM	2,289	0.57 (0.33-0.98)	2.61 (2.03-3.37)	5.94 (5.02-7.02)	16.66 (15.08-18.39)	22.10 (20.25-24.10)	*25.52 (23.16-28.07)*
CoP	161,571	0.72 (0.68-0.77)	1.14 (1.08-1.19)	1.44 (1.37-1.51)	2.19 (2.07-2.32)	3.43 (3.09-3.80)	*5.21 (4.32-6.27)*
CoC	28,101	0.62 (0.53-0.71)	1.10 (0.99-1.23)	1.56 (1.42-1.72)	2.67 (2.47-2.88)	4.07 (3.78-4.39)	*5.26 (4.64-5.96)*
MoPoM	10,256	1.06 (0.88-1.28)	1.53 (1.30-1.82)	1.87 (1.59-2.20)	3.03 (2.49-3.68)	*5.85 (4.49-7.60)*	
CoPoM	3,565	0.86 (0.59-1.24)	1.55 (1.10-2.17)	1.88 (1.33-2.64)	*1.88 (1.33-2.64)*		
Others	120**	*3.47 (1.32-8.98)*	*3.47 (1.32-8.98)*	*3.47 (1.32-8.98)*	*3.47 (1.32-8.98)*		

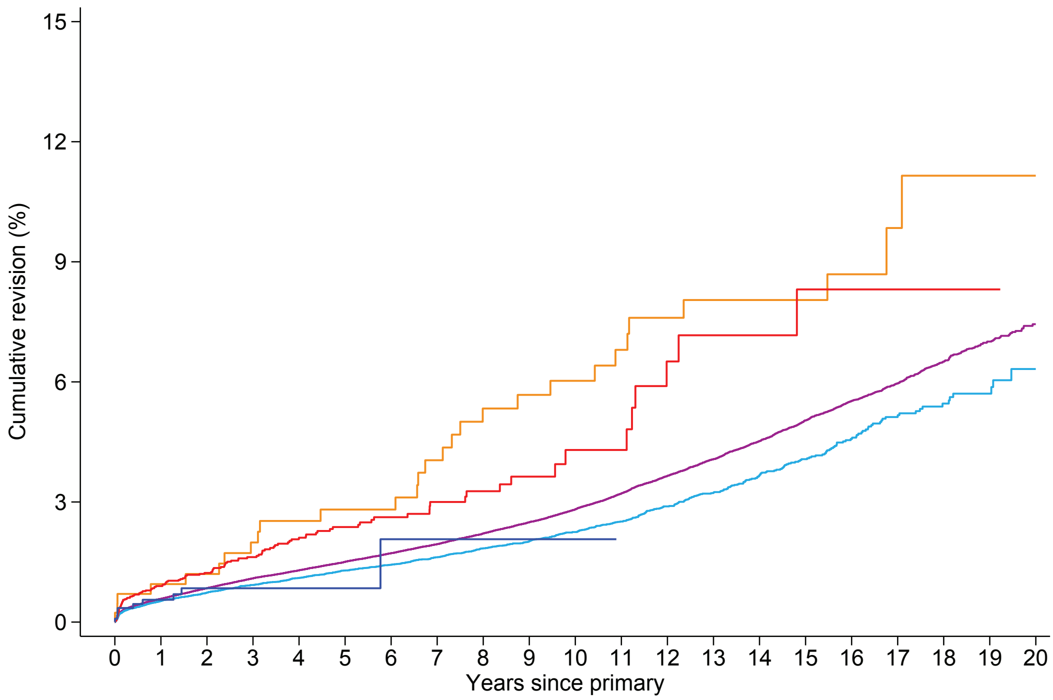
Notes:
*Includes 40,585 with unconfirmed fixation/bearing surface; ** Wide CI because estimates are based on a small group size.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.

Table 3.H5 (continued)

Fixation and bearing surface	N	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
All reverse hybrid	**39,653**	**0.81 (0.72-0.90)**	**1.39 (1.27-1.52)**	**1.85 (1.71-1.99)**	**3.15 (2.93-3.39)**	**5.66 (5.15-6.22)**	*8.74 (7.09-10.75)*
MoP	26,103	0.83 (0.73-0.95)	1.37 (1.23-1.52)	1.81 (1.65-1.99)	3.23 (2.95-3.53)	6.18 (5.48-6.97)	*10.16 (7.66-13.41)*
CoP	12,898	0.74 (0.61-0.91)	1.43 (1.23-1.66)	1.86 (1.62-2.13)	2.93 (2.58-3.32)	4.74 (4.06-5.54)	*6.01 (4.65-7.75)*
MoPoM	509	1.22 (0.55-2.70)	1.78 (0.88-3.55)	*3.99 (2.25-7.03)*	*7.95 (4.08-15.18)*	*7.95 (4.08-15.18)*	
Others	143**	*0.72 (0.10-5.00)*	*0.72 (0.10-5.00)*	*2.56 (0.57-11.13)*	*2.56 (0.57-11.13)*	*8.65 (2.07-32.38)*	
All resurfacing	**42,703**	**1.18 (1.09-1.29)**	**2.89 (2.73-3.05)**	**5.02 (4.81-5.24)**	**9.95 (9.65-10.25)**	**13.08 (12.74-13.44)**	**15.74 (15.20-16.30)**
MoM	42,313	1.18 (1.08-1.29)	2.88 (2.73-3.05)	5.02 (4.81-5.24)	9.95 (9.66-10.26)	13.09 (12.74-13.44)	15.75 (15.21-16.31)
CoC	266	*1.16 (0.38-3.55)*	*3.06 (1.45-6.41)*	*3.06 (1.45-6.41)*			
MoP	124**	*1.61 (0.41-6.29)*	*4.42 (1.85-10.35)*	*4.42 (1.85-10.35)*			

Notes:
*Includes 40,585 with unconfirmed fixation/bearing surface; ** Wide CI because estimates are based on a small group size.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.

Figure 3.H5 KM estimates of cumulative revision in cemented primary hip replacements by bearing.
Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.

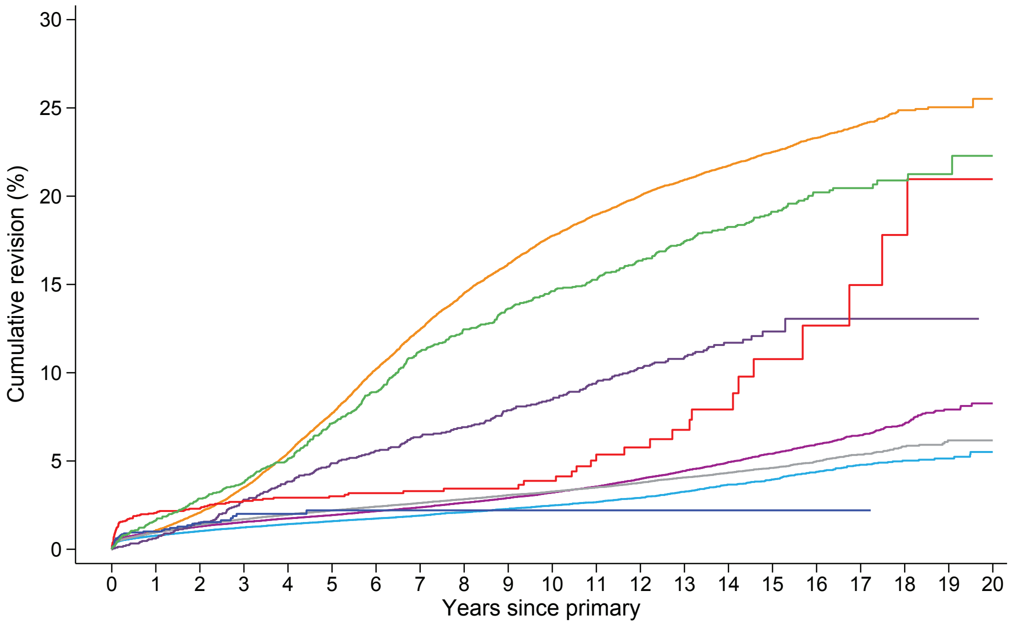


Key: Numbers at risk

Key	0	2	4	6	8	10	12	14	16	18	20
MoP	378,851	334,524	291,510	232,353	175,511	123,414	81,025	50,511	27,758	11,639	1,957
MoM	427	383	350	323	287	255	*213*	*178*	*120*	*33*	*<4*
CoP	64,504	52,770	44,168	33,586	24,120	16,061	9,806	5,679	2,985	1,256	*143*
MoPoM	6,599	4,144	2,507	1,319	635	*250*	*151*	*93*	*48*	*23*	
CoPoM	1,151	527	*209*	*70*	*15*	*<4*					

Figures 3.H5 to 3.H8 (pages 51 to 55) illustrate the differences between the various bearing surface sub-groups for cemented, uncemented, hybrid and reverse hybrid hips, respectively. Metal-on-metal bearings continue to perform worse than all other options regardless of fixation, apart from in cemented fixation where the results of the rarely used metal-on-metal combination are similar to metal-on-polyethylene-on-metal dual mobility. The revision rates for ceramic-on-polyethylene bearings remain consistently low or equivalent to other well-performing alternatives across all fixation options out to 20 years and it is encouraging that these are becoming more widely used with time. Dual mobility bearings have higher early revision rates than other options (not including metal-on-metal) for cemented and uncemented fixation. The revision rates of uncemented metal-on-polyethylene-on-metal dual mobility bearings appear to rise markedly from nine years. There is also a small divergence in revision rates for the metal-on-polyethylene-on-metal dual mobility bearings in hybrid THRs at the same time point, though this is much less marked. After the first two years the revision rates for uncemented and hybrid CoPoM dual-bearing hips appears to be following a similar trajectory to ceramic-on-polyethylene bearings. Given the relatively small numbers and the likely case mix selection, these patterns should continue to be monitored.

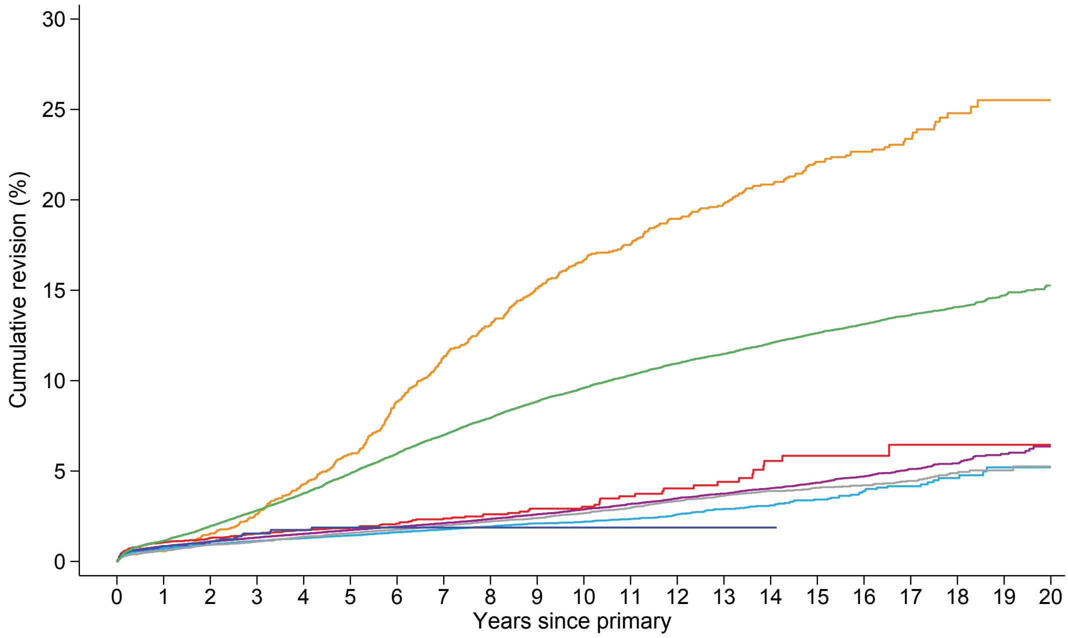
Figure 3.H6 KM estimates of cumulative revision in uncemented primary hip replacements by bearing.
Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.



Key: Numbers at risk

MoP	217,547	184,217	159,137	124,388	90,358	60,314	36,122	18,977	8,170	2,836	284
MoM	29,197	28,021	26,278	24,012	21,801	19,707	17,720	14,296	6,551	1,408	*71*
CoP	180,323	132,799	103,805	72,183	46,394	28,208	16,553	9,425	5,178	2,180	357
CoC	143,495	133,935	125,331	111,491	92,867	69,254	42,861	19,771	7,477	2,256	275
CoM	2,133	2,063	1,962	1,865	1,776	1,655	1,455	643	*36*	*<4*	
MoPoM	3,318	2,159	1,481	965	620	387	*210*	*101*	*41*	*27*	*<4*
CoPoM	2,279	1,103	583	266	*86*	*36*	*9*	*<4*	*<4*		
Resurfacing	2,861	2,738	2,553	2,369	2,245	2,160	1,946	1,518	782	*239*	*15*

Figure 3.H7 KM estimates of cumulative revision in hybrid primary hip replacements by bearing.
Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.

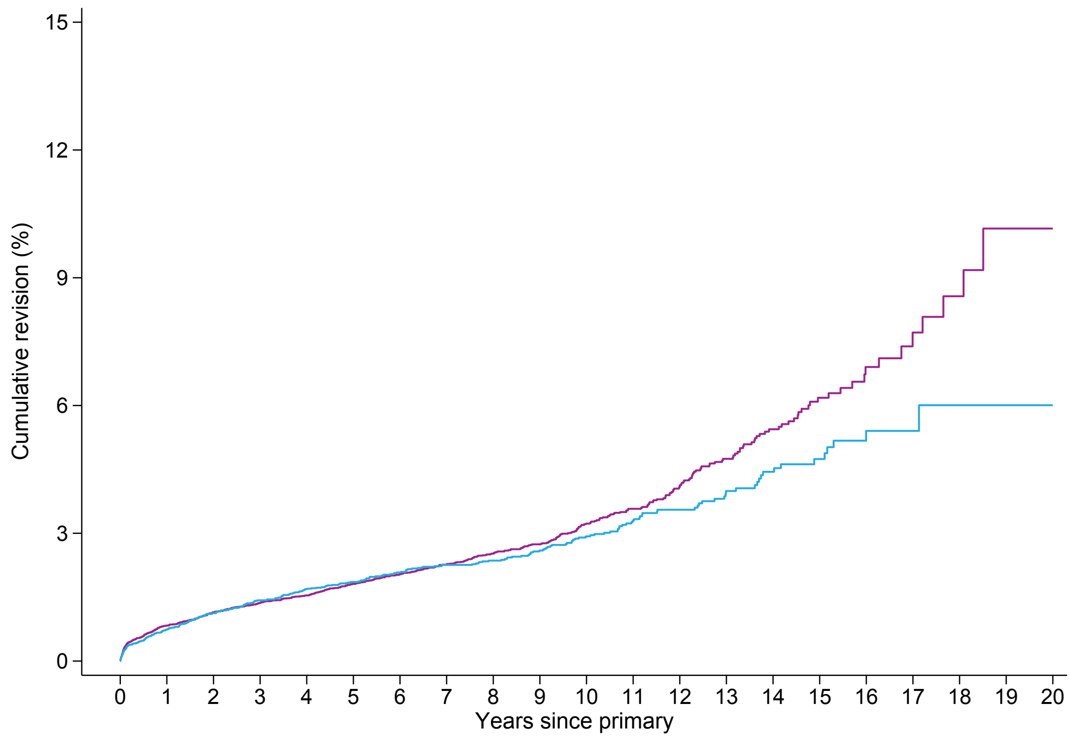


Numbers at risk

Key:	0	2	4	6	8	10	12	14	16	18	20
MoP	202,851	163,862	133,378	96,912	65,936	42,602	26,812	15,472	7,847	2,880	423
MoM	2,289	2,176	2,012	1,804	1,599	1,406	1,262	1,081	687	265	*54*
CoP	161,571	107,111	75,749	45,232	24,058	11,211	5,556	3,063	1,466	621	*109*
CoC	28,101	26,807	25,460	23,059	19,742	15,582	11,166	7,172	3,965	1,381	*122*
MoPoM	10,256	6,940	4,615	2,638	1,515	908	604	363	*168*	*67*	*<4*
CoPoM	3,565	1,667	807	260	*96*	*41*	*6*	*<4*			
Resurfacing	39,840	37,572	35,495	33,299	30,971	28,445	25,865	21,542	13,759	5,891	1,005

Figure 3.H8 (a) illustrates the revision rate of metal-on-polyethylene and ceramic-on-polyethylene bearings used with reverse hybrid fixation in primary total hip replacement. Revision rates are similar for the first eleven years, but after this there is a suggestion that outcomes are beginning to diverge with ceramic-on-polyethylene having slightly lower revision estimates. However, more data will be needed to ascertain if this trend represents a meaningful difference.

Figure 3.H8 (a) KM estimates of cumulative revision in reverse hybrid primary hip replacements by bearing. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

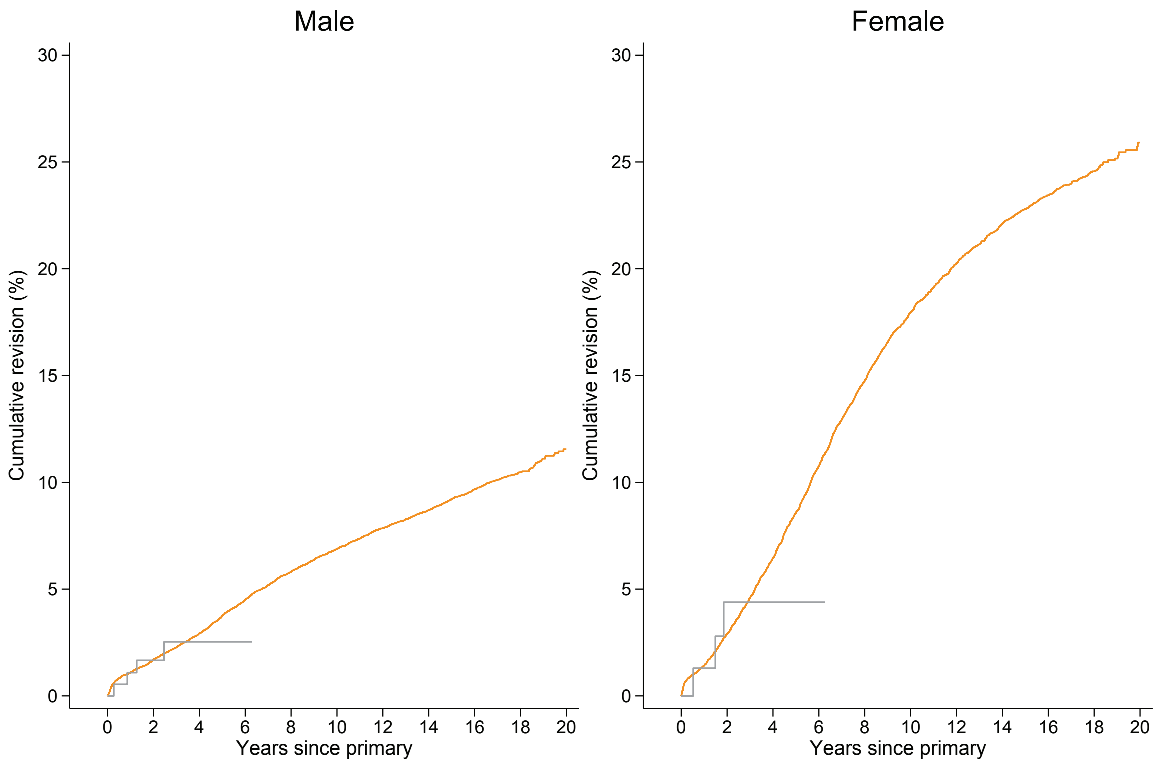


Key:

Key	Numbers at risk										
MoP	26,103	22,320	19,078	14,513	9,787	6,236	3,543	1,649	535	*158*	*17*
CoP	12,898	10,622	9,172	7,477	5,519	3,612	2,140	1,122	412	*102*	*17*

In Figure 3.H8 (b) we present a comparison between metal-on-metal hip resurfacing and ceramic-on-ceramic hip resurfacing by sex. The numbers of ceramic-on-ceramic resurfacings are very small with very short follow-up and so should be interpreted with utmost caution, but early trajectories between the two groups appear to be broadly similar.

Figure 3.H8 (b) KM estimates of cumulative revision in resurfacing primary hip replacements by bearing and sex. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:
- MoM
- CoC

Numbers at risk (Male)

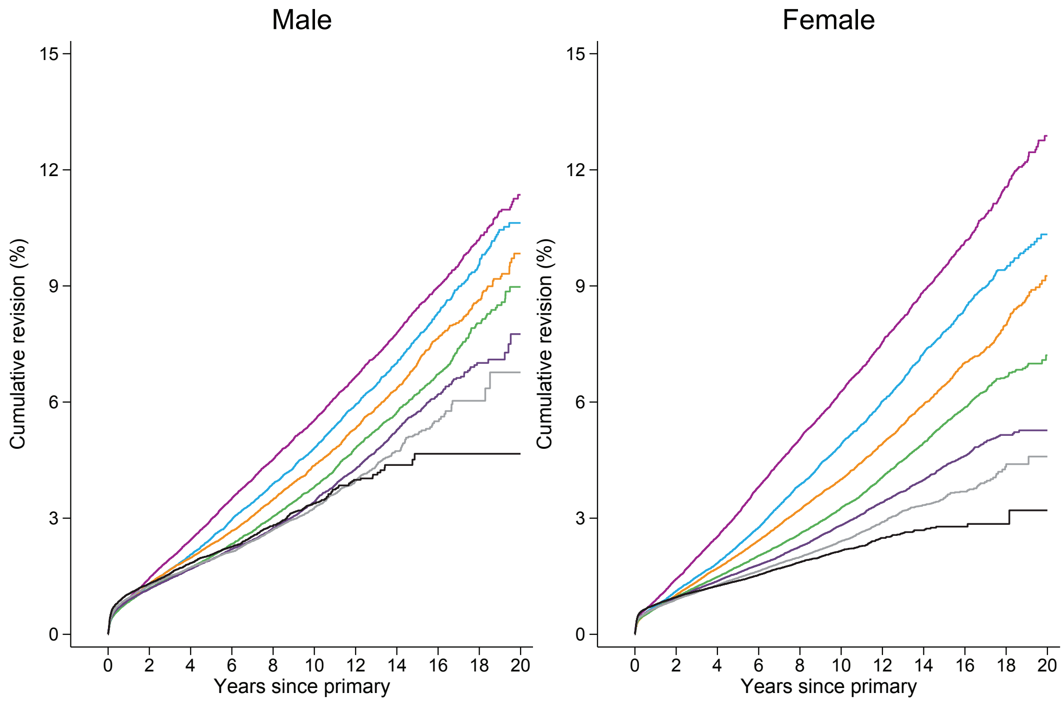
	0	2	4	6	8	10	12	14	16	18	20
MoM	31,567	29,611	27,936	26,188	24,322	22,249	20,009	16,075	9,804	4,083	689
CoC	*186*	*151*	*56*	*7*							

Numbers at risk (Female)

	0	2	4	6	8	10	12	14	16	18	20
MoM	10,746	10,398	9,967	9,428	8,891	8,355	7,801	6,984	4,736	2,047	331
CoC	*80*	*52*	*23*	*5*							

In Figure 3.H9 (a), the whole cohort (including those with metal-on-metal bearings) has been sub-divided by age at primary operation and by sex. Across the whole group, there was an inverse relationship between the probability of revision and the age of the patient. A closer look at both sexes shows that the variation between the age groups was greater in females than in males; for example, females under 55 years had higher revision rates than their male counterparts in the same age band, whereas females aged 80 years and older had a lower revision rate than their male counterparts.

Figure 3.H9 (a) KM estimates of cumulative revision in all primary hip replacements by sex and age.
Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.



Key:

Numbers at risk – Male

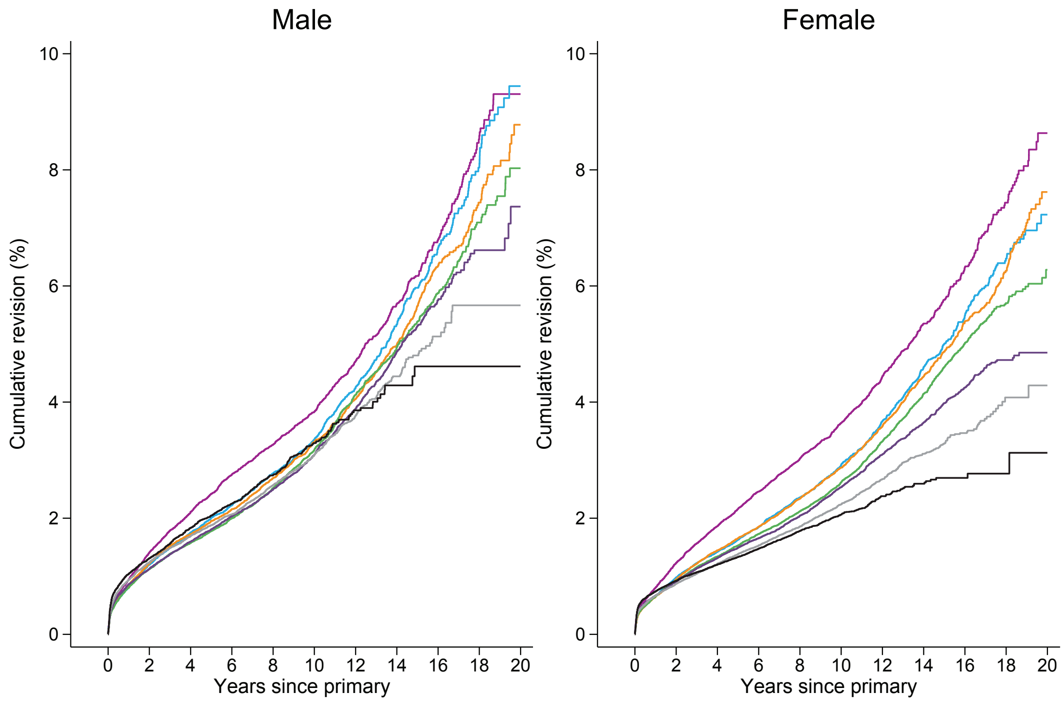
Key	0	2	4	6	8	10	12	14	16	18	20
<55y	91,614	78,500	68,909	56,698	45,127	34,586	25,178	16,922	9,421	3,988	710
55 to 59y	64,970	54,521	47,154	38,391	30,304	22,866	16,742	11,345	6,530	2,761	447
60 to 64y	89,393	75,097	65,260	53,394	42,497	32,376	23,290	14,877	7,843	2,974	461
65 to 69y	104,284	88,010	76,824	62,399	47,888	34,201	22,821	13,954	7,229	2,663	366
70 to 74y	108,932	90,487	76,272	58,662	43,175	30,189	19,488	10,941	4,913	1,527	*163*
75 to 79y	90,852	72,284	58,900	43,640	29,996	18,588	10,196	4,695	1,627	392	*22*
≥80y	77,089	58,321	43,266	27,303	15,114	7,233	2,986	1,042	312	*70*	*<4*

Numbers at risk – Female

Key	0	2	4	6	8	10	12	14	16	18	20
<55y	92,545	78,943	69,103	56,461	44,317	33,347	23,759	15,488	8,523	3,600	598
55 to 59y	74,817	62,809	54,591	44,556	35,175	26,763	19,586	13,239	7,685	3,283	529
60 to 64y	112,291	94,825	82,882	68,259	54,349	41,727	30,353	19,467	10,342	4,056	652
65 to 69y	151,994	129,567	113,858	93,507	72,529	52,729	35,991	22,685	12,086	4,809	674
70 to 74y	178,469	150,237	128,256	100,300	75,088	53,331	35,664	21,061	10,019	3,391	424
75 to 79y	162,519	131,946	110,854	85,218	61,378	40,512	24,305	12,708	5,211	1,358	*126*
≥80y	161,871	129,414	102,528	70,921	44,338	24,671	11,814	4,787	1,528	311	*23*

In Figure 3.H9 (b), primary total hip replacements with metal-on-metal (or unconfirmed) bearing surfaces and resurfacings have been excluded. The revision rates for the younger females are noticeably lower compared to the data in Figure 3.H9 (a) which includes metal-on-metal bearings; an age trend is seen in both sexes but rates for females are lower than for males across the entire age spectrum. It is interesting to observe that age appears to have a greater effect on revision rates in women than men with younger women having similar revision rates to younger men, but older women having much lower revision rates than their male counterparts.

Figure 3.H9 (b) KM estimates of cumulative revision in all primary hip replacements by sex and age, excluding metal-on-metal hip replacement, unclassified replacements, and resurfacing. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:

Male – Numbers at risk

Age group	0	2	4	6	8	10	12	14	16	18	20
<55y	69,929	58,132	49,821	38,842	28,570	19,388	11,521	6,062	3,152	1,456	251
55 to 59y	53,819	43,987	37,200	29,076	21,626	14,900	9,514	5,491	3,011	1,348	*227*
60 to 64y	78,217	64,520	55,238	43,990	33,726	24,306	16,020	9,190	4,778	1,951	327
65 to 69y	96,396	80,598	69,824	55,937	42,030	28,958	18,275	10,611	5,557	2,172	302
70 to 74y	103,481	85,511	71,685	54,528	39,549	27,084	16,972	9,273	4,189	1,341	*144*
75 to 79y	87,313	69,188	56,142	41,271	28,079	17,106	9,082	4,078	1,432	353	*16*
≥80y	74,349	56,151	41,537	26,028	14,251	6,723	2,692	925	274	*62*	*<4*

Female – Numbers at risk

Age group	0	2	4	6	8	10	12	14	16	18	20
<55y	81,283	68,260	59,014	47,058	35,577	25,250	16,333	9,223	4,628	2,009	334
55 to 59y	67,732	56,082	48,196	38,579	29,663	21,629	14,846	9,213	5,163	2,305	386
60 to 64y	104,556	87,482	75,960	61,833	48,399	36,236	25,386	15,528	8,159	3,390	553
65 to 69y	144,801	122,789	107,488	87,606	67,170	47,926	31,806	19,587	10,471	4,289	615
70 to 74y	171,824	144,086	122,552	95,156	70,499	49,398	32,392	18,908	9,064	3,183	410
75 to 79y	156,924	126,936	106,340	81,246	58,053	37,829	22,314	11,571	4,799	1,278	*118*
≥80y	155,794	124,430	98,402	67,754	42,073	23,201	10,983	4,439	1,438	303	*23*

Table 3.H6 (page 58) further expands Table 3.H5 (page 49) to show separate estimates for males and females within each of four age bands, <55, 55 to 64, 65 to 74 and ≥75 years. Estimates are shown at 1, 3, 5, 10, 15 and 20 years after the primary operation. These estimates refine results shown in earlier reports, but now with larger numbers of cases and therefore generally narrower confidence intervals. The relatively good results obtained with ceramic-on-ceramic and ceramic-on-polyethylene bearings in younger patients are striking. Resurfacing hip replacement continues to show high revision rates in all groups, especially females. Even in males under 55 years of age, metal-on-metal resurfacing has twice the revision rate of some alternatives out to 15 years. Dual mobility age and sex sub-groups are too small at this stage to provide firm conclusions on relative revision rates.

Table 3.H6 KM estimates of cumulative revision (95% CI) of primary hip replacements by sex, age group, fixation and bearing. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Fixation and bearing surface	Age at primary (years)	Male							Female						
			Time since primary							Time since primary					
		N	1 year	3 years	5 years	10 years	15 years	20 years	N	1 year	3 years	5 years	10 years	15 years	20 years
All cases	<55	91,614	0.92 (0.86-0.99)	1.95 (1.86-2.05)	2.97 (2.85-3.09)	5.53 (5.35-5.72)	8.43 (8.16-8.71)	11.36 (10.76-11.98)	92,545	0.88 (0.82-0.94)	1.99 (1.90-2.08)	3.13 (3.01-3.25)	6.27 (6.08-6.47)	9.48 (9.18-9.78)	12.88 (12.22-13.57)
All cemented	<55	5,946	0.82 (0.62-1.09)	1.79 (1.47-2.18)	2.35 (1.97-2.79)	4.04 (3.48-4.69)	7.78 (6.73-9.00)	*13.20 (11.14-15.61)*	9,316	0.68 (0.53-0.87)	1.48 (1.24-1.75)	2.16 (1.87-2.50)	4.30 (3.82-4.83)	7.91 (7.04-8.89)	*12.19 (10.42-14.24)*
MoP	<55	2,215	0.96 (0.63-1.47)	2.35 (1.78-3.08)	3.00 (2.35-3.82)	5.27 (4.32-6.42)	10.30 (8.65-12.24)	*16.75 (13.93-20.07)*	3,915	0.84 (0.59-1.18)	1.82 (1.43-2.31)	2.54 (2.07-3.11)	5.14 (4.41-6.00)	9.64 (8.40-11.06)	*14.21 (12.08-16.67)*
MoM	<55	7							12	*0.00 (-.-)*	*0.00 (-.-)*				
CoP	<55	3,598	0.68 (0.46-1.02)	1.41 (1.06-1.87)	1.90 (1.48-2.44)	3.07 (2.46-3.83)	5.06 (3.92-6.52)	*8.30 (5.82-11.77)*	5,176	0.47 (0.32-0.70)	1.10 (0.84-1.44)	1.75 (1.41-2.18)	3.44 (2.85-4.15)	5.61 (4.50-6.99)	*9.36 (6.04-14.35)*
MoPoM	<55	89	*3.42 (1.12-10.24)*	*3.42 (1.12-10.24)*	*3.42 (1.12-10.24)*				169	*3.51 (1.47-8.26)*	*5.30 (2.54-10.87)*	*7.15 (3.42-14.65)*			
CoPoM	<55	33	*0.00 (-.-)*	*0.00 (-.-)*					41	*2.44 (0.35-16.08)*	*2.44 (0.35-16.08)*				
All uncemented	<55	50,474	0.96 (0.87-1.05)	2.00 (1.88-2.13)	2.98 (2.82-3.15)	5.41 (5.17-5.67)	8.36 (7.93-8.81)	*11.03 (9.96-12.22)*	52,583	0.88 (0.81-0.97)	1.88 (1.76-2.01)	2.88 (2.73-3.04)	5.33 (5.10-5.58)	7.83 (7.45-8.22)	*10.33 (9.60-11.11)*
MoP	<55	6,596	0.92 (0.71-1.18)	1.73 (1.42-2.09)	2.38 (2.01-2.82)	3.95 (3.38-4.61)	6.64 (5.52-7.98)	*11.90 (8.96-15.72)*	7,861	0.89 (0.70-1.13)	1.68 (1.40-2.00)	2.32 (1.99-2.71)	3.68 (3.19-4.26)	6.89 (5.85-8.10)	*10.87 (8.76-13.45)*
MoM	<55	3,438	0.76 (0.52-1.11)	3.50 (2.93-4.17)	7.48 (6.65-8.42)	17.15 (15.91-18.48)	22.05 (20.65-23.53)	*26.63 (22.39-31.49)*	2,439	1.85 (1.38-2.47)	5.86 (4.99-6.87)	12.80 (11.53-14.20)	26.74 (25.02-28.57)	32.53 (30.68-34.47)	*35.26 (33.16-37.45)*
CoP	<55	17,348	0.98 (0.84-1.14)	1.68 (1.48-1.90)	2.21 (1.97-2.48)	3.13 (2.76-3.55)	5.23 (4.22-6.47)	*7.28 (5.40-9.78)*	17,429	0.85 (0.72-1.00)	1.41 (1.24-1.62)	1.91 (1.69-2.15)	2.88 (2.53-3.27)	5.02 (4.16-6.04)	*7.68 (5.93-9.93)*
CoC	<55	22,414	0.96 (0.84-1.10)	1.98 (1.80-2.17)	2.72 (2.51-2.95)	4.10 (3.82-4.39)	5.89 (5.40-6.41)	*6.66 (5.99-7.40)*	24,058	0.80 (0.69-0.92)	1.71 (1.56-1.89)	2.34 (2.15-2.55)	3.82 (3.56-4.10)	4.89 (4.52-5.28)	*6.23 (5.45-7.13)*
CoM	<55	190	*1.05 (0.26-4.14)*	*4.78 (2.51-8.98)*	*8.05 (4.93-13.00)*	*12.56 (8.53-18.31)*	*15.61 (11.03-21.83)*		266	0.38 (0.05-2.65)	5.28 (3.16-8.76)	*9.09 (6.19-13.25)*	*12.60 (9.13-17.27)*	*20.00 (14.97-26.42)*	
MoPoM	<55	130	*3.90 (1.64-9.13)*	*3.90 (1.64-9.13)*	*3.90 (1.64-9.13)*	*5.62 (2.42-12.76)*			237	*1.73 (0.65-4.55)*	*1.73 (0.65-4.55)*	*1.73 (0.65-4.55)*	*6.19 (2.21-16.74)*		
CoPoM	<55	342	0.91 (0.29-2.80)	*2.58 (1.11-5.95)*	*2.58 (1.11-5.95)*				276	*1.47 (0.55-3.86)*	*4.24 (2.05-8.64)*	*5.63 (2.73-11.42)*			
Others	<55	16	*0.00 (-.-)*	*6.67 (0.97-38.74)*	*6.67 (0.97-38.74)*				17	*5.88 (0.85-34.98)*	*11.76 (3.08-39.40)*	*11.76 (3.08-39.40)*	*23.53 (9.55-51.17)*		

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male							Female						
		N	Time since primary						N	Time since primary					
			1 year	3 years	5 years	10 years	15 years	20 years		1 year	3 years	5 years	10 years	15 years	20 years
All hybrid	<55	16,137	0.91 (0.77-1.07)	1.52 (1.33-1.73)	2.08 (1.85-2.34)	4.02 (3.61-4.47)	7.21 (6.38-8.14)	10.07 (8.62-11.75)	20,469	0.77 (0.65-0.90)	1.39 (1.23-1.57)	1.91 (1.72-2.13)	3.53 (3.20-3.89)	5.87 (5.27-6.54)	8.37 (6.88-10.16)
MoP	<55	2,156	1.65 (1.18-2.28)	2.48 (1.89-3.25)	3.27 (2.57-4.17)	5.63 (4.54-6.96)	8.08 (6.34-10.27)	14.37 (10.38-19.71)	3,007	0.78 (0.52-1.17)	1.75 (1.33-2.31)	2.31 (1.80-2.95)	4.19 (3.39-5.17)	8.11 (6.55-10.01)	12.94 (9.27-17.93)
MoM	<55	276	0.00 (-.-)	2.57 (1.23-5.32)	4.82 (2.83-8.16)	17.07 (13.03-22.19)	26.68 (21.66-32.60)		202	1.00 (0.25-3.92)	3.01 (1.36-6.58)	8.10 (5.04-12.88)	21.18 (16.06-27.65)	24.10 (18.63-30.86)	
CoP	<55	9,894	0.88 (0.71-1.09)	1.38 (1.16-1.66)	1.81 (1.53-2.15)	2.88 (2.41-3.44)	5.88 (4.09-8.41)	8.07 (5.08-12.71)	11,905	0.77 (0.63-0.95)	1.31 (1.11-1.55)	1.65 (1.41-1.93)	2.61 (2.21-3.09)	3.69 (2.83-4.81)	6.31 (3.47-11.33)
CoC	<55	3,393	0.56 (0.36-0.88)	1.14 (0.83-1.56)	1.71 (1.32-2.22)	3.09 (2.52-3.79)	5.11 (4.18-6.23)	6.72 (5.16-8.71)	4,812	0.58 (0.40-0.84)	1.10 (0.84-1.44)	1.66 (1.33-2.07)	3.02 (2.54-3.59)	4.94 (4.19-5.81)	5.80 (4.74-7.09)
MoPoM	<55	191	1.06 (0.27-4.15)	1.72 (0.55-5.28)	1.72 (0.55-5.28)	1.72 (0.55-5.28)			315	2.68 (1.35-5.30)	3.08 (1.61-5.85)	3.08 (1.61-5.85)	3.08 (1.61-5.85)		
CoPoM	<55	219	1.52 (0.49-4.67)	1.52 (0.49-4.67)	1.52 (0.49-4.67)	1.52 (0.49-4.67)			219	0.46 (0.07-3.24)	1.48 (0.34-6.34)	2.95 (0.87-9.73)			
All reverse hybrid	<55	1,096	1.11 (0.63-1.95)	2.16 (1.42-3.26)	2.75 (1.89-3.99)	4.81 (3.45-6.70)	10.32 (7.06-14.94)		1,572	0.92 (0.55-1.55)	1.57 (1.05-2.36)	2.41 (1.71-3.38)	3.36 (2.43-4.64)	6.57 (4.53-9.48)	
MoP	<55	196	0.53 (0.07-3.70)	3.87 (1.86-7.94)	4.48 (2.26-8.76)	7.48 (4.09-13.48)	16.27 (9.11-28.13)		295	0.35 (0.05-2.49)	1.10 (0.36-3.37)	2.33 (1.05-5.13)	4.31 (2.19-8.39)	7.20 (3.63-14.01)	
CoP	<55	863	1.29 (0.72-2.32)	1.82 (1.10-3.00)	2.42 (1.55-3.78)	4.29 (2.88-6.37)	8.72 (5.35-14.07)		1,224	1.09 (0.64-1.88)	1.75 (1.13-2.70)	2.40 (1.63-3.51)	3.07 (2.12-4.43)	6.47 (4.11-10.13)	
MoPoM	<55	13	0.00 (-.-)						39	0.00 (-.-)	0.00 (-.-)	6.67 (0.97-38.74)			
Others	<55	24	0.00 (-.-)	0.00 (-.-)					14	0.00 (-.-)	0.00 (-.-)	0.00 (-.-)			
All resurfacing	<55	15,461	0.83 (0.70-0.99)	2.11 (1.89-2.35)	3.70 (3.41-4.02)	7.05 (6.63-7.50)	9.56 (9.05-10.10)	12.03 (11.14-12.98)	5,705	1.25 (0.99-1.57)	4.92 (4.38-5.51)	9.10 (8.37-9.88)	19.32 (18.31-20.39)	24.27 (23.15-25.43)	27.25 (25.82-28.74)
MoM	<55	15,343	0.82 (0.69-0.98)	2.09 (1.87-2.34)	3.69 (3.39-4.01)	7.04 (6.62-7.49)	9.55 (9.04-10.09)	12.01 (11.13-12.97)	5,615	1.25 (0.99-1.57)	4.92 (4.39-5.52)	9.13 (8.40-9.91)	19.35 (18.34-20.42)	24.30 (23.18-25.46)	27.27 (25.84-28.76)
CoC	<55	102	1.00 (0.14-6.89)	3.55 (1.13-10.84)	3.55 (1.13-10.84)				52	2.04 (0.29-13.62)	4.62 (1.16-17.41)	4.62 (1.16-17.41)			
MoP	<55	16	6.25 (0.90-36.77)	14.06 (3.66-45.96)					38		4.17 (0.60-26.08)	4.17 (0.60-26.08)			

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male							Female						
		N	Time since primary						N	Time since primary					
			1 year	3 years	5 years	10 years	15 years	20 years		1 year	3 years	5 years	10 years	15 years	20 years
All cases	55 to 64	154,363	0.88 (0.83-0.92)	1.67 (1.60-1.74)	2.39 (2.31-2.47)	4.55 (4.42-4.68)	7.27 (7.06-7.49)	10.17 (9.70-10.67)	187,108	0.69 (0.65-0.73)	1.41 (1.35-1.47)	2.15 (2.08-2.22)	4.36 (4.25-4.48)	6.98 (6.79-7.16)	9.67 (9.24-10.11)
All cemented	55 to 64	19,818	0.71 (0.60-0.84)	1.45 (1.29-1.63)	1.93 (1.74-2.14)	3.73 (3.43-4.06)	7.48 (6.91-8.09)	11.79 (10.58-13.14)	33,759	0.50 (0.43-0.58)	1.03 (0.93-1.15)	1.59 (1.45-1.73)	3.20 (2.98-3.43)	6.25 (5.86-6.67)	9.84 (9.02-10.73)
MoP	55 to 64	11,725	0.72 (0.59-0.90)	1.67 (1.45-1.93)	2.22 (1.96-2.51)	4.37 (3.97-4.81)	8.47 (7.78-9.22)	*13.00 (11.64-14.51)*	21,106	0.55 (0.46-0.67)	1.21 (1.07-1.37)	1.86 (1.68-2.05)	3.69 (3.41-3.99)	7.03 (6.56-7.53)	10.82 (9.90-11.82)
MoM	55 to 64	26		*0.00 (.-.)*	*0.00 (.-.)*	*0.00 (.-.)*	*0.00 (.-.)*		54	*1.89 (0.27-12.65)*	*1.89 (0.27-12.65)*	*1.89 (0.27-12.65)*	*6.20 (2.04-18.06)*	*10.72 (4.59-23.94)*	
CoP	55 to 64	7,815	0.70 (0.53-0.91)	1.09 (0.88-1.35)	1.46 (1.20-1.77)	2.47 (2.08-2.94)	5.12 (4.16-6.30)	*7.83 (5.66-10.78)*	12,139	0.39 (0.30-0.52)	0.70 (0.56-0.87)	1.06 (0.88-1.28)	2.06 (1.75-2.42)	3.90 (3.26-4.66)	*5.86 (4.61-7.44)*
MoPoM	55 to 64	185	*0.00 (.-.)*	*1.47 (0.37-5.75)*	*2.67 (0.84-8.34)*				379	0.58 (0.15-2.33)	*1.52 (0.56-4.10)*	*2.10 (0.85-5.14)*	*8.63 (1.97-33.64)*		
CoPoM	55 to 64	66	*1.59 (0.23-10.74)*	*1.59 (0.23-10.74)*					80	*0.00 (.-.)*	*0.00 (.-.)*	*0.00 (.-.)*			
All uncemented	55 to 64	81,761	0.84 (0.78-0.91)	1.65 (1.56-1.74)	2.37 (2.26-2.49)	4.66 (4.48-4.85)	7.36 (7.05-7.69)	*9.63 (8.98-10.34)*	90,775	0.75 (0.69-0.80)	1.51 (1.43-1.60)	2.27 (2.17-2.38)	4.50 (4.33-4.67)	6.90 (6.63-7.17)	9.22 (8.59-9.90)
MoP	55 to 64	19,408	0.89 (0.77-1.03)	1.67 (1.49-1.87)	2.16 (1.95-2.39)	3.77 (3.44-4.12)	6.80 (6.13-7.54)	*10.51 (9.03-12.21)*	23,837	0.73 (0.63-0.85)	1.49 (1.34-1.66)	1.83 (1.66-2.02)	3.26 (3.00-3.55)	5.65 (5.16-6.18)	*8.23 (7.11-9.52)*
MoM	55 to 64	5,165	0.87 (0.65-1.17)	3.09 (2.65-3.60)	6.65 (5.99-7.37)	16.49 (15.48-17.56)	21.43 (20.28-22.64)	*23.53 (22.12-25.01)*	4,902	0.94 (0.71-1.25)	3.85 (3.34-4.43)	9.42 (8.63-10.28)	22.60 (21.44-23.83)	27.85 (26.58-29.18)	*30.39 (28.88-31.96)*
CoP	55 to 64	30,790	0.73 (0.64-0.84)	1.24 (1.11-1.38)	1.59 (1.43-1.75)	2.64 (2.38-2.93)	4.36 (3.78-5.02)	*5.01 (4.28-5.85)*	33,391	0.60 (0.52-0.69)	1.06 (0.95-1.18)	1.40 (1.27-1.56)	2.38 (2.14-2.64)	3.67 (3.24-4.17)	*5.29 (4.18-6.68)*
CoC	55 to 64	25,471	0.91 (0.80-1.03)	1.71 (1.55-1.88)	2.20 (2.03-2.40)	3.36 (3.12-3.61)	4.77 (4.38-5.19)	*6.50 (5.33-7.91)*	27,491	0.89 (0.78-1.00)	1.53 (1.39-1.68)	1.97 (1.80-2.14)	2.86 (2.65-3.08)	4.11 (3.80-4.45)	*5.57 (4.66-6.64)*
CoM	55 to 64	306	0.65 (0.16-2.59)	2.98 (1.56-5.65)	5.36 (3.32-8.61)	*8.28 (5.62-12.11)*	*12.34 (8.76-17.23)*		469	0.43 (0.11-1.69)	1.94 (1.02-3.70)	3.26 (1.98-5.35)	6.81 (4.84-9.55)	*10.59 (7.85-14.22)*	
MoPoM	55 to 64	230	*1.39 (0.45-4.25)*	*2.04 (0.76-5.43)*	*2.80 (1.15-6.73)*	*3.97 (1.70-9.13)*	*16.71 (7.06-36.65)*		355	1.76 (0.79-3.88)	*3.18 (1.63-6.14)*	*4.43 (2.39-8.12)*	*5.92 (3.02-11.42)*	*20.91 (10.40-39.41)*	
CoPoM	55 to 64	372	1.15 (0.43-3.06)	*1.15 (0.43-3.06)*	*1.15 (0.43-3.06)*				313	*0.69 (0.17-2.72)*	*1.88 (0.68-5.13)*	*1.88 (0.68-5.13)*			
Others	55 to 64	19	*5.26 (0.76-31.88)*	*5.26 (0.76-31.88)*	*5.26 (0.76-31.88)*				17			*5.88 (0.85-34.98)*	*5.88 (0.85-34.98)*		

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male							Female						
		N	Time since primary						N	Time since primary					
			1 year	3 years	5 years	10 years	15 years	20 years		1 year	3 years	5 years	10 years	15 years	20 years
All hybrid	55 to 64	32,808	0.90 (0.80-1.01)	1.49 (1.35-1.63)	1.99 (1.83-2.17)	3.37 (3.10-3.65)	5.51 (5.03-6.05)	*8.67 (7.40-10.15)*	48,085	0.60 (0.53-0.67)	1.09 (1.00-1.19)	1.50 (1.38-1.63)	2.92 (2.72-3.14)	4.46 (4.13-4.82)	*6.08 (5.31-6.96)*
MoP	55 to 64	8,157	1.03 (0.83-1.28)	1.73 (1.46-2.05)	2.30 (1.98-2.67)	3.70 (3.23-4.24)	5.78 (5.01-6.67)	*9.84 (7.86-12.28)*	13,518	0.72 (0.59-0.88)	1.21 (1.04-1.42)	1.71 (1.50-1.96)	3.26 (2.92-3.65)	5.21 (4.66-5.82)	*7.14 (5.92-8.60)*
MoM	55 to 64	356	0.56 (0.14-2.23)	4.03 (2.40-6.70)	7.25 (4.96-10.55)	16.51 (12.93-20.97)	*23.34 (19.01-28.46)*		365	0.55 (0.14-2.18)	3.09 (1.72-5.51)	7.74 (5.37-11.09)	*23.74 (19.51-28.70)*	*29.45 (24.79-34.76)*	*31.83 (26.68-37.69)*
CoP	55 to 64	19,072	0.86 (0.74-1.00)	1.32 (1.16-1.51)	1.67 (1.48-1.90)	2.57 (2.21-2.98)	4.24 (3.28-5.49)	*4.63 (3.47-6.16)*	26,600	0.56 (0.48-0.66)	0.99 (0.86-1.13)	1.25 (1.10-1.42)	1.97 (1.70-2.27)	2.89 (2.31-3.61)	*4.95 (3.45-7.09)*
CoC	55 to 64	4,493	0.67 (0.47-0.96)	1.18 (0.90-1.54)	1.71 (1.36-2.14)	2.80 (2.32-3.36)	4.39 (3.68-5.25)	*7.44 (5.02-10.97)*	6,559	0.43 (0.30-0.62)	0.98 (0.77-1.25)	1.35 (1.10-1.67)	2.42 (2.05-2.85)	3.32 (2.84-3.88)	*3.86 (3.23-4.61)*
MoPoM	55 to 64	353	2.38 (1.20-4.70)	*2.79 (1.45-5.33)*	*3.30 (1.76-6.14)*	*5.91 (2.34-14.55)*			642	0.97 (0.44-2.15)	1.66 (0.85-3.21)	*1.66 (0.85-3.21)*	*2.90 (1.44-5.81)*		
CoPoM	55 to 64	364	1.53 (0.64-3.66)	*3.71 (1.88-7.27)*	*4.59 (2.36-8.81)*				384	0.53 (0.13-2.09)	*1.55 (0.54-4.38)*	*2.35 (0.90-6.05)*			
Others	55 to 64	13	*0.00 (-.-)*	*0.00 (-.-)*	*0.00 (-.-)*				17	*5.88 (0.85-34.98)*	*5.88 (0.85-34.98)*	*5.88 (0.85-34.98)*	*5.88 (0.85-34.98)*		
All reverse hybrid	55 to 64	3,199	0.87 (0.60-1.27)	1.67 (1.26-2.20)	2.23 (1.74-2.86)	3.59 (2.85-4.53)	*7.22 (5.48-9.49)*		4,994	0.84 (0.62-1.14)	1.59 (1.26-1.99)	2.09 (1.70-2.56)	3.70 (3.08-4.43)	6.38 (5.15-7.89)	*6.94 (5.40-8.91)*
MoP	55 to 64	1,156	0.71 (0.35-1.41)	1.19 (0.69-2.04)	1.97 (1.27-3.04)	3.34 (2.23-4.99)	*7.57 (4.90-11.59)*		1,942	1.15 (0.76-1.74)	1.71 (1.21-2.41)	2.41 (1.79-3.24)	4.42 (3.41-5.70)	*8.69 (6.49-11.58)*	
CoP	55 to 64	2,003	0.93 (0.59-1.48)	1.94 (1.39-2.69)	2.36 (1.74-3.20)	3.57 (2.68-4.74)	*6.92 (4.78-9.98)*		2,995	0.63 (0.39-0.99)	1.47 (1.07-2.00)	1.83 (1.38-2.44)	3.17 (2.45-4.11)	*4.23 (3.17-5.62)*	
MoPoM	55 to 64	28	*3.57 (0.51-22.76)*	*3.57 (0.51-22.76)*	*3.57 (0.51-22.76)*				40	*2.78 (0.40-18.13)*	*5.82 (1.48-21.35)*	*5.82 (1.48-21.35)*			
Others	55 to 64	12							17	*0.00 (-.-)*					
All resurfacing	55 to 64	12,765	1.20 (1.02-1.40)	2.32 (2.07-2.60)	3.66 (3.34-4.01)	6.69 (6.25-7.16)	9.00 (8.47-9.57)	11.17 (10.35-12.05)	4,406	1.61 (1.28-2.03)	4.35 (3.79-5.00)	8.27 (7.49-9.13)	16.88 (15.79-18.04)	21.63 (20.41-22.91)	*24.81 (23.08-26.65)*
MoM	55 to 64	12,687	1.20 (1.02-1.40)	2.32 (2.07-2.60)	3.66 (3.34-4.01)	6.69 (6.25-7.16)	9.01 (8.47-9.57)	11.17 (10.35-12.05)	4,350	1.63 (1.30-2.06)	4.41 (3.83-5.06)	8.34 (7.55-9.21)	16.96 (15.86-18.12)	21.70 (20.47-22.98)	*24.88 (23.15-26.71)*
CoC	55 to 64	68	*1.52 (0.21-10.27)*	*1.52 (0.21-10.27)*	*1.52 (0.21-10.27)*				22						
MoP	55 to 64	10							34		*0.00 (-.-)*	*0.00 (-.-)*			

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male							Female						
		N	Time since primary						N	Time since primary					
			1 year	3 years	5 years	10 years	15 years	20 years		1 year	3 years	5 years	10 years	15 years	20 years
All cases	65 to 74	213,216	0.87 (0.83-0.91)	1.46 (1.41-1.51)	1.97 (1.91-2.04)	3.62 (3.52-3.72)	5.99 (5.80-6.18)	8.47 (7.96-9.01)	330,463	0.68 (0.65-0.71)	1.20 (1.16-1.24)	1.66 (1.62-1.71)	3.03 (2.96-3.11)	4.88 (4.75-5.02)	*6.31 (6.02-6.62)*
All cemented	65 to 74	56,425	0.68 (0.61-0.75)	1.25 (1.15-1.34)	1.73 (1.62-1.85)	3.47 (3.29-3.66)	6.10 (5.78-6.44)	8.55 (7.86-9.30)	107,921	0.48 (0.44-0.52)	1.00 (0.94-1.06)	1.40 (1.33-1.48)	2.60 (2.49-2.72)	4.65 (4.45-4.86)	6.02 (5.61-6.47)
MoP	65 to 74	47,422	0.69 (0.62-0.77)	1.28 (1.19-1.39)	1.77 (1.65-1.90)	3.60 (3.40-3.81)	6.33 (5.98-6.69)	8.83 (8.10-9.63)	91,402	0.47 (0.43-0.52)	1.02 (0.95-1.08)	1.43 (1.36-1.52)	2.68 (2.56-2.81)	4.76 (4.54-4.98)	6.12 (5.69-6.58)
MoM	65 to 74	58	*1.72 (0.24-11.62)*	*3.54 (0.90-13.45)*	*3.54 (0.90-13.45)*	*6.02 (1.95-17.80)*	*6.02 (1.95-17.80)*		107	*0.93 (0.13-6.45)*	*0.93 (0.13-6.45)*	*3.03 (0.99-9.12)*	*6.31 (2.88-13.53)*	*8.99 (4.57-17.29)*	
CoP	65 to 74	8,320	0.57 (0.42-0.76)	0.92 (0.73-1.16)	1.33 (1.09-1.63)	2.31 (1.93-2.77)	3.85 (3.09-4.80)	*5.61 (4.25-7.39)*	15,011	0.50 (0.40-0.63)	0.90 (0.75-1.07)	1.14 (0.97-1.34)	1.82 (1.56-2.13)	3.55 (2.97-4.24)	*5.09 (3.48-7.42)*
MoPoM	65 to 74	516	1.00 (0.42-2.38)	2.48 (1.32-4.63)	*4.55 (2.70-7.60)*	*7.07 (4.17-11.84)*	*14.06 (6.75-28.01)*		1,181	0.46 (0.19-1.10)	0.83 (0.41-1.66)	1.40 (0.75-2.61)	*2.73 (1.42-5.23)*	*6.01 (2.68-13.19)*	
CoPoM	65 to 74	108	*0.00 (.-)*	*1.54 (0.22-10.42)*	*1.54 (0.22-10.42)*				219	*0.99 (0.25-3.90)*	*0.99 (0.25-3.90)*	*0.99 (0.25-3.90)*			
All uncemented	65 to 74	87,595	0.90 (0.84-0.97)	1.52 (1.44-1.61)	2.06 (1.96-2.16)	3.71 (3.56-3.88)	6.15 (5.85-6.47)	*10.01 (8.43-11.86)*	109,861	0.85 (0.80-0.90)	1.45 (1.37-1.52)	2.04 (1.95-2.13)	3.72 (3.58-3.86)	5.60 (5.37-5.84)	*7.13 (6.66-7.62)*
MoP	65 to 74	37,795	0.86 (0.77-0.96)	1.45 (1.33-1.58)	1.80 (1.66-1.94)	3.18 (2.96-3.42)	5.56 (5.09-6.07)	*10.41 (7.38-14.60)*	52,068	0.89 (0.81-0.98)	1.39 (1.29-1.50)	1.77 (1.65-1.89)	2.95 (2.77-3.13)	4.63 (4.32-4.97)	*6.13 (5.42-6.93)*
MoM	65 to 74	4,536	1.13 (0.86-1.48)	3.01 (2.55-3.56)	6.11 (5.44-6.86)	13.74 (12.72-14.84)	17.92 (16.71-19.20)		4,618	1.13 (0.86-1.48)	3.57 (3.07-4.15)	8.65 (7.86-9.51)	19.27 (18.12-20.48)	23.31 (22.03-24.65)	
CoP	65 to 74	28,001	0.77 (0.67-0.88)	1.16 (1.03-1.30)	1.42 (1.27-1.58)	2.09 (1.87-2.34)	3.50 (2.92-4.19)	*5.45 (3.40-8.68)*	32,573	0.67 (0.59-0.77)	1.09 (0.97-1.22)	1.38 (1.25-1.53)	2.18 (1.96-2.41)	3.48 (3.06-3.95)	*4.53 (3.84-5.34)*
CoC	65 to 74	16,344	1.11 (0.96-1.28)	1.72 (1.53-1.94)	2.16 (1.95-2.40)	2.90 (2.64-3.19)	4.53 (4.04-5.07)	*8.21 (5.87-11.42)*	19,205	0.92 (0.79-1.07)	1.52 (1.36-1.71)	1.81 (1.63-2.01)	2.48 (2.25-2.72)	3.59 (3.21-4.01)	*4.98 (3.94-6.28)*
CoM	65 to 74	302	1.33 (0.50-3.51)	3.73 (2.08-6.64)	5.16 (3.14-8.42)	*9.01 (6.17-13.06)*	*12.29 (8.48-17.64)*		379	0.53 (0.13-2.12)	1.61 (0.72-3.54)	3.51 (2.05-5.97)	8.22 (5.78-11.62)	*10.98 (7.98-15.00)*	
MoPoM	65 to 74	343	1.90 (0.86-4.19)	*2.76 (1.38-5.48)*	*2.76 (1.38-5.48)*	*2.76 (1.38-5.48)*			682	1.94 (1.13-3.32)	3.17 (2.02-4.97)	3.17 (2.02-4.97)	*4.00 (2.33-6.82)*	*5.94 (3.34-10.47)*	
CoPoM	65 to 74	267	*0.76 (0.19-3.01)*	*1.82 (0.51-6.39)*	*1.82 (0.51-6.39)*				317	*1.02 (0.33-3.15)*	*1.53 (0.57-4.11)*	*1.53 (0.57-4.11)*			
Others	65 to 74	7							19	*5.26 (0.76-31.88)*	*10.53 (2.74-35.92)*	*10.53 (2.74-35.92)*			

Notes:
All cases includes unconfirmed hip types.
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Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male							Female						
		N	Time since primary						N	Time since primary					
			1 year	3 years	5 years	10 years	15 years	20 years		1 year	3 years	5 years	10 years	15 years	20 years
All hybrid	65 to 74	54,816	0.90 (0.83-0.99)	1.44 (1.33-1.54)	1.87 (1.75-2.00)	3.21 (3.01-3.44)	4.96 (4.58-5.38)	*6.30 (5.55-7.15)*	93,987	0.70 (0.64-0.75)	1.11 (1.04-1.18)	1.47 (1.38-1.56)	2.46 (2.33-2.61)	3.71 (3.46-3.98)	*4.70 (4.22-5.24)*
MoP	65 to 74	26,955	0.97 (0.86-1.10)	1.54 (1.39-1.70)	2.02 (1.85-2.21)	3.50 (3.22-3.80)	5.18 (4.71-5.69)	*6.07 (5.35-6.88)*	49,574	0.77 (0.69-0.85)	1.21 (1.11-1.31)	1.60 (1.48-1.72)	2.62 (2.45-2.81)	3.77 (3.48-4.08)	*4.65 (4.17-5.19)*
MoM	65 to 74	282	0.71 (0.18-2.81)	1.82 (0.76-4.31)	*3.79 (2.05-6.93)*	*13.32 (9.59-18.34)*	*18.57 (13.92-24.54)*		330	0.61 (0.15-2.41)	1.85 (0.84-4.08)	6.27 (4.09-9.55)	*14.28 (10.77-18.79)*	*17.91 (13.85-22.99)*	
CoP	65 to 74	23,197	0.81 (0.70-0.93)	1.23 (1.08-1.39)	1.52 (1.35-1.72)	2.24 (1.93-2.60)	3.43 (2.61-4.50)	*6.89 (4.09-11.47)*	37,268	0.58 (0.51-0.66)	0.96 (0.86-1.08)	1.19 (1.07-1.33)	1.81 (1.60-2.05)	2.85 (2.29-3.55)	*4.27 (2.46-7.33)*
CoC	65 to 74	2,932	0.79 (0.53-1.19)	1.46 (1.08-1.97)	1.95 (1.50-2.54)	2.89 (2.30-3.63)	4.42 (3.54-5.52)		4,020	0.68 (0.46-0.98)	0.91 (0.66-1.26)	1.26 (0.95-1.67)	2.12 (1.69-2.67)	3.26 (2.58-4.11)	
MoPoM	65 to 74	1,030	1.34 (0.78-2.30)	2.22 (1.43-3.43)	2.78 (1.83-4.21)	*4.07 (2.67-6.19)*	*6.74 (4.25-10.61)*		2,128	1.18 (0.79-1.75)	1.57 (1.10-2.24)	1.85 (1.30-2.62)	2.98 (2.02-4.37)	*6.75 (4.51-10.04)*	
CoPoM	65 to 74	400	1.99 (0.95-4.16)	*2.55 (1.24-5.20)*	*2.55 (1.24-5.20)*				641	0.47 (0.15-1.46)	*1.20 (0.46-3.08)*	*1.20 (0.46-3.08)*	*1.20 (0.46-3.08)*		
Others	65 to 74	20	*0.00 (-.-)*	*0.00 (-.-)*	*0.00 (-.-)*				26	*0.00 (-.-)*	*0.00 (-.-)*	*0.00 (-.-)*	*0.00 (-.-)*		
All reverse hybrid	65 to 74	5,917	0.96 (0.74-1.24)	1.57 (1.28-1.94)	1.98 (1.63-2.40)	3.35 (2.80-4.01)	6.51 (5.12-8.26)		9,912	0.52 (0.40-0.69)	0.95 (0.77-1.17)	1.39 (1.16-1.66)	2.53 (2.16-2.96)	4.24 (3.45-5.19)	
MoP	65 to 74	4,039	1.14 (0.85-1.53)	1.77 (1.39-2.24)	2.26 (1.82-2.80)	3.95 (3.21-4.85)	*8.49 (6.49-11.07)*		7,140	0.56 (0.41-0.76)	0.98 (0.77-1.25)	1.38 (1.12-1.69)	2.58 (2.15-3.10)	4.74 (3.71-6.05)	
CoP	65 to 74	1,821	0.57 (0.30-1.05)	1.18 (0.75-1.84)	1.41 (0.92-2.13)	2.03 (1.39-2.96)	*2.45 (1.55-3.86)*		2,650	0.38 (0.21-0.71)	0.84 (0.54-1.30)	1.31 (0.91-1.89)	2.18 (1.56-3.04)	*2.88 (2.02-4.09)*	
MoPoM	65 to 74	47	*0.00 (-.-)*	*0.00 (-.-)*	*0.00 (-.-)*	*5.88 (0.85-34.98)*			95	*2.15 (0.54-8.34)*	*2.15 (0.54-8.34)*	*6.02 (2.20-15.91)*	*10.72 (3.89-27.67)*		
Others	65 to 74	10							27	*0.00 (-.-)*					
All resurfacing	65 to 74	3,318	1.94 (1.52-2.47)	2.91 (2.39-3.55)	4.17 (3.53-4.92)	6.89 (6.03-7.85)	8.37 (7.39-9.47)	*10.28 (8.59-12.29)*	778	1.54 (0.88-2.70)	3.22 (2.19-4.73)	5.86 (4.41-7.77)	13.40 (11.15-16.06)	18.13 (15.46-21.20)	
MoM	65 to 74	3,300	1.95 (1.53-2.48)	2.93 (2.40-3.57)	4.19 (3.54-4.94)	6.91 (6.05-7.88)	8.39 (7.41-9.49)	*10.30 (8.61-12.31)*	752	1.46 (0.81-2.63)	3.07 (2.05-4.58)	5.76 (4.30-7.68)	13.35 (11.09-16.04)	18.11 (15.43-21.20)	
CoC	65 to 74	16	*0.00 (-.-)*						6						
MoP	65 to 74	<4							20	*5.00 (0.72-30.53)*	*5.00 (0.72-30.53)*	*5.00 (0.72-30.53)*			

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male N	Male 1 year	Male 3 years	Male 5 years	Male 10 years	Male 15 years	Male 20 years	Female N	Female 1 year	Female 3 years	Female 5 years	Female 10 years	Female 15 years	Female 20 years
All cases	≥75	167,941	0.99 (0.94-1.04)	1.53 (1.47-1.60)	1.99 (1.92-2.06)	3.32 (3.20-3.45)	5.09 (4.80-5.40)	*6.44 (5.52-7.51)*	324,390	0.72 (0.69-0.75)	1.10 (1.06-1.14)	1.42 (1.38-1.47)	2.30 (2.23-2.37)	3.26 (3.13-3.40)	*4.20 (3.76-4.69)*
All cemented	≥75	67,508	0.83 (0.76-0.90)	1.37 (1.28-1.46)	1.83 (1.72-1.94)	3.10 (2.92-3.29)	4.65 (4.27-5.07)	*5.08 (4.57-5.65)*	150,854	0.48 (0.45-0.52)	0.84 (0.80-0.89)	1.13 (1.07-1.19)	1.90 (1.81-2.00)	2.71 (2.55-2.88)	*3.43 (2.91-4.05)*
MoP	≥75	62,138	0.82 (0.76-0.90)	1.36 (1.27-1.46)	1.82 (1.71-1.94)	3.11 (2.92-3.31)	4.71 (4.31-5.13)	*5.15 (4.62-5.74)*	138,928	0.48 (0.45-0.52)	0.84 (0.79-0.89)	1.13 (1.07-1.19)	1.90 (1.81-2.00)	2.72 (2.55-2.89)	*3.47 (2.93-4.11)*
MoM	≥75	51	*1.96 (0.28-13.11)*	*1.96 (0.28-13.11)*	*4.24 (1.07-15.98)*	*11.63 (4.34-29.15)*			112	*0.00 (-.-)*	*3.19 (1.04-9.57)*	*3.19 (1.04-9.57)*	*6.03 (2.52-14.03)*	*8.16 (3.62-17.86)*	
CoP	≥75	4,025	0.75 (0.52-1.08)	1.27 (0.94-1.71)	1.57 (1.18-2.09)	2.27 (1.65-3.12)	*2.72 (1.79-4.14)*		8,420	0.43 (0.31-0.60)	0.65 (0.49-0.87)	0.89 (0.68-1.17)	1.46 (1.12-1.92)	*1.94 (1.37-2.73)*	
MoPoM	≥75	1,139	1.42 (0.86-2.34)	2.12 (1.35-3.30)	3.15 (2.03-4.88)	*4.52 (2.32-8.69)*			2,941	0.74 (0.49-1.14)	1.38 (0.97-1.95)	1.81 (1.29-2.53)	*3.81 (1.93-7.45)*	*3.81 (1.93-7.45)*	
CoPoM	≥75	154	*0.00 (-.-)*	*1.15 (0.16-7.88)*					450	0.49 (0.12-1.93)	*0.49 (0.12-1.93)*	*0.49 (0.12-1.93)*			
All uncemented	≥75	43,144	1.22 (1.12-1.33)	1.75 (1.62-1.88)	2.16 (2.02-2.32)	3.56 (3.33-3.82)	5.68 (5.07-6.37)		62,206	1.20 (1.12-1.29)	1.63 (1.53-1.74)	2.03 (1.91-2.15)	3.26 (3.08-3.44)	4.88 (4.52-5.27)	*6.61 (5.51-7.93)*
MoP	≥75	27,638	1.26 (1.14-1.40)	1.82 (1.67-2.00)	2.19 (2.02-2.39)	3.31 (3.03-3.60)	5.50 (4.69-6.45)		42,344	1.19 (1.09-1.30)	1.57 (1.45-1.69)	1.91 (1.78-2.06)	2.95 (2.75-3.17)	4.62 (4.15-5.15)	
MoM	≥75	1,692	1.02 (0.64-1.64)	1.79 (1.25-2.56)	3.63 (2.80-4.71)	8.59 (7.13-10.33)	*11.51 (9.53-13.88)*		2,407	1.38 (0.98-1.93)	3.13 (2.49-3.92)	4.96 (4.13-5.94)	9.51 (8.28-10.92)	12.35 (10.77-14.15)	
CoP	≥75	9,296	1.03 (0.84-1.26)	1.36 (1.13-1.64)	1.67 (1.40-1.99)	2.71 (2.21-3.32)	*4.37 (2.95-6.46)*		11,495	1.02 (0.85-1.22)	1.36 (1.15-1.60)	1.65 (1.42-1.93)	2.59 (2.21-3.04)	3.27 (2.65-4.04)	
CoC	≥75	3,743	1.38 (1.05-1.81)	1.95 (1.55-2.46)	2.15 (1.72-2.68)	3.47 (2.85-4.22)	*4.39 (3.46-5.56)*		4,769	1.54 (1.23-1.93)	1.89 (1.54-2.33)	2.12 (1.74-2.57)	3.02 (2.52-3.61)	*4.55 (3.67-5.64)*	
CoM	≥75	88	*0.00 (-.-)*	*0.00 (-.-)*	*2.80 (0.71-10.73)*	*4.29 (1.40-12.73)*			133	*0.00 (-.-)*	*0.78 (0.11-5.37)*	*0.78 (0.11-5.37)*	*1.89 (0.47-7.51)*		
MoPoM	≥75	487	2.30 (1.28-4.12)	*2.56 (1.46-4.46)*	*2.56 (1.46-4.46)*	*2.56 (1.46-4.46)*			854	2.17 (1.37-3.43)	2.53 (1.63-3.92)	2.80 (1.81-4.33)	*2.80 (1.81-4.33)*		
CoPoM	≥75	193	*1.07 (0.27-4.22)*	*1.07 (0.27-4.22)*	*1.07 (0.27-4.22)*				199	*1.02 (0.26-4.01)*	*1.02 (0.26-4.01)*	*1.02 (0.26-4.01)*			
All hybrid	≥75	48,342	0.97 (0.89-1.07)	1.52 (1.40-1.64)	1.98 (1.84-2.13)	3.33 (3.06-3.62)	4.64 (4.03-5.33)		94,109	0.73 (0.68-0.79)	1.08 (1.01-1.15)	1.40 (1.32-1.49)	2.04 (1.91-2.18)	2.62 (2.37-2.89)	*3.25 (2.68-3.95)*
MoP	≥75	32,830	0.96 (0.86-1.07)	1.55 (1.41-1.70)	2.04 (1.87-2.22)	3.35 (3.05-3.69)	4.72 (4.06-5.47)		66,654	0.74 (0.68-0.81)	1.11 (1.03-1.20)	1.41 (1.32-1.52)	2.05 (1.90-2.20)	2.64 (2.37-2.94)	*3.38 (2.72-4.19)*
MoM	≥75	178	*0.56 (0.08-3.94)*	*1.21 (0.30-4.75)*	*1.88 (0.61-5.74)*	*11.38 (6.50-19.53)*	*11.38 (6.50-19.53)*		300	0.67 (0.17-2.66)	2.44 (1.17-5.04)	*5.24 (3.13-8.70)*	*10.17 (6.89-14.87)*	*10.17 (6.89-14.87)*	

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

Table 3.H6 (continued)

Fixation and bearing surface	Age at primary (years)	Male							Female						
			Time since primary							Time since primary					
		N	1 year	3 years	5 years	10 years	15 years	20 years	N	1 year	3 years	5 years	10 years	15 years	20 years
CoP	≥75	12,426	1.02 (0.85-1.22)	1.39 (1.18-1.64)	1.76 (1.50-2.08)	2.49 (2.03-3.05)	*4.23 (1.87-9.40)*		21,209	0.70 (0.60-0.83)	0.96 (0.82-1.12)	1.32 (1.14-1.54)	1.88 (1.52-2.32)	*2.18 (1.57-3.02)*	
CoC	≥75	627	1.61 (0.87-2.98)	1.79 (0.99-3.20)	2.18 (1.27-3.74)	*3.68 (2.21-6.11)*	*4.75 (2.63-8.50)*		1,265	0.56 (0.27-1.17)	0.82 (0.44-1.51)	1.01 (0.58-1.78)	1.44 (0.86-2.43)	*1.44 (0.86-2.43)*	
MoPoM	≥75	1,764	0.88 (0.53-1.46)	1.53 (1.00-2.34)	1.92 (1.28-2.90)	*4.17 (2.43-7.10)*	*4.17 (2.43-7.10)*		3,833	0.75 (0.52-1.09)	1.05 (0.75-1.48)	1.41 (1.02-1.94)	*2.15 (1.48-3.13)*	*3.79 (1.97-7.21)*	
CoPoM	≥75	504	0.62 (0.20-1.91)	*1.01 (0.36-2.79)*	*1.01 (0.36-2.79)*				834	0.53 (0.20-1.41)	*0.53 (0.20-1.41)*	*0.53 (0.20-1.41)*			
Others	≥75	13							14	*7.14 (1.04-40.92)*	*7.14 (1.04-40.92)*				
All reverse hybrid	**≥75**	**4,591**	**1.13 (0.85-1.48)**	**1.88 (1.50-2.34)**	**2.45 (2.01-3.00)**	**3.68 (2.95-4.59)**	***5.10 (3.90-6.65)***		**8,372**	**0.76 (0.60-0.98)**	**1.16 (0.94-1.42)**	**1.45 (1.20-1.75)**	**2.67 (2.22-3.20)**	***4.08 (3.25-5.12)***	
MoP	≥75	4,011	1.10 (0.82-1.49)	1.83 (1.44-2.32)	2.37 (1.91-2.95)	3.60 (2.83-4.57)	*5.26 (3.92-7.06)*		7,324	0.75 (0.57-0.98)	1.15 (0.92-1.43)	1.40 (1.14-1.72)	2.67 (2.19-3.25)	*3.99 (3.09-5.15)*	
CoP	≥75	489	1.30 (0.59-2.88)	2.14 (1.12-4.11)	2.77 (1.53-5.00)	*4.12 (2.20-7.65)*			853	0.82 (0.39-1.72)	1.23 (0.66-2.27)	1.55 (0.88-2.73)	*2.50 (1.49-4.18)*	*4.68 (2.76-7.89)*	
MoPoM	≥75	77	*1.35 (0.19-9.21)*	*3.29 (0.81-12.78)*	*3.29 (0.81-12.78)*				170	*0.60 (0.09-4.20)*	*0.60 (0.09-4.20)*	*3.99 (1.20-12.88)*			
Others	≥75	14							25	*4.17 (0.60-26.08)*					
All resurfacing	**≥75**	**238**	***2.13 (0.89-5.04)***	***3.07 (1.48-6.35)***	***4.61 (2.50-8.42)***	***6.90 (4.12-11.42)***	***8.62 (4.90-14.93)***		**32**	***3.13 (0.45-20.18)***	***6.47 (1.65-23.49)***	***6.47 (1.65-23.49)***	***11.39 (3.70-32.13)***		
MoM	≥75	237	*2.14 (0.90-5.06)*	*3.09 (1.48-6.38)*	*4.63 (2.51-8.46)*	*6.91 (4.13-11.45)*	*8.64 (4.92-14.95)*		29	*3.45 (0.49-22.05)*	*7.16 (1.84-25.75)*	*7.16 (1.84-25.75)*	*12.05 (3.98-33.39)*		

Notes:
All cases includes unconfirmed hip types.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Rows with no data or only zeros have been suppressed.
The observed outcomes outlined here represent aggregate analysis outputs. For an individual patient level estimate of outcome based upon individual patient characteristics, prosthesis selection and surgical technique chosen, we recommend review of the NJR Patient Decision Support Tool.

3.H.3 Revisions after primary hip replacement: effect of head size for selected bearing surfaces / fixation sub-groups

This section looks at the effect of head size on the probability of revision following primary hip replacement. Fixation and bearing combinations with greater than 10,000 uses are included and head sizes with fewer than 500 implantations within each group are excluded.

This gave us 12 separate groups:

a) Metal-on-polyethylene cemented hip constructs n=378,488

b) Ceramic-on-polyethylene cemented hip constructs n=64,504

c) Metal-on-polyethylene uncemented hip constructs n=217,120

d) Metal-on-metal uncemented hip constructs n=25,819

e) Ceramic-on-polyethylene uncemented hip constructs n=180,159

f) Ceramic-on-ceramic uncemented hip constructs n=143,248

g) Metal-on-polyethylene hybrid hip constructs n=202,625

h) Ceramic-on-polyethylene hybrid hip constructs n=161,353

i) Ceramic-on-ceramic hybrid hip constructs n=27,558

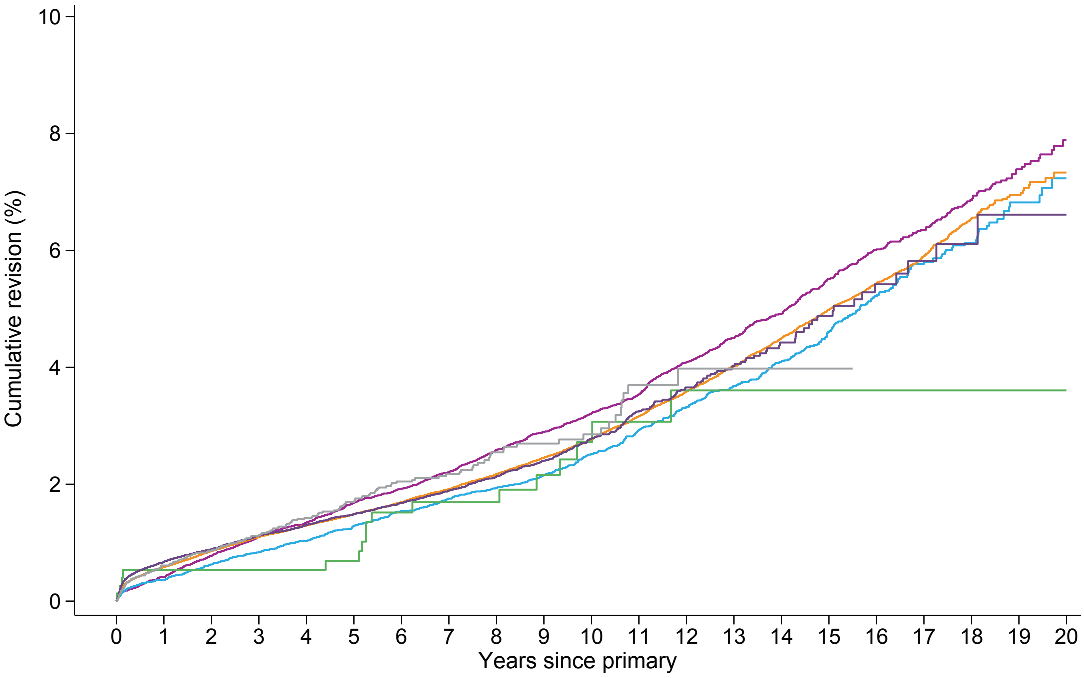
j) Metal-on-polyethylene reverse hybrid hip constructs n=25,820

k) Ceramic-on-polyethylene reverse hybrid hip constructs n=12,897

l) Metal-on-metal resurfacing n=41,692

Figures 3.H10 (a) to 3.H10 (l) (pages 67 to 78) show respective percentage cumulative probabilities of revision (Kaplan-Meier estimates) for various head sizes, for each of the groups with follow-up up to 20 years following the primary hip replacement.

Figure 3.H10 (a) KM estimates of cumulative revision of primary cemented MoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

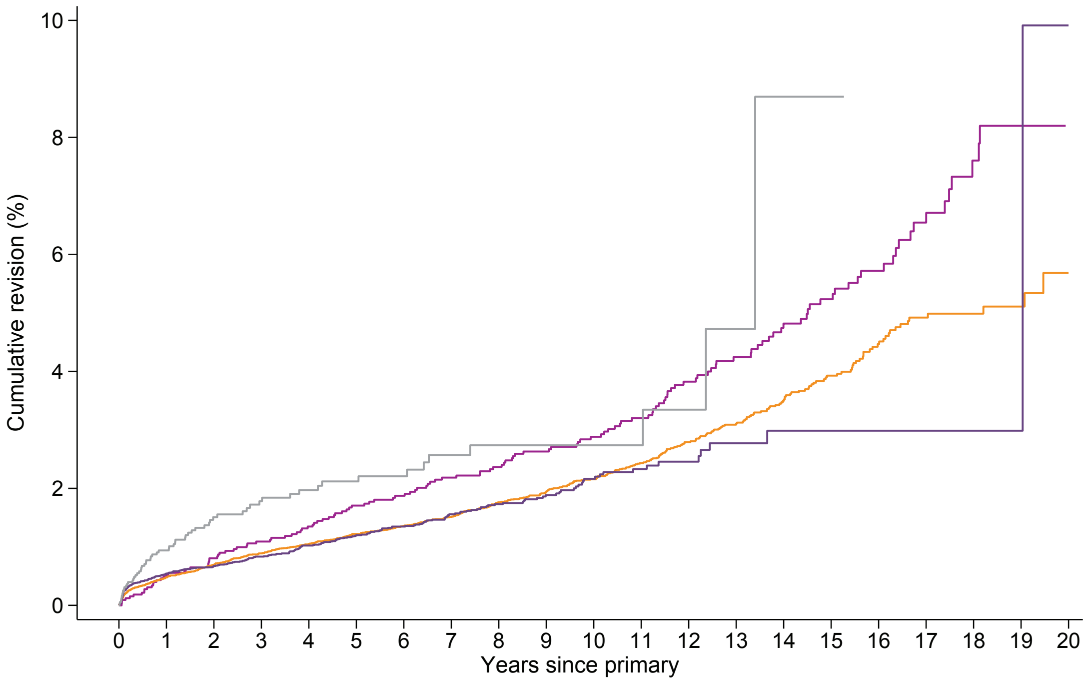


Key: Numbers at risk

Key	0	2	4	6	8	10	12	14	16	18	20
22.25	34,935	33,188	30,887	27,885	24,273	20,268	15,782	11,366	7,448	3,826	832
26	18,949	18,080	16,978	15,476	13,691	11,455	9,019	6,687	4,145	2,074	376
28	210,751	192,759	172,841	142,661	110,211	78,091	50,682	30,339	15,385	5,479	703
30	752	714	655	571	462	281	*166*	*104*	*38*	*13*	*<4*
32	102,614	81,706	64,148	41,839	24,542	12,134	4,961	1,888	671	*200*	*31*
36	10,487	7,743	5,695	3,641	2,098	1,022	296	*34*			

In Figure 3.H10 (a), for cemented metal-on-polyethylene (MoP) hips, there was a statistically significant effect of head size (overall difference P=0.003 by logrank test) on revision rates over the follow-up period. Overall, implants with head size 22.25mm had the worst revision rates over the entire duration of follow-up, but implants with head size 36mm had marginally worse revision rates in the first six years of follow-up. The numbers at risk for patients who received 36mm heads after 12 years are too small for meaningful comparison.

Figure 3.H10 (b) KM estimates of cumulative revision of primary cemented CoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

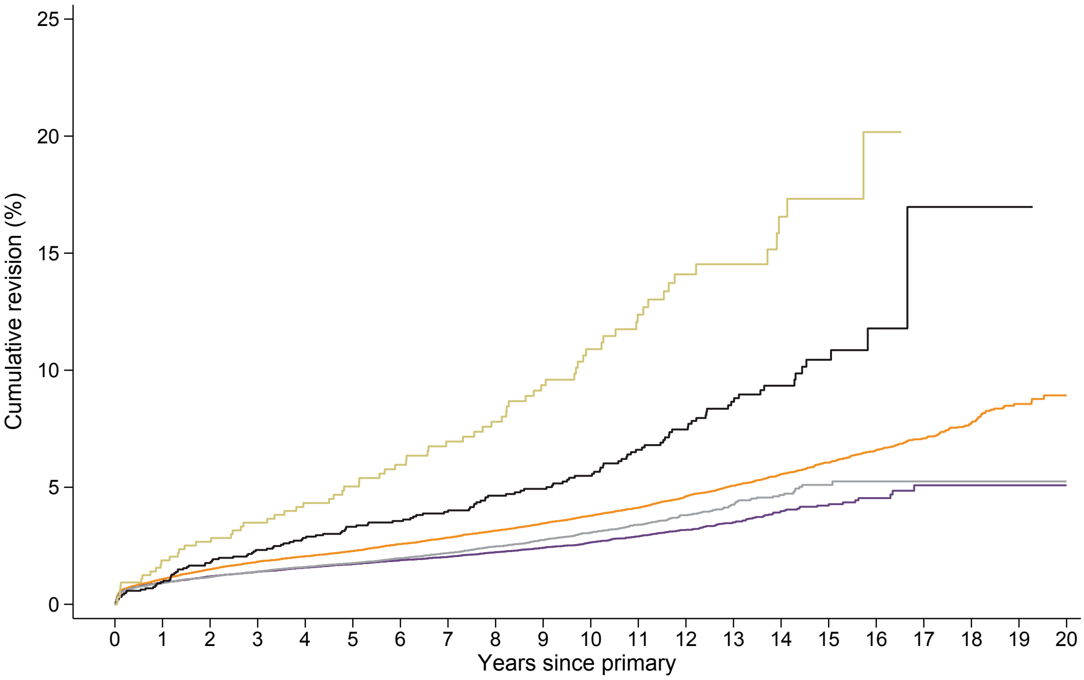


Numbers at risk

Key:											
22.25	3,244	3,161	3,059	2,886	2,632	2,203	1,718	1,263	799	331	
28	34,063	29,902	26,156	20,772	15,614	10,960	6,908	4,042	2,109	900	*138*
32	23,628	17,596	13,540	9,044	5,413	2,663	1,092	366	*77*	*25*	*5*
36	3,569	2,111	1,413	884	461	*235*	*88*	*8*			

Figure 3.H10 (b) shows revision rates for different head sizes for cemented ceramic-on-polyethylene (CoP) hips. There was a statistically significant effect of head size (overall P<0.001) with 36mm heads having the highest revision rates, followed by 22.25mm heads. The lowest revision rates were achieved with 28mm and 32mm heads.

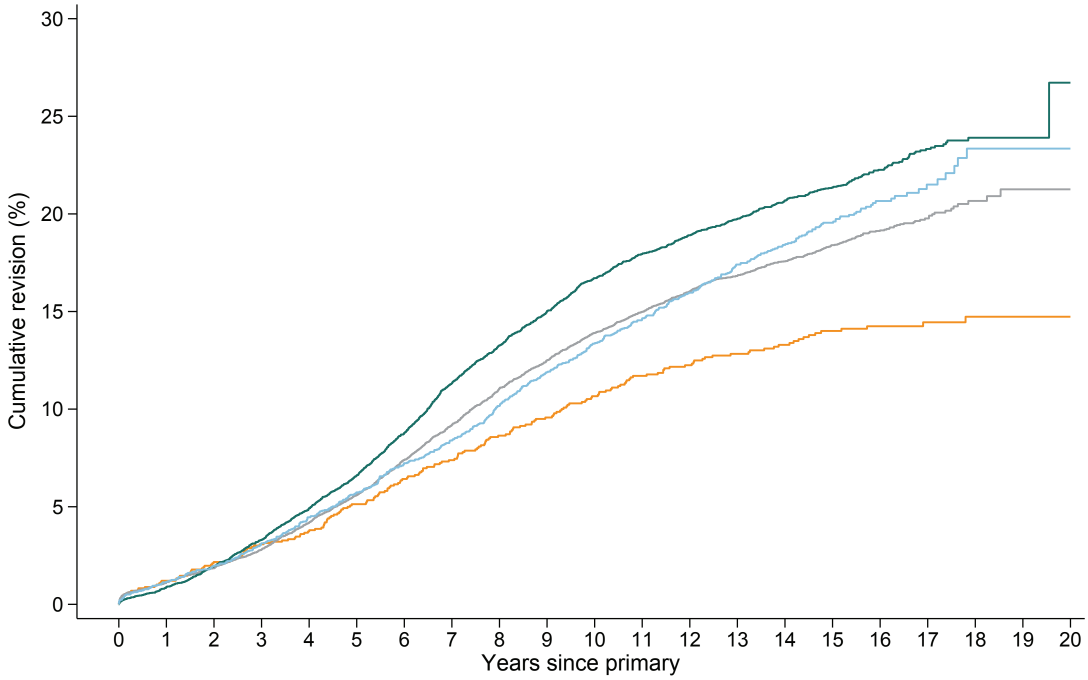
Figure 3.H10 (c) KM estimates of cumulative revision of primary uncemented MoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:	Numbers at risk										
28	60,646	56,259	52,138	45,996	38,378	30,037	21,623	13,673	7,016	2,621	274
32	101,323	84,893	72,070	52,550	34,019	18,863	8,498	3,042	777	*143*	*<4*
36	52,590	40,316	32,382	23,597	15,996	9,838	4,890	1,649	*231*	*23*	*<4*
40	1,916	1,788	1,678	1,517	1,349	1,091	769	400	*67*	*<4*	
44	645	605	563	487	425	330	*218*	*116*	*11*		

Figure 3.H10 (c) shows revision rates for uncemented metal-on-polyethylene (MoP) hips. There was a statistically significant effect of head size (overall P<0.001) with head sizes above 36mm having the highest revision rates.

Figure 3.H10 (d) KM estimates of cumulative revision of primary uncemented MoM hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

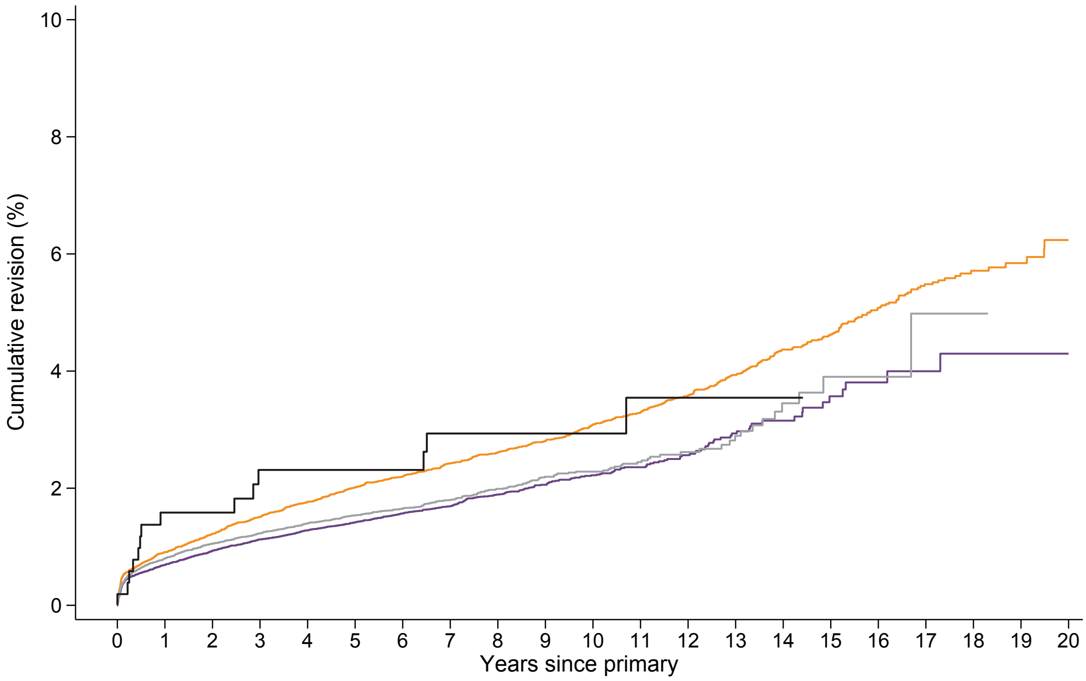


Numbers at risk

Key:	0	2	4	6	8	10	12	14	16	18	20
28	1,579	1,521	1,459	1,367	1,294	1,216	1,081	899	613	273	*30*
36	12,302	11,740	11,062	10,175	9,180	8,204	7,275	5,717	2,385	435	*17*
38 to 48	8,570	8,283	7,843	7,310	6,700	6,130	5,611	4,628	2,127	465	*12*
50 to 54	3,368	3,242	3,079	2,901	2,729	2,502	2,276	1,771	736	*132*	*11*

Figure 3.H10 (d) shows revision rates for uncemented metal-on-metal (MoM) hips, with a statistically significant difference between the head sizes overall (P<0.001) with the lowest revision rates achieved with the smallest head sizes.

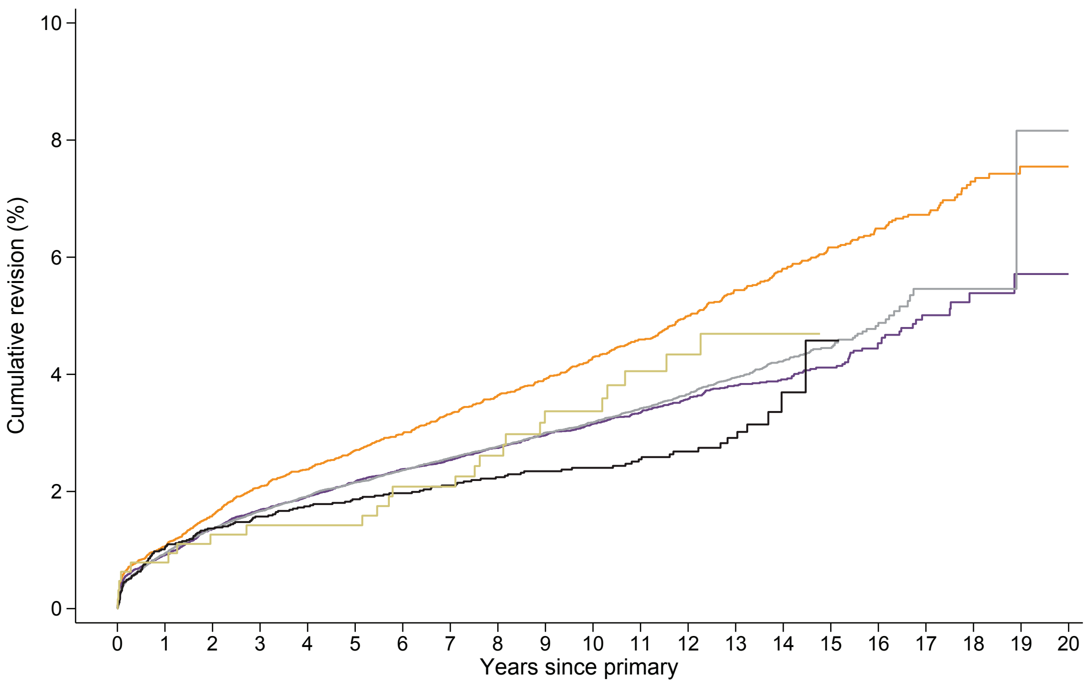
Figure 3.H10 (e) KM estimates of cumulative revision of primary uncemented CoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:	Numbers at risk										
28	31,575	27,680	24,996	21,194	17,162	13,568	10,241	7,227	4,472	1,959	336
32	83,115	61,740	47,475	30,750	17,830	9,097	4,167	1,513	552	*217*	*20*
36	64,948	42,796	30,804	19,771	11,016	5,240	1,989	667	*150*	*<4*	
40	521	426	381	324	260	*193*	*79*	*8*			

For uncemented ceramic-on-polyethylene (CoP) hips (Figure 3.H10 (e)), there was a statistically significant difference between the four head sizes shown (P<0.001) with 28mm and 40mm heads having higher revision rates than 32mm and 36mm heads, although numbers at risk for patients who received 40mm heads after eight years are too small for meaningful comparison.

Figure 3.H10 (f) KM estimates of cumulative revision of primary uncemented CoC hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

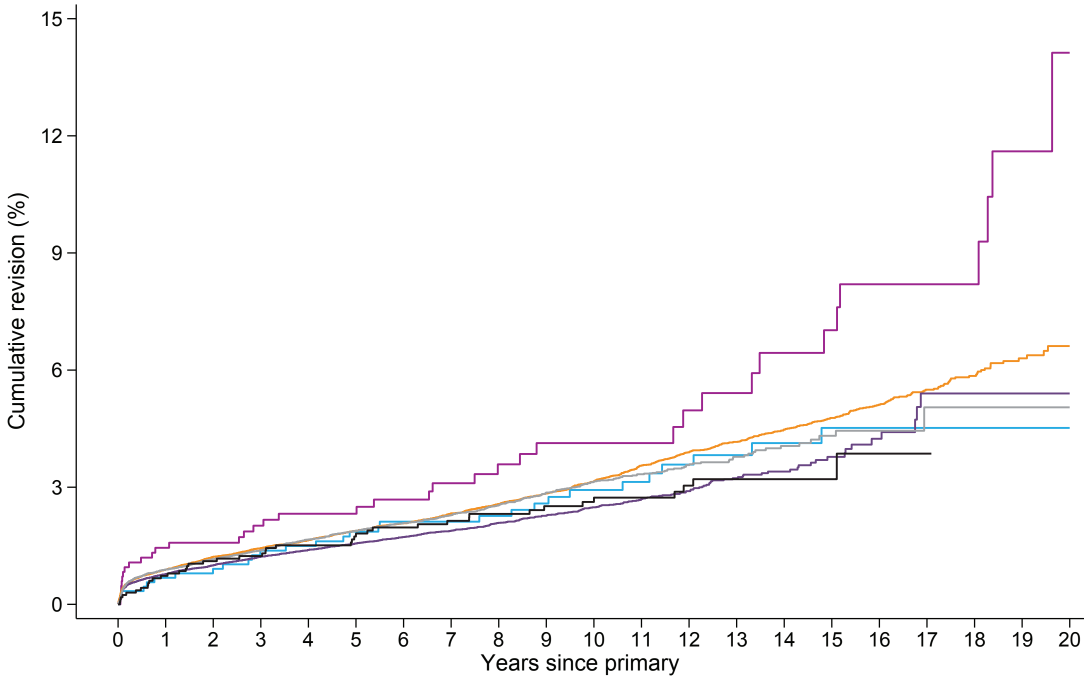


Key: / Numbers at risk

Key	0	2	4	6	8	10	12	14	16	18	20
28	13,842	13,269	12,745	11,990	11,051	9,761	7,963	5,775	3,599	1,541	*196*
32	39,502	36,699	34,227	30,044	24,703	18,409	11,381	5,433	2,095	563	*73*
36	83,378	77,680	72,504	64,067	52,413	37,356	21,372	8,229	1,783	*152*	*6*
40	5,891	5,426	5,010	4,592	3,967	3,109	1,733	273			
44	635	622	612	584	537	457	302	*47*			

Figure 3.H10 (f) shows revision rates for uncemented ceramic-on-ceramic (CoC) hip replacements by head size. There are statistically significant differences between all five head sizes shown (P<0.001). In the short-term, the larger the head size, the lower the revision rate of the construct, but revision rates begin to rise in 44mm heads after five years.

Figure 3.H10 (g) KM estimates of cumulative revision of primary hybrid MoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

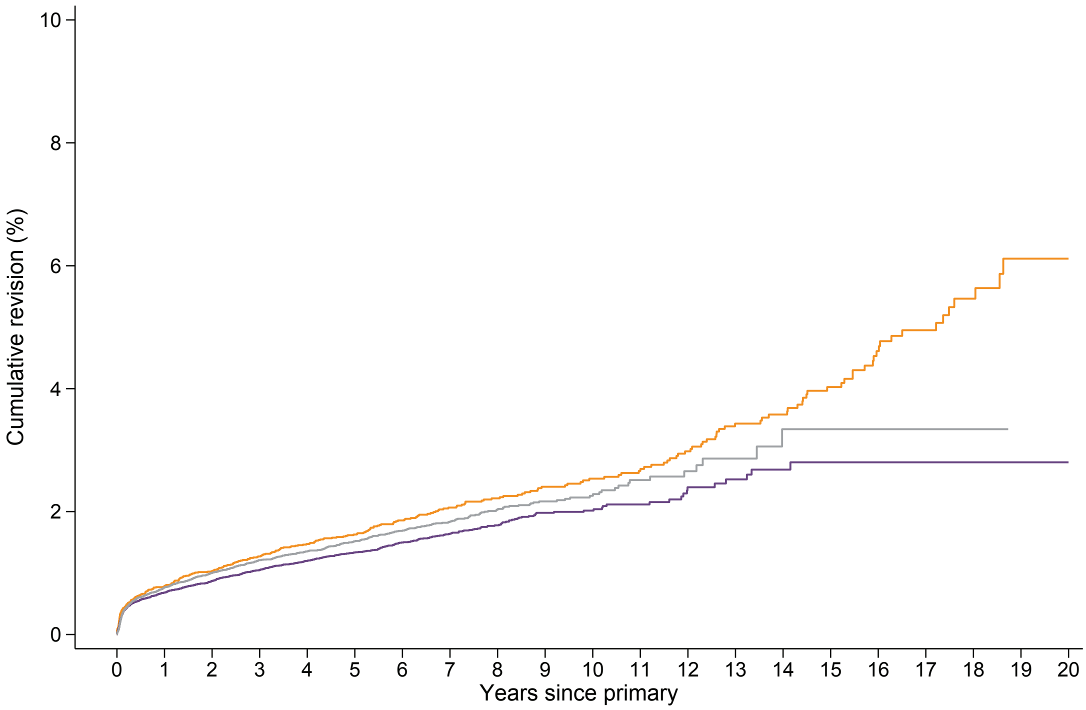


Numbers at risk

Key:	0	2	4	6	8	10	12	14	16	18	20
22.25	851	712	613	494	382	296	*221*	*176*	*131*	*89*	*14*
26	884	858	822	742	641	513	401	281	*198*	*96*	*13*
28	48,980	44,699	40,688	34,680	28,020	21,582	16,199	11,143	6,543	2,572	389
32	95,997	75,309	58,621	38,219	22,200	11,194	5,111	1,994	571	*72*	*<4*
36	54,241	40,552	31,079	21,409	13,506	8,023	4,215	1,555	342	*51*	*5*
40	1,672	1,532	1,374	1,213	1,053	882	600	290	*57*		

Figure 3.H10 (g) shows revision rates for hybrid metal-on-polyethylene hip replacements by head size. There was a statistically significant difference between the six head sizes shown (P<0.001) with 22.25mm heads having higher revision rates than the other heads. From 16 years the numbers at risk are generally low so apparent differences should be interpreted with caution.

Figure 3.H10 (h) KM estimates of cumulative revision of primary hybrid CoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

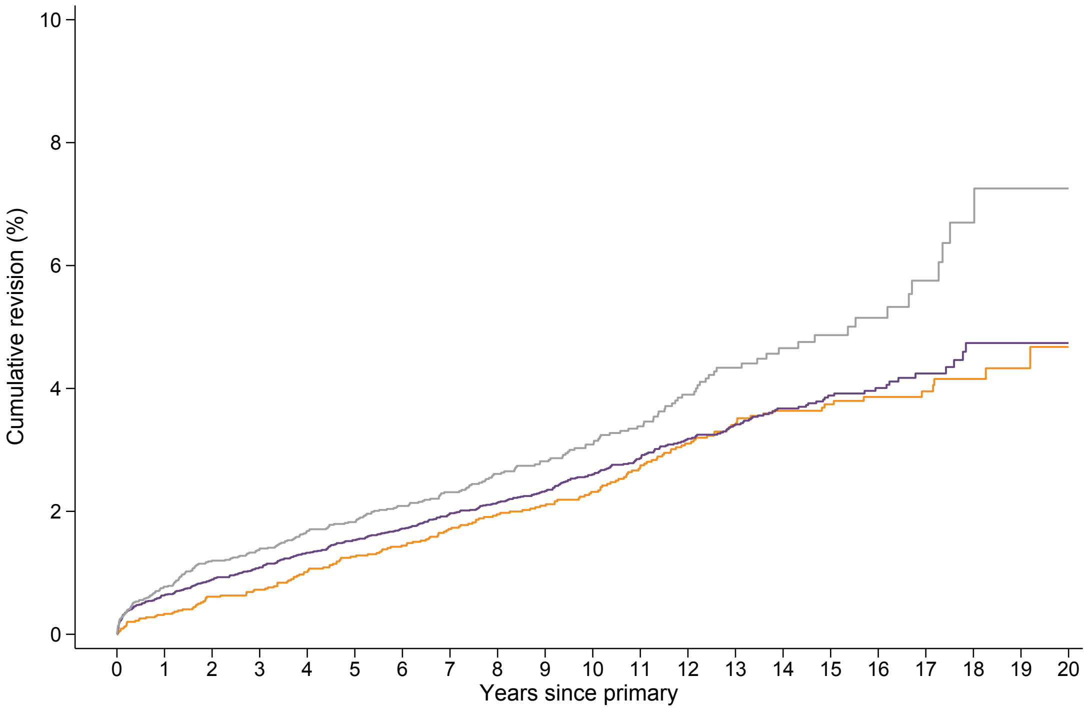


Numbers at risk

Key:											
28	15,578	12,922	10,766	7,726	5,222	3,450	2,538	1,835	1,186	558	*106*
32	81,484	53,751	37,000	20,812	10,193	4,285	1,932	882	*232*	*57*	*<4*
36	64,291	40,249	27,819	16,603	8,603	3,450	1,074	339	*41*	*5*	

Figure 3.H10 (h) shows revision rates for hybrid ceramic-on-polyethylene hip replacements by head size. Bearings with 28mm heads had higher revision rates than those with 32mm and 36mm heads (P<0.001).

Figure 3.H10 (i) KM estimates of cumulative revision of primary hybrid CoC hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

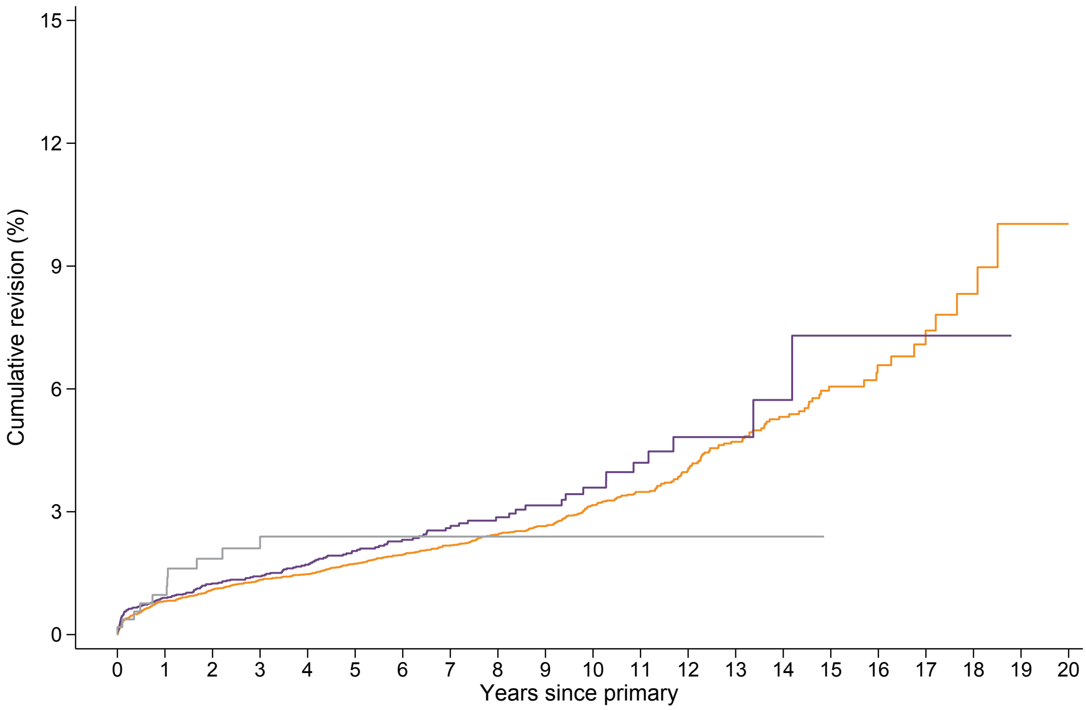


Numbers at risk

Key:											
28	5,430	5,301	5,163	4,857	4,367	3,778	3,107	2,168	1,388	640	*90*
32	13,657	13,222	12,721	11,749	10,385	8,367	6,038	3,956	2,003	572	*23*
36	8,471	7,776	7,090	5,999	4,626	3,184	1,935	1,041	574	*169*	*9*

Figure 3.H10 (i) shows revision rates for hybrid ceramic-on-ceramic hip replacements by head size. Bearings with 36mm heads had a higher revision rate than 32mm and 28mm heads (P=0.002).

Figure 3.H10 (j) KM estimates of cumulative revision of primary reverse hybrid MoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

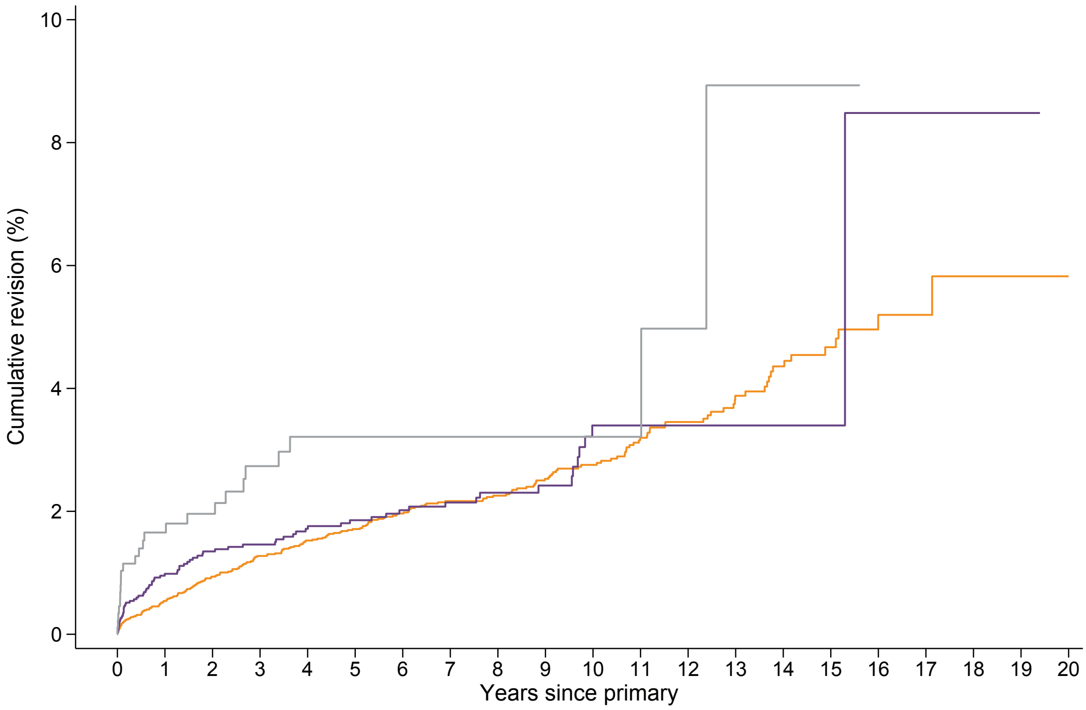


Key: Numbers at risk

Key	0	2	4	6	8	10	12	14	16	18	20
28	17,918	16,145	14,370	11,613	8,256	5,416	3,154	1,506	506	*150*	*15*
32	7,356	5,523	4,166	2,452	1,173	563	*236*	*72*	*13*	*<4*	
36	546	393	302	*228*	*153*	*75*	*28*	*4*			

Figure 3.H10 (j) shows revision rates for reverse hybrid metal-on-polyethylene hip replacements by head size. There is no evidence that bearings with 28mm heads have a lower revision rate than those with 32mm heads or 36mm heads. (P=0.286).

Figure 3.H10 (k) KM estimates of cumulative revision of primary reverse hybrid CoP hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

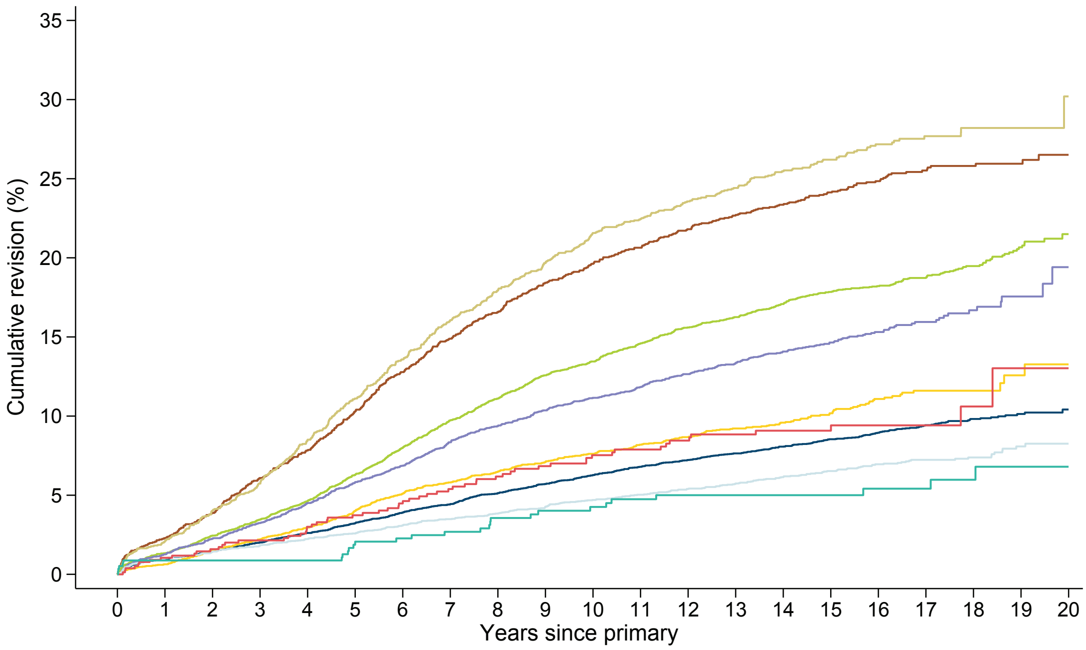


Key:

Key	Numbers at risk										
28	8,287	7,301	6,551	5,526	4,258	2,998	1,911	1,075	400	*98*	*17*
32	3,733	2,762	2,246	1,708	1,099	530	*200*	*40*	*12*	*4*	
36	877	558	375	*243*	*162*	*84*	*29*	*7*			

Figure 3.H10 (k) shows revision rates for reverse hybrid ceramic-on-polyethylene hip replacements by head size. There is some evidence of a difference in revision rates between the head sizes, with 36mm heads having a higher revision rate in the first four years (P=0.021), after which the numbers at risk fall below 250.

Figure 3.H10 (l) KM estimates of cumulative revision of primary resurfacing MoM hip replacement by head size (mm). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:

Numbers at risk

42	2,272	2,176	2,071	1,943	1,841	1,745	1,655	1,525	1,101	534	*107*
44	2,253	2,159	2,043	1,918	1,799	1,679	1,568	1,353	741	*227*	*29*
46	6,293	6,117	5,942	5,685	5,405	5,094	4,729	4,178	2,873	1,277	*204*
48	5,016	4,745	4,506	4,241	3,950	3,637	3,277	2,564	1,306	400	*43*
50	12,650	11,894	11,266	10,588	9,820	9,023	8,199	6,753	4,449	1,998	379
52	5,548	5,103	4,757	4,391	4,046	3,630	3,132	2,271	1,087	337	*31*
54	6,313	5,971	5,585	5,229	4,865	4,433	4,019	3,385	2,310	1,085	*189*
56	777	713	675	638	582	526	469	355	*199*	*58*	*4*
58	570	539	510	476	439	397	354	305	*218*	*115*	*12*

Figure 3.H10 (l) shows revision rates for resurfacing metal-on-metal hip replacements by head size. There is a strong trend to lower revision rates with larger head sizes (P<0.001).

3.H.4 Revisions after primary hip surgery for the main stem / cup brand combinations

For the first time this year we now list head brand and liner brand as part of the branding information. In this section we present results for stem / cup brand combinations with more than 2,000 procedures for cemented, uncemented, hybrid and reverse hybrid hips or more than 1,000 procedures in the case of dual-mobility hips and resurfacings. Table 3.H7 (a) shows the Kaplan-Meier estimates of the cumulative percentage probability of revision of primary hip replacement (for any reason) for all the different stem / cup branding combinations that exist within the qualifying stem / cup combinations. Table 3.H7 (b) adds the head (and liner for modular acetabular components) branding information. Table 3.H8 (a) shows the results for all of the qualifying stem / cup combinations stratified by the bearing material combination. Table 3.H8 (b) adds the head (and liner for modular acetabular components) branding information. In Tables 3.H7 (b) and 3.H8 (b) the minimum threshold for inclusion was at least 500 procedures for unipolar brand combinations, and at least 250 procedures for dual-mobility procedures. The figures in blue italics are at time points where 250 or fewer cases remained at risk; no results are shown at all where the number had fallen below ten cases. No attempt has been made to adjust for other factors that may influence the chance of revision, so the figures are unadjusted cumulative probabilities of revision. Given that the sub-groups may differ in composition with respect to age and sex, the percentage of males and the median (IQR) of the ages are also shown in these tables.

Table 3.H7 (a) KM estimates of cumulative revision (95% CI) of primary hip replacement by fixation, and stem / cup brand. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Cemented									
C-Stem AMT Cemented Stem[St] : Charnley and Elite Plus LPW[C]	3,452	75 (70 to 79)	30	0.61 (0.40-0.94)	1.34 (1.00-1.79)	1.67 (1.28-2.16)	2.60 (2.07-3.27)	4.29 (3.31-5.54)	
C-Stem AMT Cemented Stem[St] : Elite Plus Ogee[C]	5,078	77 (72 to 81)	34	0.30 (0.18-0.49)	0.96 (0.72-1.27)	1.37 (1.06-1.75)	2.18 (1.73-2.76)	*3.11 (2.32-4.18)*	
C-Stem AMT Cemented Stem[St] : Marathon[C]	24,506	75 (70 to 80)	32	0.58 (0.49-0.68)	0.98 (0.85-1.12)	1.29 (1.13-1.48)	2.01 (1.69-2.38)	*2.81 (1.97-4.00)*	
C-Stem Cemented Stem[St] : Charnley and Elite Plus LPW[C]	2,011	72 (68 to 77)	32	0.55 (0.30-0.99)	1.26 (0.86-1.86)	1.86 (1.34-2.57)	2.84 (2.16-3.72)	4.06 (3.16-5.21)	*6.88 (3.79-12.30)*
C-Stem Cemented Stem[St] : Elite Plus Ogee[C]	6,196	72 (66 to 77)	39	0.41 (0.28-0.60)	0.88 (0.67-1.15)	1.20 (0.95-1.52)	2.64 (2.20-3.17)	4.41 (3.69-5.26)	*5.68 (4.52-7.14)*
C-Stem Cemented Stem[St] : Marathon[C]	10,153	68 (60 to 75)	41	0.45 (0.33-0.60)	0.93 (0.76-1.14)	1.35 (1.13-1.60)	2.18 (1.85-2.57)	*3.68 (2.65-5.10)*	
C-Stem Cemented Stem[St] : Opera[C]	2,274	68 (60 to 74)	40	0.44 (0.24-0.82)	0.94 (0.61-1.44)	1.55 (1.11-2.16)	3.85 (3.09-4.79)	8.35 (7.00-9.95)	*19.24 (13.61-26.82)*
C-Stem Cemented Stem[St] : Wroblewski Golf Ball[C]	2,205	67 (59 to 73)	40	0.32 (0.15-0.67)	0.83 (0.53-1.32)	1.36 (0.95-1.96)	2.62 (2.00-3.43)	4.36 (3.42-5.54)	*6.66 (5.09-8.69)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (a) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
CCA SS Cemented Stem[St] : CCB Cup[C]	2,176	74 (69 to 79)	30	0.46 (0.25-0.86)	1.03 (0.68-1.56)	2.06 (1.53-2.78)	5.81 (4.74-7.11)	*8.70 (6.86-11.01)*	
CPCS[St] : Reflection Cemented[C]	2,737	77 (72 to 82)	31	0.57 (0.34-0.94)	1.20 (0.83-1.74)	1.80 (1.30-2.51)	*3.81 (2.75-5.27)*		
CPT CoCr Stem[St] : Elite Plus Ogee[C]	2,513	73 (67 to 79)	36	0.60 (0.36-1.00)	1.51 (1.10-2.08)	2.21 (1.69-2.89)	3.92 (3.17-4.84)	5.52 (4.46-6.81)	
CPT CoCr Stem[St] : Exceed ABT Cemented[C]	3,117	75 (69 to 80)	36	1.01 (0.71-1.44)	1.53 (1.11-2.10)	1.86 (1.36-2.53)			
CPT CoCr Stem[St] : Low Profile Durasul Cup[C]	2,335	75 (70 to 80)	34	0.61 (0.36-1.02)	1.29 (0.89-1.87)	1.86 (1.35-2.55)	3.40 (2.57-4.49)		
CPT CoCr Stem[St] : ZCA[C]	19,635	77 (71 to 81)	31	0.91 (0.78-1.05)	1.50 (1.33-1.69)	2.07 (1.87-2.29)	3.72 (3.37-4.10)	5.35 (4.74-6.03)	*6.27 (5.39-7.29)*
Charnley Cemented Stem[St] : Charnley Cemented Cup[C]	4,673	72 (66 to 78)	38	0.32 (0.20-0.54)	1.13 (0.86-1.48)	1.84 (1.48-2.28)	3.75 (3.20-4.39)	6.16 (5.35-7.08)	*8.84 (7.34-10.64)*
Charnley Cemented Stem[St] : Charnley Ogee[C]	10,580	73 (67 to 78)	38	0.37 (0.27-0.51)	1.21 (1.01-1.44)	1.86 (1.61-2.14)	3.63 (3.26-4.04)	5.86 (5.30-6.47)	*7.85 (6.85-8.99)*
Charnley Cemented Stem[St] : Charnley and Elite Plus LPW[C]	7,089	74 (68 to 79)	29	0.38 (0.26-0.56)	0.78 (0.60-1.02)	1.17 (0.94-1.46)	2.43 (2.06-2.86)	3.96 (3.41-4.61)	*5.04 (4.24-5.97)*
Excia Cemented Stem[St] : Chirulen[C]	2,007	78 (72 to 82)	22	1.00 (0.65-1.55)	1.47 (1.01-2.12)	1.78 (1.26-2.52)	*4.32 (2.76-6.72)*		
Exeter V40[St] : Cenator Cemented Cup[C]	2,514	75 (69 to 80)	32	0.64 (0.39-1.04)	1.39 (0.99-1.94)	2.01 (1.52-2.66)	2.72 (2.12-3.50)	4.21 (3.33-5.31)	*6.04 (4.54-8.02)*
Exeter V40[St] : Charnley and Elite Plus LPW[C]	5,574	73 (68 to 79)	31	0.69 (0.50-0.94)	1.25 (0.99-1.58)	1.54 (1.24-1.91)	2.21 (1.82-2.69)	2.88 (2.30-3.59)	*3.37 (2.55-4.43)*
Exeter V40[St] : Elite Plus Cemented Cup[C]	5,226	73 (67 to 79)	32	0.33 (0.20-0.53)	0.65 (0.46-0.91)	0.90 (0.67-1.20)	1.48 (1.16-1.88)	2.98 (2.35-3.78)	*4.68 (3.20-6.81)*
Exeter V40[St] : Elite Plus Ogee[C]	27,145	74 (69 to 80)	35	0.40 (0.33-0.48)	0.86 (0.75-0.98)	1.19 (1.06-1.33)	2.13 (1.94-2.33)	3.26 (2.96-3.60)	*4.29 (3.76-4.90)*
Exeter V40[St] : Exeter Contemporary Flanged[C]	107,395	75 (69 to 80)	34	0.59 (0.55-0.64)	1.02 (0.96-1.09)	1.36 (1.29-1.44)	2.33 (2.22-2.45)	4.26 (4.01-4.52)	*6.04 (5.47-6.66)*
Exeter V40[St] : Exeter Contemporary Hooded[C]	29,192	75 (70 to 80)	32	0.95 (0.85-1.07)	1.62 (1.48-1.77)	2.17 (2.00-2.35)	3.97 (3.71-4.24)	7.26 (6.77-7.80)	*10.22 (9.22-11.32)*
Exeter V40[St] : Exeter Duration[C]	16,943	73 (67 to 79)	32	0.59 (0.49-0.72)	1.17 (1.02-1.35)	1.61 (1.43-1.82)	3.67 (3.37-3.99)	6.86 (6.34-7.42)	*10.51 (9.12-12.11)*
Exeter V40[St] : Exeter X3 Rimfit[C]	56,792	72 (65 to 78)	33	0.52 (0.46-0.58)	0.85 (0.77-0.93)	1.15 (1.06-1.26)	1.81 (1.64-1.99)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (a) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Marathon[C]	11,221	72 (65 to 79)	34	0.57 (0.45-0.73)	0.87 (0.70-1.06)	1.13 (0.94-1.37)	1.78 (1.44-2.19)	*2.98 (1.83-4.84)*	
Exeter V40[St] : Opera[C]	2,831	74 (68 to 80)	32	0.39 (0.22-0.71)	0.84 (0.56-1.27)	1.28 (0.92-1.79)	3.00 (2.37-3.80)	8.05 (6.48-9.98)	*14.52 (10.94-19.15)*
MS-30[St] : Original ME Muller Low Profile Cup[C]	4,394	75 (69 to 81)	32	0.23 (0.12-0.43)	0.50 (0.33-0.77)	0.69 (0.48-1.00)	1.50 (1.12-2.02)	3.15 (2.32-4.29)	*3.39 (2.47-4.65)*
Muller Straight Stem[St] : Original ME Muller Low Profile Cup[C]	3,167	75 (70 to 80)	27	0.48 (0.29-0.79)	0.89 (0.61-1.30)	1.27 (0.92-1.75)	2.74 (2.14-3.51)	4.74 (3.63-6.18)	*6.97 (4.81-10.05)*
Muller-Biomet[St] : Apollo[C]	2,207	74 (69 to 80)	39	0.64 (0.38-1.08)	1.21 (0.83-1.78)	1.36 (0.95-1.96)	2.35 (1.75-3.15)	4.40 (3.39-5.71)	*6.47 (4.53-9.22)*
Stanmore Modular Stem[St] : Stanmore-Arcom Cup[C]	5,420	75 (70 to 80)	29	0.45 (0.30-0.67)	1.09 (0.84-1.40)	1.56 (1.25-1.94)	2.55 (2.12-3.06)	4.35 (3.63-5.20)	*8.01 (5.12-12.42)*
Uncemented									
Accolade[St] : Trident Cementless Cup[SL]	27,143	66 (59 to 72)	44	0.95 (0.84-1.07)	1.90 (1.74-2.07)	2.52 (2.34-2.72)	3.87 (3.64-4.13)	5.66 (5.29-6.06)	*6.49 (5.74-7.34)*
Accolade II[St] : Trident Cementless Cup[SL]	28,346	64 (57 to 72)	47	0.82 (0.72-0.94)	1.28 (1.14-1.43)	1.57 (1.40-1.76)	*2.10 (1.56-2.83)*		
Accolade II[St] : Trident II[SL]	2,096	64 (56 to 71)	48	0.59 (0.33-1.08)	*1.19 (0.51-2.74)*	*1.19 (0.51-2.74)*			
Accolade II[St] : Tritanium[SL]	3,913	62 (55 to 70)	52	0.91 (0.65-1.28)	1.44 (1.07-1.92)	2.16 (1.65-2.83)	*2.35 (1.79-3.09)*		
Anthology[St] : R3 Cementless[SL]	5,710	62 (53 to 70)	42	1.03 (0.80-1.33)	1.64 (1.33-2.01)	1.99 (1.64-2.41)	2.65 (2.20-3.19)	*3.39 (2.65-4.34)*	
Corail[St] : ASR Resurfacing Cup[C]	2,745	61 (54 to 67)	54	1.02 (0.71-1.48)	7.47 (6.54-8.52)	23.62 (22.06-25.28)	43.87 (41.98-45.82)	48.84 (46.89-50.83)	
Corail[St] : Delta TT[SL]	2,126	68 (60 to 76)	38	1.13 (0.76-1.68)	2.10 (1.57-2.81)	2.65 (2.04-3.43)	3.85 (3.07-4.81)		
Corail[St] : Duraloc Cementless Cup[SL]	4,032	70 (64 to 75)	39	0.75 (0.52-1.07)	1.67 (1.31-2.12)	2.45 (2.00-2.98)	5.39 (4.70-6.19)	10.48 (9.40-11.68)	*14.89 (13.16-16.82)*
Corail[St] : Pinnacle Gription[SL]	27,560	66 (58 to 73)	43	0.64 (0.55-0.75)	1.18 (1.04-1.35)	1.64 (1.44-1.86)	2.25 (1.92-2.63)		
Corail[St] : Pinnacle[SL]	201,407	66 (59 to 73)	45	0.75 (0.71-0.79)	1.38 (1.33-1.44)	1.96 (1.89-2.02)	3.83 (3.72-3.93)	6.20 (6.00-6.41)	
Corail[St] : Trident Cementless Cup[SL]	2,135	70 (62 to 77)	41	0.80 (0.50-1.29)	1.19 (0.81-1.76)	1.47 (1.03-2.10)	2.84 (2.09-3.83)		
Corail[St] : Trilogy[SL]	3,315	67 (60 to 74)	40	0.58 (0.37-0.90)	1.07 (0.77-1.49)	1.59 (1.21-2.09)	2.69 (2.15-3.35)	3.46 (2.77-4.32)	*7.80 (4.88-12.36)*
Corail[St] : Trinity[SL]	2,159	69 (61 to 75)	34	0.84 (0.53-1.32)	1.32 (0.91-1.90)	1.68 (1.21-2.33)	2.41 (1.80-3.22)		
Excia Cementless Stem[St] : Plasmacup SC[SL]	2,454	67 (60 to 73)	48	0.90 (0.59-1.36)	1.53 (1.11-2.10)	1.61 (1.18-2.20)	2.40 (1.83-3.14)	*3.87 (2.50-5.95)*	
Furlong Evolution Cementless[St] : Furlong HAC CSF Plus[SL]	6,820	61 (52 to 69)	39	1.19 (0.95-1.48)	1.67 (1.38-2.01)	1.91 (1.60-2.29)	2.36 (1.97-2.82)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (a) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
Furlong HAC Stem[St] : CSF[SL]	17,143	69 (63 to 76)	40	1.10 (0.96-1.27)	1.82 (1.63-2.04)	2.21 (2.00-2.44)	3.53 (3.25-3.83)	5.04 (4.66-5.44)	6.08 (5.51-6.72)
Furlong HAC Stem[St] : Furlong HAC CSF Plus[SL]	25,804	66 (59 to 73)	45	1.09 (0.97-1.22)	1.72 (1.56-1.88)	1.99 (1.83-2.17)	2.60 (2.39-2.81)	3.54 (3.16-3.97)	
M/L Taper Cementless[St] : Continuum[SL]	6,460	61 (53 to 68)	49	1.23 (0.99-1.53)	1.76 (1.46-2.11)	2.11 (1.78-2.49)	2.91 (2.49-3.40)		
M/L Taper Cementless[St] : Trilogy IT[SL]	6,289	63 (55 to 70)	52	1.19 (0.95-1.49)	1.86 (1.55-2.24)	2.19 (1.84-2.59)	2.94 (2.40-3.59)		
MetaFix Stem[St] : Trinity[SL]	10,710	64 (56 to 70)	47	0.75 (0.60-0.94)	1.05 (0.87-1.28)	1.39 (1.16-1.67)	2.39 (1.97-2.92)		
MiniHip[St] : Trinity[SL]	2,885	56 (49 to 63)	47	1.47 (1.09-1.98)	2.15 (1.68-2.77)	2.46 (1.94-3.11)	3.06 (2.43-3.84)		
Polarstem Cementless[St] : R3 Cementless[SL]	33,697	65 (58 to 72)	47	0.68 (0.60-0.78)	0.91 (0.81-1.03)	1.13 (1.01-1.27)	1.89 (1.61-2.22)		
Profemur L Modular[St] : Procotyl L[SL]	2,367	61 (53 to 69)	46	1.10 (0.75-1.62)	2.28 (1.75-2.98)	3.05 (2.42-3.84)	4.90 (4.06-5.91)	*7.02 (4.98-9.86)*	
S-Rom Cementless Stem[St] : Pinnacle[SL]	2,200	52 (39 to 64)	40	2.47 (1.90-3.21)	4.73 (3.91-5.72)	6.52 (5.54-7.67)	11.88 (10.48-13.46)	14.14 (12.51-15.95)	*16.12 (13.92-18.63)*
SL-Plus Cementless Stem[St] : EP-Fit Plus[SL]	3,793	66 (59 to 74)	42	1.46 (1.12-1.89)	3.13 (2.62-3.74)	4.48 (3.86-5.21)	7.07 (6.25-7.99)	9.08 (8.08-10.20)	
Summit Cementless Stem[St] : Pinnacle[SL]	2,848	55 (47 to 63)	51	0.82 (0.55-1.24)	1.21 (0.86-1.71)	1.60 (1.16-2.19)	2.64 (1.90-3.65)	*3.22 (2.30-4.49)*	
Synergy Cementless Stem[St] : R3 Cementless[SL]	4,224	65 (57 to 71)	52	0.90 (0.66-1.24)	1.26 (0.96-1.66)	1.60 (1.25-2.04)	2.42 (1.94-3.01)	*5.90 (3.55-9.71)*	
Taperloc Cementless Stem[St] : Exceed ABT[SL]	28,156	65 (58 to 72)	45	1.09 (0.98-1.22)	1.50 (1.36-1.65)	1.75 (1.60-1.92)	2.25 (2.07-2.45)	2.74 (2.46-3.05)	
Taperloc Complete Cementless Stem[St] : Continuum[SL]	2,103	58 (51 to 65)	54	0.90 (0.57-1.43)	1.46 (0.99-2.16)	1.57 (1.07-2.30)			
Taperloc Complete Cementless Stem[St] : Exceed ABT[SL]	3,876	63 (55 to 70)	50	0.88 (0.63-1.23)	1.36 (1.03-1.77)	1.55 (1.20-2.00)	2.07 (1.61-2.66)		
Taperloc Complete Cementless Stem[St] : G7 Cementless Acetabular Component[SL]	4,061	64 (57 to 72)	48	0.62 (0.42-0.92)	0.89 (0.62-1.27)	0.94 (0.66-1.34)			

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (a) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Tri-Lock BPS[St] : Pinnacle Gription[SL]	2,317	64 (57 to 72)	48	0.70 (0.43-1.14)	1.34 (0.92-1.94)	1.93 (1.39-2.67)	2.59 (1.91-3.52)		
Tri-Lock BPS[St] : Pinnacle[SL]	2,372	63 (56 to 70)	50	1.02 (0.68-1.52)	1.43 (1.02-2.00)	1.83 (1.35-2.48)	2.65 (2.00-3.49)		
TriFit TS hip stem[St] : Trinity[SL]	2,375	56 (50 to 63)	57	0.81 (0.52-1.27)	1.66 (1.20-2.30)	1.86 (1.36-2.54)	*2.14 (1.57-2.92)*		
Hybrid									
C-Stem AMT Cemented Stem[St] : Pinnacle Gription[SL]	11,120	74 (66 to 79)	35	0.75 (0.60-0.93)	1.10 (0.88-1.37)	1.76 (1.34-2.30)	*2.31 (1.38-3.84)*		
C-Stem AMT Cemented Stem[St] : Pinnacle[SL]	28,572	72 (65 to 77)	38	0.68 (0.59-0.79)	1.13 (1.00-1.27)	1.40 (1.25-1.56)	2.30 (2.01-2.63)	2.54 (2.15-3.00)	
CPCS[St] : R3 Cementless[SL]	8,249	74 (68 to 79)	32	0.70 (0.54-0.91)	1.16 (0.93-1.44)	1.49 (1.21-1.85)	*2.31 (1.52-3.50)*		
CPT CoCr Stem[St] : Continuum[SL]	15,993	70 (63 to 77)	37	1.48 (1.30-1.68)	2.09 (1.87-2.34)	2.59 (2.33-2.88)	3.70 (3.26-4.20)		
CPT CoCr Stem[St] : Trabecular Metal Modular Cementless Cup[SL]	3,230	72 (65 to 79)	32	1.07 (0.77-1.50)	1.87 (1.44-2.42)	2.33 (1.84-2.96)	3.90 (3.15-4.83)	*5.37 (4.04-7.11)*	
CPT CoCr Stem[St] : Trilogy IT[SL]	16,748	70 (63 to 76)	37	1.10 (0.95-1.27)	1.68 (1.49-1.90)	2.06 (1.83-2.31)	3.12 (2.68-3.63)		
CPT CoCr Stem[St] : Trilogy[SL]	27,531	71 (65 to 77)	36	0.87 (0.76-0.98)	1.40 (1.27-1.55)	2.03 (1.86-2.21)	3.44 (3.18-3.73)	4.84 (4.39-5.33)	*5.75 (5.03-6.57)*
Exeter No.1 125mm stem Line Extension[St] : Trident Cementless Cup[SL]	2,825	68 (59 to 75)	33	0.77 (0.50-1.20)	1.05 (0.71-1.56)	1.29 (0.85-1.95)			
Exeter V40[St] : ABG II Cementless Cup[SL]	2,690	65 (59 to 73)	34	0.26 (0.12-0.55)	0.68 (0.43-1.08)	1.11 (0.77-1.60)	2.19 (1.68-2.87)	3.91 (3.13-4.87)	*5.56 (4.24-7.28)*
Exeter V40[St] : Pinnacle[SL]	11,743	72 (64 to 78)	39	0.77 (0.62-0.94)	1.12 (0.94-1.34)	1.37 (1.16-1.61)	2.35 (1.99-2.78)	3.20 (2.63-3.88)	
Exeter V40[St] : R3 Cementless[SL]	4,158	73 (66 to 79)	31	0.77 (0.54-1.09)	1.21 (0.91-1.62)	1.61 (1.24-2.10)	2.10 (1.56-2.83)		
Exeter V40[St] : Reflection Cementless[SL]	2,440	72 (66 to 78)	38	0.62 (0.37-1.02)	1.13 (0.77-1.64)	1.53 (1.11-2.12)	3.32 (2.63-4.19)	5.55 (4.53-6.79)	*7.91 (5.68-10.96)*
Exeter V40[St] : Restoration ADM LIner[DM] : Trident Cementless Cup[SL]	4,616	74 (66 to 80)	36	0.92 (0.67-1.25)	1.42 (1.08-1.86)	1.59 (1.21-2.09)	*2.26 (1.46-3.48)*		
Exeter V40[St] : Trident Cementless Cup[SL]	161,512	70 (62 to 76)	39	0.63 (0.60-0.67)	1.04 (0.98-1.09)	1.37 (1.30-1.43)	2.30 (2.19-2.41)	3.53 (3.32-3.75)	*4.61 (4.15-5.12)*
Exeter V40[St] : Trident II[SL]	3,596	70 (61 to 77)	37	0.42 (0.25-0.71)	*0.65 (0.36-1.19)*				

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (a) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Trilogy[SL]	15,529	70 (63 to 76)	41	0.57 (0.46-0.70)	0.89 (0.75-1.06)	1.24 (1.08-1.44)	2.10 (1.87-2.37)	3.25 (2.89-3.65)	*4.25 (3.65-4.94)*
Exeter V40[St] : Tritanium[SL]	11,148	68 (60 to 75)	44	0.93 (0.77-1.13)	1.47 (1.25-1.75)	1.88 (1.60-2.21)	2.87 (2.39-3.45)		
TaperFit Cemented Stem[St] : Trinity[SL]	9,536	72 (65 to 77)	34	0.92 (0.74-1.13)	1.36 (1.14-1.63)	1.52 (1.28-1.81)	2.25 (1.71-2.96)		
Taperloc Cemented Stem[St] : Exceed ABT[SL]	2,635	75 (70 to 80)	25	0.69 (0.44-1.10)	0.93 (0.62-1.40)	1.12 (0.76-1.66)	*1.42 (0.91-2.21)*		
Reverse hybrid									
Corail[St] : Charnley and Elite Plus LPW[C]	2,318	71 (66 to 76)	33	0.83 (0.53-1.29)	1.41 (1.00-1.99)	1.65 (1.20-2.27)	2.87 (2.20-3.76)	*3.88 (2.92-5.15)*	
Corail[St] : Elite Plus Cemented Cup[C]	2,077	72 (67 to 78)	36	0.39 (0.19-0.77)	0.78 (0.48-1.28)	1.22 (0.82-1.82)	2.32 (1.68-3.21)	4.51 (3.29-6.16)	
Corail[St] : Elite Plus Ogee[C]	3,172	72 (65 to 77)	37	0.66 (0.43-1.02)	1.45 (1.09-1.94)	1.84 (1.42-2.39)	2.88 (2.29-3.62)	5.14 (4.01-6.57)	
Corail[St] : Marathon[C]	21,838	70 (64 to 76)	39	0.59 (0.49-0.70)	1.01 (0.88-1.16)	1.27 (1.11-1.44)	2.08 (1.82-2.39)	*4.00 (2.98-5.36)*	
Resurfacing									
ASR Resurfacing Cup	2,942	55 (49 to 60)	68	1.67 (1.26-2.20)	5.83 (5.04-6.74)	13.17 (11.99-14.45)	26.00 (24.43-27.64)	30.11 (28.46-31.83)	
Adept Resurfacing Cup	4,394	54 (47 to 59)	79	1.12 (0.84-1.48)	2.41 (1.98-2.93)	4.33 (3.74-5.02)	7.67 (6.85-8.59)	10.15 (9.16-11.23)	
BHR Resurfacing Cup	24,517	55 (48 to 60)	77	1.00 (0.88-1.13)	2.23 (2.05-2.43)	3.41 (3.19-3.65)	7.06 (6.73-7.41)	9.90 (9.49-10.33)	12.51 (11.90-13.15)
Conserve Plus Resurfacing Cup	1,259	57 (50 to 61)	64	2.15 (1.48-3.12)	5.34 (4.23-6.74)	8.47 (7.06-10.16)	14.23 (12.40-16.31)	16.80 (14.79-19.04)	
Cormet 2000 Resurfacing Cup	3,662	55 (48 to 60)	65	1.50 (1.16-1.95)	3.73 (3.16-4.39)	7.65 (6.83-8.56)	16.71 (15.53-17.97)	22.08 (20.74-23.49)	*26.15 (23.98-28.48)*
Durom Resurfacing Cup	1,697	55 (49 to 60)	70	1.36 (0.90-2.03)	3.60 (2.82-4.61)	5.51 (4.52-6.71)	8.53 (7.29-9.97)	10.48 (9.09-12.07)	
Recap Magnum	1,682	54 (49 to 59)	73	1.96 (1.40-2.75)	3.28 (2.53-4.25)	5.50 (4.51-6.71)	10.01 (8.66-11.55)	12.63 (11.08-14.39)	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) KM estimates of cumulative revision (95% CI) of primary hip replacement by fixation, and stem / head / cup brand (and liner in the case of modular acetabular components). *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Cemented									
C-Stem AMT Cemented[St] : Articul/eze[H] : Charnley and Elite Plus LPW[C]	3,452	75 (70 to 79)	30	0.61 (0.40-0.94)	1.34 (1.00-1.79)	1.67 (1.28-2.16)	2.60 (2.07-3.27)	4.29 (3.31-5.54)	
C-Stem AMT Cemented[St] : Articul/eze[H] : Elite Plus Ogee[C]	5,077	77 (72 to 81)	34	0.30 (0.18-0.49)	0.96 (0.72-1.27)	1.37 (1.06-1.75)	2.18 (1.73-2.76)	*3.11 (2.32-4.18)*	
C-Stem AMT Cemented[St] : Articul/eze[H] : Marathon[C]	24,500	75 (70 to 80)	32	0.58 (0.49-0.68)	0.98 (0.85-1.12)	1.29 (1.13-1.48)	2.01 (1.69-2.38)	*2.81 (1.97-4.00)*	
C-Stem Cemented[St] : Elite[H] : Charnley and Elite Plus LPW[C]	1,936	72 (68 to 77)	32	0.47 (0.24-0.89)	1.21 (0.81-1.82)	1.83 (1.31-2.55)	2.85 (2.16-3.77)	3.84 (2.96-4.97)	*6.75 (3.64-12.37)*
C-Stem Cemented[St] : Ceramax[H] : Elite Plus Ogee[C]	748	62 (58 to 65)	44	0.00 (.-.)	0.28 (0.07-1.10)	0.73 (0.31-1.76)	1.66 (0.85-3.23)	*3.18 (1.60-6.25)*	
C-Stem Cemented[St] : Elite[H] : Elite Plus Ogee[C]	5,440	73 (68 to 78)	38	0.46 (0.31-0.69)	0.97 (0.74-1.27)	1.27 (0.99-1.61)	2.79 (2.30-3.37)	4.58 (3.81-5.50)	*5.80 (4.60-7.32)*
C-Stem Cemented[St] : Ceramax[H] : Marathon[C]	4,402	59 (52 to 65)	46	0.55 (0.37-0.81)	1.04 (0.77-1.39)	1.49 (1.16-1.91)	2.44 (1.94-3.07)	*3.42 (2.51-4.64)*	
C-Stem Cemented[St] : Elite[H] : Marathon[C]	5,738	73 (68 to 78)	37	0.35 (0.23-0.54)	0.83 (0.62-1.10)	1.22 (0.96-1.56)	1.96 (1.55-2.47)	*3.83 (2.30-6.34)*	
C-Stem Cemented[St] : Ceramax[H] : Opera[C]	687	58 (51 to 63)	44	0.44 (0.14-1.35)	0.73 (0.30-1.74)	1.47 (0.79-2.71)	3.31 (2.19-4.98)	6.09 (4.40-8.40)	
C-Stem Cemented[St] : Elite[H] : Opera[C]	1,587	71 (66 to 76)	39	0.44 (0.21-0.93)	1.03 (0.63-1.68)	1.58 (1.06-2.35)	4.12 (3.18-5.33)	9.75 (7.89-12.03)	*20.87 (14.77-29.03)*
C-Stem Cemented[St] : Ceramax[H] : Wroblewski Golf Ball[C]	1,071	61 (54 to 66)	43	0.28 (0.09-0.87)	0.76 (0.38-1.50)	1.05 (0.58-1.88)	2.30 (1.53-3.44)	3.70 (2.60-5.27)	
C-Stem Cemented[St] : Elite[H] : Wroblewski Golf Ball[C]	1,134	72 (67 to 77)	37	0.36 (0.13-0.95)	0.91 (0.49-1.68)	1.68 (1.06-2.65)	2.96 (2.06-4.24)	5.12 (3.66-7.15)	*6.83 (4.67-9.94)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
CCA SS Cemented[St] : SS[H] : CCB[C]	1,944	74 (70 to 80)	31	0.36 (0.17-0.76)	0.84 (0.52-1.37)	1.59 (1.11-2.28)	5.20 (4.13-6.53)	*8.28 (6.37-10.72)*	
CPCS[St] : Oxinium Ball[H] : Reflection Cemented[C]	727	72 (66 to 78)	37	0.56 (0.21-1.48)	0.93 (0.41-2.07)	1.61 (0.82-3.13)	*3.02 (1.56-5.83)*		
CPCS[St] : Smith Nephew Femoral[H] : Reflection Cemented[C]	1,972	78 (74 to 83)	29	0.58 (0.32-1.05)	1.33 (0.88-2.03)	1.93 (1.32-2.81)	*3.55 (2.42-5.19)*		
CPT CoCr[St] : CPT[H] : Avantage Liner[DM] : Avantage Cemented[C]	1,167	78 (72 to 83)	29	0.91 (0.49-1.68)	1.66 (0.98-2.79)	*2.27 (1.31-3.89)*			
CPT CoCr[St] : CPT[H] : Elite Plus Ogee[C]	2,466	73 (67 to 79)	36	0.57 (0.34-0.96)	1.46 (1.05-2.02)	2.17 (1.65-2.85)	3.86 (3.11-4.78)	5.48 (4.42-6.78)	
CPT CoCr[St] : CPT[H] : Exceed ABT Cemented[C]	2,581	76 (72 to 81)	35	0.94 (0.63-1.42)	1.31 (0.91-1.90)	1.70 (1.18-2.43)			
CPT CoCr[St] : Zimmer Biolox[H] : Exceed ABT Cemented[C]	516	62 (56 to 66)	41	1.40 (0.67-2.92)	*2.70 (1.47-4.94)*	*2.70 (1.47-4.94)*			
CPT CoCr[St] : CPT[H] : Low Profile Durasul[C]	2,130	75 (70 to 80)	34	0.47 (0.26-0.88)	1.16 (0.77-1.75)	1.76 (1.25-2.47)	3.33 (2.49-4.44)		
CPT CoCr[St] : CPT[H] : ZCA[C]	18,060	77 (72 to 82)	30	0.97 (0.84-1.13)	1.59 (1.41-1.78)	2.17 (1.96-2.41)	3.85 (3.49-4.25)	5.37 (4.76-6.06)	*6.25 (5.35-7.29)*
CPT CoCr[St] : Zimmer Biolox[H] : ZCA[C]	1,278	69 (59 to 77)	34	0.16 (0.04-0.65)	0.36 (0.13-0.95)	0.66 (0.29-1.51)	*2.92 (0.93-8.97)*		
Charnley Cemented[St] : Charnley Cemented[C]	4,673	72 (66 to 78)	38	0.32 (0.20-0.54)	1.13 (0.86-1.48)	1.84 (1.48-2.28)	3.75 (3.20-4.39)	6.16 (5.35-7.08)	*8.84 (7.34-10.64)*
Charnley Cemented[St] : Charnley Ogee[C]	10,580	73 (67 to 78)	38	0.37 (0.27-0.51)	1.21 (1.01-1.44)	1.86 (1.61-2.14)	3.63 (3.26-4.04)	5.86 (5.30-6.47)	*7.85 (6.85-8.99)*
Charnley Cemented[St] : Charnley and Elite Plus LPW[C]	7,089	74 (68 to 79)	29	0.38 (0.26-0.56)	0.78 (0.60-1.02)	1.17 (0.94-1.46)	2.43 (2.06-2.86)	3.96 (3.41-4.61)	*5.04 (4.24-5.97)*
Excia Cemented[St] : Aesculap Biolox Delta[H] : Chirulen[C]	554	75 (68 to 80)	32	0.73 (0.28-1.94)	0.93 (0.39-2.23)	*1.37 (0.58-3.22)*	*1.37 (0.58-3.22)*		
Excia Cemented[St] : Isodur Modular[H] : Chirulen[C]	1,427	79 (73 to 83)	19	1.13 (0.69-1.84)	1.67 (1.12-2.51)	1.97 (1.34-2.88)	*4.77 (2.78-8.14)*		
Exeter V40[St] : Orthinox V40[H] : Cenator Cemented[C]	2,431	75 (70 to 80)	32	0.66 (0.41-1.08)	1.44 (1.03-2.01)	2.03 (1.53-2.70)	2.78 (2.16-3.57)	4.27 (3.37-5.41)	*6.11 (4.59-8.11)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Orthinox V40[H] : Charnley and Elite Plus LPW[C]	4,359	75 (71 to 80)	28	0.74 (0.52-1.04)	1.27 (0.98-1.66)	1.57 (1.23-1.99)	2.48 (1.99-3.07)	3.36 (2.63-4.28)	*3.96 (2.95-5.31)*
Exeter V40[St] : V40 Modular[H] : Charnley and Elite Plus LPW[C]	1,215	66 (63 to 70)	42	0.49 (0.22-1.10)	1.16 (0.69-1.96)	1.44 (0.90-2.30)	1.44 (0.90-2.30)	*1.44 (0.90-2.30)*	
Exeter V40[St] : Orthinox V40[H] : Elite Plus Cemented[C]	4,422	74 (68 to 79)	33	0.39 (0.24-0.62)	0.69 (0.48-0.99)	0.87 (0.63-1.20)	1.44 (1.10-1.88)	2.66 (2.05-3.45)	*4.53 (2.96-6.90)*
Exeter V40[St] : V40 Modular[H] : Elite Plus Cemented[C]	802	66 (59 to 74)	30	0.00 (.-.)	0.39 (0.12-1.19)	1.07 (0.54-2.13)	1.67 (0.95-2.93)	*5.67 (2.72-11.62)*	
Exeter V40[St] : Orthinox V40[H] : Elite Plus Ogee[C]	23,924	75 (70 to 80)	34	0.38 (0.31-0.47)	0.85 (0.74-0.98)	1.17 (1.03-1.32)	2.10 (1.90-2.31)	3.22 (2.90-3.57)	*4.31 (3.74-4.97)*
Exeter V40[St] : V40 Modular[H] : Elite Plus Ogee[C]	3,214	68 (62 to 74)	41	0.53 (0.33-0.85)	0.88 (0.61-1.28)	1.37 (1.01-1.86)	2.37 (1.83-3.08)	3.58 (2.75-4.66)	*3.99 (2.92-5.44)*
Exeter V40[St] : Orthinox V40[H] : Exeter Contemporary Flanged[C]	91,244	75 (70 to 80)	34	0.57 (0.53-0.63)	1.00 (0.93-1.06)	1.33 (1.25-1.41)	2.29 (2.17-2.42)	4.16 (3.90-4.44)	*5.99 (5.38-6.66)*
Exeter V40[St] : V40 Modular[H] : Exeter Contemporary Flanged[C]	16,138	72 (65 to 78)	35	0.70 (0.58-0.84)	1.17 (1.01-1.35)	1.56 (1.37-1.78)	2.58 (2.28-2.91)	4.95 (4.18-5.87)	
Exeter V40[St] : Orthinox V40[H] : Exeter Contemporary Hooded[C]	24,541	76 (70 to 81)	32	0.94 (0.83-1.07)	1.57 (1.42-1.74)	2.12 (1.94-2.31)	3.89 (3.62-4.18)	7.24 (6.72-7.81)	*10.14 (9.10-11.28)*
Exeter V40[St] : V40 Modular[H] : Exeter Contemporary Hooded[C]	4,646	74 (67 to 80)	31	1.02 (0.77-1.35)	1.85 (1.50-2.29)	2.43 (2.02-2.93)	4.46 (3.75-5.31)	*7.07 (5.65-8.82)*	*10.76 (7.45-15.40)*
Exeter V40[St] : Orthinox V40[H] : Exeter Duration[C]	15,883	74 (68 to 79)	32	0.62 (0.50-0.75)	1.20 (1.04-1.38)	1.65 (1.46-1.87)	3.72 (3.41-4.06)	6.89 (6.35-7.48)	*11.03 (9.46-12.84)*
Exeter V40[St] : V40 Modular[H] : Exeter Duration[C]	1,053	64 (58 to 70)	38	0.29 (0.09-0.88)	0.67 (0.32-1.41)	0.87 (0.46-1.67)	2.81 (1.93-4.07)	6.24 (4.60-8.45)	*6.24 (4.60-8.45)*
Exeter V40[St] : Orthinox V40[H] : Exeter X3 Rimfit[C]	30,379	74 (68 to 79)	28	0.47 (0.40-0.55)	0.79 (0.69-0.91)	1.00 (0.89-1.14)	1.57 (1.36-1.80)		
Exeter V40[St] : V40 Modular[H] : Exeter X3 Rimfit[C]	26,405	68 (61 to 76)	38	0.58 (0.49-0.68)	0.91 (0.79-1.04)	1.33 (1.18-1.50)	2.08 (1.82-2.37)		
Exeter V40[St] : Orthinox V40[H] : Marathon[C]	7,257	76 (70 to 80)	32	0.57 (0.42-0.78)	0.87 (0.68-1.13)	1.09 (0.86-1.38)	1.74 (1.33-2.26)		
Exeter V40[St] : V40 Modular[H] : Marathon[C]	3,962	65 (58 to 71)	39	0.57 (0.37-0.86)	0.85 (0.60-1.22)	1.22 (0.89-1.67)	1.86 (1.33-2.59)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Orthinox V40[H] : Novae Liner[DM] : Novae Stick[C]	985	78 (70 to 84)	27	0.34 (0.11-1.05)	1.07 (0.53-2.14)	1.93 (1.08-3.45)	*4.16 (1.41-11.92)*		
Exeter V40[St] : V40 Modular[H] : Novae Liner[DM] : Novae Stick[C]	295	75 (68 to 82)	32	*0.75 (0.19-2.96)*	*0.75 (0.19-2.96)*	*0.75 (0.19-2.96)*			
Exeter V40[St] : Orthinox V40[H] : Opera[C]	2,651	75 (69 to 80)	31	0.38 (0.21-0.71)	0.86 (0.57-1.31)	1.33 (0.95-1.87)	3.15 (2.48-3.99)	8.17 (6.57-10.15)	*14.70 (11.08-19.35)*
MS-30[St] : Original ME Muller Low Profile[C]	3,355	76 (69 to 81)	31	0.21 (0.10-0.44)	0.47 (0.28-0.77)	0.68 (0.44-1.04)	1.50 (1.09-2.06)	3.16 (2.30-4.32)	*3.39 (2.46-4.68)*
MS-30[St] : Zimmer Biolox[H] : Original ME Muller Low Profile[C]	1,025	73 (69 to 77)	34	0.30 (0.10-0.92)	0.63 (0.28-1.39)	0.75 (0.36-1.56)	*1.15 (0.58-2.27)*		
Muller Straight[St] : Original ME Muller Low Profile[C]	2,742	75 (70 to 80)	29	0.44 (0.25-0.78)	0.87 (0.58-1.31)	1.22 (0.86-1.73)	2.58 (1.97-3.36)	4.60 (3.48-6.07)	*6.86 (4.68-9.98)*
Muller-Biomet[St] : Apollo[C]	2,198	74 (69 to 80)	39	0.60 (0.35-1.03)	1.17 (0.79-1.73)	1.32 (0.91-1.91)	2.31 (1.72-3.11)	4.37 (3.36-5.68)	*6.44 (4.49-9.19)*
Stanmore Modular[St] : Stanmore-Arcom[C]	5,419	75 (70 to 80)	29	0.45 (0.30-0.67)	1.09 (0.84-1.41)	1.56 (1.26-1.94)	2.55 (2.12-3.06)	4.35 (3.63-5.20)	*8.01 (5.12-12.42)*
Uncemented									
Accolade[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	26,882	66 (59 to 72)	44	0.95 (0.84-1.07)	1.91 (1.75-2.08)	2.53 (2.35-2.73)	3.89 (3.65-4.14)	5.68 (5.30-6.08)	*6.51 (5.76-7.37)*
Accolade II[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	28,197	64 (57 to 71)	47	0.82 (0.72-0.94)	1.27 (1.13-1.42)	1.56 (1.39-1.75)	*2.10 (1.56-2.83)*		
Accolade II[St] : V40 Modular[H] : Trident[L] : Trident II[S]	2,093	64 (56 to 71)	48	0.59 (0.33-1.08)	*1.19 (0.51-2.75)*	*1.19 (0.51-2.75)*			
Accolade II[St] : V40 Modular[H] : Trident[L] : Tritanium[S]	3,887	62 (55 to 70)	52	0.92 (0.66-1.28)	1.45 (1.08-1.94)	2.17 (1.66-2.85)	*2.37 (1.80-3.11)*		
Anthology[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	4,375	63 (54 to 70)	39	1.03 (0.77-1.38)	1.65 (1.30-2.09)	1.92 (1.54-2.40)	2.24 (1.79-2.80)		
Anthology[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	1,294	60 (49 to 68)	52	1.01 (0.59-1.73)	1.57 (1.02-2.42)	1.75 (1.15-2.64)	2.51 (1.71-3.67)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Corail[St] : ASR Modular[H] : ASR Resurfacing[C]	2,745	61 (54 to 67)	54	1.02 (0.71-1.48)	7.47 (6.54-8.52)	23.62 (22.06-25.28)	43.87 (41.98-45.82)	48.84 (46.89-50.83)	
Corail[St] : Articul/eze[H] : Delta[L] : Delta TT[S]	2,046	68 (60 to 76)	36	1.13 (0.75-1.69)	1.98 (1.46-2.69)	2.45 (1.85-3.22)	3.70 (2.92-4.67)		
Corail[St] : Articul/eze[H] : Enduron[L] : Duraloc Cementless[S]	3,595	70 (64 to 75)	39	0.64 (0.43-0.96)	1.56 (1.20-2.02)	2.37 (1.91-2.93)	5.44 (4.70-6.29)	10.24 (9.11-11.50)	*15.52 (13.44-17.88)*
Corail[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	10,238	67 (59 to 74)	37	0.50 (0.38-0.67)	0.97 (0.74-1.27)	1.32 (1.01-1.73)	*1.82 (1.28-2.58)*		
Corail[St] : Articul/eze[H] : CeraMax[L] : Pinnacle Gription[S]	2,868	57 (49 to 64.5)	45	1.06 (0.74-1.52)	1.65 (1.23-2.20)	2.42 (1.89-3.10)	3.13 (2.42-4.05)		
Corail[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	14,354	67 (60 to 74)	48	0.64 (0.52-0.79)	1.21 (1.02-1.45)	1.55 (1.30-1.85)	2.08 (1.69-2.56)		
Corail[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	40,195	68 (61 to 75)	37	0.61 (0.54-0.69)	0.98 (0.88-1.08)	1.21 (1.09-1.33)	2.00 (1.74-2.29)		
Corail[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	45,428	59 (52 to 65)	49	0.83 (0.75-0.92)	1.73 (1.61-1.86)	2.34 (2.21-2.49)	3.67 (3.49-3.87)	5.27 (4.98-5.58)	
Corail[St] : Articul/eze[H] : Enduron[L] : Pinnacle[S]	9,231	70 (63 to 76)	36	0.87 (0.70-1.08)	1.56 (1.33-1.84)	1.91 (1.65-2.22)	3.55 (3.17-3.97)	5.51 (4.97-6.10)	
Corail[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	92,132	68 (61 to 74)	48	0.73 (0.68-0.79)	1.15 (1.08-1.22)	1.45 (1.37-1.54)	2.35 (2.22-2.48)	3.59 (3.27-3.95)	
Corail[St] : Articul/eze[H] : Ultamet[L] : Pinnacle[S]	13,624	66 (59 to 73)	46	0.83 (0.69-1.00)	2.49 (2.24-2.77)	5.09 (4.73-5.49)	12.66 (12.08-13.26)	17.15 (16.46-17.88)	
Corail[St] : Articul/eze[H] : Trident[L] : Trident Cementless[S]	1,896	71 (62 to 77)	37	0.85 (0.52-1.38)	1.29 (0.86-1.91)	1.54 (1.06-2.22)	2.97 (2.15-4.09)		
Corail[St] : Articul/eze[H] : Trilogy[L] : Trilogy[S]	3,154	67 (61 to 74)	40	0.54 (0.34-0.87)	1.00 (0.70-1.42)	1.51 (1.13-2.01)	2.55 (2.02-3.23)	3.35 (2.64-4.25)	
Corail[St] : Articul/eze[H] : Trinity[L] : Trinity[S]	2,127	69 (61 to 75)	34	0.85 (0.54-1.34)	1.34 (0.92-1.93)	1.70 (1.23-2.37)	2.45 (1.83-3.27)		
Excia Cementless[St] : Aesculap Biolox Delta[H] : Plasmacup SC[L] : Plasmacup SC[S]	625	66 (61 to 73)	50	0.64 (0.24-1.70)	1.29 (0.65-2.57)	1.29 (0.65-2.57)	*2.77 (1.56-4.91)*		
Excia Cementless[St] : Aesculap Biolox Delta[H] : Plasmacup[L] : Plasmacup SC[S]	1,309	66 (59 to 73)	50	0.85 (0.47-1.52)	1.08 (0.64-1.82)	1.16 (0.70-1.92)	1.66 (1.07-2.58)	*2.24 (1.38-3.62)*	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Furlong Evolution Cementless[St] : JRI Ceramic Femoral[H] : CSF II[L] : Furlong HAC CSF Plus[S]	6,597	61 (51 to 69)	39	1.12 (0.89-1.41)	1.53 (1.25-1.87)	1.79 (1.48-2.16)	2.23 (1.84-2.70)		
Furlong HAC[St] : JRI Ceramic Femoral[H] : CSF[L] : CSF[S]	9,036	66 (60 to 72)	42	0.88 (0.70-1.09)	1.51 (1.28-1.79)	1.93 (1.67-2.24)	2.98 (2.63-3.37)	4.42 (3.96-4.93)	5.06 (4.50-5.70)
Furlong HAC[St] : Tri-Fit Modular[H] : CSF[L] : CSF[S]	8,070	73 (67 to 78)	39	1.34 (1.11-1.61)	2.15 (1.85-2.49)	2.49 (2.17-2.86)	4.16 (3.71-4.66)	5.80 (5.19-6.48)	*8.05 (6.49-9.96)*
Furlong HAC[St] : JRI Ceramic Femoral[H] : CSF II[L] : Furlong HAC CSF Plus[S]	19,652	64 (57 to 70)	47	0.93 (0.80-1.07)	1.55 (1.39-1.74)	1.77 (1.59-1.96)	2.31 (2.09-2.54)	3.22 (2.79-3.70)	
Furlong HAC[St] : Tri-Fit Modular[H] : CSF II[L] : Furlong HAC CSF Plus[S]	6,082	74 (69 to 79)	39	1.59 (1.31-1.94)	2.24 (1.89-2.65)	2.70 (2.31-3.15)	3.56 (3.08-4.12)	*4.67 (3.90-5.57)*	
M/L Taper Cementless[St] : CPT[H] : Longevity[L] : Continuum[S]	2,127	69 (64 to 75)	45	1.09 (0.72-1.63)	1.53 (1.08-2.15)	1.90 (1.39-2.59)	2.88 (2.16-3.82)		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Longevity[L] : Continuum[S]	2,161	58 (52 to 65)	52	1.63 (1.17-2.27)	2.02 (1.50-2.72)	2.30 (1.74-3.05)	3.23 (2.43-4.30)		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Trilogy[L] : Continuum[S]	2,153	56 (49 to 62)	52	0.98 (0.64-1.49)	1.73 (1.25-2.37)	2.11 (1.58-2.81)	2.71 (2.09-3.50)		
M/L Taper Cementless[St] : CPT[H] : Longevity[L] : Trilogy IT[S]	2,515	70 (64 to 75)	44	1.20 (0.84-1.71)	1.86 (1.39-2.47)	2.32 (1.79-3.01)	*3.31 (2.43-4.50)*		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Longevity[L] : Trilogy IT[S]	2,763	60 (53 to 66)	58	1.33 (0.96-1.84)	1.89 (1.43-2.50)	2.21 (1.70-2.88)	*2.30 (1.76-2.99)*		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Trilogy[L] : Trilogy IT[S]	955	53 (47 to 59)	57	0.73 (0.35-1.53)	1.79 (1.11-2.86)	1.79 (1.11-2.86)	*2.89 (1.82-4.56)*		
MetaFix[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	9,128	62 (55 to 69)	47	0.71 (0.56-0.91)	0.98 (0.78-1.22)	1.31 (1.07-1.61)	2.14 (1.70-2.70)		
MetaFix[St] : Trinity Modular[H] : Trinity[L] : Trinity[S]	1,334	71 (67 to 76)	48	0.84 (0.46-1.51)	1.36 (0.85-2.18)	1.69 (1.09-2.62)	*3.78 (2.41-5.91)*		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
MiniHip[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	2,560	56 (48 to 63)	46	1.38 (0.99-1.92)	2.12 (1.62-2.77)	2.47 (1.91-3.17)	3.05 (2.38-3.91)		
Polarstem Cementless[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	27,580	65 (57 to 72)	47	0.67 (0.58-0.78)	0.90 (0.79-1.03)	1.11 (0.97-1.27)	2.07 (1.67-2.57)		
Polarstem Cementless[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	6,114	68 (60 to 73)	47	0.71 (0.53-0.96)	0.96 (0.74-1.25)	1.21 (0.95-1.54)	1.65 (1.27-2.16)		
Profemur L Modular[St] : Microport Delta Femoral[H] : Rim-Lock Ceramic[L] : Procotyl L[S]	1,340	57 (49 to 63)	47	1.34 (0.85-2.12)	2.64 (1.91-3.66)	3.45 (2.58-4.59)	5.26 (4.13-6.69)	*6.41 (4.87-8.42)*	
Profemur L Modular[St] : Transend Modular[H] : Rim-Lock Poly[L] : Procotyl L[S]	597	69 (64 to 74)	44	1.01 (0.46-2.24)	1.87 (1.04-3.35)	2.22 (1.29-3.79)	3.19 (2.02-5.02)	*3.19 (2.02-5.02)*	
S-Rom Cementless[St] : S-Rom[H] : CeraMax[L] : Pinnacle[S]	1,028	43 (33 to 53)	39	1.36 (0.81-2.29)	2.82 (1.96-4.06)	3.84 (2.80-5.27)	5.15 (3.87-6.85)	*5.54 (4.17-7.33)*	
S-Rom Cementless[St] : S-Rom[H] : Ultamet[L] : Pinnacle[S]	848	62 (53 to 70)	45	3.80 (2.70-5.33)	7.09 (5.54-9.05)	10.11 (8.23-12.39)	20.12 (17.45-23.14)	23.63 (20.70-26.90)	*25.05 (21.86-28.62)*
SL-Plus Cementless[St] : EP-Fit Plus[H] : EP-Fit Plus[L] : EP-Fit Plus[S]	2,584	66 (58 to 74)	43	1.52 (1.11-2.07)	3.34 (2.71-4.12)	4.91 (4.13-5.84)	7.82 (6.81-8.98)	9.87 (8.69-11.20)	
SL-Plus Cementless[St] : Oxinium Ball[H] : EP-Fit Plus[L] : EP-Fit Plus[S]	842	70 (61 to 77)	39	1.19 (0.64-2.20)	2.17 (1.37-3.42)	2.79 (1.86-4.17)	*3.40 (2.29-5.02)*		
Summit Cementless[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	2,386	54 (45 to 61)	50	0.81 (0.52-1.27)	1.17 (0.79-1.71)	1.36 (0.94-1.95)	1.44 (1.00-2.06)	*1.44 (1.00-2.06)*	
Synergy Cementless[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	2,790	65 (56 to 71)	52	0.90 (0.61-1.33)	1.13 (0.80-1.61)	1.38 (1.00-1.90)	1.90 (1.41-2.55)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Synergy Cementless[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	1,352	66 (58 to 72)	50	0.89 (0.51-1.56)	1.13 (0.68-1.87)	1.31 (0.82-2.11)	1.43 (0.90-2.26)	*2.07 (1.04-4.08)*	
Taperloc Cementless[St] : Exceed ABT[L] : Exceed ABT[S]	13,117	69 (62 to 75)	42	1.07 (0.91-1.26)	1.39 (1.20-1.61)	1.58 (1.37-1.81)	2.11 (1.85-2.41)	*3.65 (2.22-6.00)*	
Taperloc Cementless[St] : M2A[L] : Exceed ABT[S]	12,913	61 (54 to 67)	47	1.10 (0.94-1.30)	1.53 (1.33-1.76)	1.85 (1.62-2.10)	2.27 (2.02-2.56)	2.70 (2.37-3.07)	
Taperloc Cementless[St] : Ringloc-X ArCom[L] : Exceed ABT[S]	1,483	73 (67 to 78)	38	1.15 (0.72-1.84)	1.84 (1.27-2.67)	2.13 (1.50-3.02)	2.70 (1.97-3.70)	*2.94 (2.16-4.00)*	
Taperloc Complete Cementless[St] : Longevity[L] : Continuum[S]	1,600	60 (53 to 67)	54	0.79 (0.45-1.38)	1.26 (0.78-2.04)	1.39 (0.86-2.22)			
Taperloc Complete Cementless[St] : Exceed ABT[L] : Exceed ABT[S]	1,594	64 (57 to 71)	47	0.69 (0.38-1.24)	0.95 (0.57-1.57)	1.02 (0.63-1.66)	*1.50 (0.90-2.48)*		
Taperloc Complete Cementless[St] : M2A[L] : Exceed ABT[S]	1,549	59 (52 to 65)	54	0.58 (0.30-1.12)	1.38 (0.90-2.11)	1.66 (1.13-2.45)	*2.02 (1.40-2.91)*		
Taperloc Complete Cementless[St] : G7[L] : G7 Cementless Acetabular Component[S]	4,060	64 (57 to 72)	48	0.62 (0.42-0.92)	0.89 (0.62-1.27)	0.94 (0.66-1.34)			
Tri-Lock BPS[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	1,299	65 (59 to 73)	45	0.32 (0.12-0.84)	0.96 (0.51-1.80)	1.28 (0.72-2.29)	*1.93 (1.12-3.30)*		
Tri-Lock BPS[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	713	66 (59 to 73)	52	1.41 (0.76-2.60)	1.88 (1.10-3.22)	3.07 (1.99-4.73)	*3.81 (2.52-5.73)*		
Tri-Lock BPS[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	651	66 (59 to 72)	41	0.79 (0.33-1.88)	0.97 (0.44-2.15)	1.41 (0.70-2.82)	*2.27 (1.24-4.15)*		
Tri-Lock BPS[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	823	58 (51 to 64)	57	0.98 (0.49-1.94)	1.61 (0.94-2.76)	2.02 (1.24-3.27)	3.14 (2.02-4.86)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
Tri-Lock BPS[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	860	67 (59 to 73)	50	1.28 (0.71-2.30)	1.52 (0.89-2.61)	1.91 (1.18-3.11)	2.44 (1.55-3.83)		
TriFit TS hip[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	2,330	56 (50 to 62)	57	0.78 (0.49-1.24)	1.65 (1.19-2.30)	1.85 (1.35-2.55)	*2.15 (1.57-2.94)*		
Hybrid									
C-Stem AMT Cemented[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	6,003	73 (65 to 79)	34	0.77 (0.57-1.04)	1.13 (0.82-1.56)	2.41 (1.60-3.61)			
C-Stem AMT Cemented[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	4,887	74 (68 to 79)	36	0.74 (0.53-1.03)	0.99 (0.72-1.38)	1.14 (0.78-1.65)	*1.98 (0.84-4.65)*		
C-Stem AMT Cemented[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	10,402	72 (66 to 78)	33	0.52 (0.40-0.69)	0.84 (0.66-1.06)	0.96 (0.76-1.21)	*1.25 (0.93-1.67)*		
C-Stem AMT Cemented[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	1,824	61 (54 to 66)	39	0.50 (0.26-0.95)	0.92 (0.57-1.50)	1.46 (0.98-2.17)	2.34 (1.67-3.29)	*2.86 (1.96-4.16)*	
C-Stem AMT Cemented[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	15,610	73 (67 to 78)	41	0.80 (0.67-0.95)	1.29 (1.12-1.50)	1.56 (1.35-1.79)	2.26 (1.91-2.66)	*2.26 (1.91-2.66)*	
CPCS[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	4,086	72 (64 to 78)	32	0.56 (0.37-0.86)	1.08 (0.77-1.50)	1.38 (0.98-1.93)	*2.90 (1.21-6.87)*		
CPCS[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	4,156	76 (71 to 80)	33	0.84 (0.60-1.18)	1.24 (0.93-1.66)	1.52 (1.15-2.01)	*1.98 (1.45-2.71)*		
CPT CoCr[St] : CPT[H] : Longevity[L] : Continuum[S]	7,897	75 (70 to 80)	35	1.50 (1.25-1.79)	2.10 (1.80-2.46)	2.67 (2.30-3.09)	4.10 (3.35-5.01)		
CPT CoCr[St] : Zimmer Biolox[H] : Longevity[L] : Continuum[S]	6,431	65 (59 to 72)	39	1.43 (1.16-1.75)	2.04 (1.71-2.45)	2.42 (2.03-2.89)	*2.93 (2.35-3.64)*		
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Continuum[S]	1,504	56 (48 to 63)	39	1.33 (0.86-2.06)	2.01 (1.41-2.87)	2.57 (1.88-3.52)	3.67 (2.80-4.82)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
CPT CoCr[St] : CPT[H] : G7 Liner[DM] : G7 Cementless Acetabular Component[S]	427	74 (65 to 80)	31	0.95 (0.36-2.50)	2.29 (1.13-4.62)	3.01 (1.48-6.08)			
CPT CoCr[St] : Zimmer Biolox[H] : G7 Liner[DM] : G7 Cementless Acetabular Component[S]	584	73 (63 to 79)	31	0.41 (0.10-1.61)	1.17 (0.42-3.23)	1.17 (0.42-3.23)			
CPT CoCr[St] : CPT[H] : Trilogy[L] : Trabecular Metal Modular Cementless[S]	1,964	76 (69 to 81)	28	0.98 (0.63-1.53)	1.67 (1.17-2.36)	2.21 (1.62-3.02)	3.80 (2.88-5.00)	5.36 (3.83-7.47)	
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Trabecular Metal Modular Cementless[S]	1,093	65 (58 to 72)	39	1.30 (0.77-2.19)	2.37 (1.59-3.51)	2.73 (1.88-3.96)	3.96 (2.80-5.59)		
CPT CoCr[St] : CPT[H] : Longevity[L] : Trilogy IT[S]	7,108	74 (69 to 79)	35	1.39 (1.14-1.69)	2.04 (1.73-2.41)	2.42 (2.07-2.84)	3.87 (3.16-4.75)		
CPT CoCr[St] : Zimmer Biolox[H] : Longevity[L] : Trilogy IT[S]	8,164	67 (60 to 73)	39	0.88 (0.70-1.11)	1.45 (1.19-1.76)	1.90 (1.58-2.29)	2.72 (2.06-3.61)		
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Trilogy IT[S]	1,363	60 (53 to 65)	43	0.95 (0.56-1.64)	1.25 (0.78-2.00)	1.40 (0.90-2.19)	1.96 (1.26-3.05)		
CPT CoCr[St] : CPT[H] : Trilogy[L] : Trilogy[S]	14,835	73 (67 to 79)	35	0.92 (0.78-1.09)	1.52 (1.33-1.73)	2.28 (2.05-2.55)	4.01 (3.65-4.40)	5.46 (4.93-6.05)	6.47 (5.65-7.41)
CPT CoCr[St] : Trilogy[L] : Trilogy[S]	963	66 (59 to 73)	38	0.44 (0.17-1.19)	0.73 (0.33-1.64)	1.35 (0.72-2.51)	2.14 (1.29-3.54)	3.27 (2.13-5.01)	
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Trilogy[S]	10,947	69 (62 to 75)	38	0.84 (0.68-1.03)	1.27 (1.07-1.51)	1.72 (1.48-2.01)	2.42 (2.08-2.82)		
Exeter No.1 125mm stem Line Extension[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	2,337	66 (57 to 74)	33	0.80 (0.50-1.29)	1.09 (0.70-1.68)	1.40 (0.88-2.23)			
Exeter V40[St] : Orthinox V40[H] : ABG[L] : ABG II Cementless[S]	797	72 (65 to 78)	37	0.38 (0.12-1.17)	1.29 (0.70-2.39)	1.58 (0.90-2.76)	2.56 (1.61-4.05)	4.13 (2.77-6.13)	5.94 (3.94-8.89)
Exeter V40[St] : V40 Modular[H] : ABG[L] : ABG II Cementless[S]	1,891	63 (56 to 69)	33	0.21 (0.08-0.56)	0.43 (0.21-0.85)	0.92 (0.57-1.48)	2.04 (1.47-2.84)	3.80 (2.91-4.96)	5.44 (3.74-7.88)

Notes:
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[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary					
				1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Orthinox V40[H] : AltrX[L] : Pinnacle[S]	593	77 (73 to 82)	12	0.69 (0.26-1.81)	0.86 (0.36-2.06)	1.19 (0.52-2.71)	*1.19 (0.52-2.71)*		
Exeter V40[St] : Orthinox V40[H] : Enduron[L] : Pinnacle[S]	1,132	73 (67 to 79)	32	0.45 (0.19-1.07)	1.09 (0.62-1.92)	1.59 (0.99-2.54)	3.25 (2.29-4.60)	4.07 (2.92-5.65)	
Exeter V40[St] : Orthinox V40[H] : Pinnacle[L] : Pinnacle[S]	4,124	75 (70 to 80)	30	0.88 (0.64-1.22)	1.25 (0.95-1.64)	1.43 (1.10-1.86)	2.11 (1.61-2.77)	*2.55 (1.89-3.43)*	
Exeter V40[St] : V40 Modular[H] : AltrX[L] : Pinnacle[S]	1,234	73 (65 to 79)	33	0.70 (0.35-1.39)	0.70 (0.35-1.39)	1.14 (0.58-2.25)	*1.14 (0.58-2.25)*		
Exeter V40[St] : V40 Modular[H] : Pinnacle[L] : Pinnacle[S]	4,237	67 (60 to 73)	56	0.63 (0.43-0.93)	0.99 (0.72-1.35)	1.16 (0.86-1.56)	2.12 (1.48-3.04)	*3.50 (2.08-5.88)*	
Exeter V40[St] : Orthinox V40[H] : R3[L] : R3 Cementless[S]	2,775	75 (70 to 80)	27	0.81 (0.53-1.23)	1.33 (0.95-1.85)	1.71 (1.25-2.32)	2.30 (1.66-3.20)		
Exeter V40[St] : V40 Modular[H] : R3[L] : R3 Cementless[S]	1,383	68 (60 to 75)	38	0.68 (0.36-1.31)	0.97 (0.55-1.71)	1.42 (0.84-2.40)	*1.42 (0.84-2.40)*		
Exeter V40[St] : Orthinox V40[H] : Reflection[L] : Reflection Cementless[S]	2,163	73 (68 to 78)	35	0.60 (0.35-1.04)	1.08 (0.72-1.63)	1.54 (1.09-2.17)	3.46 (2.71-4.40)	5.86 (4.75-7.22)	*8.36 (6.00-11.57)*
Exeter V40[St] : Orthinox V40[H] : Restoration ADM LIner[DM] : Trident Cementless[S]	1,629	75 (68 to 81)	37	1.17 (0.74-1.86)	1.53 (1.00-2.32)	1.64 (1.09-2.48)	*1.97 (1.23-3.15)*		
Exeter V40[St] : V40 Modular[H] : Restoration ADM LIner[DM] : Trident Cementless[S]	2,987	74 (64 to 80)	35	0.78 (0.51-1.18)	1.38 (0.96-1.97)	1.59 (1.11-2.29)	*2.59 (1.34-4.98)*		
Exeter V40[St] : Orthinox V40[H] : Restoration ADM LIner[DM] : Tritanium[S]	422	75 (68 to 81)	39	2.43 (1.32-4.48)	*3.20 (1.80-5.65)*	*3.77 (2.13-6.61)*			
Exeter V40[St] : V40 Modular[H] : Restoration ADM LIner[DM] : Tritanium[S]	607	74 (65 to 80)	41	1.35 (0.68-2.68)	1.94 (1.03-3.65)	*2.31 (1.24-4.27)*			
Exeter V40[St] : Orthinox V40[H] : Trident[L] : Trident Cementless[S]	43,629	73 (67 to 78)	35	0.68 (0.61-0.76)	1.13 (1.03-1.24)	1.44 (1.33-1.57)	2.38 (2.18-2.59)	3.83 (3.42-4.29)	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	117,741	68 (60 to 75)	41	0.62 (0.57-0.67)	1.00 (0.94-1.06)	1.34 (1.26-1.42)	2.27 (2.14-2.41)	3.41 (3.17-3.67)	*4.61 (4.05-5.24)*
Exeter V40[St] : Orthinox V40[H] : Trident[L] : Trident II[S]	786	73 (66 to 78)	30	0.67 (0.28-1.60)	*0.95 (0.41-2.19)*				
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident II[S]	2,809	69 (59 to 76)	39	0.35 (0.18-0.67)	*0.56 (0.24-1.30)*				
Exeter V40[St] : Orthinox V40[H] : Trilogy[L] : Trilogy[S]	12,064	71 (65 to 77)	39	0.53 (0.42-0.68)	0.85 (0.70-1.03)	1.20 (1.01-1.42)	2.03 (1.76-2.33)	3.26 (2.84-3.74)	*4.40 (3.66-5.28)*
Exeter V40[St] : V40 Modular[H] : Trilogy[L] : Trilogy[S]	3,391	64 (58 to 70)	45	0.71 (0.48-1.06)	1.08 (0.78-1.49)	1.42 (1.07-1.89)	2.37 (1.88-3.00)	3.32 (2.65-4.15)	*3.97 (3.04-5.18)*
Exeter V40[St] : Orthinox V40[H] : Trident[L] : Tritanium[S]	1,782	75 (71 to 80)	34	0.89 (0.54-1.47)	1.18 (0.75-1.84)	1.49 (0.97-2.28)	*2.43 (1.58-3.73)*		
Exeter V40[St] : V40 Modular[H] : Trident[L] : Tritanium[S]	9,339	66 (59 to 74)	46	0.94 (0.76-1.16)	1.54 (1.29-1.85)	1.97 (1.66-2.35)	2.95 (2.41-3.60)		
TaperFit Cemented[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	5,045	67 (61 to 73)	35	0.71 (0.51-0.99)	1.15 (0.88-1.51)	1.32 (1.02-1.72)	*2.22 (1.30-3.78)*		
TaperFit Cemented[St] : Trinity Modular[H] : Trinity[L] : Trinity[S]	4,453	76 (71 to 80)	33	1.15 (0.88-1.52)	1.61 (1.27-2.05)	1.76 (1.39-2.22)	*2.36 (1.82-3.05)*		
Taperloc Cemented[St] : Exceed ABT[L] : Exceed ABT[S]	2,440	76 (70 to 81)	24	0.71 (0.44-1.13)	0.91 (0.60-1.40)	1.12 (0.75-1.69)	*1.48 (0.92-2.39)*		
Reverse hybrid									
Corail[St] : Articul/eze[H] : Charnley and Elite Plus LPW[C]	2,315	71 (66 to 76)	33	0.83 (0.53-1.29)	1.41 (1.00-1.99)	1.65 (1.20-2.27)	2.88 (2.20-3.76)	*3.89 (2.92-5.16)*	
Corail[St] : Articul/eze[H] : Elite Plus Cemented[C]	2,077	72 (67 to 78)	36	0.39 (0.19-0.77)	0.78 (0.48-1.28)	1.22 (0.82-1.82)	2.32 (1.68-3.21)	4.51 (3.29-6.16)	
Corail[St] : Articul/eze[H] : Elite Plus Ogee[C]	3,147	72 (65 to 77)	37	0.64 (0.41-0.99)	1.43 (1.07-1.92)	1.82 (1.40-2.37)	2.87 (2.28-3.62)	5.17 (4.03-6.63)	
Corail[St] : Articul/eze[H] : Marathon[C]	21,822	70 (64 to 76)	39	0.58 (0.49-0.70)	1.00 (0.87-1.15)	1.26 (1.11-1.43)	2.07 (1.81-2.38)	*4.00 (2.97-5.37)*	
Resurfacing									
ASR[RH] : ASR Resurfacing[C]	2,942	55 (49 to 60)	68	1.67 (1.26-2.20)	5.83 (5.04-6.74)	13.17 (11.99-14.45)	26.00 (24.43-27.64)	30.11 (28.46-31.83)	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H7 (b) (continued)

Stem:cup brand	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Adept[RH] : Adept Resurfacing[C]	4,394	54 (47 to 59)	79	1.12 (0.84-1.48)	2.41 (1.98-2.93)	4.33 (3.74-5.02)	7.67 (6.85-8.59)	10.15 (9.16-11.23)	
BHR[RH] : BHR Resurfacing[C]	24,517	55 (48 to 60)	77	1.00 (0.88-1.13)	2.23 (2.05-2.43)	3.41 (3.19-3.65)	7.06 (6.73-7.41)	9.90 (9.49-10.33)	12.51 (11.90-13.15)
Conserve[RH] : Conserve Plus Resurfacing[C]	1,259	57 (50 to 61)	64	2.15 (1.48-3.12)	5.34 (4.23-6.74)	8.47 (7.06-10.16)	14.23 (12.40-16.31)	16.80 (14.79-19.04)	
Cormet 2000[RH] : Cormet 2000 Resurfacing[C]	3,662	55 (48 to 60)	65	1.50 (1.16-1.95)	3.73 (3.16-4.39)	7.65 (6.83-8.56)	16.71 (15.53-17.97)	22.08 (20.74-23.49)	*26.15 (23.98-28.48)*
Durom[RH] : Durom Resurfacing[C]	1,697	55 (49 to 60)	70	1.36 (0.90-2.03)	3.60 (2.82-4.61)	5.51 (4.52-6.71)	8.53 (7.29-9.97)	10.48 (9.09-12.07)	
Recap[RH] : Recap Magnum[C]	1,682	54 (49 to 59)	73	1.96 (1.40-2.75)	3.28 (2.53-4.25)	5.50 (4.51-6.71)	10.01 (8.66-11.55)	12.63 (11.08-14.39)	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility; [RH]= Resurfacing head
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) further divides the data by stratifying for bearing surface. This table shows the estimated cumulative percentage probability of revision for the resulting fixation / bearing sub-groups, provided there were more than 2,000 procedures for unipolar bearings, or more than 1,000 procedures for dual mobility bearings.

Table 3.H8 (a) KM estimates of cumulative revision (95% CI) of primary hip replacement by fixation, stem / cup brand (and liner in the case of modular acetabular components) and bearing. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Cemented										
C-Stem AMT Cemented Stem[St] : Charnley and Elite Plus LPW[C]	MoP	3,418	75 (71 to 80)	30	0.62 (0.40-0.95)	1.35 (1.01-1.80)	1.68 (1.29-2.19)	2.63 (2.09-3.30)	4.34 (3.35-5.60)	
C-Stem AMT Cemented Stem[St] : Elite Plus Ogee[C]	MoP	4,339	77 (73 to 82)	33	0.30 (0.18-0.52)	0.97 (0.72-1.33)	1.39 (1.07-1.82)	2.29 (1.80-2.93)	*3.33 (2.45-4.52)*	
C-Stem AMT Cemented Stem[St] : Marathon[C]	MoP	18,846	77 (72 to 81)	31	0.56 (0.46-0.68)	1.00 (0.85-1.17)	1.36 (1.18-1.58)	1.92 (1.62-2.28)	*2.46 (1.85-3.28)*	
C-Stem AMT Cemented Stem[St] : Marathon[C]	CoP	5,660	66 (60 to 73)	36	0.64 (0.46-0.89)	0.89 (0.65-1.20)	0.98 (0.72-1.32)	2.19 (1.41-3.40)		

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) (continued)

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
C-Stem Cemented Stem[St] : Elite Plus Ogee[C]	MoP	5,201	73 (68 to 78)	38	0.49 (0.33-0.72)	1.01 (0.77-1.33)	1.33 (1.04-1.69)	2.89 (2.39-3.50)	4.78 (3.95-5.77)	*6.21 (4.83-7.97)*
C-Stem Cemented Stem[St] : Marathon[C]	MoP	5,697	73 (68 to 78)	37	0.37 (0.24-0.57)	0.85 (0.64-1.13)	1.21 (0.95-1.55)	1.96 (1.55-2.48)	*4.07 (2.36-7.00)*	
C-Stem Cemented Stem[St] : Marathon[C]	CoP	4,456	59 (52 to 65)	46	0.54 (0.36-0.80)	1.02 (0.77-1.37)	1.52 (1.19-1.94)	2.45 (1.96-3.07)	*3.34 (2.49-4.47)*	
CPCS[St] : Reflection Cemented[C]	MoP	2,719	77 (72 to 82)	31	0.57 (0.34-0.94)	1.21 (0.83-1.75)	1.82 (1.31-2.53)	*3.86 (2.78-5.33)*		
CPT CoCr Stem[St] : Elite Plus Ogee[C]	MoP	2,468	73 (67 to 79)	36	0.57 (0.34-0.96)	1.45 (1.05-2.02)	2.17 (1.65-2.85)	3.85 (3.11-4.78)	5.48 (4.42-6.78)	
CPT CoCr Stem[St] : Exceed ABT Cemented[C]	MoP	2,599	76 (72 to 81)	35	0.94 (0.62-1.41)	1.31 (0.90-1.89)	1.69 (1.17-2.42)			
CPT CoCr Stem[St] : Low Profile Durasul Cup[C]	MoP	2,143	75 (70 to 80)	34	0.52 (0.29-0.94)	1.20 (0.81-1.79)	1.80 (1.29-2.51)	3.36 (2.52-4.47)		
CPT CoCr Stem[St] : ZCA[C]	MoP	18,147	77 (72 to 82)	30	0.97 (0.84-1.12)	1.58 (1.40-1.78)	2.17 (1.95-2.41)	3.84 (3.48-4.24)	5.36 (4.75-6.05)	*6.24 (5.34-7.28)*
Charnley Cemented Stem[St] : Charnley Cemented Cup[C]	MoP	4,673	72 (66 to 78)	38	0.32 (0.20-0.54)	1.13 (0.86-1.48)	1.84 (1.48-2.28)	3.75 (3.20-4.39)	6.16 (5.35-7.08)	*8.84 (7.34-10.64)*
Charnley Cemented Stem[St] : Charnley Ogee[C]	MoP	10,580	73 (67 to 78)	38	0.37 (0.27-0.51)	1.21 (1.01-1.44)	1.86 (1.61-2.14)	3.63 (3.26-4.04)	5.86 (5.30-6.47)	*7.85 (6.85-8.99)*
Charnley Cemented Stem[St] : Charnley and Elite Plus LPW[C]	MoP	7,089	74 (68 to 79)	29	0.38 (0.26-0.56)	0.78 (0.60-1.02)	1.17 (0.94-1.46)	2.43 (2.06-2.86)	3.96 (3.41-4.61)	*5.04 (4.24-5.97)*
Exeter V40[St] : Cenator Cemented Cup[C]	MoP	2,443	75 (70 to 80)	32	0.66 (0.40-1.07)	1.43 (1.02-2.00)	2.03 (1.52-2.69)	2.76 (2.15-3.56)	4.25 (3.35-5.39)	*6.09 (4.58-8.09)*
Exeter V40[St] : Charnley and Elite Plus LPW[C]	MoP	4,397	75 (71 to 80)	28	0.73 (0.52-1.04)	1.26 (0.97-1.65)	1.55 (1.22-1.98)	2.45 (1.97-3.05)	3.33 (2.61-4.24)	*3.93 (2.93-5.28)*
Exeter V40[St] : Elite Plus Cemented Cup[C]	MoP	4,923	74 (68 to 79)	32	0.35 (0.22-0.56)	0.62 (0.44-0.89)	0.85 (0.62-1.16)	1.42 (1.10-1.83)	2.74 (2.13-3.52)	*4.61 (3.04-6.96)*
Exeter V40[St] : Elite Plus Ogee[C]	MoP	24,392	75 (70 to 80)	34	0.39 (0.32-0.48)	0.87 (0.76-0.99)	1.20 (1.06-1.35)	2.12 (1.92-2.34)	3.27 (2.95-3.62)	*4.36 (3.78-5.01)*
Exeter V40[St] : Elite Plus Ogee[C]	CoP	2,753	67 (61 to 73)	41	0.47 (0.28-0.81)	0.77 (0.50-1.18)	1.12 (0.78-1.61)	2.20 (1.63-2.96)	3.21 (2.38-4.32)	*3.62 (2.56-5.11)*
Exeter V40[St] : Exeter Contemporary Flanged[C]	MoP	98,787	75 (70 to 80)	34	0.59 (0.55-0.64)	1.03 (0.96-1.09)	1.37 (1.29-1.44)	2.35 (2.23-2.48)	4.30 (4.04-4.57)	*6.12 (5.51-6.79)*

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) (continued)

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Exeter Contemporary Flanged[C]	CoP	8,608	67 (62 to 73)	36	0.60 (0.46-0.79)	0.98 (0.79-1.22)	1.34 (1.10-1.62)	2.12 (1.77-2.54)	3.85 (3.13-4.72)	
Exeter V40[St] : Exeter Contemporary Hooded[C]	MoP	27,270	76 (70 to 81)	32	0.97 (0.86-1.09)	1.63 (1.48-1.79)	2.17 (2.00-2.35)	3.93 (3.67-4.21)	7.31 (6.80-7.87)	*10.20 (9.17-11.34)*
Exeter V40[St] : Exeter Duration[C]	MoP	15,965	74 (68 to 79)	32	0.61 (0.50-0.75)	1.20 (1.04-1.38)	1.65 (1.46-1.87)	3.73 (3.42-4.07)	6.92 (6.38-7.50)	*11.05 (9.48-12.85)*
Exeter V40[St] : Exeter X3 Rimfit[C]	MoP	39,137	75 (69 to 80)	32	0.50 (0.43-0.57)	0.83 (0.74-0.93)	1.11 (1.00-1.23)	1.75 (1.55-1.97)		
Exeter V40[St] : Exeter X3 Rimfit[C]	CoP	17,655	64 (58 to 71)	36	0.56 (0.46-0.69)	0.89 (0.75-1.05)	1.26 (1.08-1.46)	1.94 (1.64-2.28)		
Exeter V40[St] : Marathon[C]	MoP	7,573	75 (70 to 80)	33	0.60 (0.45-0.81)	0.92 (0.72-1.17)	1.14 (0.91-1.43)	1.80 (1.40-2.31)		
Exeter V40[St] : Marathon[C]	CoP	3,648	64 (58 to 70)	38	0.51 (0.32-0.80)	0.75 (0.50-1.11)	1.11 (0.78-1.57)	1.73 (1.19-2.52)		
Exeter V40[St] : Opera[C]	MoP	2,699	75 (69 to 80)	31	0.38 (0.20-0.70)	0.85 (0.56-1.28)	1.31 (0.93-1.84)	3.09 (2.43-3.92)	8.06 (6.48-10.01)	*14.54 (10.95-19.18)*
MS-30[St] : Original ME Muller Low Profile Cup[C]	CoP	2,763	71 (66 to 76)	31	0.18 (0.08-0.44)	0.53 (0.31-0.89)	0.65 (0.41-1.05)	1.40 (0.97-2.02)	2.99 (2.05-4.35)	*3.29 (2.23-4.84)*
Muller Straight Stem[St] : Original ME Muller Low Profile Cup[C]	MoP	2,432	75 (70 to 80)	27	0.50 (0.28-0.88)	0.90 (0.59-1.38)	1.34 (0.94-1.92)	2.96 (2.25-3.87)	*5.23 (3.90-7.00)*	*7.84 (5.08-12.01)*
Muller-Biomet[St] : Apollo[C]	MoP	2,129	74 (69 to 80)	39	0.67 (0.39-1.12)	1.26 (0.86-1.84)	1.41 (0.98-2.03)	2.44 (1.82-3.27)	4.60 (3.54-5.97)	
Stanmore Modular Stem[St] : Stanmore-Arcom Cup[C]	MoP	4,991	75 (70 to 81)	30	0.40 (0.26-0.63)	1.08 (0.82-1.41)	1.60 (1.28-2.00)	2.56 (2.12-3.09)	4.32 (3.57-5.21)	*7.93 (5.04-12.39)*
Uncemented										
Accolade[St] : Trident Cementless Cup[SL]	MoP	12,456	71 (64 to 76)	41	0.97 (0.81-1.16)	1.96 (1.73-2.22)	2.68 (2.40-2.98)	4.70 (4.31-5.12)	7.83 (7.13-8.60)	
Accolade[St] : Trident Cementless Cup[SL]	CoP	7,345	61 (55 to 67)	46	0.85 (0.66-1.08)	1.63 (1.36-1.95)	1.98 (1.69-2.33)	2.50 (2.15-2.90)	*3.63 (2.78-4.72)*	
Accolade[St] : Trident Cementless Cup[SL]	CoC	7,340	62 (54 to 68)	46	1.01 (0.80-1.27)	2.06 (1.75-2.41)	2.80 (2.44-3.20)	3.79 (3.37-4.26)	4.56 (4.06-5.12)	*4.70 (4.17-5.30)*
Accolade II[St] : Trident Cementless Cup[SL]	MoP	7,331	71 (64 to 76)	43	0.99 (0.79-1.25)	1.52 (1.25-1.85)	1.80 (1.49-2.17)	*2.33 (1.50-3.63)*		
Accolade II[St] : Trident Cementless Cup[SL]	CoP	20,505	62 (56 to 69)	48	0.77 (0.66-0.91)	1.19 (1.03-1.37)	1.45 (1.25-1.68)	*1.99 (1.51-2.62)*		

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) (continued)

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Accolade II[St] : Tritanium[SL]	CoP	3,239	61 (54 to 69)	53	0.95 (0.66-1.36)	1.53 (1.12-2.09)	2.07 (1.53-2.80)	*2.19 (1.62-2.96)*		
Anthology[St] : R3 Cementless[SL]	MoP	4,643	63 (55 to 71)	39	1.08 (0.82-1.42)	1.69 (1.34-2.11)	1.94 (1.56-2.40)	2.24 (1.81-2.78)		
Corail[St] : ASR Resurfacing Cup[C]	MoM	2,745	61 (54 to 67)	54	1.02 (0.71-1.48)	7.47 (6.54-8.52)	23.62 (22.06-25.28)	43.87 (41.98-45.82)	48.84 (46.89-50.83)	
Corail[St] : Duraloc Cementless Cup[SL]	MoP	3,704	70 (65 to 75)	39	0.62 (0.41-0.94)	1.46 (1.12-1.91)	2.28 (1.84-2.83)	5.28 (4.56-6.11)	10.19 (9.07-11.44)	*15.09 (13.11-17.34)*
Corail[St] : Pinnacle Gription[SL]	MoP	9,817	73 (68 to 78)	39	0.81 (0.65-1.02)	1.31 (1.07-1.61)	1.72 (1.41-2.10)	*2.38 (1.87-3.04)*		
Corail[St] : Pinnacle Gription[SL]	CoP	14,863	63 (56 to 69)	46	0.43 (0.33-0.56)	0.99 (0.80-1.23)	1.28 (1.03-1.58)	*1.65 (1.28-2.12)*		
Corail[St] : Pinnacle Gription[SL]	CoC	2,871	57 (49 to 64)	45	1.06 (0.74-1.51)	1.65 (1.23-2.20)	2.42 (1.89-3.09)	3.13 (2.42-4.05)		
Corail[St] : Pinnacle[SL]	MoP	77,390	71 (66 to 77)	41	0.77 (0.71-0.83)	1.24 (1.16-1.32)	1.52 (1.43-1.61)	2.54 (2.40-2.68)	4.08 (3.79-4.39)	
Corail[St] : Pinnacle[SL]	MoM	11,891	67 (60 to 74)	47	0.89 (0.73-1.07)	2.46 (2.20-2.76)	5.18 (4.79-5.61)	13.35 (12.71-14.01)	17.96 (17.21-18.75)	
Corail[St] : Pinnacle[SL]	CoP	64,829	64 (57 to 70)	48	0.64 (0.58-0.71)	0.99 (0.92-1.08)	1.32 (1.22-1.42)	2.23 (2.05-2.42)	3.91 (3.33-4.59)	
Corail[St] : Pinnacle[SL]	CoC	45,468	59 (52 to 65)	49	0.83 (0.75-0.92)	1.73 (1.61-1.85)	2.34 (2.20-2.49)	3.66 (3.48-3.85)	5.25 (4.96-5.56)	
Corail[St] : Trilogy[SL]	MoP	2,400	70 (64 to 76)	42	0.55 (0.32-0.94)	0.97 (0.65-1.46)	1.56 (1.13-2.15)	2.81 (2.17-3.63)	3.83 (2.90-5.06)	*8.56 (5.56-13.06)*
Furlong Evolution Cementless[St] : Furlong HAC CSF Plus[SL]	CoC	5,936	60 (50 to 68)	39	1.12 (0.88-1.43)	1.54 (1.24-1.89)	1.82 (1.50-2.22)	2.28 (1.87-2.79)		
Furlong HAC Stem[St] : CSF[SL]	MoP	8,092	73 (67 to 78)	39	1.36 (1.13-1.64)	2.17 (1.87-2.51)	2.51 (2.19-2.88)	4.17 (3.73-4.67)	5.81 (5.20-6.49)	*8.05 (6.50-9.95)*
Furlong HAC Stem[St] : CSF[SL]	CoP	7,383	67 (61 to 73)	41	0.79 (0.61-1.02)	1.37 (1.13-1.67)	1.76 (1.48-2.09)	2.65 (2.29-3.07)	3.91 (3.42-4.46)	*4.45 (3.89-5.09)*
Furlong HAC Stem[St] : Furlong HAC CSF Plus[SL]	MoP	6,114	74 (69 to 79)	40	1.60 (1.31-1.95)	2.24 (1.90-2.65)	2.72 (2.33-3.17)	3.58 (3.09-4.14)	*4.68 (3.92-5.59)*	
Furlong HAC Stem[St] : Furlong HAC CSF Plus[SL]	CoP	3,763	67 (62 to 72)	46	0.92 (0.65-1.28)	1.52 (1.17-1.98)	1.79 (1.40-2.28)	2.49 (1.99-3.12)	*2.94 (2.26-3.82)*	
Furlong HAC Stem[St] : Furlong HAC CSF Plus[SL]	CoC	15,927	63 (56 to 69)	47	0.93 (0.80-1.10)	1.56 (1.38-1.77)	1.77 (1.57-1.99)	2.27 (2.04-2.53)	3.24 (2.78-3.79)	
M/L Taper Cementless[St] : Continuum[SL]	MoP	2,134	69 (64 to 75)	45	1.08 (0.72-1.62)	1.52 (1.08-2.15)	1.89 (1.38-2.58)	2.87 (2.16-3.81)		
M/L Taper Cementless[St] : Continuum[SL]	CoP	2,165	58 (52 to 64)	52	1.63 (1.17-2.26)	2.02 (1.50-2.71)	2.30 (1.74-3.04)	3.23 (2.42-4.29)		

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) (continued)

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
M/L Taper Cementless[St] : Continuum[SL]	CoC	2,158	56 (49 to 62)	52	0.97 (0.64-1.49)	1.72 (1.25-2.37)	2.10 (1.57-2.80)	2.70 (2.08-3.50)		
M/L Taper Cementless[St] : Trilogy IT[SL]	MoP	2,539	70 (64 to 75)	44	1.22 (0.86-1.74)	1.88 (1.42-2.50)	2.35 (1.81-3.03)	*3.33 (2.45-4.52)*		
M/L Taper Cementless[St] : Trilogy IT[SL]	CoP	2,793	60 (53 to 66)	58	1.31 (0.95-1.82)	1.87 (1.41-2.47)	2.19 (1.68-2.85)	*2.27 (1.74-2.96)*		
MetaFix Stem[St] : Trinity[SL]	CoP	6,014	64 (57 to 70)	47	0.74 (0.55-1.01)	0.97 (0.74-1.28)	1.25 (0.95-1.65)	*2.44 (1.58-3.78)*		
MetaFix Stem[St] : Trinity[SL]	CoC	3,346	59 (52 to 66)	46	0.70 (0.47-1.05)	1.03 (0.73-1.45)	1.43 (1.06-1.92)	2.10 (1.58-2.77)		
Polarstem Cementless[St] : R3 Cementless[SL]	MoP	31,435	66 (58 to 73)	47	0.70 (0.61-0.80)	0.93 (0.83-1.05)	1.17 (1.04-1.32)	2.08 (1.73-2.51)		
SL-Plus Cementless Stem[St] : EP-Fit Plus[SL]	MoP	2,007	69 (62 to 76)	41	1.55 (1.09-2.20)	3.25 (2.55-4.13)	4.43 (3.60-5.44)	7.66 (6.45-9.08)	10.01 (8.44-11.85)	
Summit Cementless Stem[St] : Pinnacle[SL]	CoC	2,391	54 (45 to 61)	50	0.81 (0.52-1.27)	1.16 (0.79-1.71)	1.35 (0.94-1.95)	1.43 (1.00-2.06)	*1.43 (1.00-2.06)*	
Synergy Cementless Stem[St] : R3 Cementless[SL]	MoP	3,329	66 (58 to 72)	51	0.97 (0.68-1.36)	1.22 (0.90-1.66)	1.43 (1.07-1.90)	1.92 (1.46-2.51)		
Taperloc Cementless Stem[St] : Exceed ABT[SL]	MoP	8,795	72 (66 to 77)	40	1.31 (1.09-1.57)	1.79 (1.53-2.09)	2.06 (1.78-2.38)	2.74 (2.39-3.14)	*3.15 (2.48-4.00)*	
Taperloc Cementless Stem[St] : Exceed ABT[SL]	CoP	6,482	65 (58 to 71)	45	0.79 (0.60-1.04)	1.03 (0.81-1.31)	1.14 (0.90-1.44)	1.54 (1.23-1.92)	*2.83 (1.60-5.00)*	
Taperloc Cementless Stem[St] : Exceed ABT[SL]	CoC	12,866	61 (54 to 67)	47	1.10 (0.93-1.30)	1.53 (1.33-1.76)	1.84 (1.62-2.10)	2.27 (2.02-2.56)	2.70 (2.37-3.08)	
Taperloc Complete Cementless Stem[St] : G7 Cementless Acetabular Component[SL]	CoP	2,549	62 (56 to 68)	52	0.50 (0.28-0.88)	0.72 (0.43-1.22)	0.72 (0.43-1.22)			
Hybrid										
C-Stem AMT Cemented Stem[St] : Pinnacle Gription[SL]	MoP	5,418	77 (73 to 81)	31	0.70 (0.50-0.97)	0.92 (0.66-1.28)	1.17 (0.78-1.73)	*2.11 (0.86-5.14)*		

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) (continued)

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
C-Stem AMT Cemented Stem[St] : Pinnacle Gription[SL]	CoP	5,575	68 (60 to 75)	38	0.80 (0.59-1.09)	1.20 (0.88-1.64)	2.33 (1.56-3.47)			
C-Stem AMT Cemented Stem[St] : Pinnacle[SL]	MoP	14,142	76 (72 to 80)	34	0.72 (0.59-0.88)	1.23 (1.05-1.44)	1.54 (1.32-1.79)	2.31 (1.92-2.78)	*2.42 (1.99-2.94)*	
C-Stem AMT Cemented Stem[St] : Pinnacle[SL]	CoP	12,413	67 (61 to 73)	41	0.64 (0.51-0.80)	0.99 (0.82-1.20)	1.09 (0.91-1.32)	1.59 (1.26-2.01)	*1.59 (1.26-2.01)*	
CPCS[St] : R3 Cementless[SL]	MoP	7,813	75 (69 to 80)	32	0.68 (0.52-0.89)	1.15 (0.91-1.44)	1.46 (1.17-1.83)	*2.36 (1.43-3.88)*		
CPT CoCr Stem[St] : Continuum[SL]	MoP	8,025	75 (70 to 80)	35	1.54 (1.29-1.84)	2.14 (1.83-2.50)	2.71 (2.34-3.13)	4.13 (3.38-5.05)		
CPT CoCr Stem[St] : Continuum[SL]	CoP	6,441	65 (59 to 72)	39	1.42 (1.16-1.75)	2.04 (1.70-2.45)	2.42 (2.03-2.89)	*2.92 (2.35-3.64)*		
CPT CoCr Stem[St] : Trabecular Metal Modular Cementless Cup[SL]	MoP	2,080	76 (69 to 81)	29	0.98 (0.63-1.52)	1.66 (1.17-2.34)	2.19 (1.61-2.99)	3.76 (2.86-4.93)	*5.28 (3.79-7.34)*	
CPT CoCr Stem[St] : Trilogy IT[SL]	MoP	7,200	74 (69 to 79)	35	1.37 (1.12-1.67)	2.04 (1.72-2.41)	2.42 (2.06-2.84)	3.87 (3.16-4.74)		
CPT CoCr Stem[St] : Trilogy IT[SL]	CoP	8,184	67 (60 to 73)	39	0.88 (0.69-1.11)	1.44 (1.19-1.75)	1.90 (1.57-2.29)	*2.72 (2.05-3.59)*		
CPT CoCr Stem[St] : Trilogy[SL]	MoP	15,536	73 (68 to 79)	35	0.90 (0.76-1.06)	1.50 (1.32-1.71)	2.25 (2.02-2.51)	3.96 (3.61-4.34)	5.39 (4.86-5.97)	*6.40 (5.58-7.33)*
CPT CoCr Stem[St] : Trilogy[SL]	CoP	11,474	69 (62 to 75)	38	0.82 (0.67-1.01)	1.28 (1.08-1.51)	1.72 (1.48-2.00)	2.38 (2.06-2.76)	*2.48 (2.11-2.91)*	
Exeter V40[St] : Pinnacle[SL]	MoP	6,860	75 (70 to 80)	30	0.86 (0.66-1.11)	1.24 (1.00-1.54)	1.54 (1.26-1.88)	2.47 (2.04-2.98)	3.15 (2.54-3.90)	
Exeter V40[St] : Pinnacle[SL]	CoP	4,608	66 (59 to 72)	52	0.56 (0.38-0.83)	0.84 (0.60-1.18)	0.95 (0.69-1.31)	2.07 (1.39-3.06)	*3.23 (1.97-5.25)*	
Exeter V40[St] : R3 Cementless[SL]	MoP	2,975	75 (70 to 80)	28	0.83 (0.55-1.23)	1.35 (0.98-1.85)	1.70 (1.26-2.29)	2.26 (1.64-3.10)		
Exeter V40[St] : Reflection Cementless[SL]	MoP	2,218	73 (68 to 78)	37	0.68 (0.41-1.12)	1.15 (0.78-1.69)	1.59 (1.14-2.22)	3.53 (2.78-4.47)	5.90 (4.80-7.25)	*8.36 (6.04-11.51)*
Exeter V40[St] : Restoration ADM LIner[DM] : Trident Cementless Cup[SL]*	MoPoM	3,166	75 (68 to 81)	31	0.90 (0.62-1.31)	1.43 (1.03-1.97)	1.58 (1.15-2.18)	*2.43 (1.46-4.01)*		
Exeter V40[St] : Restoration ADM LIner[DM] : Trident Cementless Cup[SL]*	CoPoM	1,450	71.5 (61 to 79)	46	0.97 (0.56-1.67)	1.39 (0.83-2.31)	*1.63 (0.97-2.73)*	*1.63 (0.97-2.73)*		

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (a) (continued)

Stem:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : Trident Cementless Cup[SL]	MoP	74,838	74 (68 to 79)	36	0.70 (0.64-0.76)	1.14 (1.07-1.23)	1.48 (1.39-1.58)	2.42 (2.26-2.59)	3.61 (3.29-3.95)	
Exeter V40[St] : Trident Cementless Cup[SL]	CoP	73,437	66 (59 to 73)	41	0.59 (0.53-0.64)	0.90 (0.83-0.98)	1.17 (1.08-1.27)	1.83 (1.66-2.02)	2.72 (2.24-3.29)	
Exeter V40[St] : Trident Cementless Cup[SL]	CoC	13,118	59 (52 to 65)	44	0.53 (0.42-0.68)	1.06 (0.90-1.25)	1.53 (1.33-1.75)	2.67 (2.40-2.98)	4.02 (3.64-4.44)	*5.22 (4.57-5.97)*
Exeter V40[St] : Trident II[SL]	CoP	2,248	66 (58 to 74)	38	0.44 (0.23-0.85)	*0.69 (0.30-1.56)*				
Exeter V40[St] : Trilogy[SL]	MoP	12,543	71 (65 to 77)	40	0.56 (0.45-0.71)	0.88 (0.73-1.06)	1.26 (1.08-1.48)	2.12 (1.85-2.42)	3.32 (2.90-3.79)	*4.45 (3.72-5.32)*
Exeter V40[St] : Trilogy[SL]	CoP	2,846	63 (57 to 69)	43	0.56 (0.35-0.92)	0.93 (0.63-1.36)	1.15 (0.82-1.63)	1.98 (1.50-2.61)	3.03 (2.34-3.91)	*3.68 (2.74-4.93)*
Exeter V40[St] : Tritanium[SL]	MoP	2,999	75 (70 to 80)	37	0.94 (0.64-1.36)	1.48 (1.08-2.03)	2.12 (1.59-2.83)	3.40 (2.53-4.58)		
Exeter V40[St] : Tritanium[SL]	CoP	7,680	66 (59 to 73)	46	0.97 (0.77-1.23)	1.51 (1.23-1.85)	1.80 (1.47-2.20)	2.39 (1.86-3.06)		
TaperFit Cemented Stem[St] : Trinity[SL]	MoP	4,479	76 (71 to 80)	33	1.15 (0.87-1.51)	1.60 (1.26-2.04)	1.75 (1.39-2.21)	*2.34 (1.81-3.03)*		
TaperFit Cemented Stem[St] : Trinity[SL]	CoP	3,906	69 (63 to 74)	34	0.82 (0.58-1.16)	1.31 (0.98-1.75)	1.48 (1.12-1.96)	*2.97 (1.35-6.48)*		
Reverse hybrid										
Corail[St] : Elite Plus Ogee[C]	MoP	2,440	74 (68 to 78)	36	0.74 (0.47-1.17)	1.25 (0.88-1.79)	1.58 (1.15-2.18)	2.47 (1.84-3.32)	5.18 (3.77-7.12)	
Corail[St] : Marathon[C]	MoP	14,859	73 (68 to 78)	38	0.63 (0.51-0.77)	1.01 (0.86-1.20)	1.28 (1.10-1.50)	2.19 (1.86-2.58)	*4.22 (2.93-6.06)*	
Corail[St] : Marathon[C]	CoP	6,979	63 (57 to 68)	41	0.50 (0.35-0.70)	1.00 (0.77-1.28)	1.24 (0.98-1.57)	1.87 (1.46-2.40)	*3.63 (2.14-6.10)*	

Notes:
*Inclusion criteria for dual mobility hips is set at ≥1,000 procedures.
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [C]=Cup; [SL]=Shell liner; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) KM estimates of cumulative revision (95% CI) of primary hip replacement by fixation, stem / head / cup brand (and liner in the case of modular acetabular components) and bearing. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
Cemented										
C-Stem AMT Cemented[St] : Articul/eze[H] : Charnley and Elite Plus LPW[C]	MoP	3,418	75 (71 to 80)	30	0.62 (0.40-0.95)	1.35 (1.01-1.80)	1.68 (1.29-2.19)	2.63 (2.09-3.30)	4.34 (3.35-5.60)	
C-Stem AMT Cemented[St] : Articul/eze[H] : Elite Plus Ogee[C]	MoP	4,338	77 (73 to 82)	33	0.30 (0.18-0.52)	0.97 (0.72-1.33)	1.39 (1.07-1.82)	2.29 (1.80-2.93)	*3.33 (2.45-4.52)*	
C-Stem AMT Cemented[St] : Articul/eze[H] : Elite Plus Ogee[C]	CoP	739	69 (60 to 76)	37	0.27 (0.07-1.08)	0.84 (0.38-1.85)	1.18 (0.59-2.36)	*1.18 (0.59-2.36)*		
C-Stem AMT Cemented[St] : Articul/eze[H] : Marathon[C]	MoP	18,845	77 (72 to 81)	31	0.56 (0.46-0.68)	1.00 (0.85-1.17)	1.36 (1.18-1.58)	1.92 (1.62-2.28)	*2.46 (1.85-3.28)*	
C-Stem AMT Cemented[St] : Articul/eze[H] : Marathon[C]	CoP	5,655	66 (60 to 73)	36	0.64 (0.46-0.89)	0.89 (0.66-1.21)	0.98 (0.72-1.32)	2.19 (1.41-3.40)		
C-Stem Cemented[St] : Elite[H] : Charnley and Elite Plus LPW[C]	MoP	1,895	73 (69 to 77)	32	0.48 (0.25-0.91)	1.18 (0.78-1.79)	1.76 (1.24-2.47)	2.74 (2.05-3.65)	3.76 (2.88-4.91)	*6.86 (3.58-12.92)*
C-Stem Cemented[St] : Ceramax[H] : Elite Plus Ogee[C]	CoP	748	62 (58 to 65)	44	0.00 (.-.)	0.28 (0.07-1.10)	0.73 (0.31-1.76)	1.66 (0.85-3.23)	*3.18 (1.60-6.25)*	
C-Stem Cemented[St] : Elite[H] : Elite Plus Ogee[C]	MoP	5,193	73 (68 to 78)	38	0.49 (0.33-0.72)	1.01 (0.77-1.33)	1.33 (1.04-1.69)	2.90 (2.39-3.51)	4.79 (3.96-5.78)	*6.22 (4.84-7.98)*
C-Stem Cemented[St] : Ceramax[H] : Marathon[C]	CoP	4,402	59 (52 to 65)	46	0.55 (0.37-0.81)	1.04 (0.77-1.39)	1.49 (1.16-1.91)	2.44 (1.94-3.07)	*3.42 (2.51-4.64)*	
C-Stem Cemented[St] : Elite[H] : Marathon[C]	MoP	5,686	73 (68 to 78)	37	0.36 (0.23-0.55)	0.84 (0.63-1.11)	1.20 (0.93-1.53)	1.94 (1.53-2.46)	*4.07 (2.35-7.03)*	
C-Stem Cemented[St] : Ceramax[H] : Opera[C]	CoP	687	58 (51 to 63)	44	0.44 (0.14-1.35)	0.73 (0.30-1.74)	1.47 (0.79-2.71)	3.31 (2.19-4.98)	6.09 (4.40-8.40)	
C-Stem Cemented[St] : Elite[H] : Opera[C]	MoP	1,469	72 (67 to 76)	39	0.48 (0.23-1.00)	1.05 (0.63-1.73)	1.64 (1.10-2.46)	4.24 (3.25-5.53)	9.95 (7.96-12.40)	*21.77 (15.52-30.05)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
C-Stem Cemented[St] : Ceramax[H] : Wroblewski Golf Ball[C]	CoP	1,071	61 (54 to 66)	43	0.28 (0.09-0.87)	0.76 (0.38-1.50)	1.05 (0.58-1.88)	2.30 (1.53-3.44)	3.70 (2.60-5.27)	
C-Stem Cemented[St] : Elite[H] : Wroblewski Golf Ball[C]	MoP	1,134	72 (67 to 77)	37	0.36 (0.13-0.95)	0.91 (0.49-1.68)	1.68 (1.06-2.65)	2.96 (2.06-4.24)	5.12 (3.66-7.15)	*6.83 (4.67-9.94)*
CCA SS Cemented[St] : SS[H] : CCB[C]	MoP	1,944	74 (70 to 80)	31	0.36 (0.17-0.76)	0.84 (0.52-1.37)	1.59 (1.11-2.28)	5.20 (4.13-6.53)	*8.28 (6.37-10.72)*	
CPCS[St] : Oxinium Ball[H] : Reflection Cemented[C]	MoP	727	72 (66 to 78)	37	0.56 (0.21-1.48)	0.93 (0.41-2.07)	1.61 (0.82-3.13)	*3.02 (1.56-5.83)*		
CPCS[St] : Smith Nephew Femoral[H] : Reflection Cemented[C]	MoP	1,954	78 (74 to 83)	29	0.59 (0.33-1.06)	1.35 (0.88-2.05)	1.95 (1.33-2.85)	*3.60 (2.45-5.28)*		
CPT CoCr[St] : CPT[H] : Avantage Liner[DM] : Avantage Cemented[C]	MoPoM	1,167	78 (72 to 83)	29	0.91 (0.49-1.68)	1.66 (0.98-2.79)	*2.27 (1.31-3.89)*			
CPT CoCr[St] : CPT[H] : Elite Plus Ogee[C]	MoP	2,466	73 (67 to 79)	36	0.57 (0.34-0.96)	1.46 (1.05-2.02)	2.17 (1.65-2.85)	3.86 (3.11-4.78)	5.48 (4.42-6.78)	
CPT CoCr[St] : CPT[H] : Exceed ABT Cemented[C]	MoP	2,581	76 (72 to 81)	35	0.94 (0.63-1.42)	1.31 (0.91-1.90)	1.70 (1.18-2.43)			
CPT CoCr[St] : Zimmer Biolox[H] : Exceed ABT Cemented[C]	CoP	516	62 (56 to 66)	41	1.40 (0.67-2.92)	*2.70 (1.47-4.94)*	*2.70 (1.47-4.94)*			
CPT CoCr[St] : CPT[H] : Low Profile Durasul[C]	MoP	2,130	75 (70 to 80)	34	0.47 (0.26-0.88)	1.16 (0.77-1.75)	1.76 (1.25-2.47)	3.33 (2.49-4.44)		
CPT CoCr[St] : CPT[H] : ZCA[C]	MoP	18,060	77 (72 to 82)	30	0.97 (0.84-1.13)	1.59 (1.41-1.78)	2.17 (1.96-2.41)	3.85 (3.49-4.25)	5.37 (4.76-6.06)	*6.25 (5.35-7.29)*
CPT CoCr[St] : Zimmer Biolox[H] : ZCA[C]	CoP	1,278	69 (59 to 77)	34	0.16 (0.04-0.65)	0.36 (0.13-0.95)	0.66 (0.29-1.51)	*2.92 (0.93-8.97)*		
Charnley Cemented[St] : Charnley Cemented[C]	MoP	4,673	72 (66 to 78)	38	0.32 (0.20-0.54)	1.13 (0.86-1.48)	1.84 (1.48-2.28)	3.75 (3.20-4.39)	6.16 (5.35-7.08)	*8.84 (7.34-10.64)*
Charnley Cemented[St] : Charnley Ogee[C]	MoP	10,580	73 (67 to 78)	38	0.37 (0.27-0.51)	1.21 (1.01-1.44)	1.86 (1.61-2.14)	3.63 (3.26-4.04)	5.86 (5.30-6.47)	*7.85 (6.85-8.99)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
Charnley Cemented[St] : Charnley and Elite Plus LPW[C]	MoP	7,089	74 (68 to 79)	29	0.38 (0.26-0.56)	0.78 (0.60-1.02)	1.17 (0.94-1.46)	2.43 (2.06-2.86)	3.96 (3.41-4.61)	*5.04 (4.24-5.97)*
Excia Cemented[St] : Aesculap Biolox Delta[H] : Chirulen[C]	CoP	554	75 (68 to 80)	32	0.73 (0.28-1.94)	0.93 (0.39-2.23)	*1.37 (0.58-3.22)*	*1.37 (0.58-3.22)*		
Excia Cemented[St] : Isodur Modular[H] : Chirulen[C]	MoP	1,423	79 (73 to 83)	19	1.13 (0.69-1.84)	1.68 (1.12-2.51)	1.97 (1.34-2.88)	*4.78 (2.78-8.14)*		
Exeter V40[St] : Orthinox V40[H] : Cenator Cemented[C]	MoP	2,431	75 (70 to 80)	32	0.66 (0.41-1.08)	1.44 (1.03-2.01)	2.03 (1.53-2.70)	2.78 (2.16-3.57)	4.27 (3.37-5.41)	*6.11 (4.59-8.11)*
Exeter V40[St] : Orthinox V40[H] : Charnley and Elite Plus LPW[C]	MoP	4,359	75 (71 to 80)	28	0.74 (0.52-1.04)	1.27 (0.98-1.66)	1.57 (1.23-1.99)	2.48 (1.99-3.07)	3.36 (2.63-4.28)	*3.96 (2.95-5.31)*
Exeter V40[St] : V40 Modular[H] : Charnley and Elite Plus LPW[C]	CoP	1,177	66 (63 to 70)	43	0.51 (0.23-1.13)	1.20 (0.71-2.02)	1.48 (0.92-2.37)	1.48 (0.92-2.37)	*1.48 (0.92-2.37)*	
Exeter V40[St] : Orthinox V40[H] : Elite Plus Cemented[C]	MoP	4,422	74 (68 to 79)	33	0.39 (0.24-0.62)	0.69 (0.48-0.99)	0.87 (0.63-1.20)	1.44 (1.10-1.88)	2.66 (2.05-3.45)	*4.53 (2.96-6.90)*
Exeter V40[St] : Orthinox V40[H] : Elite Plus Ogee[C]	MoP	23,924	75 (70 to 80)	34	0.38 (0.31-0.47)	0.85 (0.74-0.98)	1.17 (1.03-1.32)	2.10 (1.90-2.31)	3.22 (2.90-3.57)	*4.31 (3.74-4.97)*
Exeter V40[St] : V40 Modular[H] : Elite Plus Ogee[C]	CoP	2,753	67 (61 to 73)	41	0.47 (0.28-0.81)	0.77 (0.50-1.18)	1.12 (0.78-1.61)	2.20 (1.63-2.96)	3.21 (2.38-4.32)	*3.62 (2.56-5.11)*
Exeter V40[St] : Orthinox V40[H] : Exeter Contemporary Flanged[C]	MoP	91,244	75 (70 to 80)	34	0.57 (0.53-0.63)	1.00 (0.93-1.06)	1.33 (1.25-1.41)	2.29 (2.17-2.42)	4.16 (3.90-4.44)	*5.99 (5.38-6.66)*
Exeter V40[St] : V40 Modular[H] : Exeter Contemporary Flanged[C]	MoP	7,532	76 (71 to 81)	34	0.82 (0.64-1.06)	1.39 (1.15-1.69)	1.82 (1.53-2.17)	3.16 (2.67-3.74)	*11.70 (6.20-21.51)*	
Exeter V40[St] : V40 Modular[H] : Exeter Contemporary Flanged[C]	CoP	8,606	67 (62 to 73)	36	0.59 (0.45-0.78)	0.97 (0.78-1.21)	1.33 (1.09-1.61)	2.11 (1.76-2.53)	3.84 (3.12-4.71)	
Exeter V40[St] : Orthinox V40[H] : Exeter Contemporary Hooded[C]	MoP	24,541	76 (70 to 81)	32	0.94 (0.83-1.07)	1.57 (1.42-1.74)	2.12 (1.94-2.31)	3.89 (3.62-4.18)	7.24 (6.72-7.81)	*10.14 (9.10-11.28)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : V40 Modular[H] : Exeter Contemporary Hooded[C]	MoP	2,724	77 (72 to 82)	27	1.22 (0.87-1.71)	2.12 (1.63-2.74)	2.63 (2.08-3.32)	4.27 (3.40-5.37)		
Exeter V40[St] : V40 Modular[H] : Exeter Contemporary Hooded[C]	CoP	1,922	68 (62 to 73)	38	0.73 (0.43-1.23)	1.48 (1.02-2.13)	2.15 (1.58-2.93)	4.52 (3.48-5.87)	*6.65 (5.07-8.70)*	*10.43 (7.03-15.33)*
Exeter V40[St] : Orthinox V40[H] : Exeter Duration[C]	MoP	15,883	74 (68 to 79)	32	0.62 (0.50-0.75)	1.20 (1.04-1.38)	1.65 (1.46-1.87)	3.72 (3.41-4.06)	6.89 (6.35-7.48)	*11.03 (9.46-12.84)*
Exeter V40[St] : V40 Modular[H] : Exeter Duration[C]	CoP	978	63.5 (58 to 69)	39	0.31 (0.10-0.95)	0.72 (0.35-1.51)	0.94 (0.49-1.80)	2.74 (1.86-4.03)	6.02 (4.39-8.22)	*6.02 (4.39-8.22)*
Exeter V40[St] : Orthinox V40[H] : Exeter X3 Rimfit[C]	MoP	30,379	74 (68 to 79)	28	0.47 (0.40-0.55)	0.79 (0.69-0.91)	1.00 (0.89-1.14)	1.57 (1.36-1.80)		
Exeter V40[St] : V40 Modular[H] : Exeter X3 Rimfit[C]	MoP	8,751	77 (71 to 81)	43	0.60 (0.46-0.79)	0.94 (0.75-1.18)	1.46 (1.19-1.78)	2.36 (1.88-2.95)		
Exeter V40[St] : V40 Modular[H] : Exeter X3 Rimfit[C]	CoP	17,654	64 (58 to 71)	36	0.56 (0.46-0.69)	0.89 (0.75-1.05)	1.26 (1.08-1.47)	1.94 (1.64-2.29)		
Exeter V40[St] : Orthinox V40[H] : Marathon[C]	MoP	7,257	76 (70 to 80)	32	0.57 (0.42-0.78)	0.87 (0.68-1.13)	1.09 (0.86-1.38)	1.74 (1.33-2.26)		
Exeter V40[St] : V40 Modular[H] : Marathon[C]	CoP	3,648	64 (58 to 70)	38	0.51 (0.32-0.80)	0.75 (0.50-1.11)	1.11 (0.78-1.57)	1.73 (1.19-2.52)		
Exeter V40[St] : Orthinox V40[H] : Novae Liner[DM] : Novae Stick[C]	MoPoM	985	78 (70 to 84)	27	0.34 (0.11-1.05)	1.07 (0.53-2.14)	1.93 (1.08-3.45)	*4.16 (1.41-11.92)*		
Exeter V40[St] : Orthinox V40[H] : Opera[C]	MoP	2,651	75 (69 to 80)	31	0.38 (0.21-0.71)	0.86 (0.57-1.31)	1.33 (0.95-1.87)	3.15 (2.48-3.99)	8.17 (6.57-10.15)	*14.70 (11.08-19.35)*
MS-30[St] : Original ME Muller Low Profile[C]	MoP	1,621	80 (76 to 84)	33	0.31 (0.13-0.75)	0.45 (0.21-0.94)	0.77 (0.43-1.40)	1.73 (1.06-2.82)	*3.56 (2.10-5.99)*	
MS-30[St] : Original ME Muller Low Profile[C]	CoP	1,734	70 (64 to 75)	30	0.12 (0.03-0.46)	0.47 (0.24-0.94)	0.59 (0.32-1.10)	1.34 (0.88-2.05)	2.93 (1.97-4.34)	*3.24 (2.16-4.83)*
MS-30[St] : Zimmer Biolox[H] : Original ME Muller Low Profile[C]	CoP	1,025	73 (69 to 77)	34	0.30 (0.10-0.92)	0.63 (0.28-1.39)	0.75 (0.36-1.56)	*1.15 (0.58-2.27)*		
Muller Straight[St] : Original ME Muller Low Profile[C]	MoP	2,352	75 (70 to 80)	27	0.47 (0.26-0.85)	0.89 (0.57-1.37)	1.30 (0.90-1.88)	2.70 (2.02-3.60)	*5.00 (3.67-6.79)*	*7.64 (4.87-11.89)*

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Muller-Biomet[St] : Apollo[C]	MoP	2,120	74 (69 to 80)	39	0.62 (0.36-1.07)	1.21 (0.82-1.79)	1.37 (0.95-1.98)	2.40 (1.79-3.23)	4.57 (3.50-5.94)	
Stanmore Modular[St] : Stanmore-Arcom[C]	MoP	4,990	75 (70 to 81)	30	0.40 (0.26-0.63)	1.08 (0.82-1.41)	1.60 (1.28-2.00)	2.56 (2.12-3.10)	4.32 (3.57-5.21)	*7.93 (5.04-12.39)*
Uncemented										
Accolade[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	MoP	12,269	71 (64 to 76)	42	0.97 (0.81-1.16)	1.99 (1.75-2.25)	2.71 (2.43-3.02)	4.77 (4.37-5.19)	7.91 (7.19-8.69)	
Accolade[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	CoP	7,273	62 (55 to 67)	46	0.85 (0.67-1.09)	1.63 (1.36-1.95)	1.96 (1.67-2.31)	2.48 (2.13-2.89)	*3.62 (2.77-4.73)*	
Accolade[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	CoC	7,340	62 (54 to 68)	46	1.01 (0.80-1.27)	2.06 (1.75-2.41)	2.80 (2.44-3.20)	3.79 (3.37-4.26)	4.56 (4.06-5.12)	*4.70 (4.17-5.30)*
Accolade II[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	MoP	7,239	71 (64 to 76)	43	0.99 (0.78-1.25)	1.50 (1.23-1.83)	1.79 (1.48-2.16)	*2.33 (1.48-3.66)*		
Accolade II[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	CoP	20,462	62 (56 to 69)	48	0.77 (0.66-0.91)	1.19 (1.03-1.37)	1.45 (1.25-1.68)	*2.00 (1.52-2.62)*		
Accolade II[St] : V40 Modular[H] : Trident[L] : Trident II[S]	CoP	1,880	63 (55 to 69)	49	0.55 (0.28-1.07)	*1.18 (0.49-2.86)*	*1.18 (0.49-2.86)*			
Accolade II[St] : V40 Modular[H] : Trident[L] : Tritanium[S]	MoP	541	73 (66 to 80)	49	0.75 (0.28-1.98)	0.75 (0.28-1.98)	*2.44 (1.16-5.10)*			
Accolade II[St] : V40 Modular[H] : Trident[L] : Tritanium[S]	CoP	3,226	61 (54 to 69)	53	0.95 (0.66-1.36)	1.54 (1.13-2.10)	2.08 (1.54-2.80)	*2.19 (1.62-2.97)*		
Anthology[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	MoP	4,375	63 (54 to 70)	39	1.03 (0.77-1.38)	1.65 (1.30-2.09)	1.92 (1.54-2.40)	2.24 (1.79-2.80)		
Anthology[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	CoC	812	56 (45 to 63)	57	0.74 (0.33-1.64)	1.38 (0.77-2.47)	1.65 (0.96-2.82)	2.65 (1.68-4.16)		
Corail[St] : ASR Modular[H] : ASR Resurfacing[C]	MoM	2,745	61 (54 to 67)	54	1.02 (0.71-1.48)	7.47 (6.54-8.52)	23.62 (22.06-25.28)	43.87 (41.98-45.82)	48.84 (46.89-50.83)	
Corail[St] : Articul/eze[H] : Delta[L] : Delta TT[S]	CoC	1,186	66 (58 to 73)	35	0.84 (0.45-1.56)	1.78 (1.16-2.72)	2.04 (1.37-3.03)	3.04 (2.16-4.28)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
Corail[St] : Articul/eze[H] : Enduron[L] : Duraloc Cementless[S]	MoP	3,457	70 (65 to 76)	39	0.58 (0.37-0.90)	1.47 (1.12-1.94)	2.29 (1.83-2.86)	5.34 (4.60-6.21)	10.09 (8.94-11.38)	*15.48 (13.33-17.95)*
Corail[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	MoP	3,160	73 (68 to 79)	29	0.69 (0.44-1.07)	1.34 (0.91-1.96)	1.76 (1.21-2.56)	*2.23 (1.47-3.38)*		
Corail[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	CoP	7,078	63 (56 to 70)	40	0.41 (0.28-0.60)	0.79 (0.55-1.15)	1.10 (0.75-1.60)	*1.61 (0.92-2.81)*		
Corail[St] : Articul/eze[H] : CeraMax[L] : Pinnacle Gription[S]	CoC	2,867	57 (49 to 64)	45	1.06 (0.74-1.52)	1.65 (1.23-2.20)	2.42 (1.89-3.10)	3.13 (2.42-4.05)		
Corail[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	MoP	6,620	73 (68 to 78)	44	0.86 (0.66-1.12)	1.31 (1.03-1.66)	1.71 (1.34-2.17)	*2.42 (1.82-3.21)*		
Corail[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	CoP	7,734	62 (56 to 68)	51	0.45 (0.32-0.63)	1.14 (0.88-1.48)	1.41 (1.08-1.83)	*1.74 (1.31-2.31)*		
Corail[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	MoP	14,129	73 (68 to 78)	32	0.70 (0.58-0.86)	1.03 (0.87-1.22)	1.23 (1.04-1.44)	1.99 (1.64-2.42)		
Corail[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	CoP	26,066	65 (58 to 71)	40	0.56 (0.47-0.66)	0.95 (0.83-1.09)	1.20 (1.06-1.37)	1.99 (1.63-2.42)		
Corail[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	CoC	45,395	59 (52 to 65)	49	0.83 (0.75-0.91)	1.73 (1.61-1.85)	2.34 (2.20-2.48)	3.66 (3.48-3.85)	5.26 (4.96-5.56)	
Corail[St] : Articul/eze[H] : Enduron[L] : Pinnacle[S]	MoP	7,891	71 (65 to 77)	36	0.93 (0.74-1.17)	1.66 (1.40-1.97)	1.99 (1.70-2.33)	3.75 (3.33-4.22)	5.85 (5.25-6.52)	
Corail[St] : Articul/eze[H] : Enduron[L] : Pinnacle[S]	CoP	1,340	63 (58 to 69)	36	0.52 (0.25-1.10)	0.98 (0.57-1.68)	1.45 (0.93-2.26)	2.44 (1.72-3.46)	3.66 (2.68-5.00)	
Corail[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	MoP	54,955	71 (65 to 76)	45	0.76 (0.69-0.84)	1.23 (1.14-1.33)	1.51 (1.41-1.62)	2.38 (2.23-2.54)	3.39 (3.08-3.74)	
Corail[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	CoP	37,177	63 (56 to 69)	53	0.69 (0.61-0.79)	1.02 (0.91-1.13)	1.37 (1.25-1.50)	2.33 (2.11-2.57)	4.36 (3.41-5.55)	
Corail[St] : Articul/eze[H] : Ultamet[L] : Pinnacle[S]	MoM	11,889	67 (60 to 74)	47	0.89 (0.73-1.07)	2.46 (2.20-2.76)	5.18 (4.79-5.61)	13.35 (12.72-14.01)	17.97 (17.21-18.75)	
Corail[St] : Articul/eze[H] : Ultamet[L] : Pinnacle[S]	CoM	1,735	63 (57 to 70)	40	0.46 (0.23-0.92)	2.69 (2.02-3.57)	4.49 (3.60-5.59)	8.17 (6.94-9.60)	*11.74 (10.09-13.65)*	
Corail[St] : Articul/eze[H] : Trident[L] : Trident Cementless[S]	MoP	1,708	71 (64 to 77)	37	0.94 (0.58-1.53)	1.42 (0.96-2.12)	1.70 (1.18-2.46)	3.36 (2.43-4.64)		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Corail[St] : Articul/eze[H] : Trilogy[L] : Trilogy[S]	MoP	2,334	70 (64 to 76)	42	0.56 (0.33-0.96)	1.00 (0.66-1.50)	1.60 (1.16-2.22)	2.73 (2.09-3.56)	3.82 (2.86-5.10)	
Corail[St] : Articul/eze[H] : Trilogy[L] : Trilogy[S]	CoP	763	61 (55 to 66)	36	0.53 (0.20-1.41)	0.93 (0.45-1.95)	1.07 (0.54-2.13)	1.95 (1.13-3.35)	*2.14 (1.26-3.60)*	
Corail[St] : Articul/eze[H] : Trinity[L] : Trinity[S]	CoP	999	70 (64 to 76)	31	1.21 (0.69-2.12)	1.73 (1.08-2.77)	2.08 (1.35-3.21)	*3.11 (2.09-4.63)*		
Corail[St] : Articul/eze[H] : Trinity[L] : Trinity[S]	CoC	787	64 (57 to 70)	39	0.38 (0.12-1.18)	0.64 (0.27-1.53)	1.03 (0.52-2.06)	1.50 (0.83-2.71)		
Excia Cementless[St] : Aesculap Biolox Delta[H] : Plasmacup SC[L] : Plasmacup SC[S]	CoP	625	66 (61 to 73)	50	0.64 (0.24-1.70)	1.29 (0.65-2.57)	1.29 (0.65-2.57)	*2.77 (1.56-4.91)*		
Excia Cementless[St] : Aesculap Biolox Delta[H] : Plasmacup[L] : Plasmacup SC[S]	CoC	1,309	66 (59 to 73)	50	0.85 (0.47-1.52)	1.08 (0.64-1.82)	1.16 (0.70-1.92)	1.66 (1.07-2.58)	*2.24 (1.38-3.62)*	
Furlong Evolution Cementless[St] : JRI Ceramic Femoral[H] : CSF II[L] : Furlong HAC CSF Plus[S]	CoP	661	66 (59 to 73)	39	1.08 (0.52-2.26)	1.47 (0.76-2.81)	1.47 (0.76-2.81)	*1.75 (0.93-3.27)*		
Furlong Evolution Cementless[St] : JRI Ceramic Femoral[H] : CSF II[L] : Furlong HAC CSF Plus[S]	CoC	5,936	60 (50 to 68)	39	1.12 (0.88-1.43)	1.54 (1.24-1.89)	1.82 (1.50-2.22)	2.28 (1.87-2.79)		
Furlong HAC[St] : JRI Ceramic Femoral[H] : CSF[L] : CSF[S]	CoP	7,376	67 (61 to 73)	41	0.79 (0.61-1.02)	1.36 (1.12-1.65)	1.75 (1.47-2.08)	2.64 (2.28-3.05)	3.90 (3.41-4.45)	*4.44 (3.88-5.08)*
Furlong HAC[St] : JRI Ceramic Femoral[H] : CSF[L] : CSF[S]	CoC	1,660	59 (53 to 66)	44	1.27 (0.83-1.94)	2.18 (1.58-3.01)	2.74 (2.05-3.66)	4.37 (3.47-5.49)	6.33 (5.21-7.69)	*7.37 (5.83-9.29)*
Furlong HAC[St] : Tri-Fit Modular[H] : CSF[L] : CSF[S]	MoP	8,068	73 (67 to 78)	39	1.34 (1.11-1.61)	2.15 (1.85-2.49)	2.49 (2.17-2.86)	4.16 (3.71-4.66)	5.80 (5.19-6.48)	*8.05 (6.49-9.96)*
Furlong HAC[St] : JRI Ceramic Femoral[H] : CSF II[L] : Furlong HAC CSF Plus[S]	CoP	3,731	67 (62 to 72)	46	0.92 (0.66-1.29)	1.54 (1.18-2.00)	1.80 (1.41-2.30)	2.51 (2.01-3.15)	*2.97 (2.28-3.86)*	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
Furlong HAC[St] : JRI Ceramic Femoral[H] : CSF II[L] : Furlong HAC CSF Plus[S]	CoC	15,921	63 (56 to 69)	47	0.93 (0.79-1.09)	1.55 (1.37-1.76)	1.76 (1.56-1.98)	2.27 (2.04-2.52)	3.24 (2.77-3.78)	
Furlong HAC[St] : Tri-Fit Modular[H] : CSF II[L] : Furlong HAC CSF Plus[S]	MoP	6,082	74 (69 to 79)	39	1.59 (1.31-1.94)	2.24 (1.89-2.65)	2.70 (2.31-3.15)	3.56 (3.08-4.12)	*4.67 (3.90-5.57)*	
M/L Taper Cementless[St] : CPT[H] : Longevity[L] : Continuum[S]	MoP	2,127	69 (64 to 75)	45	1.09 (0.72-1.63)	1.53 (1.08-2.15)	1.90 (1.39-2.59)	2.88 (2.16-3.82)		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Longevity[L] : Continuum[S]	CoP	2,161	58 (52 to 65)	52	1.63 (1.17-2.27)	2.02 (1.50-2.72)	2.30 (1.74-3.05)	3.23 (2.43-4.30)		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Trilogy[L] : Continuum[S]	CoC	2,153	56 (49 to 62)	52	0.98 (0.64-1.49)	1.73 (1.25-2.37)	2.11 (1.58-2.81)	2.71 (2.09-3.50)		
M/L Taper Cementless[St] : CPT[H] : Longevity[L] : Trilogy IT[S]	MoP	2,515	70 (64 to 75)	44	1.20 (0.84-1.71)	1.86 (1.39-2.47)	2.32 (1.79-3.01)	*3.31 (2.43-4.50)*		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Longevity[L] : Trilogy IT[S]	CoP	2,763	60 (53 to 66)	58	1.33 (0.96-1.84)	1.89 (1.43-2.50)	2.21 (1.70-2.88)	*2.30 (1.76-2.99)*		
M/L Taper Cementless[St] : Zimmer Biolox[H] : Trilogy[L] : Trilogy IT[S]	CoC	955	53 (47 to 59)	57	0.73 (0.35-1.53)	1.79 (1.11-2.86)	1.79 (1.11-2.86)	*2.89 (1.82-4.56)*		
MetaFix[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoP	5,988	64 (57 to 70)	47	0.73 (0.54-0.99)	0.96 (0.72-1.27)	1.24 (0.94-1.63)	*2.49 (1.58-3.92)*		
MetaFix[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoC	3,140	59 (52 to 66)	46	0.68 (0.45-1.04)	1.00 (0.70-1.43)	1.39 (1.01-1.90)	2.06 (1.53-2.78)		
MetaFix[St] : Trinity Modular[H] : Trinity[L] : Trinity[S]	MoP	1,334	71 (67 to 76)	48	0.84 (0.46-1.51)	1.36 (0.85-2.18)	1.69 (1.09-2.62)	*3.78 (2.41-5.91)*		
MiniHip[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoP	1,242	58 (52 to 64)	50	1.54 (0.99-2.41)	2.30 (1.58-3.34)	2.79 (1.96-3.96)	*3.36 (2.31-4.89)*		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
MiniHip[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoC	1,318	53 (46 to 61)	43	1.22 (0.75-1.99)	1.94 (1.32-2.86)	2.20 (1.52-3.17)	2.79 (1.97-3.92)		
Polarstem Cementless[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	MoP	27,578	65 (57 to 72)	47	0.67 (0.58-0.78)	0.90 (0.79-1.03)	1.11 (0.97-1.27)	2.07 (1.67-2.57)		
Polarstem Cementless[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	MoP	3,856	71 (65 to 76)	45	0.87 (0.62-1.22)	1.14 (0.84-1.54)	1.52 (1.15-2.01)	*2.24 (1.57-3.19)*		
Polarstem Cementless[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	CoC	1,774	60 (52 to 66)	50	0.45 (0.23-0.90)	0.63 (0.35-1.14)	0.70 (0.40-1.23)	0.99 (0.59-1.67)		
Profemur L Modular[St] : Microport Delta Femoral[H] : Rim-Lock Ceramic[L] : Procotyl L[S]	CoC	1,340	57 (49 to 63)	47	1.34 (0.85-2.12)	2.64 (1.91-3.66)	3.45 (2.58-4.59)	5.26 (4.13-6.69)	*6.41 (4.87-8.42)*	
Profemur L Modular[St] : Transend Modular[H] : Rim-Lock Poly[L] : Procotyl L[S]	MoP	597	69 (64 to 74)	44	1.01 (0.46-2.24)	1.87 (1.04-3.35)	2.22 (1.29-3.79)	3.19 (2.02-5.02)	*3.19 (2.02-5.02)*	
S-Rom Cementless[St] : S-Rom[H] : CeraMax[L] : Pinnacle[S]	CoC	1,028	43 (33 to 53)	39	1.36 (0.81-2.29)	2.82 (1.96-4.06)	3.84 (2.80-5.27)	5.15 (3.87-6.85)	*5.54 (4.17-7.33)*	
S-Rom Cementless[St] : S-Rom[H] : Ultamet[L] : Pinnacle[S]	MoM	816	62.5 (54 to 70)	45	3.95 (2.81-5.54)	7.37 (5.76-9.41)	10.51 (8.56-12.86)	20.61 (17.86-23.71)	23.94 (20.95-27.29)	*25.39 (22.13-29.03)*
SL-Plus Cementless[St] : EP-Fit Plus[H] : EP-Fit Plus[L] : EP-Fit Plus[S]	MoP	936	71 (64 to 77)	40	1.61 (0.98-2.66)	3.72 (2.67-5.17)	5.24 (3.96-6.91)	9.44 (7.62-11.67)	*11.79 (9.65-14.35)*	
SL-Plus Cementless[St] : EP-Fit Plus[H] : EP-Fit Plus[L] : EP-Fit Plus[S]	CoP	858	70 (62 to 76)	38	1.05 (0.55-2.02)	2.26 (1.45-3.53)	3.91 (2.78-5.48)	5.88 (4.43-7.78)	*7.47 (5.73-9.72)*	
SL-Plus Cementless[St] : EP-Fit Plus[H] : EP-Fit Plus[L] : EP-Fit Plus[S]	CoC	772	57 (51 to 63)	52	1.95 (1.18-3.21)	4.16 (2.96-5.83)	5.75 (4.31-7.65)	8.33 (6.56-10.53)	10.45 (8.44-12.90)	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
SL-Plus Cementless[St] : Oxinium Ball[H] : EP-Fit Plus[L] : EP-Fit Plus[S]	MoP	842	70 (61 to 77)	39	1.19 (0.64-2.20)	2.17 (1.37-3.42)	2.79 (1.86-4.17)	*3.40 (2.29-5.02)*		
Summit Cementless[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	CoC	2,386	54 (45 to 61)	50	0.81 (0.52-1.27)	1.17 (0.79-1.71)	1.36 (0.94-1.95)	1.44 (1.00-2.06)	*1.44 (1.00-2.06)*	
Synergy Cementless[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	MoP	2,790	65 (56 to 71)	52	0.90 (0.61-1.33)	1.13 (0.80-1.61)	1.38 (1.00-1.90)	1.90 (1.41-2.55)		
Synergy Cementless[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	MoP	539	71 (67 to 77)	50	1.30 (0.62-2.70)	1.68 (0.88-3.21)	1.68 (0.88-3.21)	*1.96 (1.05-3.64)*		
Synergy Cementless[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	CoC	685	60 (53 to 66)	51	0.73 (0.31-1.75)	0.73 (0.31-1.75)	1.13 (0.53-2.36)	1.13 (0.53-2.36)	*1.90 (0.76-4.68)*	
Taperloc Cementless[St] : Exceed ABT[L] : Exceed ABT[S]	MoP	7,195	72 (66 to 77)	39	1.28 (1.05-1.57)	1.68 (1.40-2.00)	1.91 (1.62-2.26)	2.57 (2.19-3.02)	*3.46 (2.13-5.58)*	
Taperloc Cementless[St] : Exceed ABT[L] : Exceed ABT[S]	CoP	5,922	65 (58 to 70)	45	0.81 (0.61-1.08)	1.04 (0.81-1.33)	1.16 (0.91-1.48)	1.53 (1.21-1.93)		
Taperloc Cementless[St] : M2A[L] : Exceed ABT[S]	CoC	12,863	61 (54 to 67)	47	1.10 (0.93-1.30)	1.53 (1.33-1.76)	1.84 (1.62-2.10)	2.27 (2.02-2.56)	2.70 (2.37-3.08)	
Taperloc Cementless[St] : Ringloc-X ArCom[L] : Exceed ABT[S]	MoP	1,145	74 (68 to 79)	38	1.31 (0.79-2.17)	2.12 (1.42-3.14)	2.50 (1.73-3.60)	3.05 (2.17-4.26)	*3.21 (2.30-4.49)*	
Taperloc Complete Cementless[St] : Longevity[L] : Continuum[S]	CoP	1,336	58 (52 to 64)	56	0.77 (0.41-1.43)	1.13 (0.65-1.98)	*1.13 (0.65-1.98)*			
Taperloc Complete Cementless[St] : Exceed ABT[L] : Exceed ABT[S]	CoP	1,259	63 (56 to 69)	48	0.64 (0.32-1.27)	0.96 (0.55-1.69)	1.05 (0.61-1.80)	*1.27 (0.72-2.21)*		
Taperloc Complete Cementless[St] : M2A[L] : Exceed ABT[S]	CoC	1,541	59 (52 to 65)	53	0.59 (0.30-1.12)	1.39 (0.91-2.12)	1.67 (1.13-2.47)	*2.03 (1.41-2.92)*		

Notes:
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[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Taperloc Complete Cementless[St] : G7[L] : G7 Cementless Acetabular Component[S]	MoP	1,099	73 (68 to 79)	39	0.93 (0.50-1.72)	1.14 (0.65-2.01)	1.27 (0.74-2.19)			
Taperloc Complete Cementless[St] : G7[L] : G7 Cementless Acetabular Component[S]	CoP	2,549	62 (56 to 68)	52	0.50 (0.28-0.88)	0.72 (0.43-1.22)	0.72 (0.43-1.22)			
Tri-Lock BPS[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	MoP	503	73 (68 to 77)	38	0.61 (0.20-1.86)	1.56 (0.74-3.25)	1.85 (0.92-3.68)	*2.58 (1.37-4.83)*		
Tri-Lock BPS[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	CoP	796	61 (56 to 66.5)	50	0.13 (0.02-0.89)	0.48 (0.15-1.49)	0.85 (0.29-2.47)	*1.37 (0.50-3.67)*		
Tri-Lock BPS[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	CoC	823	58 (51 to 64)	57	0.98 (0.49-1.94)	1.61 (0.94-2.76)	2.02 (1.24-3.27)	3.14 (2.02-4.86)		
TriFit TS hip[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoP	1,807	57 (51 to 64)	56	0.95 (0.59-1.53)	1.67 (1.15-2.41)	1.93 (1.36-2.75)	*2.35 (1.65-3.34)*		
TriFit TS hip[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoC	523	52 (46 to 57)	59	0.20 (0.03-1.38)	1.56 (0.74-3.25)	1.56 (0.74-3.25)			
Hybrid										
C-Stem AMT Cemented[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	MoP	2,241	77 (73 to 81)	29	0.57 (0.33-1.01)	0.89 (0.47-1.69)	*1.19 (0.60-2.36)*			
C-Stem AMT Cemented[St] : Articul/eze[H] : AltrX[L] : Pinnacle Gription[S]	CoP	3,762	69 (61 to 76)	37	0.89 (0.62-1.27)	1.27 (0.88-1.83)	*3.38 (2.06-5.52)*			
C-Stem AMT Cemented[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	MoP	3,111	77 (73 to 81)	33	0.80 (0.54-1.19)	0.97 (0.66-1.43)	1.19 (0.74-1.93)	*2.37 (0.87-6.36)*		
C-Stem AMT Cemented[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle Gription[S]	CoP	1,776	66 (59 to 73)	40	0.63 (0.34-1.18)	1.09 (0.60-1.98)	*1.09 (0.60-1.98)*			
C-Stem AMT Cemented[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	MoP	3,759	77 (73 to 82)	27	0.54 (0.35-0.85)	0.77 (0.52-1.14)	0.89 (0.60-1.32)	*1.21 (0.76-1.92)*		

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
C-Stem AMT Cemented[St] : Articul/eze[H] : AltrX[L] : Pinnacle[S]	CoP	6,643	69 (62 to 74)	36	0.51 (0.36-0.72)	0.88 (0.66-1.17)	1.00 (0.75-1.34)	*1.29 (0.88-1.88)*		
C-Stem AMT Cemented[St] : Articul/eze[H] : CeraMax[L] : Pinnacle[S]	CoC	1,823	61 (54 to 66)	39	0.50 (0.26-0.95)	0.92 (0.57-1.51)	1.46 (0.98-2.17)	2.34 (1.67-3.29)	*2.86 (1.96-4.16)*	
C-Stem AMT Cemented[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	MoP	9,906	75 (71 to 80)	37	0.80 (0.64-0.99)	1.38 (1.16-1.65)	1.73 (1.47-2.05)	2.49 (2.05-3.03)	*2.49 (2.05-3.03)*	
C-Stem AMT Cemented[St] : Articul/eze[H] : Pinnacle[L] : Pinnacle[S]	CoP	5,704	66 (60 to 71)	47	0.79 (0.59-1.07)	1.13 (0.88-1.46)	1.22 (0.95-1.57)	*1.77 (1.33-2.34)*	*1.77 (1.33-2.34)*	
CPCS[St] : Oxinium Ball[H] : R3[L] : R3 Cementless[S]	MoP	4,086	72 (64 to 78)	32	0.56 (0.37-0.86)	1.08 (0.77-1.50)	1.38 (0.98-1.93)	*2.90 (1.21-6.87)*		
CPCS[St] : Smith Nephew Femoral[H] : R3[L] : R3 Cementless[S]	MoP	3,727	76 (72 to 81)	32	0.80 (0.56-1.16)	1.22 (0.90-1.67)	1.57 (1.16-2.11)	*1.97 (1.41-2.75)*		
CPT CoCr[St] : CPT[H] : Longevity[L] : Continuum[S]	MoP	7,897	75 (70 to 80)	35	1.50 (1.25-1.79)	2.10 (1.80-2.46)	2.67 (2.30-3.09)	4.10 (3.35-5.01)		
CPT CoCr[St] : Zimmer Biolox[H] : Longevity[L] : Continuum[S]	CoP	6,431	65 (59 to 72)	39	1.43 (1.16-1.75)	2.04 (1.71-2.45)	2.42 (2.03-2.89)	*2.93 (2.35-3.64)*		
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Continuum[S]	CoC	1,503	56 (48 to 63)	39	1.33 (0.86-2.06)	2.01 (1.41-2.87)	2.57 (1.88-3.52)	3.68 (2.80-4.82)		
CPT CoCr[St] : CPT[H] : G7 Liner[DM] : G7 Cementless Acetabular Component[S]	MoPoM	427	74 (65 to 80)	31	0.95 (0.36-2.50)	*2.29 (1.13-4.62)*	*3.01 (1.48-6.08)*			
CPT CoCr[St] : Zimmer Biolox[H] : G7 Liner[DM] : G7 Cementless Acetabular Component[S]	CoPoM	584	73 (63 to 79)	31	0.41 (0.10-1.61)	*1.17 (0.42-3.23)*	*1.17 (0.42-3.23)*			
CPT CoCr[St] : CPT[H] : Trilogy[L] : Trabecular Metal Modular Cementless[S]	MoP	1,964	76 (69 to 81)	28	0.98 (0.63-1.53)	1.67 (1.17-2.36)	2.21 (1.62-3.02)	3.80 (2.88-5.00)	*5.36 (3.83-7.47)*	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Trabecular Metal Modular Cementless[S]	CoP	1,093	65 (58 to 72)	39	1.30 (0.77-2.19)	2.37 (1.59-3.51)	2.73 (1.88-3.96)	*3.96 (2.80-5.59)*		
CPT CoCr[St] : CPT[H] : Longevity[L] : Trilogy IT[S]	MoP	7,108	74 (69 to 79)	35	1.39 (1.14-1.69)	2.04 (1.73-2.41)	2.42 (2.07-2.84)	3.87 (3.16-4.75)		
CPT CoCr[St] : Zimmer Biolox[H] : Longevity[L] : Trilogy IT[S]	CoP	8,164	67 (60 to 73)	39	0.88 (0.70-1.11)	1.45 (1.19-1.76)	1.90 (1.58-2.29)	*2.72 (2.06-3.61)*		
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Trilogy IT[S]	CoC	1,363	60 (53 to 65)	43	0.95 (0.56-1.64)	1.25 (0.78-2.00)	1.40 (0.90-2.19)	1.96 (1.26-3.05)		
CPT CoCr[St] : CPT[H] : Trilogy[L] : Trilogy[S]	MoP	14,832	73 (67 to 79)	35	0.92 (0.78-1.09)	1.52 (1.33-1.73)	2.28 (2.05-2.55)	4.01 (3.65-4.40)	5.44 (4.91-6.03)	*6.46 (5.63-7.39)*
CPT CoCr[St] : Trilogy[L] : Trilogy[S]	CoC	518	61 (56 to 66)	42	0.77 (0.29-2.05)	1.16 (0.52-2.56)	1.75 (0.91-3.34)	2.55 (1.49-4.35)	*3.90 (2.50-6.05)*	
CPT CoCr[St] : Zimmer Biolox[H] : Trilogy[L] : Trilogy[S]	CoP	10,947	69 (62 to 75)	38	0.84 (0.68-1.03)	1.27 (1.07-1.51)	1.72 (1.48-2.01)	2.42 (2.08-2.82)		
Exeter No.1 125mm stem Line Extension[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	CoP	1,970	64 (56 to 72)	33	0.91 (0.56-1.48)	1.26 (0.80-1.96)	1.67 (1.03-2.71)			
Exeter V40[St] : Orthinox V40[H] : ABG[L] : ABG II Cementless[S]	MoP	795	72 (65 to 78)	36	0.38 (0.12-1.18)	1.30 (0.70-2.40)	1.58 (0.90-2.77)	2.57 (1.62-4.06)	4.14 (2.77-6.14)	*5.95 (3.95-8.91)*
Exeter V40[St] : V40 Modular[H] : ABG[L] : ABG II Cementless[S]	CoC	1,806	63 (56 to 68)	33	0.22 (0.08-0.59)	0.45 (0.22-0.89)	0.97 (0.60-1.55)	2.14 (1.54-2.97)	3.80 (2.89-4.98)	*5.71 (3.80-8.55)*
Exeter V40[St] : Orthinox V40[H] : AltrX[L] : Pinnacle[S]	MoP	593	77 (73 to 82)	12	0.69 (0.26-1.81)	0.86 (0.36-2.06)	1.19 (0.52-2.71)	*1.19 (0.52-2.71)*		
Exeter V40[St] : Orthinox V40[H] : Enduron[L] : Pinnacle[S]	MoP	1,132	73 (67 to 79)	32	0.45 (0.19-1.07)	1.09 (0.62-1.92)	1.59 (0.99-2.54)	3.25 (2.29-4.60)	4.07 (2.92-5.65)	
Exeter V40[St] : Orthinox V40[H] : Pinnacle[L] : Pinnacle[S]	MoP	4,124	75 (70 to 80)	30	0.88 (0.64-1.22)	1.25 (0.95-1.64)	1.43 (1.10-1.86)	2.11 (1.61-2.77)	*2.55 (1.89-3.43)*	
Exeter V40[St] : V40 Modular[H] : AltrX[L] : Pinnacle[S]	CoP	935	70 (63 to 77)	36	0.70 (0.31-1.55)	0.70 (0.31-1.55)	*1.10 (0.46-2.64)*			

Notes:
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[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : V40 Modular[H] : Pinnacle[L] : Pinnacle[S]	MoP	684	77 (72 to 82)	49	1.38 (0.72-2.63)	1.78 (0.98-3.20)	2.41 (1.43-4.07)	*3.00 (1.82-4.93)*		
Exeter V40[St] : V40 Modular[H] : Pinnacle[L] : Pinnacle[S]	CoP	3,553	65 (58 to 71)	57	0.49 (0.31-0.79)	0.83 (0.57-1.22)	0.92 (0.64-1.32)	2.01 (1.27-3.15)	*3.62 (2.02-6.45)*	
Exeter V40[St] : Orthinox V40[H] : R3[L] : R3 Cementless[S]	MoP	2,775	75 (70 to 80)	27	0.81 (0.53-1.23)	1.33 (0.95-1.85)	1.71 (1.25-2.32)	2.30 (1.66-3.20)		
Exeter V40[St] : V40 Modular[H] : R3[L] : R3 Cementless[S]	CoP	1,182	66 (58 to 74)	38	0.62 (0.30-1.30)	0.85 (0.44-1.64)	1.41 (0.78-2.56)	*1.41 (0.78-2.56)*		
Exeter V40[St] : Orthinox V40[H] : Reflection[L] : Reflection Cementless[S]	MoP	2,163	73 (68 to 78)	35	0.60 (0.35-1.04)	1.08 (0.72-1.63)	1.54 (1.09-2.17)	3.46 (2.71-4.40)	5.86 (4.75-7.22)	*8.36 (6.00-11.57)*
Exeter V40[St] : Orthinox V40[H] : Restoration ADM LIner[DM] : Trident Cementless[S]	MoPoM	1,629	75 (68 to 81)	37	1.17 (0.74-1.86)	1.53 (1.00-2.32)	1.64 (1.09-2.48)	*1.97 (1.23-3.15)*		
Exeter V40[St] : V40 Modular[H] : Restoration ADM LIner[DM] : Trident Cementless[S]	MoPoM	1,537	75 (68 to 81)	25	0.60 (0.32-1.16)	1.34 (0.81-2.21)	1.53 (0.93-2.53)			
Exeter V40[St] : V40 Modular[H] : Restoration ADM LIner[DM] : Trident Cementless[S]	CoPoM	1,450	71.5 (61 to 79)	46	0.97 (0.56-1.67)	1.39 (0.83-2.31)	*1.63 (0.97-2.73)*	*1.63 (0.97-2.73)*		
Exeter V40[St] : Orthinox V40[H] : Restoration ADM LIner[DM] : Tritanium[S]	MoPoM	422	75 (68 to 81)	39	2.43 (1.32-4.48)	*3.20 (1.80-5.65)*	*3.77 (2.13-6.61)*			
Exeter V40[St] : V40 Modular[H] : Restoration ADM LIner[DM] : Tritanium[S]	MoPoM	390	75 (67 to 82)	32	1.57 (0.71-3.46)	*2.02 (0.95-4.27)*	*2.02 (0.95-4.27)*			
Exeter V40[St] : Orthinox V40[H] : Trident[L] : Trident Cementless[S]	MoP	43,621	73 (67 to 78)	35	0.68 (0.61-0.76)	1.13 (1.03-1.24)	1.45 (1.33-1.57)	2.38 (2.18-2.60)	3.84 (3.43-4.30)	
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	MoP	31,207	75 (70 to 80)	39	0.72 (0.64-0.83)	1.16 (1.04-1.29)	1.53 (1.39-1.69)	2.48 (2.24-2.75)	3.07 (2.69-3.50)	

Notes:
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[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary					
					1 year	3 years	5 years	10 years	15 years	20 years
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	CoP	73,417	66 (59 to 73)	41	0.59 (0.53-0.65)	0.90 (0.83-0.98)	1.17 (1.08-1.27)	1.83 (1.66-2.03)	2.72 (2.24-3.30)	
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident Cementless[S]	CoC	13,117	59 (52 to 65)	44	0.53 (0.42-0.68)	1.06 (0.90-1.25)	1.53 (1.33-1.75)	2.67 (2.40-2.98)	4.02 (3.64-4.44)	*5.22 (4.57-5.97)*
Exeter V40[St] : Orthinox V40[H] : Trident[L] : Trident II[S]	MoP	786	73 (66 to 78)	30	0.67 (0.28-1.60)	*0.95 (0.41-2.19)*				
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident II[S]	MoP	561	76 (71 to 82)	43	*0.00 (.-.)*					
Exeter V40[St] : V40 Modular[H] : Trident[L] : Trident II[S]	CoP	2,248	66 (58 to 74)	38	0.44 (0.23-0.85)	*0.69 (0.30-1.56)*				
Exeter V40[St] : Orthinox V40[H] : Trilogy[L] : Trilogy[S]	MoP	12,064	71 (65 to 77)	39	0.53 (0.42-0.68)	0.85 (0.70-1.03)	1.20 (1.01-1.42)	2.03 (1.76-2.33)	3.26 (2.84-3.74)	*4.40 (3.66-5.28)*
Exeter V40[St] : V40 Modular[H] : Trilogy[L] : Trilogy[S]	CoP	2,811	63 (57 to 69)	43	0.57 (0.35-0.93)	0.94 (0.64-1.38)	1.17 (0.83-1.65)	2.01 (1.52-2.64)	3.08 (2.38-3.98)	*3.75 (2.79-5.04)*
Exeter V40[St] : Orthinox V40[H] : Trident[L] : Tritanium[S]	MoP	1,781	75 (71 to 80)	34	0.89 (0.54-1.47)	1.18 (0.75-1.84)	1.49 (0.97-2.28)	*2.43 (1.58-3.73)*		
Exeter V40[St] : V40 Modular[H] : Trident[L] : Tritanium[S]	MoP	1,217	75 (69 to 80)	42	1.01 (0.58-1.78)	1.93 (1.24-3.00)	3.02 (2.05-4.43)	*4.40 (3.05-6.34)*		
Exeter V40[St] : V40 Modular[H] : Trident[L] : Tritanium[S]	CoP	7,675	66 (59 to 73)	46	0.97 (0.77-1.23)	1.51 (1.23-1.85)	1.80 (1.47-2.21)	2.39 (1.87-3.06)		
TaperFit Cemented[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoP	3,903	69 (63 to 74)	34	0.82 (0.58-1.16)	1.31 (0.98-1.75)	1.48 (1.12-1.96)	*2.98 (1.35-6.48)*		
TaperFit Cemented[St] : Corin Ceramic[H] : Trinity[L] : Trinity[S]	CoC	1,142	61 (53 to 67)	36	0.36 (0.13-0.95)	0.59 (0.26-1.31)	0.76 (0.35-1.63)	*1.12 (0.50-2.50)*		
TaperFit Cemented[St] : Trinity Modular[H] : Trinity[L] : Trinity[S]	MoP	4,453	76 (71 to 80)	33	1.15 (0.88-1.52)	1.61 (1.27-2.05)	1.76 (1.39-2.22)	*2.36 (1.82-3.05)*		

Notes:
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[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) (continued)

Stem:head:cup brand	Bearing surface	N	Age at primary Median (IQR)	Male (%)	Time since primary 1 year	3 years	5 years	10 years	15 years	20 years
Taperloc Cemented[St] : Exceed ABT[L] : Exceed ABT[S]	MoP	1,630	78 (73 to 82)	20	0.81 (0.47-1.39)	0.81 (0.47-1.39)	0.98 (0.59-1.63)	*1.10 (0.67-1.82)*		
Taperloc Cemented[St] : Exceed ABT[L] : Exceed ABT[S]	CoP	810	71 (65 to 76)	31	0.50 (0.19-1.32)	1.21 (0.60-2.46)	1.54 (0.77-3.07)	*3.24 (1.10-9.30)*		
Reverse Hybrid										
Corail[St] : Articul/eze[H] : Charnley and Elite Plus LPW[C]	MoP	1,397	74 (70 to 78)	29	0.72 (0.39-1.34)	1.09 (0.66-1.80)	1.42 (0.91-2.21)	3.09 (2.15-4.43)	*4.00 (2.73-5.83)*	
Corail[St] : Articul/eze[H] : Charnley and Elite Plus LPW[C]	CoP	918	66 (62 to 71)	39	0.99 (0.51-1.89)	1.88 (1.18-3.01)	2.00 (1.27-3.16)	2.72 (1.81-4.08)	*3.76 (2.50-5.64)*	
Corail[St] : Articul/eze[H] : Elite Plus Cemented[C]	MoP	1,335	75 (71 to 80)	35	0.30 (0.11-0.80)	0.69 (0.36-1.33)	1.12 (0.66-1.89)	2.56 (1.73-3.78)	*4.59 (3.10-6.78)*	
Corail[St] : Articul/eze[H] : Elite Plus Cemented[C]	CoP	742	66 (61 to 70)	38	0.54 (0.20-1.43)	0.95 (0.45-1.98)	1.41 (0.76-2.61)	1.84 (1.03-3.25)	*4.37 (2.57-7.38)*	
Corail[St] : Articul/eze[H] : Elite Plus Ogee[C]	MoP	2,425	74 (68 to 78)	36	0.70 (0.44-1.13)	1.22 (0.85-1.75)	1.55 (1.12-2.15)	2.45 (1.81-3.30)	5.20 (3.77-7.16)	
Corail[St] : Articul/eze[H] : Elite Plus Ogee[C]	CoP	722	64 (60 to 68)	42	0.42 (0.13-1.29)	2.11 (1.28-3.48)	2.70 (1.73-4.20)	4.25 (2.95-6.11)	*5.59 (3.88-8.03)*	
Corail[St] : Articul/eze[H] : Marathon[C]	MoP	14,856	73 (68 to 78)	38	0.63 (0.51-0.77)	1.01 (0.85-1.19)	1.27 (1.09-1.49)	2.18 (1.86-2.57)	*4.21 (2.92-6.05)*	
Corail[St] : Articul/eze[H] : Marathon[C]	CoP	6,966	63 (57 to 68)	41	0.48 (0.34-0.68)	0.98 (0.76-1.27)	1.23 (0.97-1.56)	1.86 (1.45-2.39)	*3.63 (2.14-6.14)*	

Notes:
Blank cells indicate that the number at risk at the time shown has fallen below ten and thus estimates have been omitted as they are highly unreliable.
[St]=Stem; [H]=Head; [C]=Cup; [L]=Liner; [S]=Shell; [DM]=Dual mobility.
Total hip replacement and hip resurfacing constructs with a 10-year survival rate below 5% are highlighted in green. Constructs with a 10-year survival rate equal to and above 5% are highlighted in red. Where the confidence interval spans 5% or the number of prosthesis constructs at risk is below 250 the cells are not highlighted.

Table 3.H8 (b) shows that there are 11 cemented, ten uncemented, two hybrid and two reverse hybrid stem / head / cup (or liner / shell) / bearing combinations with revision rates of less than 2% at ten years where more than 250 cases remain at risk at that time point. This is markedly lower than the current recommendation by NICE stating that implants with a revision rate of less than 5% at ten years should be selected for primary hip replacement for end-stage arthritis of the hip and the rates required to achieve an Orthopaedic Data Evaluation Panel (ODEP) 10A* rating.

https://www.nice.org.uk/guidance/ta304

3.H.5 Revisions for different indications after primary hip replacement

Overall, 47,090 (3.0%) of the 1,561,640 primary hip replacements had an associated first revision. The most common indications for revision were aseptic loosening (11,781), dislocation / subluxation (8,308), periprosthetic fracture (7,900), infection (7,531), adverse soft tissue reaction to particulate debris (6,531, a figure that is likely to be an underestimate due to changes in MDS collection, see later), and pain (5,207). Pain was not usually cited alone; in 3,538 out of the 5,207 instances (68%), it was cited together with one or more other indications. Associated PTIRs for these and the other indications are shown in Table 3.H9 (page 121). Here, implant wear denotes wear of the polyethylene component, wear of the acetabular component or dissociation of the liner.

The number of adverse reactions to particulate debris is likely to be underestimated because this was not requested as an indication for revision on the data collection forms in the earlier years of the registry, i.e. it was not included in MDSv1 and MDSv2. Some of these cases may have recorded the indication for revision as 'other' but this is not definitively known. Adoption of the later revision forms (MDSv3 onwards) was staggered over time and so a small number of revisions associated with a few primaries as late as 2011 still had revisions reported on MDSv1 and MDSv2 of the data collection forms. Restricting our analyses to primaries from 2008 onwards, as done in previous annual reports, ensures that >99% of revisions were recorded on later forms (MDSv3 onwards). It was noted that only 3,123 of the 6,531 instances (47.8%) of adverse reactions to particulate debris would thus be included, i.e. 3,408 of the earlier cases are therefore excluded from the analysis. Therefore, two sets of PTIRs are presented: one set for all primary hip replacements in the registry, which are likely to be underestimates of revisions for adverse reactions to particulate debris, and the other set for all primary hip replacements performed since the beginning of 2008, which has better ascertainment but does not include the cases with the longest follow-up.

Table 3.H9 reports revision by indication with further breakdowns by hip fixation and bearing. Metal-on-metal (irrespective of the type of fixation) and resurfacings seem to have the highest PTIRs for both aseptic loosening and pain, but ceramic-on-metal has similarly poor outcomes with rates that are not statistically significantly different. Metal-on-metal bearings have the highest incidence of adverse reaction to particulate debris. Although the numbers are relatively small in comparison to other groups, dual mobility bearings appear to have PTIRs for revision for dislocation / subluxation that are higher than or similar to alternative bearings and higher PTIRs for revision for periprosthetic fracture and infection. It is not yet known how much selection accounts for these observations.

Table 3.H9 PTIR estimates of indications for hip revision (95% CI) by fixation and bearing.

Fixation and bearing surface	Prosthesis-years at risk (x1,000)	Number of revisions per 1,000 prosthesis-years for: All causes	Aseptic loosening	Pain	Dislocation / Subluxation	Infection	Periprosthetic fracture	Malalignment	Lysis	Implant wear	Implant fracture	Head/ socket size mismatch	Adverse reaction to particulate debris**	Adverse reaction to particulate debris for primaries from 1.1.2008***: Prosthesis-years at risk (x1,000)	Number of revisions per 1,000 prosthesis-years
All cases*	11,425.9	4.12 (4.08-4.16)	1.03 (1.01-1.05)	0.46 (0.44-0.47)	0.73 (0.71-0.74)	0.66 (0.64-0.67)	0.69 (0.68-0.71)	0.26 (0.25-0.27)	0.26 (0.25-0.27)	0.24 (0.23-0.25)	0.13 (0.13-0.14)	0.03 (0.02-0.03)	0.57 (0.56-0.59)	8,862.6	0.35 (0.34-0.36)
All cemented	3,501.4	3.15 (3.09-3.21)	1.11 (1.08-1.15)	0.20 (0.18-0.21)	0.75 (0.72-0.78)	0.62 (0.60-0.65)	0.53 (0.51-0.56)	0.16 (0.15-0.17)	0.24 (0.23-0.26)	0.21 (0.20-0.23)	0.08 (0.07-0.09)	0.01 (0.01-0.01)	0.04 (0.03-0.04)	2,472.0	0.03 (0.02-0.03)
MoP	3,027.1	3.21 (3.14-3.27)	1.16 (1.12-1.20)	0.20 (0.19-0.22)	0.78 (0.75-0.81)	0.60 (0.58-0.63)	0.54 (0.51-0.57)	0.17 (0.15-0.18)	0.25 (0.24-0.27)	0.22 (0.21-0.24)	0.07 (0.06-0.08)	0.01 (0.01-0.02)	0.04 (0.03-0.04)	2,077.5	0.03 (0.02-0.03)
MoM	4.7	6.17 (4.28-8.87)	1.91 (1.00-3.68)	0.21 (0.03-1.51)	1.28 (0.57-2.84)	0.64 (0.21-1.98)	1.06 (0.44-2.55)	0	0.85 (0.32-2.27)	0.43 (0.11-1.70)	0.64 (0.21-1.98)	0	0.64 (0.21-1.98)	1.0	0
CoP	442.5	2.64 (2.49-2.79)	0.80 (0.72-0.88)	0.16 (0.13-0.20)	0.58 (0.52-0.66)	0.67 (0.60-0.75)	0.40 (0.34-0.46)	0.12 (0.09-0.16)	0.16 (0.12-0.20)	0.12 (0.10-0.16)	0.10 (0.08-0.14)	0.01 (0.00-0.02)	0.03 (0.02-0.05)	368.5	0.03 (0.02-0.05)
MoPoM	24.3	5.22 (4.38-6.21)	0.94 (0.63-1.42)	0.16 (0.06-0.44)	0.78 (0.50-1.22)	1.81 (1.35-2.43)	1.81 (1.35-2.43)	0.08 (0.02-0.33)	0.29 (0.14-0.60)	0.08 (0.02-0.33)	0	0	0.04 (0.01-0.29)	22.2	0.05 (0.01-0.32)
CoPoM	2.6	3.44 (1.79-6.60)	0.38 (0.05-2.71)	0	0.76 (0.19-3.05)	1.15 (0.37-3.55)	1.15 (0.37-3.55)	0	0	0	0	0	0	2.6	0
All uncemented	4,329.9	4.62 (4.56-4.68)	1.11 (1.08-1.14)	0.55 (0.53-0.57)	0.71 (0.68-0.73)	0.63 (0.61-0.65)	0.68 (0.66-0.71)	0.35 (0.33-0.37)	0.26 (0.24-0.27)	0.30 (0.29-0.32)	0.17 (0.16-0.18)	0.04 (0.03-0.05)	0.90 (0.87-0.93)	3,639.4	0.57 (0.55-0.60)
MoP	1,578.7	3.74 (3.65-3.84)	0.88 (0.83-0.92)	0.30 (0.28-0.33)	0.87 (0.82-0.92)	0.58 (0.54-0.61)	0.84 (0.79-0.89)	0.32 (0.29-0.35)	0.21 (0.19-0.24)	0.39 (0.36-0.43)	0.10 (0.08-0.11)	0.03 (0.03-0.04)	0.19 (0.17-0.22)	1,346.5	0.19 (0.16-0.21)
MoM	348.8	17.05 (16.62-17.49)	3.31 (3.12-3.50)	3.04 (2.87-3.23)	0.76 (0.68-0.86)	1.37 (1.25-1.50)	0.95 (0.85-1.06)	0.67 (0.59-0.76)	1.40 (1.28-1.53)	0.56 (0.49-0.65)	0.18 (0.14-0.23)	0.07 (0.05-0.11)	9.40 (9.09-9.73)	178.7	8.83 (8.40-9.27)
CoP	1,002.0	3.09 (2.99-3.20)	0.70 (0.65-0.75)	0.22 (0.19-0.25)	0.77 (0.71-0.82)	0.63 (0.59-0.68)	0.50 (0.46-0.55)	0.29 (0.26-0.33)	0.11 (0.09-0.13)	0.25 (0.22-0.28)	0.08 (0.06-0.10)	0.03 (0.02-0.05)	0.06 (0.05-0.08)	875.3	0.05 (0.04-0.07)
CoC	1,353.2	3.45 (3.36-3.55)	1.07 (1.02-1.13)	0.42 (0.39-0.46)	0.46 (0.42-0.49)	0.47 (0.44-0.51)	0.53 (0.50-0.57)	0.34 (0.31-0.37)	0.11 (0.09-0.13)	0.16 (0.14-0.18)	0.32 (0.29-0.35)	0.04 (0.03-0.05)	0.13 (0.11-0.15)	1,193.8	0.12 (0.10-0.14)
CoM	25.1	8.90 (7.80-10.14)	3.03 (2.42-3.80)	1.24 (0.87-1.76)	0.60 (0.36-0.99)	0.92 (0.61-1.38)	0.96 (0.64-1.43)	0.64 (0.39-1.04)	0.64 (0.39-1.04)	0.48 (0.27-0.84)	0.20 (0.08-0.48)	0.16 (0.06-0.43)	2.47 (1.93-3.17)	24.3	2.43 (1.88-3.13)
MoPoM	14.9	7.24 (5.99-8.74)	2.08 (1.46-2.95)	0.47 (0.22-0.98)	1.21 (0.76-1.91)	1.94 (1.35-2.80)	1.88 (1.30-2.72)	0.47 (0.22-0.98)	0.87 (0.51-1.50)	0.74 (0.41-1.33)	0	0	0.47 (0.22-0.98)	13.7	0.29 (0.11-0.78)
CoPoM	6.1	5.55 (3.96-7.77)	0.82 (0.34-1.96)	0.16 (0.02-1.16)	0.16 (0.02-1.16)	2.28 (1.35-3.86)	2.12 (1.23-3.65)	0.33 (0.08-1.31)	0	0.49 (0.16-1.52)	0	0	0	6.1	0
Others	1.0	11.85 (6.73-20.86)	0.99 (0.14-7.01)	0.99 (0.14-7.01)	0.99 (0.14-7.01)	1.97 (0.49-7.89)	0	1.97 (0.49-7.89)	1.97 (0.49-7.89)	0	0.99 (0.14-7.01)	1.97 (0.49-7.89)	5.92 (2.66-13.18)	0.9	7.00 (3.14-15.57)

Notes:
*Including 40,585 with unconfirmed fixation/bearing.
**Rates are likely to be underestimated: this reason was not solicited in the early phase of the registry (revision report forms MDSv1/MDSv2).
***For primaries from 2008 onwards the majority of revision report forms were MDSv3/MDSv6 which explicitly gave this indication for revision as an option.

Table 3.H9 (continued)

Fixation and bearing surface	Prosthesis-years at risk (x1,000)	Number of revisions per 1,000 prosthesis-years for:											Adverse reaction to particulate debris for primaries from 1.1.2008***	
		All causes	Aseptic loosening	Pain	Dislocation / Subluxation	Infection	Periprosthetic fracture	Malalignment	Lysis	Implant wear	Implant fracture	Head/socket size mismatch	Adverse reaction to particulate debris**	Prosthesis-years at risk (x1,000)	Number of revisions per 1,000 prosthesis-years
All hybrid	2,379.0	3.35 (3.28-3.43)	0.45 (0.42-0.48)	0.20 (0.18-0.21)	0.83 (0.79-0.86)	0.79 (0.76-0.83)	0.85 (0.81-0.89)	0.20 (0.18-0.22)	0.15 (0.14-0.17)	0.17 (0.15-0.19)	0.14 (0.12-0.15)	0.02 (0.01-0.02)	0.15 (0.14-0.17)	2,007.6	0.09 (0.08-0.10)
MoP	1,304.7	3.32 (3.22-3.42)	0.47 (0.43-0.50)	0.17 (0.15-0.19)	0.91 (0.86-0.96)	0.74 (0.70-0.79)	0.95 (0.90-1.00)	0.21 (0.19-0.24)	0.16 (0.14-0.19)	0.20 (0.18-0.23)	0.09 (0.08-0.11)	0.01 (0.01-0.02)	0.07 (0.06-0.08)	1,072.7	0.06 (0.05-0.08)
MoM	27.0	16.00 (14.56-17.58)	2.93 (2.35-3.65)	2.67 (2.12-3.36)	1.07 (0.75-1.55)	1.33 (0.96-1.85)	1.67 (1.24-2.23)	0.33 (0.17-0.64)	1.67 (1.24-2.23)	0.41 (0.23-0.74)	0.41 (0.23-0.74)	0.15 (0.06-0.39)	7.89 (6.90-9.02)	9.2	7.64 (6.04-9.65)
CoP	695.8	3.07 (2.94-3.20)	0.26 (0.23-0.31)	0.09 (0.07-0.12)	0.85 (0.78-0.92)	0.98 (0.91-1.05)	0.69 (0.63-0.75)	0.17 (0.14-0.21)	0.08 (0.06-0.10)	0.11 (0.09-0.14)	0.09 (0.07-0.12)	0.02 (0.01-0.03)	0.03 (0.02-0.05)	661.7	0.03 (0.02-0.05)
CoC	296.6	2.82 (2.63-3.01)	0.53 (0.46-0.62)	0.34 (0.28-0.41)	0.36 (0.30-0.44)	0.47 (0.39-0.55)	0.60 (0.51-0.69)	0.24 (0.19-0.30)	0.12 (0.08-0.16)	0.13 (0.09-0.18)	0.41 (0.34-0.49)	0.02 (0.01-0.05)	0.12 (0.08-0.16)	214.3	0.13 (0.09-0.18)
MoPoM	45.1	4.28 (3.72-4.93)	0.71 (0.50-1.00)	0.09 (0.03-0.24)	0.93 (0.69-1.26)	1.13 (0.86-1.49)	1.35 (1.05-1.74)	0.13 (0.06-0.30)	0.18 (0.09-0.35)	0.29 (0.17-0.50)	0.11 (0.05-0.27)	0	0.04 (0.01-0.18)	40.0	0.05 (0.01-0.20)
CoPoM	8.9	4.71 (3.48-6.37)	1.01 (0.52-1.94)	0	1.01 (0.52-1.94)	1.12 (0.60-2.08)	1.90 (1.18-3.06)	0.11 (0.02-0.80)	0.11 (0.02-0.80)	0.22 (0.06-0.90)	0	0.11 (0.02-0.80)	0	8.9	0
Others	1.0	7.36 (3.51-15.43)	0	0	2.10 (0.53-8.40)	3.15 (1.02-9.77)	1.05 (0.15-7.46)	0	0	0	2.10 (0.53-8.40)	0	1.05 (0.15-7.46)	0.8	1.30 (0.18-9.20)
All reverse hybrid	276.5	3.62 (3.40-3.85)	1.24 (1.12-1.38)	0.24 (0.18-0.30)	0.75 (0.66-0.86)	0.68 (0.59-0.79)	0.68 (0.59-0.79)	0.24 (0.19-0.30)	0.19 (0.15-0.25)	0.25 (0.19-0.31)	0.05 (0.03-0.09)	0.02 (0.01-0.05)	0.05 (0.03-0.09)	249.1	0.04 (0.02-0.07)
MoP	180.9	3.70 (3.43-4.00)	1.20 (1.05-1.37)	0.17 (0.12-0.24)	0.85 (0.72-0.99)	0.66 (0.55-0.79)	0.78 (0.66-0.92)	0.22 (0.16-0.30)	0.22 (0.16-0.30)	0.24 (0.18-0.33)	0.04 (0.02-0.09)	0.02 (0.01-0.06)	0.06 (0.03-0.11)	163.2	0.05 (0.02-0.10)
CoP	92.8	3.35 (3.00-3.74)	1.28 (1.07-1.53)	0.38 (0.27-0.53)	0.57 (0.44-0.75)	0.69 (0.54-0.88)	0.50 (0.37-0.66)	0.27 (0.18-0.40)	0.13 (0.07-0.23)	0.25 (0.16-0.37)	0.05 (0.02-0.13)	0.02 (0.01-0.09)	0.02 (0.01-0.09)	83.6	0.01 (0.00-0.08)
MoPoM	2.2	7.19 (4.40-11.73)	2.25 (0.93-5.40)	0	0.90 (0.22-3.59)	2.25 (0.93-5.40)	0.90 (0.22-3.59)	0.45 (0.06-3.19)	0.45 (0.06-3.19)	0.45 (0.06-3.19)	0.45 (0.06-3.19)	0	0.45 (0.06-3.19)	1.9	0.53 (0.07-3.74)
Others	0.6	6.26 (2.35-16.67)	3.13 (0.78-12.51)	0	0	1.56 (0.22-11.11)	0	0	0	0	0	0	0	0.4	0
All resurfacing	542.7	9.33 (9.07-9.59)	2.04 (1.92-2.16)	2.54 (2.41-2.67)	0.22 (0.19-0.27)	0.46 (0.40-0.52)	1.07 (0.98-1.16)	0.49 (0.44-0.55)	0.88 (0.81-0.97)	0.22 (0.19-0.27)	0.20 (0.17-0.24)	0.05 (0.03-0.07)	3.42 (3.27-3.58)	239.6	2.71 (2.51-2.92)
MoM	541.2	9.33 (9.07-9.59)	2.04 (1.92-2.16)	2.54 (2.41-2.68)	0.23 (0.19-0.27)	0.46 (0.40-0.52)	1.06 (0.97-1.15)	0.49 (0.44-0.55)	0.88 (0.81-0.97)	0.22 (0.18-0.26)	0.20 (0.17-0.24)	0.05 (0.03-0.07)	3.43 (3.27-3.58)	238.3	2.72 (2.52-2.94)
CoC	0.9	8.18 (3.90-17.17)	0	0	0	0	5.85 (2.43-14.04)	1.17 (0.16-8.30)	0	0	0	0	1.17 (0.16-8.30)	0.9	1.17 (0.16-8.30)
MoP	0.6	10.33 (4.64-23.00)	6.89 (2.59-18.36)	1.72 (0.24-12.23)	0	0	1.72 (0.24-12.23)	0	1.72 (0.24-12.23)	3.44 (0.86-13.77)	1.72 (0.24-12.23)	0	0	0.5	0

Notes:
*Including 40,585 with unconfirmed fixation/bearing.
**Rates are likely to be underestimated: this reason was not solicited in the early phase of the registry (revision report forms MDSv1/MDSv2).
***For primaries from 2008 onwards the majority of revision report forms were MDSv3/MDSv6 which explicitly gave this indication for revision as an option.

Table 3.H10 PTIR estimates of indications for revision (95% CI) by years following primary hip replacement.

Time since primary	Prosthesis-years at risk (x1,000)	Number of revisions per 1,000 prosthesis-years for:												Adverse reaction to particulate debris for primaries from 1.1.2008***	
		All causes	Aseptic loosening	Pain	Dislocation / Subluxation	Infection	Periprosthetic fracture	Malalignment	Lysis	Implant wear	Implant fracture	Head/socket size mismatch	Adverse reaction to particulate debris**	Prosthesis-years at risk (x1,000)	Number of revisions per 1,000 prosthesis-years
All cases	11,425.9	4.12 (4.08-4.16)	1.03 (1.01-1.05)	0.46 (0.44-0.47)	0.73 (0.71-0.74)	0.66 (0.64-0.67)	0.69 (0.68-0.71)	0.26 (0.25-0.27)	0.26 (0.25-0.27)	0.24 (0.23-0.25)	0.13 (0.13-0.14)	0.03 (0.02-0.03)	0.57 (0.56-0.59)	8,862.6	0.35 (0.34-0.36)
<1 year	1,487.7	8.14 (8.00-8.29)	0.90 (0.86-0.95)	0.42 (0.39-0.46)	2.39 (2.31-2.47)	2.22 (2.14-2.30)	1.67 (1.61-1.74)	0.65 (0.61-0.69)	0.06 (0.05-0.08)	0.27 (0.24-0.30)	0.18 (0.16-0.21)	0.09 (0.08-0.11)	0.08 (0.06-0.09)	1,293.9	0.09 (0.07-0.11)
1 to <3 years	2,592.0	3.15 (3.08-3.22)	0.82 (0.79-0.86)	0.55 (0.52-0.58)	0.57 (0.54-0.60)	0.65 (0.62-0.68)	0.38 (0.36-0.41)	0.28 (0.26-0.30)	0.11 (0.10-0.13)	0.11 (0.10-0.12)	0.10 (0.09-0.11)	0.02 (0.02-0.03)	0.17 (0.15-0.19)	2,216.1	0.19 (0.17-0.21)
3 to <5 years	2,177.8	2.96 (2.88-3.03)	0.74 (0.71-0.78)	0.55 (0.52-0.58)	0.42 (0.39-0.45)	0.39 (0.37-0.42)	0.43 (0.40-0.46)	0.20 (0.18-0.22)	0.16 (0.14-0.18)	0.15 (0.13-0.16)	0.10 (0.09-0.11)	0.01 (0.01-0.02)	0.50 (0.47-0.53)	1,820.9	0.38 (0.35-0.41)
5 to <7 years	1,720.4	3.32 (3.23-3.40)	0.87 (0.83-0.92)	0.54 (0.50-0.57)	0.38 (0.35-0.41)	0.32 (0.30-0.35)	0.53 (0.49-0.56)	0.18 (0.16-0.21)	0.24 (0.21-0.26)	0.18 (0.16-0.20)	0.11 (0.10-0.13)	0.01 (0.01-0.02)	0.85 (0.80-0.89)	1,387.1	0.46 (0.43-0.50)
7 to <10 years	1,783.4	3.73 (3.64-3.82)	1.15 (1.10-1.20)	0.37 (0.34-0.40)	0.46 (0.43-0.49)	0.32 (0.29-0.34)	0.61 (0.57-0.65)	0.17 (0.16-0.20)	0.37 (0.34-0.40)	0.25 (0.23-0.27)	0.14 (0.13-0.16)	0.01 (0.01-0.02)	0.94 (0.90-0.99)	1,334.9	0.51 (0.47-0.55)
10 to <13 years	1,020.7	4.55 (4.42-4.68)	1.67 (1.59-1.75)	0.23 (0.20-0.26)	0.51 (0.46-0.55)	0.34 (0.30-0.37)	0.85 (0.79-0.91)	0.16 (0.14-0.19)	0.58 (0.54-0.63)	0.49 (0.45-0.53)	0.19 (0.16-0.22)	0.01 (0.01-0.02)	1.03 (0.97-1.09)	639.3	0.64 (0.58-0.71)
13 to <15 years	369.4	5.12 (4.89-5.35)	2.07 (1.93-2.22)	0.21 (0.17-0.27)	0.54 (0.47-0.62)	0.37 (0.31-0.44)	0.92 (0.82-1.02)	0.13 (0.10-0.17)	0.90 (0.81-1.00)	0.74 (0.66-0.84)	0.23 (0.18-0.28)	0.01 (0.00-0.03)	1.15 (1.05-1.27)	153.3	0.97 (0.82-1.13)
15 to <17 years	189.7	5.26 (4.94-5.60)	2.22 (2.02-2.44)	0.17 (0.12-0.24)	0.63 (0.52-0.75)	0.35 (0.28-0.45)	1.06 (0.92-1.22)	0.20 (0.15-0.28)	0.94 (0.81-1.09)	0.87 (0.75-1.02)	0.22 (0.16-0.30)	0.04 (0.02-0.08)	1.04 (0.91-1.20)	17.0	1.00 (0.62-1.61)
≥17 years*	84.7	5.56 (5.08-6.09)	2.85 (2.51-3.23)	0.25 (0.16-0.38)	0.55 (0.42-0.74)	0.37 (0.26-0.52)	1.06 (0.86-1.31)	0.19 (0.12-0.31)	1.20 (0.99-1.46)	1.02 (0.82-1.25)	0.26 (0.17-0.39)	0.05 (0.02-0.13)	0.91 (0.73-1.14)		

Notes:
*Current maximum observed follow up is 20.75 years.
**Rates are likely to be underestimated: this reason was not solicited in the early phase of the registry (revision report forms MDSv1/MDSv2).
***For primaries from 2008 onwards the majority of revision report forms were MDSv3/MDSv6 which explicitly gave this indication for revision as an option.
Blank cells indicate there are no current data.

In Table 3.H10 (page 123), the PTIRs for each indication are shown separately for different time periods from the primary hip replacement, within the first year, and between 1 to <3, 3 to <5, 5 to <7, 7 to <10, 10 to <13, 13 to <15, 15 to <17, and ≥17 years after surgery (the maximum follow-up for any implant is now 20.75 years). Revision rates due to aseptic loosening are fairly constant until five years and then begin to steadily increase. Revision due to pain rises out to seven years and then declines. The revision rates due to subluxation / dislocation, infection and malalignment were all higher in the first year and then fell. In the case of periprosthetic fracture, the highest rates were seen in the first year, these then declined markedly before beginning to rise again at around five years. Revision for adverse reaction to particulate debris increased until 15 years before declining, whereas revision for lysis continued to rise over time.

Figures 3.H11 (a) to 3.H11 (i) (pages 125 to 133) show how PTIRs of revision for aseptic loosening, pain, dislocation / subluxation, infection, lysis, adverse soft tissue reaction to particulate debris, periprosthetic fracture, and implant fracture changed with time. Only sub-groups with a total overall prosthesis-years at risk of more than 150,000 have been included. With time from the operation, PTIRs of revision for aseptic loosening tended to rise in cemented fixations and follow a fairly similar pattern in uncemented metal-on-polyethylene bearings. In uncemented metal-on-metal, they rose for the first seven years and then fell. In uncemented ceramic-on-polyethylene, ceramic-on-ceramic, hybrid ceramic-on-ceramic and resurfacings, the PTIRs were reasonably consistent over time. In hybrid metal-on-polyethylene and ceramic-on-polyethylene bearings, there were marked increases at later time points. For pain, PTIRs were either fairly consistent or had a small initial peak followed by a decline to fairly constant rates for all bearings, apart from uncemented metal-on-metal and resurfacings where rates started high, rose to peaks at five years and then declined. Conversely, there was a high initial rate for dislocation / subluxation in all fixation / bearing groups which later fell but then began to rise in all groups from 13 years onwards apart from cemented metal-on-polyethylene, uncemented metal-on-metal, hybrid ceramic-on-ceramic and resurfacing (Figure 3.H11 (c), page 127). Revision rates for infection were initially high and then fell in all groups apart from uncemented metal-on-metal primary total hip replacement and resurfacing (Figure 3.H11 (d), page 128). The opposite was seen for lysis with increasing rates over time in all groups (Figure 3.H11 (e), page 129).

Revision rates due to an adverse reaction to particulate debris increased with time, up to seven years in uncemented metal-on-metal primary total hip replacement and resurfacings (Figures 3.H11 (f) and (g), pages 130 and 131). Confidence intervals have not been shown here for simplicity but are wide in some groups.

The revision rate for periprosthetic fracture (PPFx) reported by the NJR represent only those patients who have undergone a revision operation and not other types of surgery (e.g. Open Reduction and Internal Fixation). Revision for PPFx for uncemented THRs with all bearing combinations is substantially higher in the first year compared to cemented and hybrid THRs. The initial higher revision for PPFx in uncemented THRs then falls and then increases again with extended follow-up. Reverse hybrid constructs have a similarly high initial revision rate for PPFx compared to fully uncemented constructs, suggesting that post-operative fracture of the femur is a complication predominantly associated with uncemented stems. Hybrid fixation constructs have a lower revision rate for PPFx than for fully uncemented constructs, but greater than fully cemented constructs suggesting post-operative fracture of the acetabulum is a complication predominantly associated with uncemented acetabular cups and shells. Resurfacing THRs have a high revision rate for PPFx which is in excess of uncemented constructs. Currently, it is not clear how many PPFx occur in total or how many are fixed by other strategies, not including revision surgery.

Revision rates for implant fracture are generally low, the only exception is a small increase in implant fracture rates for ceramic-on-ceramic devices which is evident in both fully uncemented and hybrid constructs.

Figure 3.H11 (a) PTIR estimates of aseptic loosening by fixation and bearing.

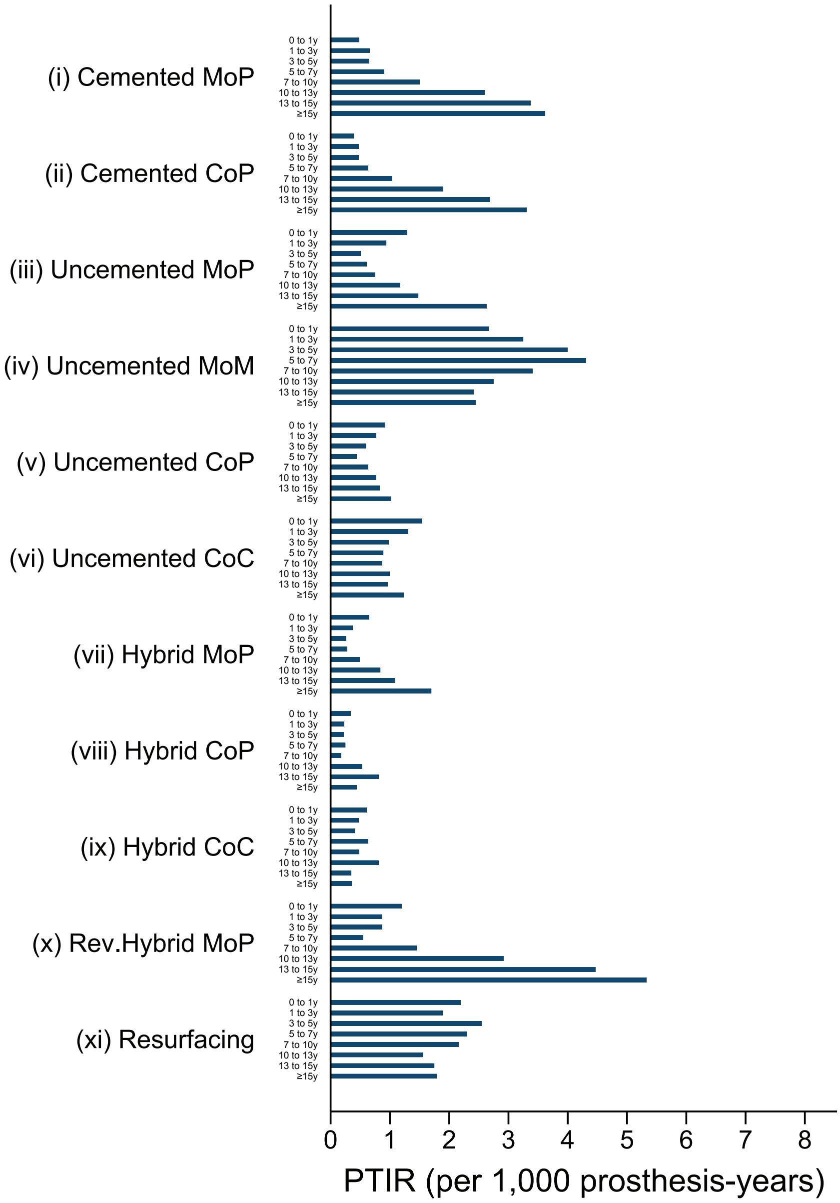


Figure 3.H11 (b) PTIR estimates of pain by fixation and bearing.

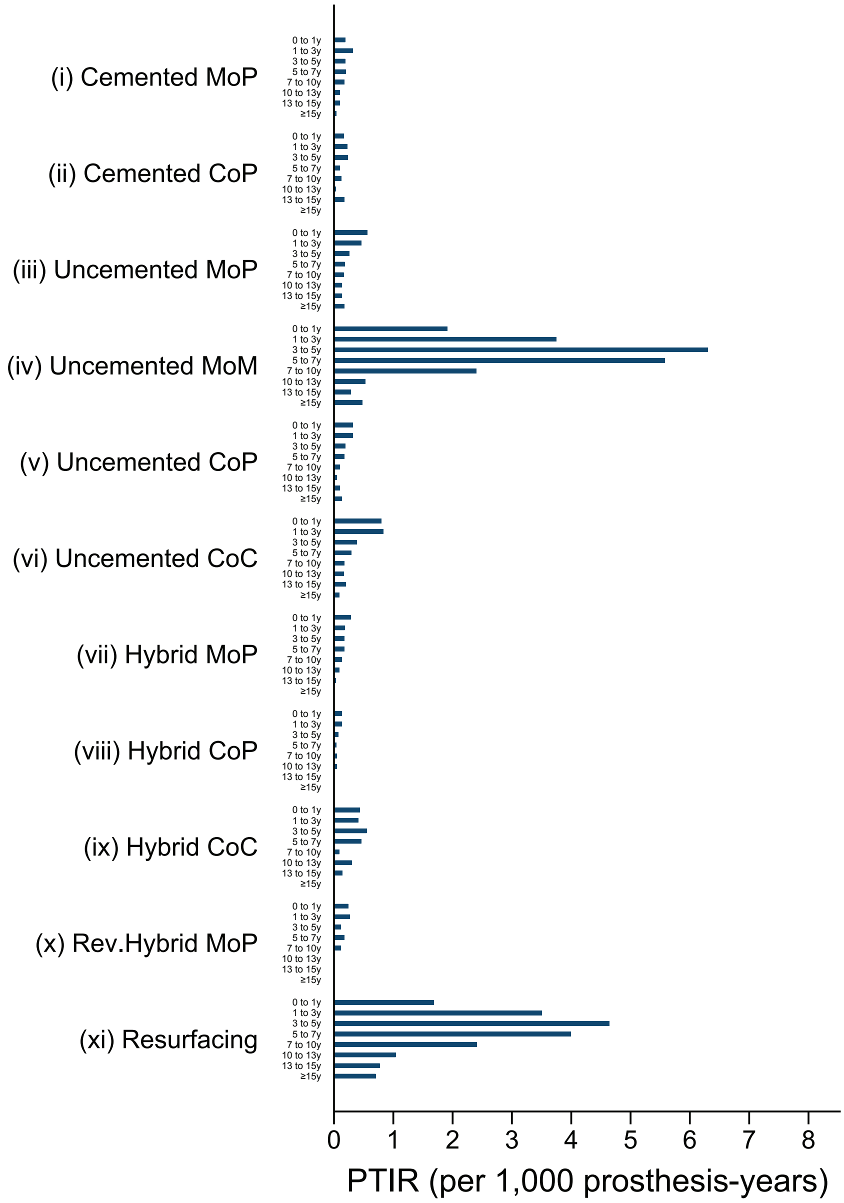


Figure 3.H11 (c) PTIR estimates of dislocation / subluxation by fixation and bearing.

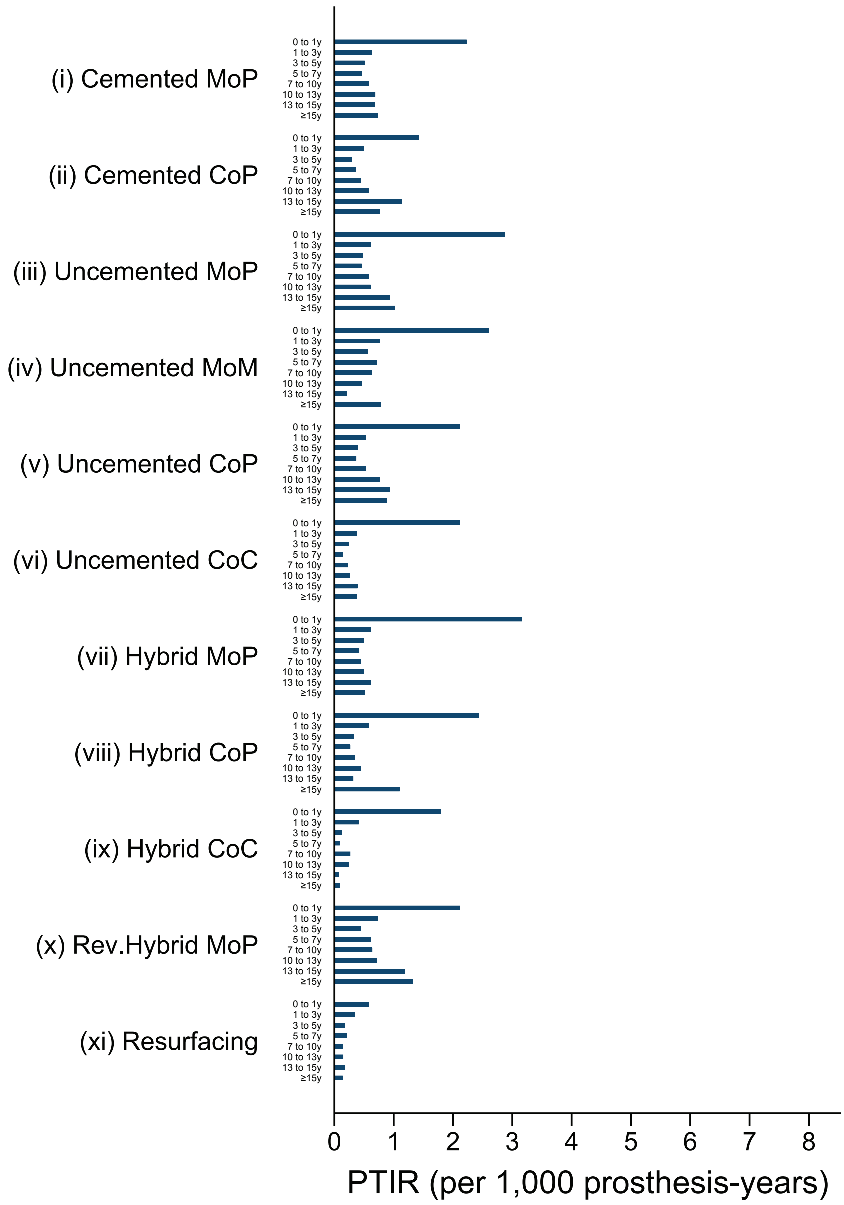


Figure 3.H11 (d) PTIR estimates of infection by fixation and bearing.

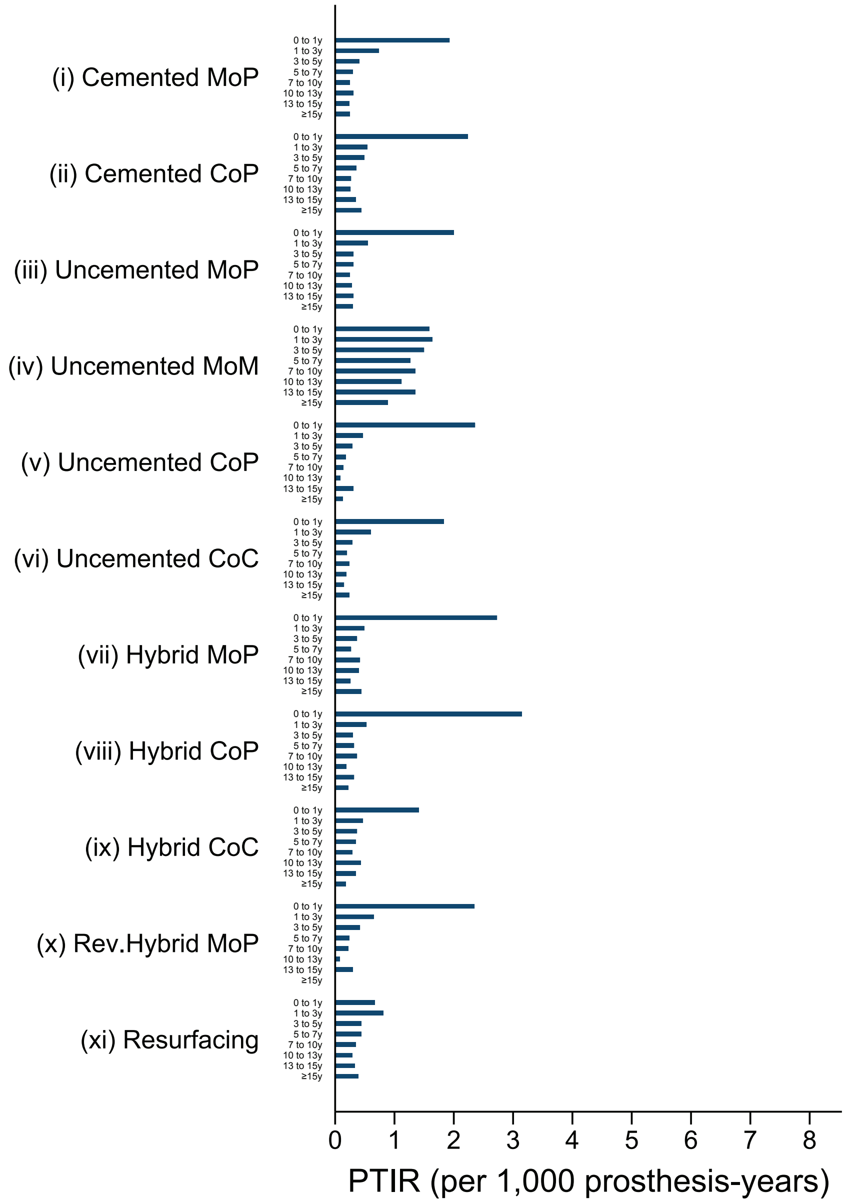


Figure 3.H11 (e) PTIR estimates of lysis by fixation and bearing.

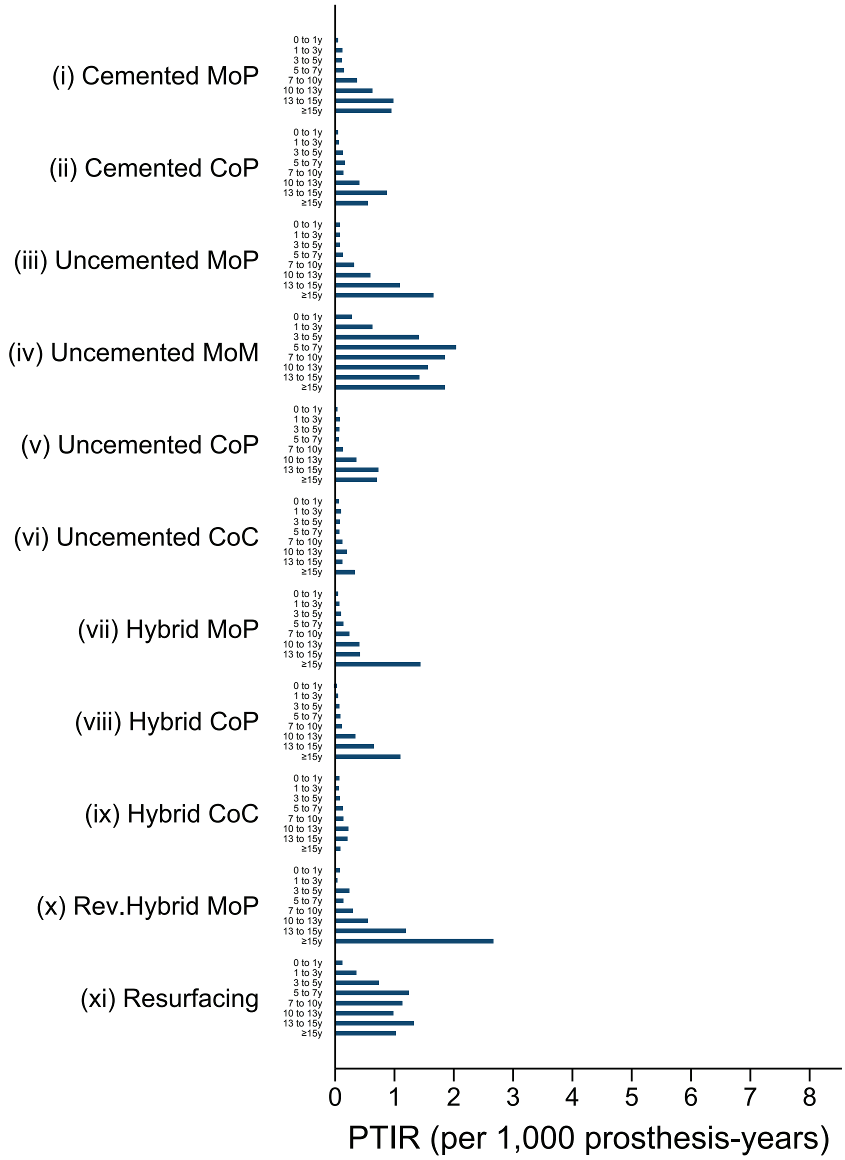


Figure 3.H11 (f) PTIR estimates of adverse soft tissue reaction by fixation and bearing.

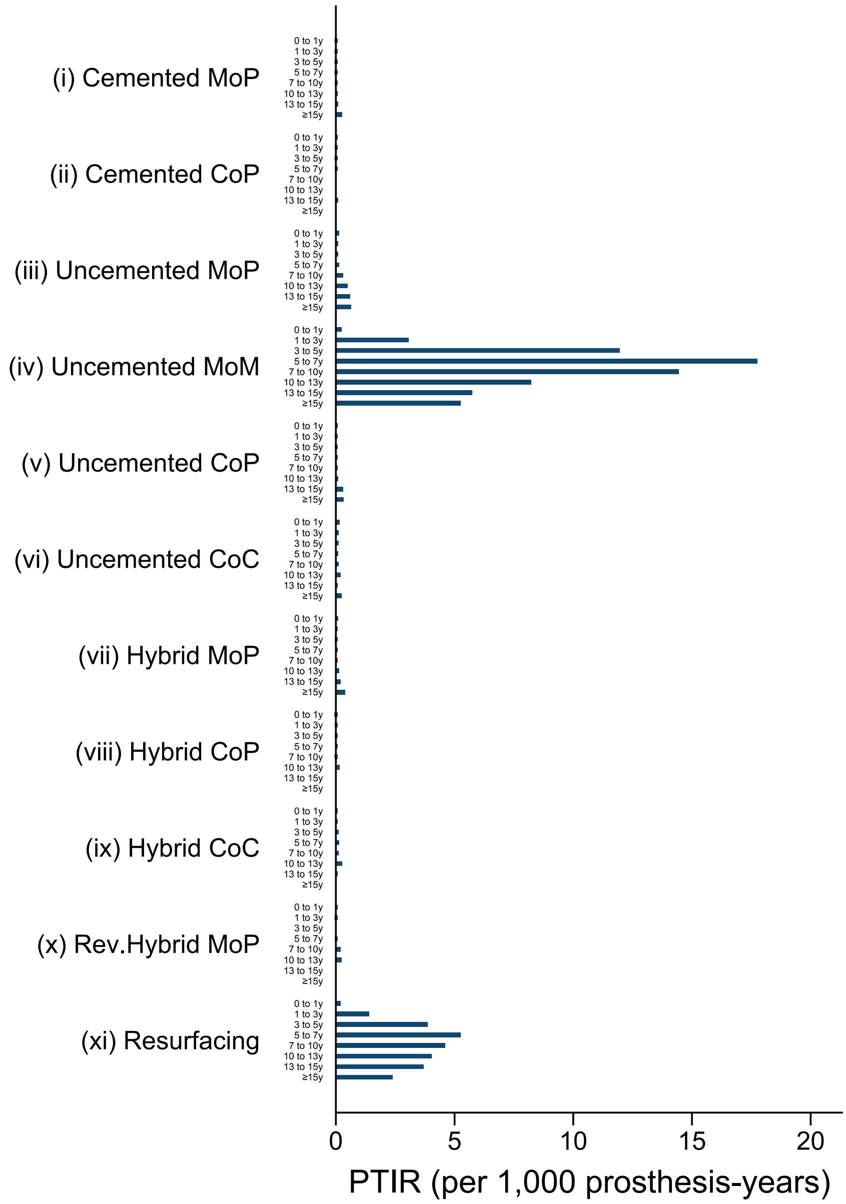


Figure 3.H11 (g) PTIR estimates of adverse soft tissue reaction by fixation and bearing, since 2008.

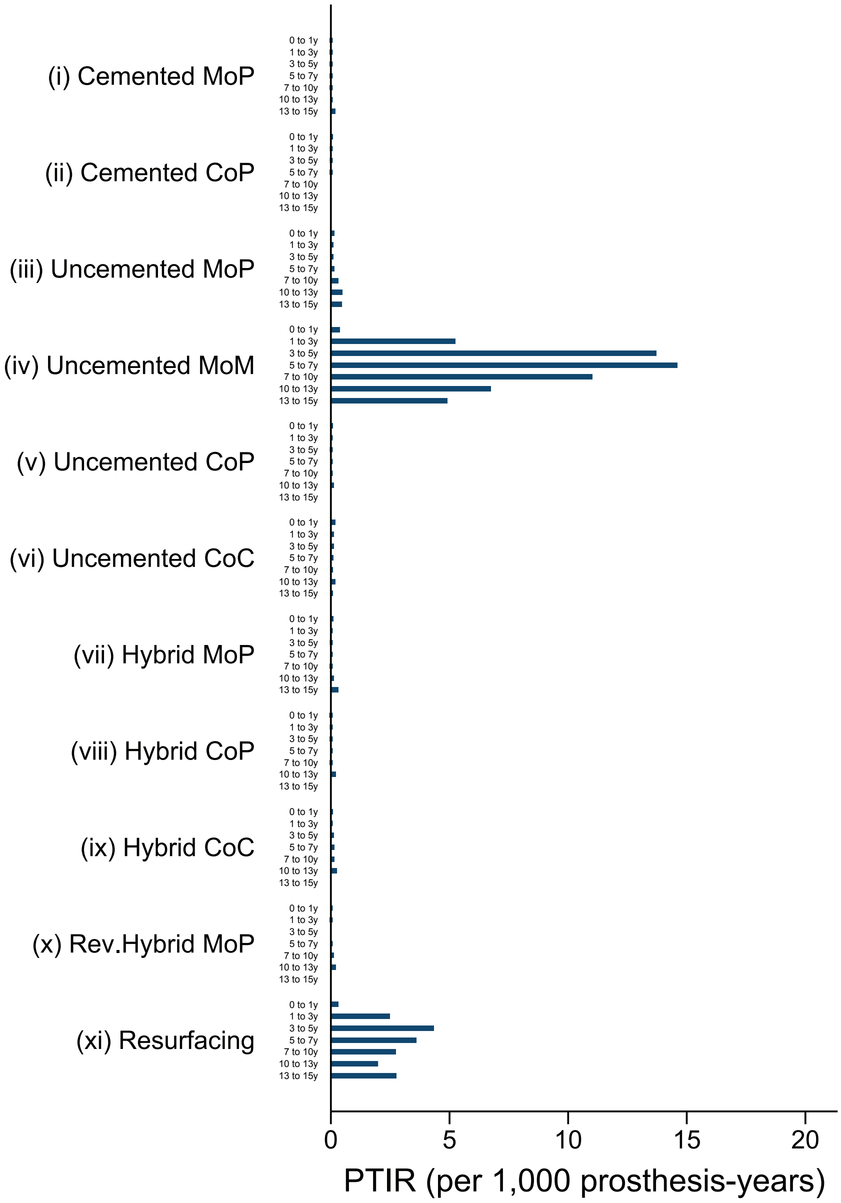


Figure 3.H11 (h) PTIR estimates of periprosthetic fracture by fixation and bearing.

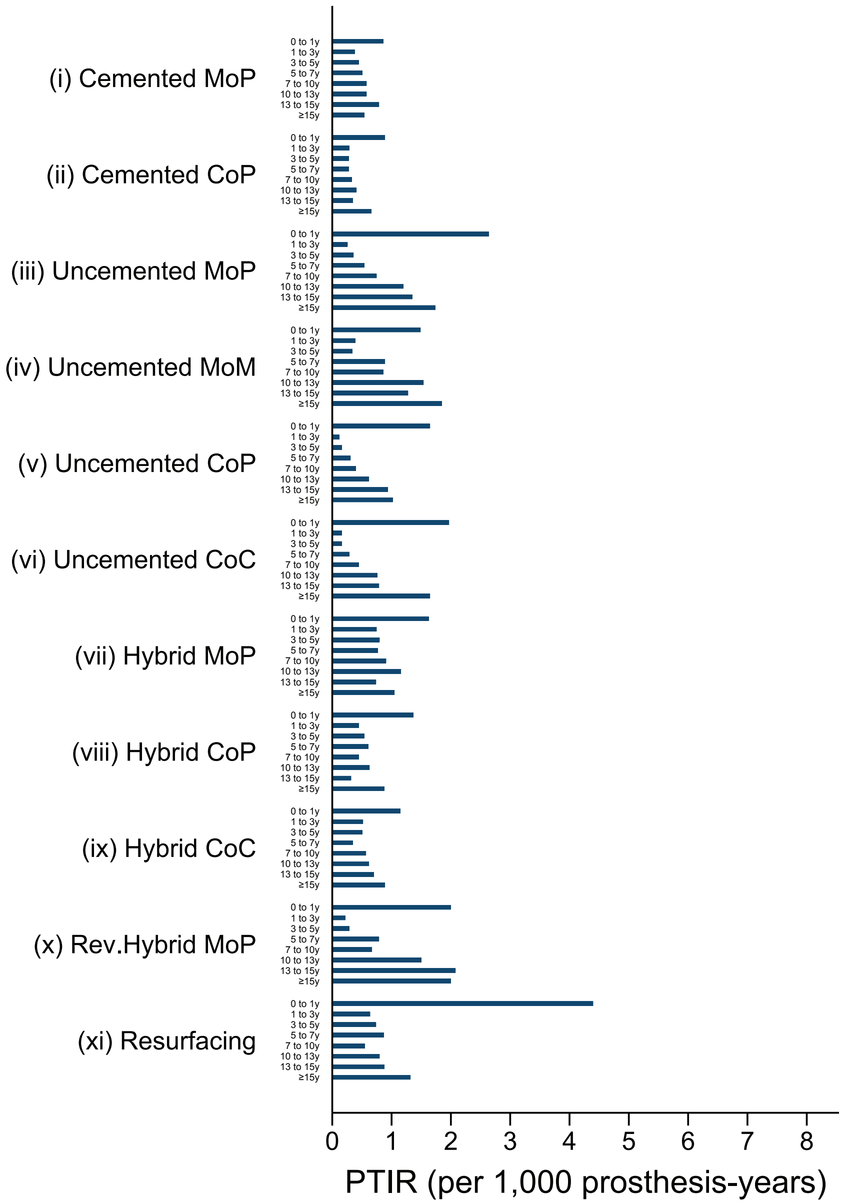
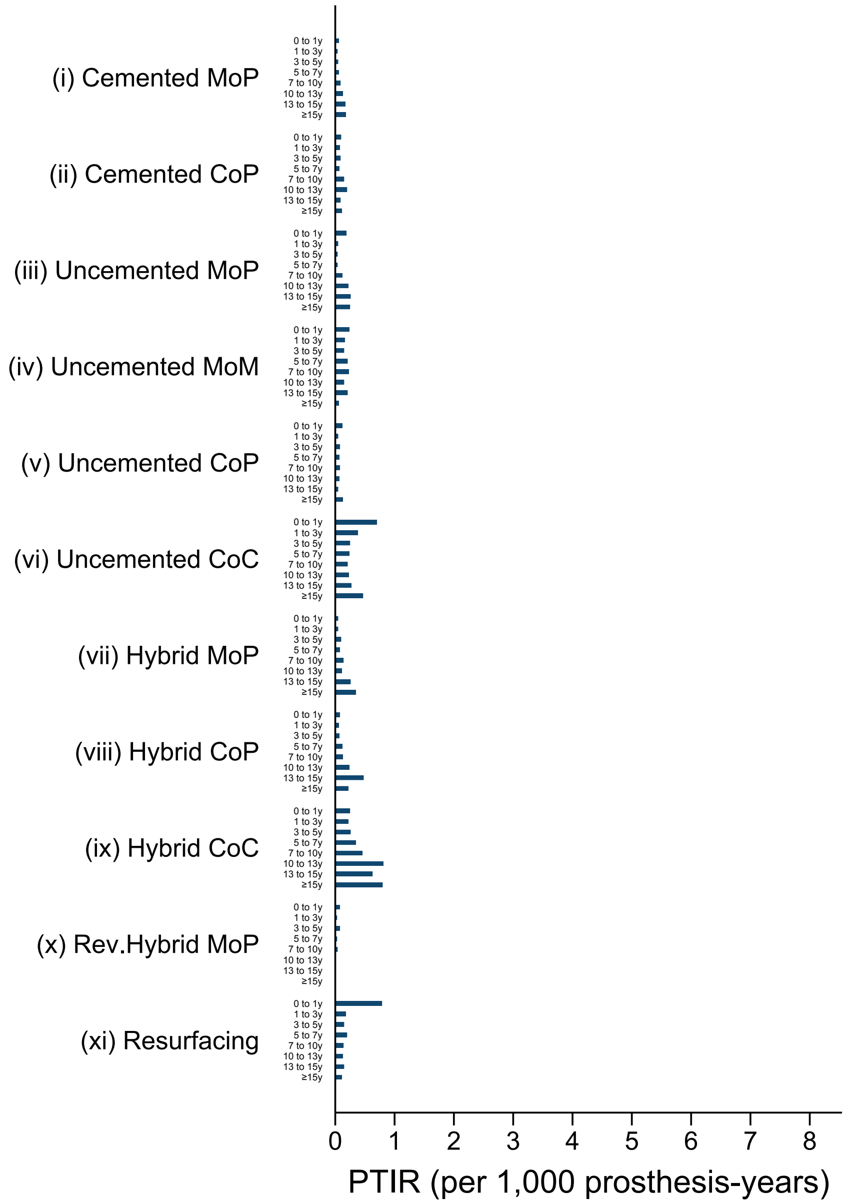


Figure 3.H11 (i) PTIR estimates of implant fracture by fixation and bearing.



3.H.6 Mortality after primary hip replacement surgery

In this section we describe the mortality of the cohort up to 20 years from primary hip replacement, according to sex and age group. Deaths recorded after 31 December 2023 were not included in the analysis. For simplicity, we have not taken into account whether the patient had a first (or further) joint revision after the primary operation when calculating the cumulative probability of death. While such surgery may have contributed to the overall mortality, the impact of this is not investigated in this report (see survival analysis methods note on page 24). Among the 1,561,640 primary hip replacements, there were 6,396 bilateral operations, with the left and right side operated on the same day; here the second of the two has been excluded, leaving 1,555,244 primary hip replacements, of whom 362,939 of the recipients had died before the end of 2023.

Table 3.H11 KM estimates of cumulative mortality (95% CI) by age and sex, in primary hip replacement. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

		Time since primary						
Age group	N	30 days	90 days	1 year	5 years	10 years	15 years	20 years
All cases	**1,555,244***	**0.20 (0.19-0.21)**	**0.44 (0.43-0.46)**	**1.42 (1.40-1.44)**	**9.57 (9.52-9.63)**	**25.64 (25.56-25.73)**	**44.12 (43.99-44.26)**	**61.29 (61.01-61.58)**
Male								
<55 years	90,428	0.07 (0.05-0.08)	0.15 (0.13-0.18)	0.53 (0.48-0.58)	2.42 (2.31-2.53)	5.61 (5.43-5.80)	9.86 (9.56-10.17)	15.66 (14.85-16.50)
55 to 59 years	64,398	0.06 (0.05-0.08)	0.20 (0.17-0.24)	0.63 (0.57-0.70)	3.44 (3.28-3.59)	8.85 (8.57-9.14)	16.93 (16.45-17.41)	28.00 (26.84-29.20)
60 to 64 years	88,832	0.10 (0.08-0.12)	0.23 (0.20-0.26)	0.79 (0.74-0.86)	4.68 (4.53-4.84)	12.35 (12.07-12.62)	24.43 (23.97-24.90)	43.24 (41.95-44.55)
65 to 69 years	103,851	0.15 (0.13-0.17)	0.35 (0.31-0.39)	1.07 (1.01-1.14)	6.82 (6.65-6.99)	18.64 (18.34-18.94)	37.94 (37.42-38.46)	63.18 (61.92-64.45)
70 to 74 years	108,654	0.18 (0.16-0.21)	0.42 (0.38-0.46)	1.53 (1.46-1.61)	10.37 (10.17-10.57)	29.28 (28.92-29.64)	56.81 (56.27-57.34)	*82.33 (81.27-83.37)*
75 to 79 years	90,701	0.36 (0.32-0.40)	0.72 (0.67-0.78)	2.42 (2.32-2.52)	16.58 (16.31-16.86)	46.36 (45.92-46.80)	77.75 (77.22-78.28)	*95.24 (94.33-96.04)*
80 to 84 years	53,129	0.64 (0.58-0.72)	1.30 (1.21-1.40)	3.86 (3.70-4.03)	26.62 (26.20-27.04)	66.82 (66.25-67.39)	92.40 (91.90-92.88)	*98.80 (98.25-99.20)*
≥85 years	23,910	1.50 (1.36-1.67)	2.74 (2.54-2.95)	7.38 (7.05-7.73)	43.38 (42.66-44.11)	85.95 (85.28-86.60)	*98.33 (97.94-98.67)*	*99.31 (98.92-99.57)*
Female								
<55 years	91,724	0.06 (0.05-0.08)	0.20 (0.17-0.23)	0.64 (0.59-0.69)	2.48 (2.38-2.59)	5.14 (4.97-5.32)	8.66 (8.38-8.96)	13.66 (12.94-14.41)
55 to 59 years	74,347	0.06 (0.05-0.08)	0.17 (0.14-0.20)	0.57 (0.52-0.63)	3.00 (2.87-3.14)	7.10 (6.87-7.34)	13.36 (12.97-13.77)	23.12 (22.07-24.22)
60 to 64 years	111,727	0.07 (0.05-0.09)	0.18 (0.16-0.21)	0.59 (0.55-0.64)	3.67 (3.55-3.80)	9.47 (9.26-9.69)	19.02 (18.64-19.41)	34.57 (33.42-35.75)
65 to 69 years	151,426	0.08 (0.07-0.09)	0.21 (0.18-0.23)	0.72 (0.68-0.77)	4.87 (4.75-4.99)	13.76 (13.54-13.98)	29.13 (28.73-29.53)	51.56 (50.49-52.64)
70 to 74 years	178,089	0.11 (0.09-0.12)	0.26 (0.24-0.28)	0.91 (0.87-0.96)	6.93 (6.80-7.06)	21.48 (21.22-21.73)	45.16 (44.74-45.59)	72.82 (71.84-73.79)
75 to 79 years	162,272	0.20 (0.18-0.22)	0.41 (0.38-0.44)	1.42 (1.36-1.48)	11.20 (11.03-11.37)	34.53 (34.22-34.84)	66.19 (65.75-66.63)	*90.66 (89.84-91.45)*
80 to 84 years	106,705	0.32 (0.29-0.35)	0.73 (0.68-0.78)	2.37 (2.28-2.46)	18.20 (17.94-18.46)	53.54 (53.13-53.95)	85.18 (84.76-85.60)	*97.68 (97.11-98.16)*
≥85 years	55,051	0.74 (0.67-0.81)	1.66 (1.55-1.77)	4.63 (4.45-4.81)	31.98 (31.55-32.42)	75.36 (74.86-75.86)	95.95 (95.60-96.27)	*99.45 (99.16-99.66)*

Notes:
*Some patients had operations on the left and right side on the same day. The second of 6,396 pairs of simultaneous bilateral operations were excluded.

Table 3.H11 shows Kaplan-Meier estimates of cumulative percentage mortality at 30 days, 90 days and at 1, 5, 10, 15 and 20 years from the time of the primary hip replacement, for all cases and by age and sex. Unsurprisingly, younger patients had a lower risk of death. These differences were apparent at 30 days, with approximately half the risk of death for a male patient under the age of 55 compared to one aged 65 to 69 years. These differences persisted to one year and then diverged further with four times the risk of death in the older group at 20 years. For a similar age-group comparison, there was little initial difference for females, but by 20 years there was approximately three and half times the risk of death in the older group. It is worthy of note that for all cases in the registry, there is almost a 10% risk of death by five years, over 25% by ten years, over 40% by 15 years and over 60% by 20 years after primary hip replacement. The median age for undergoing a total hip replacement is 69 years, and for the 50% of patients over this age mortality rates are extremely high by 20 years ranging from 72.82% (95% CI 71.84-73.79) for women aged 70 to 74 years to 99.31% (95% CI 98.92-99.57) for men aged over 85 years.

3.H.7 Primary hip replacement for fractured neck of femur compared with other reasons for implantation

Total hip replacement is a treatment option for fractured neck of femur and in this section, we report on revision and mortality rates for primary total hip replacements performed because of a fractured neck of femur compared to cases performed for other indications. A total of 60,205 (3.9%) of the primary total hip replacements were performed for a fractured neck of femur (NOF)†.

Table 3.H12 (page 136) shows that the proportion of primary hip replacements performed for an indication of a fractured neck of femur has increased with time to a maximum of 7.6% in 2020. The proportion of THRs performed for fractured NOF in 2020 was artificially inflated by the dramatic decrease in elective THRs performed in 2020 due to the impact of COVID, prior to this the peak was 5.7%. The use of dual mobility bearings has become more popular in this group and accounted for 18.1% of cases in 2023. The proportion of THRs for a fractured NOF using a dual mobility bearing has increased from that in earlier reports, this is due to the increased granularity of the data in the new component database which has been introduced for this year's report and allows better resolution of the bearings used. The most striking feature is the marked drop in 2020 in the total annual number of THRs performed for a fractured NOF (4,339 compared to 5,675 in 2019). This is most likely due to the impact of the COVID pandemic possibly through a combination of fewer fractures occurring during lockdown and less or altered provision of care (with a possible shift from THR to hemiarthroplasty). This decrease has been sustained in 2021 with 4,630 THRs performed for fractured NOF, 5,025 in 2022, and 4,406 in 2023. There are usually late registrations of cases into the registry and thus the figures for 2023 may be revised upwards in next year's report, but this observation may also be related to the publication of the HEALTH trial which demonstrated no difference in the risk of secondary procedures for patients receiving total hip replacement or hemiarthroplasty for a displaced hip fracture and a clinically unimportant improvement in function and quality of life for patients receiving a total hip replacement (Bhandari M, et al., 2019).

†These comprised 2,252 cases with the indication for primary hip replacement including fractured neck of femur in the early phase of the registry (i.e. 205,129 implants entered using MDSv1 and v2) and 57,953 cases with indications including acute trauma neck of femur in the later phase (i.e. 1,356,511 entered using MDSv3, v6, v7 and v8).

Bhandari M et al.; Total Hip Arthroplasty or Hemiarthroplasty for Hip Fracture. Value Health. N Engl J Med 2019; 381:2199-2208.

Table 3.H12 Number and percentage of fractured neck of femur in the registry by year.

Year of primary	Primary total hip replacements for all indications N	NOF N (%)	NOF treated with	
			Dual mobility N (%)	Unipolar N (%)
2003	15,076	143 (0.9)	<4 (0.7)	127 (88.8)
2004	29,293	298 (1.0)	<4 (0.3)	263 (88.3)
2005	41,697	395 (0.9)	0 (0)	358 (90.6)
2006	48,561	528 (1.1)	<4 (0.2)	469 (88.8)
2007	61,716	788 (1.3)	<4 (0.1)	725 (92.0)
2008	67,714	868 (1.3)	<4 (0.3)	773 (89.1)
2009	68,663	1,081 (1.6)	19 (1.8)	967 (89.5)
2010	71,199	1,372 (1.9)	28 (2.0)	1,232 (89.8)
2011	74,138	1,725 (2.3)	52 (3.0)	1,555 (90.1)
2012	78,355	2,440 (3.1)	82 (3.4)	2,257 (92.5)
2013	80,510	3,119 (3.9)	192 (6.2)	2,829 (90.7)
2014	87,761	3,726 (4.2)	296 (7.9)	3,312 (88.9)
2015	89,920	4,208 (4.7)	345 (8.2)	3,771 (89.6)
2016	94,471	4,878 (5.2)	422 (8.7)	4,344 (89.1)
2017	96,620	5,028 (5.2)	493 (9.8)	4,412 (87.7)
2018	97,549	5,533 (5.7)	616 (11.1)	4,804 (86.8)
2019	99,907	5,675 (5.7)	818 (14.4)	4,747 (83.6)
2020	57,455	4,339 (7.6)	690 (15.9)	3,555 (81.9)
2021	89,244	4,630 (5.2)	808 (17.5)	3,720 (80.3)
2022	103,233	5,025 (4.9)	936 (18.6)	3,968 (79.0)
2023	108,558	4,406 (4.1)	797 (18.1)	3,429 (77.8)
Total	**1,561,640**	**60,205 (3.9)**	**6,601 (11.0)**	**51,617 (85.7)**

Notes:
Unipolar includes cemented, uncemented, hybrid, reverse hybrid, and resurfacing hip types, and excludes unconfirmed hip type.

Table 3.H13 Fractured neck of femur versus osteoarthritis only by sex, age and fixation.

	Reason for primary hip replacement	
	Fractured neck of femur (n=60,205)	Osteoarthritis only (n=1,372,840)
% Female	71.9%	59.2%
Median age (IQR)		
Both sexes	73 (66 to 78)	70 (62 to 76)
Male only	72 (64 to 78)	68 (60 to 75)
Female only	73 (66 to 78)	71 (63 to 77)
% Hip type*		
All cemented	39.6	29.6
All uncemented	17.7	38.8
All hybrid	40.7	26.0
All reverse hybrid	1.9	2.6
All resurfacing	<0.1	2.9

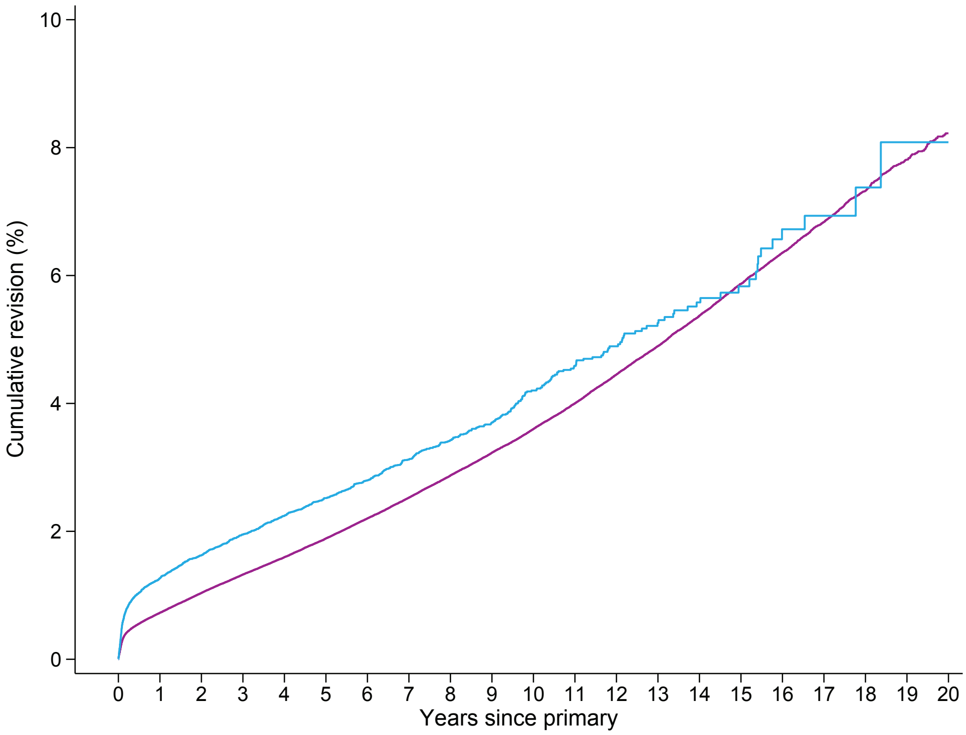
Notes:
*Excludes 128,595 cases who had other reasons in addition to osteoarthritis.

Table 3.H13 compares the fractured NOF group with the remainder with respect to sex and age composition together and type of hip replacement received. A significantly larger percentage of the fractured NOF cases, compared with the remainder, were female (71.9% versus 59.2%: P<0.001, Chi-squared test).

The fractured NOF patients were significantly older (median age 73 years versus 70 years at operation). We found that cemented and hybrid hip replacements were used more commonly in fractured NOF cases than in hip replacements performed for osteoarthritis only, but cemented fixation was still used in under half of the patients. Figure 3.H12 (a) (page 138) shows that the cumulative revision rate was higher in the fractured NOF cases group compared with the remainder (P<0.001, logrank test). The plotted cumulative revision lines diverge early in the first year and then remain approximately parallel out until about 13 years. This effect was not fully explained by differences in age and sex, as stratification by these variables left the result unchanged (P<0.001 using stratified logrank test: 14 sub-groups of age <55, 55 to 59, 60 to 64, 65 to 69, 70 to 74, 75 to 79, ≥80 for each sex). Figure 3.H12 (b) (page 139) shows similar cumulative revision rates for dual mobility compared to unipolar total hip replacement bearings in the hip fracture population out to eight years after which point the numbers fall below 250 in the dual mobility group. While the difference here is not significant, it is interesting that this is a different pattern seen to that for dual mobility bearings in cemented and uncemented fixation groups in elective total hip replacement where the early revision rates appear higher in the dual mobility bearings.

Figure 3.H13 (page 140) shows a markedly higher overall mortality in total hip replacements performed for hip fracture cases compared to cases implanted for osteoarthritis only (P<0.001, logrank test). As in the overall mortality section, the second of 6,396 simultaneous bilateral procedures were excluded. Sex and age differences did not fully explain the difference seen, as a stratified analysis still showed a difference (P<0.001).

Figure 3.H12 (a) KM estimates of cumulative revision for fractured neck of femur and osteoarthritis only cases for primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

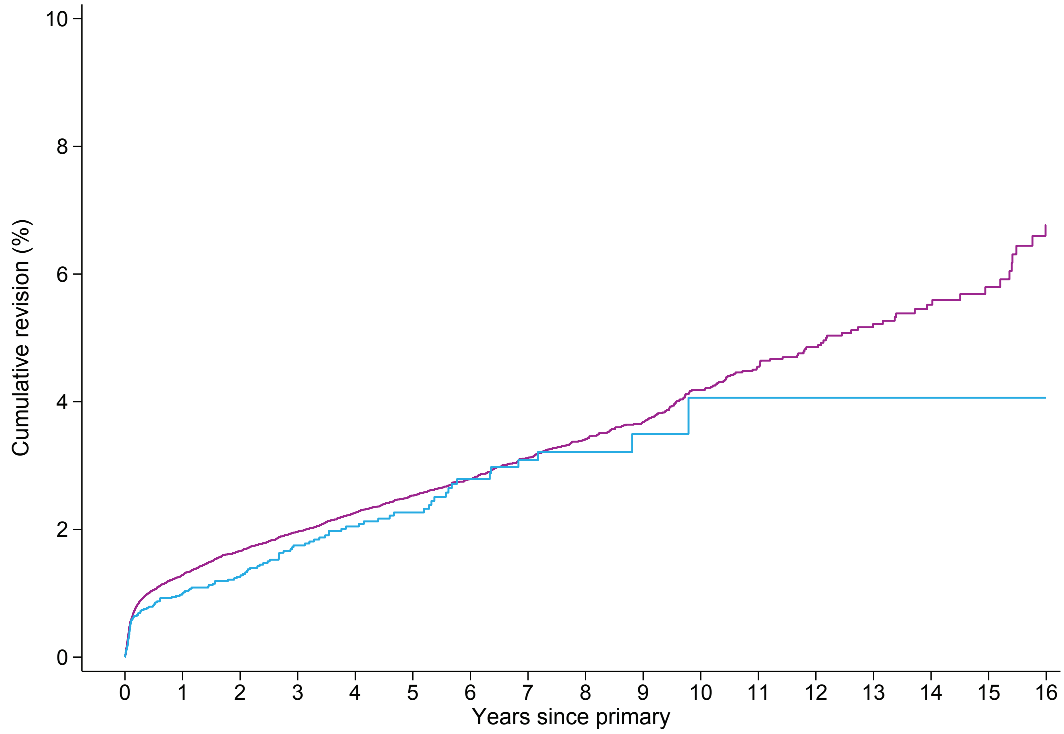


Key:

Numbers at risk

Osteoarthritis only	1,372,840	1,146,285	979,016	771,285	578,650	410,398	273,971	165,704	84,243	31,626	4,618
Fractured neck of femur	60,205	45,656	34,034	21,838	12,493	6,428	3,004	1,417	589	*186*	*21*

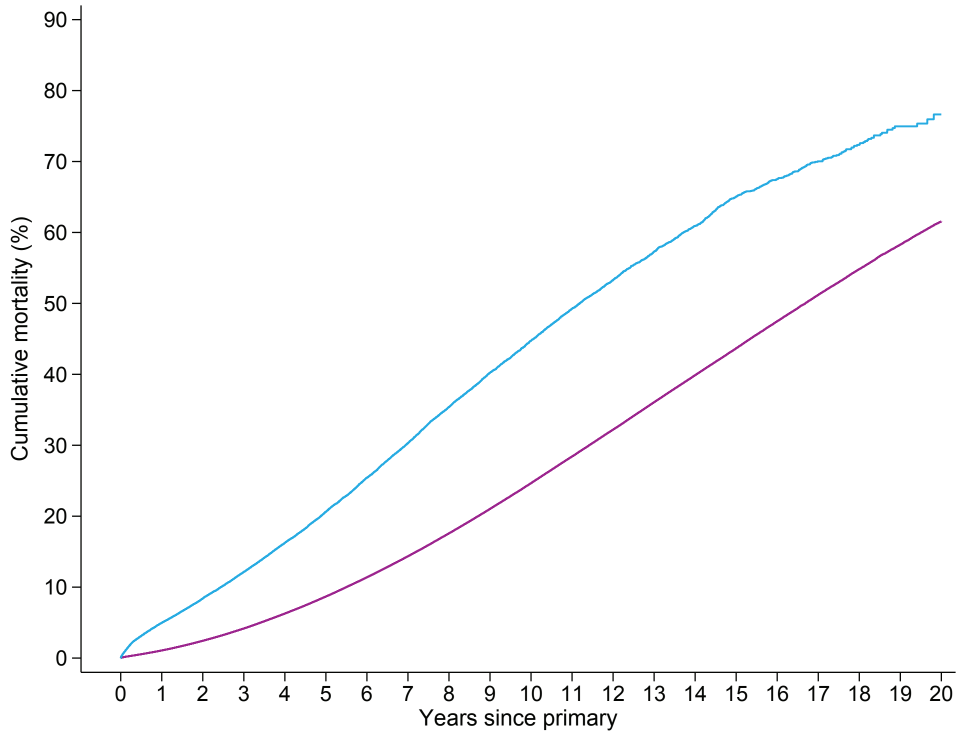
Figure 3.H12 (b) KM estimates of cumulative revision by bearing type for fractured neck of femur cases in primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key: Numbers at risk

Key	0	2	4	6	8	10	12	14	16
Unipolar bearings	51,617	40,032	30,436	19,860	11,435	5,910	2,744	1,292	539
Dual mobility	6,601	4,297	2,562	1,211	514	*144*	*26*	*4*	*<4*

Figure 3.H13 KM estimates of cumulative mortality for fractured neck of femur and osteoarthritis only in primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:

Numbers at risk

Key	0	2	4	6	8	10	12	14	16	18	20
Osteoarthritis only	1,367,313	1,153,269	990,670	785,753	594,673	426,712	289,518	179,100	92,585	34,953	5,063
Fractured neck of femur	60,161	46,351	34,733	22,417	12,945	6,733	3,194	1,543	665	*214*	*25*

3.H.8 Overview of hip revisions

In this section we look at all hip revision procedures performed since the start of data collection by the NJR, 1 April 2003, up to 31 December 2023, for all patients with valid patient identifiers (i.e. whose data could therefore be linked).

In total, there were 149,622 revision procedures. These revisions were recorded on 126,976 hips in 119,186 patients. In addition to the 47,090 first revised primary hip replacements described in section 3.H.2 of this report, there were 92,653 additional revisions of a hip for which there is no associated primary hip replacement recorded in the registry. It is likely that the majority of the primaries associated with these revisions where the primary is not recorded in the registry would have been performed prior to the commencement of data capture by the NJR in 2003. The remaining 9,879 revision procedures were re-revisions, i.e. revision procedures subsequent to the first revision.

Revisions are classified as single-stage, stage one and stage two of two-stage revisions. Information on stage one and stage two revisions are entered into the registry separately, whereas in practice a stage two revision has to be linked to a preceding stage one revision. Debridement and Implant Retention (DAIR) with or without modular exchange are included as single-stage procedures. With the introduction of distinct indicators for the DAIR procedures with or without modular exchange in MDSv7 and introduction of a separate reoperations form in MDSv8, which now captures the DAIRs without modular exchange that do not meet the registry definition of a revision procedure as no implant is added, removed or modified, it may be possible to report these as distinct categories in future reports. Although not all patients who undergo a stage one of two revision will undergo a stage two of two revision, in some cases stage one revisions have been entered without a stage two, and vice versa, making identification of individual revision episodes difficult. We have attempted to do this later in this section.

The NJR asks surgeons and those responsible for healthcare delivery to ensure that when primary and revision joint replacement procedures of the hip, knee, ankle, elbow or shoulder are performed, that the relevant MDS form is completed and data entered into the registry. This is a requirement mandated by the NHS Standard Contract. For the purposes of the Annual Report, revision procedures include any addition, removal or modification of the implants and procedures such as debridement and implant retention with implant exchange, excision arthroplasty, amputation and conversion to arthrodesis. For data submitted on MDSv7 only, DAIRs without modular exchange are included as revision procedures. The completion of a revision MDS form is also mandatory for a procedure involving modification of a joint by adding another implant to another part of the joint. For the analyses of surgeon performance, hospital performance and implant performance, debridement and implant retention (DAIR) without implant exchange is currently excluded.

Table 3.H14 Number and percentage of hip revisions by procedure type and year.

Year of revision surgery	Type of revision procedure			All procedures
	Single-stage N (%)	Stage one of two-stage N (%)	Stage two of two-stage N (%)	
2003*	1,476 (100.0)	0 (0.0)	0 (0.0)	1,476
2004	2,531 (90.3)	120 (4.3)	153 (5.5)	2,804
2005	3,507 (87.3)	204 (5.1)	305 (7.6)	4,016
2006	4,204 (86.8)	269 (5.6)	373 (7.7)	4,846
2007	5,617 (87.5)	340 (5.3)	463 (7.2)	6,420
2008	6,054 (86.2)	420 (6.0)	550 (7.8)	7,024
2009	6,319 (84.3)	516 (6.9)	662 (8.8)	7,497
2010	7,052 (86.5)	502 (6.2)	598 (7.3)	8,152
2011	7,983 (87.5)	531 (5.8)	611 (6.7)	9,125
2012	9,254 (88.0)	606 (5.8)	650 (6.2)	10,510
2013	8,540 (87.8)	567 (5.8)	623 (6.4)	9,730
2014	8,408 (87.0)	667 (6.9)	592 (6.1)	9,667
2015	8,018 (86.0)	709 (7.6)	597 (6.4)	9,324
2016	7,734 (87.3)	590 (6.7)	539 (6.1)	8,863
2017	7,710 (87.2)	614 (6.9)	520 (5.9)	8,844
2018	7,480 (87.6)	574 (6.7)	481 (5.6)	8,535
2019	7,229 (87.4)	568 (6.9)	471 (5.7)	8,268
2020	4,492 (86.2)	426 (8.2)	293 (5.6)	5,211
2021	5,262 (87.2)	412 (6.8)	358 (5.9)	6,032
2022	5,776 (87.3)	506 (7.6)	337 (5.1)	6,619
2023	5,775 (86.7)	535 (8.0)	349 (5.2)	6,659
Total	**130,421 (87.2)**	**9,676 (6.5)**	**9,525 (6.4)**	**149,622**

Notes:
*Incomplete year.
Single-stages include DAIRs (Debridement And Implant Retention) and hip excision arthroplasty.

Table 3.H14 gives an overview of all hip replacement revision procedures carried out each year since April 2003. There were a maximum number of 13 documented revision procedures associated with a single hip, making up eleven revision episodes as two episodes consisted of a stage one of a two-stage procedure and a stage two of a two-stage procedure.

The incidence of revision hip replacement peaked in 2012 and has declined since then, despite the increasing number of at-risk implants due to the increase in primary hip replacements and secular increases in the longevity of the lives of patients. In the COVID-impacted years of 2020 and 2021, the number of revision hip replacements performed were approximately half of the peak rate observed in 2012. The number of revisions performed in 2023 (6,659) remains a fifth lower than the number performed in 2019 (8,268) prior to the impact of COVID.

Table 3.H15 (a) Number and percentage of hip revision by indication and procedure type.

Reason	Type of revision procedure Single-stage N (%) (n=130,421)	Stage one of two-stage N (%) (n=9,676)	Stage two of two-stage N (%) (n=9,525)
Aseptic loosening	59,180 (45.4)	1,072 (11.1)	1,051 (11.0)
Dislocation / Subluxation	22,079 (16.9)	392 (4.1)	322 (3.4)
Pain	18,996 (14.6)	833 (8.6)	647 (6.8)
Lysis	18,819 (14.4)	860 (8.9)	528 (5.5)
Implant wear	17,941 (13.8)	370 (3.8)	264 (2.8)
Periprosthetic fracture	17,028 (13.1)	400 (4.1)	424 (4.5)
Other indication	8,521 (6.5)	310 (3.2)	726 (7.6)
Infection	7,669 (5.9)	8,024 (82.9)	7,141 (75.0)
Malalignment	6,844 (5.2)	126 (1.3)	74 (0.8)
Implant fracture	4,812 (3.7)	95 (1.0)	104 (1.1)
Head/socket size mismatch	852 (0.7)	23 (0.2)	15 (0.2)
Adverse reaction to particulate debris*	11,384 (10.5) n=108,907	276 (3.3) n=8,408	193 (2.4) n=7,994

Notes:
*Not recorded in the early phase of the registry; MDSv3, v6, v7 and v8 only.

Table 3.H15 (b) Number and percentage of hip revision by indication and procedure type in last five years.

Reason	Type of revision procedure Single-stage N (%) (n=28,545)	Stage one of two-stage N (%) (n=2,450)	Stage two of two-stage N (%) (n=1,808)
Aseptic loosening	10,257 (35.9)	178 (7.3)	148 (8.2)
Dislocation / Subluxation	5,842 (20.5)	101 (4.1)	54 (3.0)
Periprosthetic fracture	5,816 (20.4)	123 (5.0)	115 (6.4)
Implant wear	3,732 (13.1)	61 (2.5)	26 (1.4)
Lysis	3,636 (12.7)	193 (7.9)	75 (4.1)
Infection	3,063 (10.7)	2,156 (88.0)	1,464 (81.0)
Adverse reaction to particulate debris	2,523 (8.8)	85 (3.5)	53 (2.9)
Malalignment	1,294 (4.5)	25 (1.0)	7 (0.4)
Implant fracture	1,219 (4.3)	20 (0.8)	13 (0.7)
Other indication	1,072 (3.8)	50 (2.0)	114 (6.3)
Pain	906 (3.2)	24 (1.0)	12 (0.7)
Head/socket size mismatch	122 (0.4)	<4 (0.1)	0 (0.0)

Table 3.H15 (a) shows the stated indication for the revision hip replacement surgery. Please note that, as several indications can be stated, the indications are not mutually exclusive and therefore column percentages may add up to over 100%. Aseptic loosening was the most common indication for revision.

Table 3.H15 (b) shows the stated indication for revision hip replacement surgery performed in the last five years (1,826 days). The most notable difference between all the data and that recorded in the last five years is pain as an indication for revision falling from 14.6% to 3.2% of single-stage revisions. There is also a higher proportion of cases revised for periprosthetic fracture in the last five years (20.4% compared to 13.1%) and a higher proportion of cases revised due to infection (10.7% compared to 5.9%). The ratio of stage two of two-stage, stage one of two-stage and single-stage revisions overall (1:1.02:13.7) is different compared to those performed in the last five years (1:1.36:15.8). Please note that higher percentage ratios do not equate to an absolute increase in revisions for a specific cause. Looking at the data for the last five years in comparison to data for the whole registry, the use of single-stage revision for infection in comparison to a two-staged revision approach has increased.

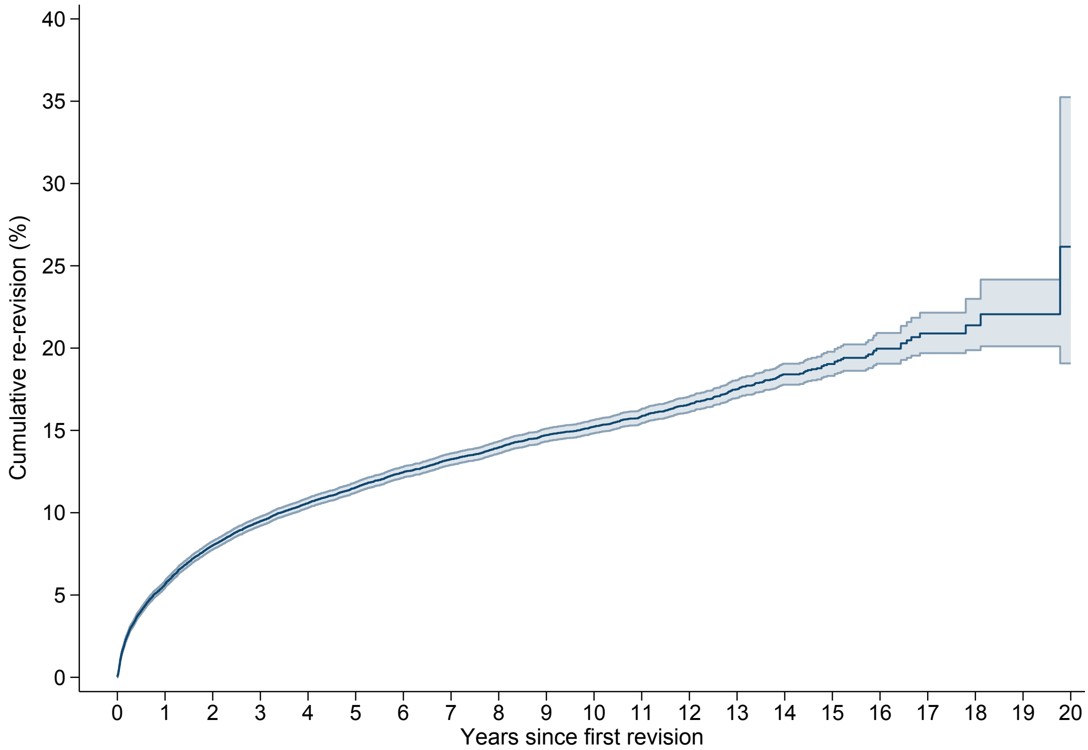
3.H.9 Rates of hip re-revision

In most instances (91.7% of 126,976 hips), the first revision procedure was a single-stage revision, however in the remaining 8.3% it was part of a two-stage procedure. For a given hip, survival following the first documented revision hip replacement procedure for those with a linked primary in the registry (n=47,090) has been analysed. This analysis is restricted to patients with a linked primary procedure so that there is confidence that the next observed procedure on the same joint is the first revision episode. If there is no linked primary record in the dataset, it cannot be determined if the first observed revision is the first revision or if it has been preceded by other revision episodes. The time from the first documented revision procedure (of any type) to the time at which a second revision episode was undertaken has been determined. For this purpose, an initial stage one followed by either a stage one or a stage two have been considered to be the same revision episode and these were disregarded, looking instead for the start of a second revision episode (the maximum number of distinct revision episodes was determined to be 11 for any hip).

In cases where a stage one of two procedure was followed by a stage two of two procedure within 365 days, we have treated this as a single distinct episode. This definition allows multiple stage one procedures to occur before a new revision episode is triggered. In situations where the first stage one procedure is not followed by a stage two procedure within a 365-day period, the next occurrence of a stage one procedure was considered as a new revision episode.

Kaplan-Meier estimates of the cumulative percentage probability of having a subsequent revision (re-revision) were calculated. There were 5,631 re-revisions and for 10,147 cases the patient died without having been re-revised. The censoring date for the remainder was the end of 2023.

Figure 3.H14 (a) KM estimates of cumulative re-revision in linked primary hip replacements (shaded area indicates point-wise 95% CI). *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

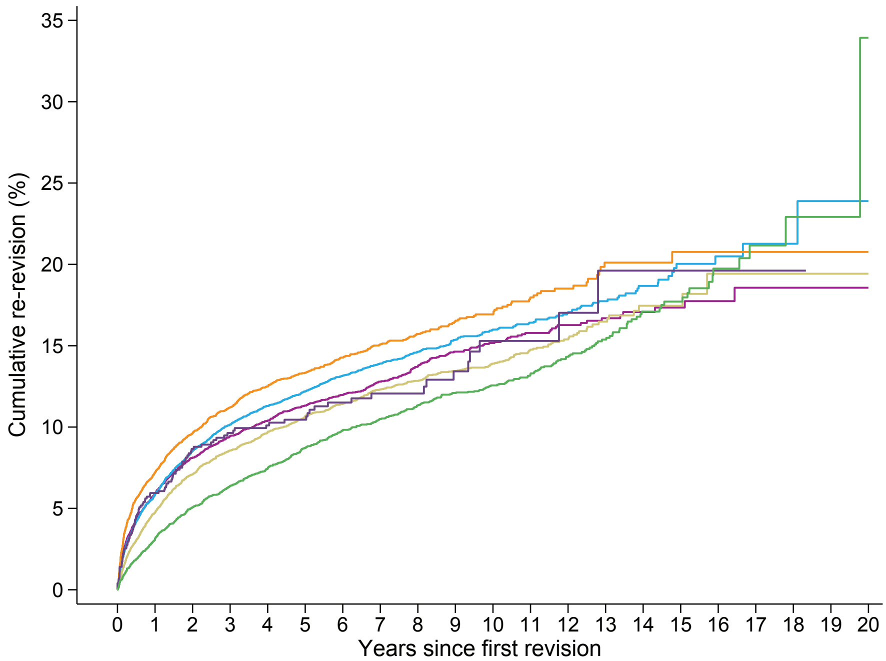


Numbers at risk

47,090	35,183	28,296	20,832	14,728	9,457	4,825	1,925	635	*135*	*9*

Figure 3.H14 (a) plots Kaplan-Meier estimates of the cumulative probability of a subsequent revision between 1 and 20 years since the first revision operation.

Figure 3.H14 (b) KM estimates of cumulative re-revision by primary fixation in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:

Numbers at risk

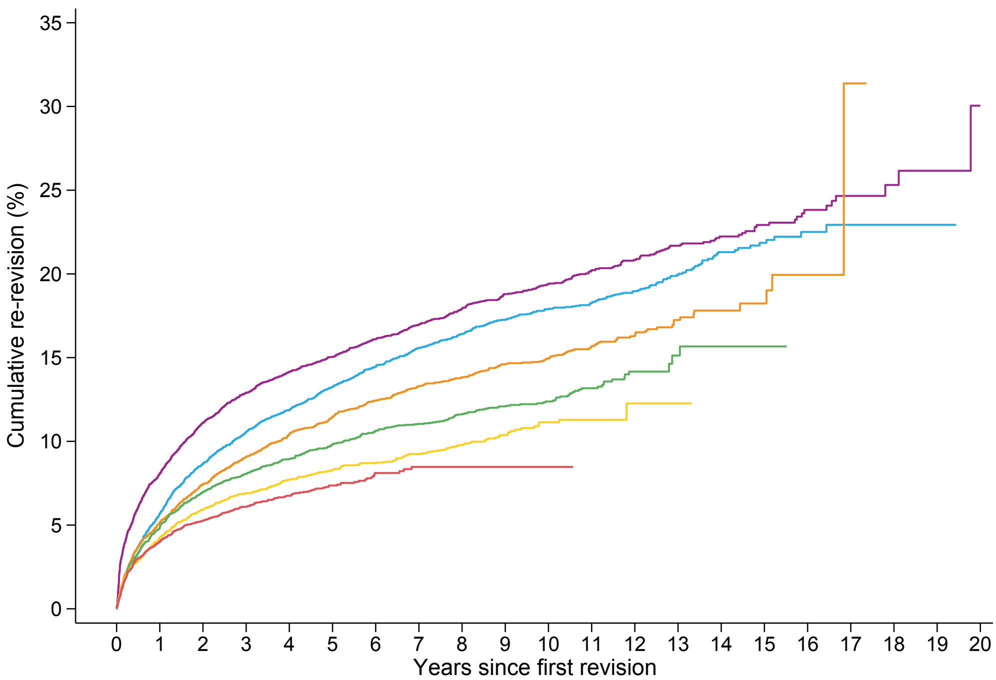
Key	0	2	4	6	8	10	12	14	16	18	20
Cemented	11,036	7,741	5,866	3,872	2,429	1,405	746	336	*131*	*22*	*<4*
Uncemented without MoM	14,058	10,316	8,158	5,854	3,971	2,326	1,160	501	*159*	*36*	*<4*
Uncemented MoM	5,946	5,100	4,545	3,822	3,037	2,089	912	*250*	*50*	*8*	*<4*
Hybrid	7,974	5,371	3,933	2,568	1,554	886	467	*188*	*71*	*17*	*<4*
Reverse hybrid	1,001	694	540	357	*215*	*108*	*44*	*13*	*4*	*<4*	
Resurfacing	5,062	4,416	3,999	3,392	2,768	2,126	1,196	507	*174*	*39*	*<4*

Figure 3.H14 (b) shows estimates of re-revision by type of primary hip replacement. Resurfacing has the lowest re-revision rate until approximately 14 years, after which the revision rate appears to be worse than that associated with alternatives. However, after 14 years the numbers at risk are low and should therefore be interpreted with caution. Hybrid primary total hip replacements have the highest rates of re-revision to alternatives up until approximately 13 years, after which the numbers at risk become small.

Figure 3.H14 (c) shows the relationship between time to first revision and the risk of subsequent revision.

The earlier the primary hip replacement is revised, the higher the risk of a second revision. There is a relationship between the indication for first revision and time to first revision; earlier in this report (section 3.H.5) we show, for example, that revisions for dislocation / subluxation, infection and malalignment were more prevalent in the early period after the primary hip replacement, and aseptic loosening and lysis were more prevalent causes later on.

Figure 3.H14 (c) KM estimates of cumulative re-revision by years to first revision, in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



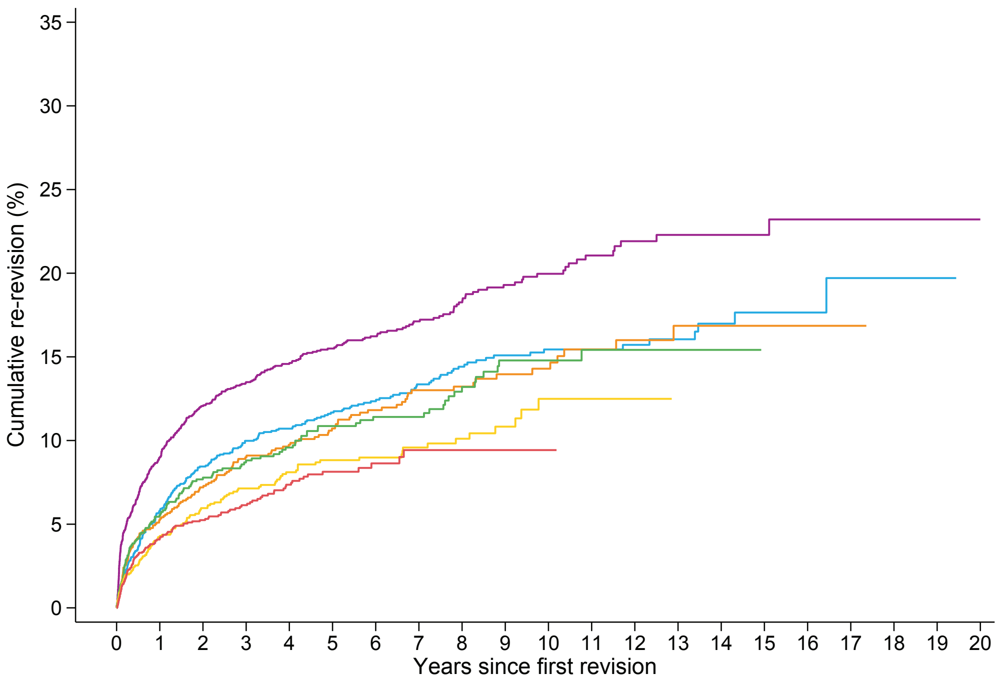
Key:

Numbers at risk

Key	0	2	4	6	8	10	12	14	16	18	20
First rev. <1y	12,115	8,885	7,195	5,319	3,787	2,503	1,589	883	363	*101*	*9*
First rev. 1 up to 3y	8,171	6,653	5,598	4,418	3,420	2,516	1,657	738	*240*	*34*	
First rev. 3 up to 5y	6,437	5,212	4,420	3,641	2,942	2,214	1,067	264	*32*		
First rev. 5 up to 7y	5,708	4,589	3,948	3,223	2,542	1,552	449	*40*			
First rev. 7 up to 10y	6,657	5,172	4,246	3,111	1,766	658	*63*				
First rev. ≥10y	8,002	4,672	2,889	1,120	271	*14*					

For those with a documented primary hip replacement within the registry, Figures 3.H15 (a) to (e) show cumulative re-revision rates following the first revision hip replacement, according to the main fixation used in the primary. Each sub-group, with the exception of reverse hybrid, has been further sub-divided according to the time interval from the primary hip replacement to the first revision, i.e. less than 1 year, 1 up to 3, 3 up to 5, 5 up to 7, 7 up to 10, and greater than or equal to ten years. For reverse hybrid the overall numbers were too low for these sub-divisions and as such the maximum cut-off was greater than or equal to five years. For cemented, uncemented, hybrid, reverse hybrid and resurfacing hip replacements, there was a trend of higher observed re-revision rates in those that had their first revision within one year, between one and three years or three to five years of the initial primary hip replacement.

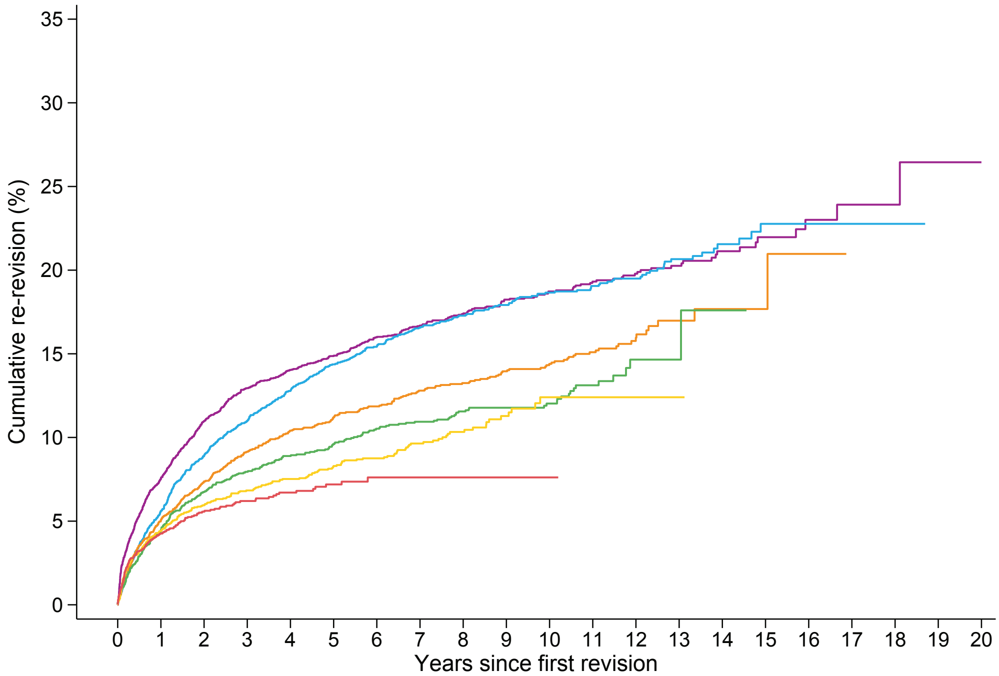
Figure 3.H15 (a) KM estimates of cumulative re-revision in cemented primary hip replacement by years to first revision, in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key: Numbers at risk

Key	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
First rev. <1y	2,562	2,113	1,863	1,660	1,464	1,237	1,031	836	671	538	421	325	*246*	*174*	*130*	*86*	*63*	*37*	*16*	*9*	*<4*
First rev. 1 up to 3y	1,977	1,729	1,557	1,404	1,285	1,117	949	807	683	555	456	371	281	*205*	*136*	*98*	*55*	*22*	*6*	*<4*	
First rev. 3 up to 5y	1,390	1,172	1,034	909	813	685	577	479	389	304	*234*	*180*	*135*	*96*	*60*	*32*	*13*	*<4*			
First rev. 5 up to 7y	1,167	969	860	759	674	557	466	392	306	*240*	*169*	*124*	*66*	*36*	*10*						
First rev. 7 up to 10y	1,583	1,314	1,114	939	818	669	532	397	299	*206*	*122*	*56*	*18*								
First rev. ≥10y	2,357	1,709	1,313	1,038	812	531	317	*175*	*81*	*27*	*<4*										

Figure 3.H15 (b) KM estimates of cumulative re-revision in uncemented primary hip replacement by years to first revision, in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

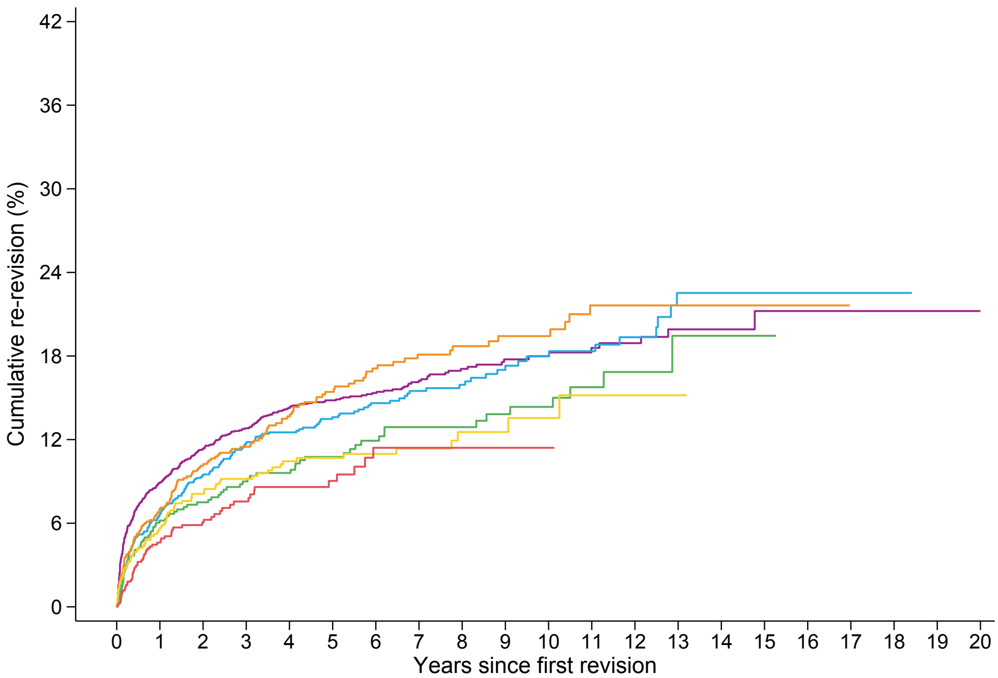


Key:

Numbers at risk

Key	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
First rev. <1y	5,198	4,441	3,945	3,613	3,318	2,938	2,545	2,207	1,904	1,550	1,253	1,007	753	542	393	*230*	*127*	*63*	*36*	*13*	*4*
First rev. 1 up to 3y	3,502	3,166	2,954	2,750	2,545	2,297	2,086	1,855	1,643	1,409	1,194	971	743	497	286	*150*	*76*	*28*	*8*		
First rev. 3 up to 5y	2,832	2,560	2,376	2,203	2,062	1,902	1,762	1,602	1,456	1,279	1,093	800	428	*160*	*68*	*25*	*6*				
First rev. 5 up to 7y	2,579	2,315	2,149	2,001	1,878	1,747	1,570	1,415	1,227	962	676	392	*140*	*32*	*4*						
First rev. 7 up to 10y	2,913	2,547	2,309	2,110	1,927	1,676	1,393	1,069	717	416	*198*	*64*	*8*	*<4*							
First rev. ≥10y	2,980	2,209	1,683	1,279	973	611	320	*152*	*61*	*13*	*<4*										

Figure 3.H15 (c) KM estimates of cumulative re-revision in hybrid primary hip replacement by years to first revision, in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*

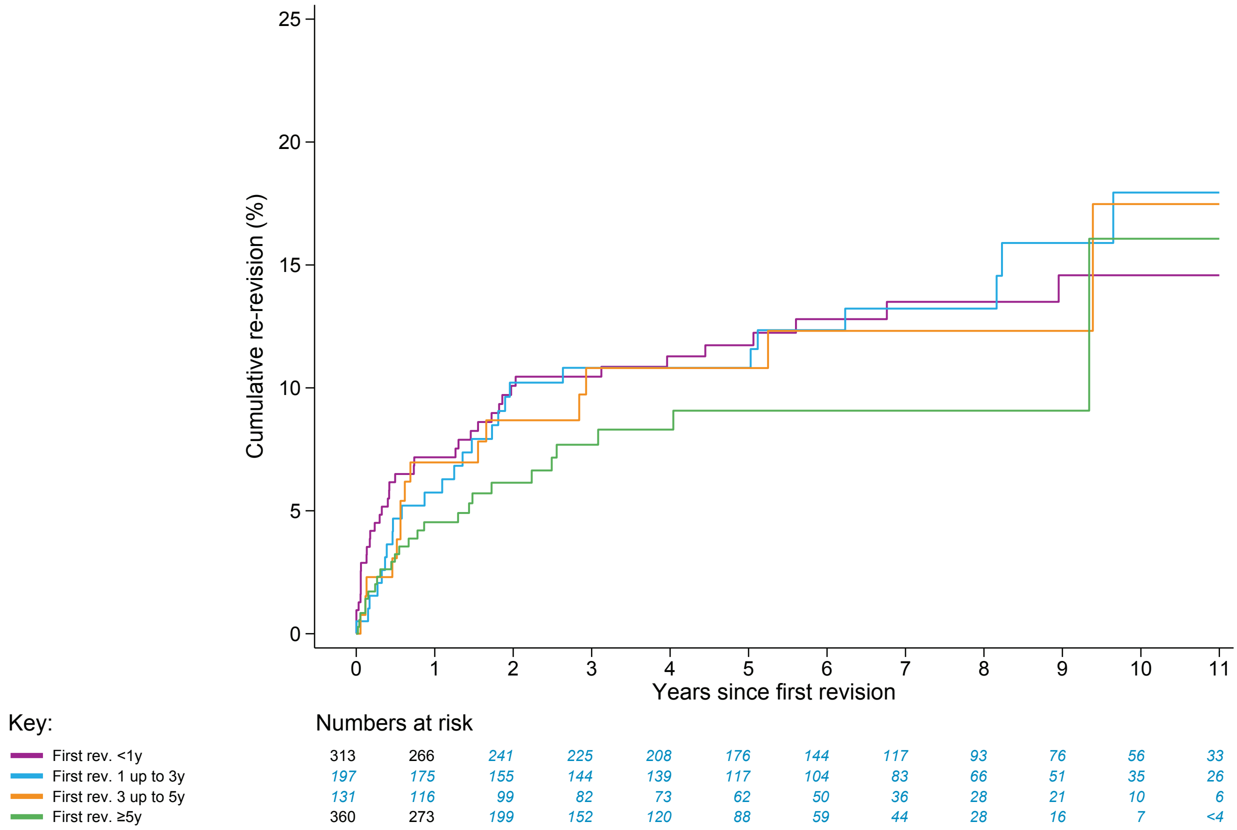


Key:

Numbers at risk

Key	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
First rev. <1y	3,096	2,410	2,056	1,762	1,527	1,254	1,005	772	585	422	313	*247*	*187*	*134*	*89*	*57*	*40*	*21*	*11*	*7*	*<4*
First rev. 1 up to 3y	1,484	1,244	1,088	929	806	667	541	438	343	272	*216*	*177*	*136*	*87*	*61*	*38*	*27*	*12*	*6*		
First rev. 3 up to 5y	994	825	693	606	520	432	368	301	257	*210*	*166*	*123*	*90*	*56*	*32*	*10*	*4*				
First rev. 5 up to 7y	758	608	519	454	403	338	277	*243*	*204*	*168*	*133*	*89*	*50*	*27*	*6*	*<4*					
First rev. 7 up to 10y	784	618	525	460	396	325	259	*202*	*131*	*90*	*56*	*31*	*4*	*<4*							
First rev. ≥10y	858	640	490	369	281	*204*	*118*	*75*	*34*	*14*	*<4*										

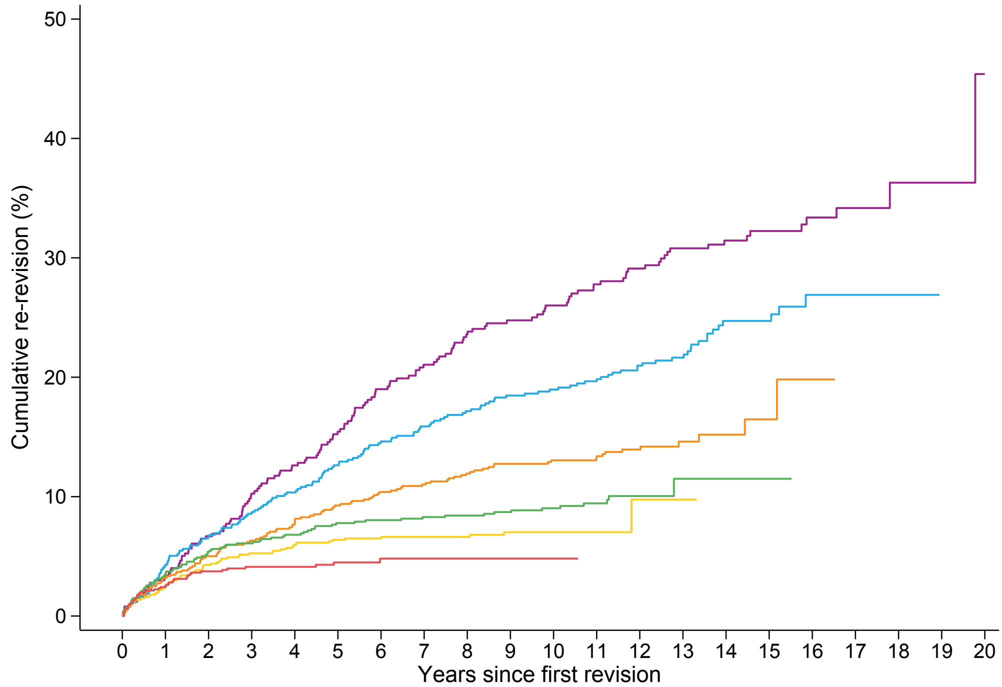
Figure 3.H15 (d) KM estimates of cumulative re-revision in reverse hybrid primary hip replacement by years to first revision, in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Numbers at risk

	0	1	2	3	4	5	6	7	8	9	10	11
First rev. <1y	313	266	*241*	*225*	*208*	*176*	*144*	*117*	*93*	*76*	*56*	*33*
First rev. 1 up to 3y	*197*	*175*	*155*	*144*	*139*	*117*	*104*	*83*	*66*	*51*	*35*	*26*
First rev. 3 up to 5y	*131*	*116*	*99*	*82*	*73*	*62*	*50*	*36*	*28*	*21*	*10*	*6*
First rev. ≥5y	360	273	*199*	*152*	*120*	*88*	*59*	*44*	*28*	*16*	*7*	*<4*

Figure 3.H15 (e) KM estimates of cumulative re-revision in resurfacing primary hip replacement by years to first revision, in linked primary hip replacements. *Blue italics in the numbers at risk table signify that 250 or fewer cases remained at risk at these time points.*



Key:

Numbers at risk

Key											
First rev. <1y	503	449	404	362	330	295	260	*199*	*106*	*29*	*<4*
First rev. 1 up to 3y	700	637	595	550	516	480	390	*200*	*60*	*10*	
First rev. 3 up to 5y	841	793	757	713	658	592	353	*92*	*7*		
First rev. 5 up to 7y	861	801	772	729	667	503	*166*	*15*			
First rev. 7 up to 10y	952	881	840	743	522	*249*	*26*				
First rev. ≥10y	1,204	854	630	294	*74*	*6*					

Table 3.H16 (a) shows the re-revision rate of the 47,090 primary hip replacements in the registry that were revised, and of these, 5,631 were re-revised. Table 3.H16 (b) shows that primary hip replacements that fail within the first year after surgery have just over twice the chance of needing re-revision at each time point compared with primaries that last more than ten years.

Table 3.H16 (a) KM estimates of cumulative re-revision (95% CI). *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

	Number of first revised joints at risk of re-revision	Time since first revision					
		1 year	3 years	5 years	10 years	15 years	20 years
Primary recorded in the registry	47,090	5.66 (5.45-5.88)	9.48 (9.20-9.76)	11.53 (11.22-11.85)	15.23 (14.83-15.64)	19.03 (18.31-19.78)	*26.16 (19.07-35.25)*

Table 3.H16 (b) KM estimates of cumulative re-revision (95% CI) by years since first revision. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Primary in the registry where the first revision took place:	Number of first revised joints at risk of re-revision	Time since first revision						
		1 year	3 years	5 years	7 years	10 years	13 years	15 years
<1 year after primary	12,115	8.07 (7.59-8.57)	12.91 (12.30-13.55)	15.05 (14.38-15.75)	16.99 (16.26-17.76)	19.39 (18.55-20.28)	21.69 (20.66-22.76)	22.93 (21.72-24.19)
1 up to 3 years after primary	8,171	5.69 (5.20-6.22)	10.54 (9.87-11.25)	13.26 (12.50-14.06)	15.58 (14.73-16.46)	17.89 (16.95-18.88)	19.95 (18.85-21.10)	21.86 (20.50-23.29)
3 up to 5 years after primary	6,437	5.17 (4.65-5.75)	9.07 (8.37-9.83)	11.45 (10.65-12.31)	13.30 (12.42-14.24)	14.97 (14.01-16.00)	17.25 (16.02-18.56)	*18.24 (16.67-19.93)*
5 up to 7 years after primary	5,708	4.89 (4.35-5.49)	8.07 (7.36-8.83)	9.82 (9.03-10.68)	11.05 (10.20-11.96)	12.38 (11.44-13.39)	*15.13 (13.40-17.05)*	
7 up to 10 years after primary	6,657	4.24 (3.77-4.76)	6.91 (6.30-7.58)	8.31 (7.62-9.06)	9.26 (8.51-10.07)	11.14 (10.14-12.23)		
≥10 years after primary	8,002	4.03 (3.60-4.51)	6.10 (5.53-6.71)	7.37 (6.69-8.11)	8.48 (7.60-9.45)	*8.48 (7.60-9.45)*		

Notes:
Maximum interval was 20.6 years.
Blank cells indicate the number at risk is below ten and thus estimates have been omitted as they are highly unreliable.
Data have not been presented at 20 years due to low numbers.

Table 3.H16 (c) KM estimates of cumulative re-revision (95% CI) by fixation and bearing used in primary hip replacement. *Blue italics signify that 250 or fewer cases remained at risk at these time points.*

Fixation and bearing surface	N	Time since first revision						
		1 year	3 years	5 years	7 years	10 years	13 years	15 years
All	**47,090**	**5.66 (5.45-5.88)**	**9.48 (9.20-9.76)**	**11.53 (11.22-11.85)**	**13.25 (12.91-13.61)**	**15.23 (14.83-15.64)**	**17.50 (16.96-18.05)**	**19.03 (18.31-19.78)**
All cemented	**11,036**	**5.92 (5.48-6.39)**	**9.45 (8.88-10.05)**	**11.32 (10.68-12.00)**	**12.79 (12.07-13.56)**	**15.17 (14.26-16.13)**	**16.69 (15.54-17.92)**	*17.35 (16.00-18.80)*
MoP	9,703	5.87 (5.41-6.37)	9.23 (8.63-9.86)	10.95 (10.28-11.67)	12.43 (11.67-13.24)	14.87 (13.90-15.89)	15.99 (14.85-17.22)	*16.72 (15.33-18.22)*
MoM	29	*3.85 (0.55-24.31)*	*3.85 (0.55-24.31)*	*17.84 (7.05-41.02)*	*17.84 (7.05-41.02)*			
CoP	1,167	6.15 (4.87-7.75)	11.33 (9.49-13.51)	14.26 (12.09-16.78)	15.56 (13.21-18.28)	*17.56 (14.77-20.82)*	*23.46 (18.24-29.89)*	*23.46 (18.24-29.89)*
MoPoM	127	*6.64 (3.37-12.85)*	*10.10 (5.64-17.75)*	*10.10 (5.64-17.75)*				
All uncemented	**20,004**	**5.53 (5.22-5.86)**	**9.65 (9.23-10.09)**	**11.72 (11.25-12.21)**	**13.41 (12.89-13.95)**	**15.27 (14.68-15.89)**	**17.38 (16.60-18.20)**	**19.29 (18.09-20.55)**
MoP	5,909	5.79 (5.21-6.43)	9.98 (9.20-10.83)	11.71 (10.85-12.65)	13.67 (12.69-14.73)	15.40 (14.24-16.63)	16.38 (15.00-17.87)	*19.04 (16.62-21.75)*
MoM	5,946	4.73 (4.21-5.30)	8.56 (7.86-9.31)	10.66 (9.87-11.50)	12.31 (11.45-13.22)	13.90 (12.96-14.90)	16.48 (15.21-17.84)	*17.46 (15.90-19.15)*
CoP	3,099	6.27 (5.45-7.21)	10.86 (9.73-12.11)	12.85 (11.57-14.24)	14.53 (13.10-16.10)	16.35 (14.64-18.24)	*18.96 (16.39-21.87)*	*20.08 (16.86-23.83)*
CoC	4,673	5.55 (4.92-6.26)	9.67 (8.82-10.59)	12.02 (11.05-13.06)	13.54 (12.49-14.67)	15.97 (14.73-17.31)	18.11 (16.53-19.81)	*20.65 (18.13-23.46)*
CoM	223	*7.06 (4.32-11.44)*	*11.73 (8.01-17.01)*	*16.17 (11.60-22.30)*	*16.89 (12.19-23.15)*	*20.08 (14.55-27.35)*		
MoPoM	108	*9.53 (5.24-16.99)*	*11.91 (6.92-20.09)*	*11.91 (6.92-20.09)*	*11.91 (6.92-20.09)*			
CoPoM	34	*13.97 (5.45-33.23)*	*34.99 (18.58-59.43)*					
All hybrid	**7,974**	**7.21 (6.65-7.81)**	**11.21 (10.49-11.98)**	**13.34 (12.53-14.20)**	**15.10 (14.18-16.07)**	**16.93 (15.83-18.10)**	**20.11 (18.38-21.98)**	*20.76 (18.67-23.06)*
MoP	4,331	7.42 (6.66-8.26)	11.08 (10.13-12.12)	13.07 (12.00-14.23)	14.69 (13.49-15.99)	16.64 (15.19-18.20)	*19.79 (17.53-22.30)*	*20.87 (17.92-24.24)*
MoM	432	3.81 (2.35-6.14)	9.87 (7.33-13.22)	12.93 (9.97-16.67)	*14.90 (11.67-18.93)*	*17.41 (13.78-21.86)*	*20.75 (16.39-26.08)*	*20.75 (16.39-26.08)*
CoP	2,134	7.54 (6.47-8.79)	11.42 (10.02-13.01)	13.82 (12.18-15.65)	15.18 (13.30-17.30)	*16.07 (13.89-18.55)*	*19.07 (13.70-26.19)*	
CoC	835	6.30 (4.83-8.21)	10.60 (8.61-13.02)	11.98 (9.82-14.57)	14.75 (12.21-17.76)	*16.37 (13.48-19.80)*	*19.38 (15.24-24.46)*	*19.38 (15.24-24.46)*
MoPoM	193	*8.59 (5.26-13.87)*	*11.80 (7.63-18.02)*	*17.13 (11.28-25.54)*	*17.13 (11.28-25.54)*			
CoPoM	42	*17.56 (8.76-33.42)*						
All reverse hybrid	**1,001**	**5.95 (4.62-7.64)**	**9.64 (7.86-11.79)**	**10.45 (8.57-12.72)**	**12.06 (9.91-14.64)**	*15.29 (12.19-19.09)*	*19.62 (13.78-27.50)*	
MoP	670	5.15 (3.69-7.17)	9.02 (6.95-11.67)	9.80 (7.60-12.61)	*11.96 (9.31-15.31)*	*14.73 (10.99-19.58)*	*22.81 (13.39-37.28)*	
CoP	311	6.62 (4.32-10.07)	*10.14 (7.15-14.30)*	*11.06 (7.88-15.41)*	*11.81 (8.42-16.44)*	*15.92 (10.89-22.96)*	*15.92 (10.89-22.96)*	
All resurfacing	**5,062**	**3.12 (2.67-3.64)**	**6.37 (5.71-7.10)**	**8.73 (7.95-9.58)**	**10.50 (9.63-11.44)**	**12.56 (11.58-13.62)**	**15.38 (14.13-16.72)**	**17.71 (16.08-19.50)**
Unconfirmed	**2,013**	**5.88 (4.92-7.03)**	**9.09 (7.86-10.50)**	**11.11 (9.71-12.69)**	**14.00 (12.36-15.83)**	**15.64 (13.84-17.66)**	*17.18 (15.04-19.58)*	*17.63 (15.35-20.19)*

Notes:
Maximum interval was 20.6 years.
Data have not been presented for 20 years due to low numbers.

Table 3.H16 (c) shows cumulative re-revision rates at 1, 3, 5, 7, 10, 13 and 15 years following the first revision for those with documented primary hip replacements within the registry, broken down by fixation types and bearing surfaces used in the primary hip replacement. The numbers are low for dual mobility hips and the duration of follow-up is short, but initial results show high failure rates ranging from 6.6% to 17.6% at one year in dual mobility procedures.

The revision rates for revisions following resurfacings were comparatively low, but Figure 3.H14 (b) (page 146) shows that after 14 years the revision rate is becoming higher than those for alternatives.

3.H.10 Reasons for hip re-revision

Tables 3.H17 (a) and (b) (page 156) show a breakdown of the stated indications for the first revision and for any second revision. Please note the indications are not mutually exclusive. Table 3.H17 (a) shows the indications for recorded revisions in the registry and Table 3.H17 (b) reports the indications for the first linked revision and the number and percentage of first linked revisions that were subsequently revised. In the final column in Table 3.H17 (b), we report the indications for all the second linked revisions e.g. 1,149 linked second revisions recorded aseptic loosening as an indication. It is interesting to note that both dislocation and infection are much more common indications for a second revision than for a first revision. This shows the increased risk of instability and infection following the first revision of a hip replacement compared to that of primary hip replacement.

Table 3.H17 (a) Number of revisions by indication for all revisions.

Reason for revision	All recorded revisions, N (%)
Aseptic loosening	61,303 (41.0)
Infection	22,834 (15.3)
Dislocation / Subluxation	22,793 (15.2)
Pain	20,476 (13.7)
Lysis	20,207 (13.5)
Implant wear	18,575 (12.4)
Periprosthetic fracture	17,852 (11.9)
Malalignment	7,044 (4.7)
Implant fracture	5,011 (3.3)
Head/socket size mismatch	890 (0.6)
Other indication	9,557 (6.4)
Adverse reaction to particulate debris*	12,151 (8.1)

Notes:
*Adverse reaction to particulate debris was only recorded using MDSv3 onwards and as such was only a potential reason for revision among a total of 128,898 revisions as opposed to 149,622 revisions for the other reasons.

Table 3.H17 (b) Number of revisions by indication for first linked revision and second linked re-revision.

Reason for revision	First linked revision		Second linked revision
	N	Subsequently re-revised, N (%)	N
Aseptic loosening	11,781	1,172 (9.9)	1,149
Dislocation / Subluxation	8,308	1,007 (12.1)	1,414
Periprosthetic fracture	7,900	809 (10.2)	521
Infection	7,531	1,391 (18.5)	1,867
Pain	5,207	709 (13.6)	449
Malalignment	3,017	304 (10.1)	263
Lysis	3,008	257 (8.5)	253
Implant wear	2,785	257 (9.2)	264
Implant fracture	1,528	180 (11.8)	170
Head/socket size mismatch	292	43 (14.7)	18
Other indication	3,450	488 (14.1)	331
Adverse reaction to particulate debris*	3,031	295 (9.7)	144

Notes:
*Adverse reaction to particulate debris was only recorded using MDSv3 onwards and as such was only a potential reason for revision among a total of 31,911 revisions as opposed to 47,090 revisions for the other reasons.

Tables 3.H18 (a) and (b) (pages 157 and 158) show that the numbers of revisions and the relative proportion of revisions with a linked primary in the registry increased with time. Approximately 60% of revisions performed in 2023 had a linked primary in the registry. This is likely to reflect improved data capture over time, improved linkability of records and the longevity of hip replacements with a proportion of primaries being revised being performed before data capture began or being outside the coverage of the registry.

Table 3.H18 (a) Number of revisions by year.

Year of first revision in the registry*	Number of first revisions*	Number of first revisions (%) with the associated primary recorded in the registry
2003	1,453	43 (3.0)
2004	2,713	144 (5.3)
2005	3,797	306 (8.1)
2006	4,486	463 (10.3)
2007	5,911	816 (13.8)
2008	6,322	1,161 (18.4)
2009	6,561	1,517 (23.1)
2010	7,076	1,959 (27.7)
2011	7,947	2,672 (33.6)
2012	9,028	3,350 (37.1)
2013	8,227	3,060 (37.2)
2014	8,083	3,108 (38.5)
2015	7,654	3,245 (42.4)
2016	7,275	3,247 (44.6)
2017	7,186	3,355 (46.7)
2018	6,930	3,544 (51.1)
2019	6,658	3,579 (53.8)
2020	4,133	2,400 (58.1)
2021	4,801	2,751 (57.3)
2022	5,357	3,191 (59.6)
2023	5,378	3,179 (59.1)
Total	**126,976**	**47,090 (37.1)**

Notes:
*First documented revision in the registry.

Table 3.H18 (b) Number of revisions by year, stage, and whether or not primary is in the registry.

Year of first revision in the registry*	Single-stage		First documented stage of two-stage	
	Primary not in the registry	Primary in the registry	Primary not in the registry	Primary in the registry
2003	1,410	43	0	0
2004	2,359	126	210	18
2005	3,161	251	330	55
2006	3,648	375	375	88
2007	4,648	688	447	128
2008	4,691	960	470	201
2009	4,567	1,254	477	263
2010	4,705	1,728	412	231
2011	4,884	2,403	391	269
2012	5,300	3,021	378	329
2013	4,854	2,760	313	300
2014	4,628	2,813	347	295
2015	4,104	2,919	305	326
2016	3,792	2,959	236	288
2017	3,585	3,080	246	275
2018	3,158	3,291	228	253
2019	2,894	3,306	185	273
2020	1,595	2,192	138	208
2021	1,906	2,542	144	209
2022	2,007	2,941	159	250
2023	2,023	2,888	176	291
Total	73,919	42,540	5,967	4,550

Notes:
*First documented revision in the registry.

3.H.11 90-day mortality after hip revision

The overall cumulative percentage mortality at 90 days after hip revision was lower in the cases with a primary hip replacement recorded in the registry compared with the remainder (Kaplan-Meier estimates 1.74% (95% CI 1.62-1.86) versus 2.07% (95% CI 1.97-2.17)), which may reflect the fact that patients in this group were younger at the time of their first revision, median age of 70 (IQR 62 to 78) years compared to the group without primaries documented in the registry who had a median age of 74 (IQR 66 to 81) years. The percentage of males to females was similar in both groups (44.6% versus 42.6% respectively).

3.H.12 Conclusions

As in previous reports, our analysis of implants has been by revision of the construct, rather than revision of a single component, as the mechanisms of failure (such as wear, adverse reaction to particulate debris and dislocation) are interdependent between different parts of the construct. Revision analyses have also been stratified by age and sex. The introduction of the new component database used for analysis for this year's report has provided increased granularity of implant data. This has primarily allowed more detailed reporting, such as the addition of the brand of the head and liner to the primary brand reporting tables. It has also allowed us to better resolve implant data where there was uncertainty previously, this is most noticeable in the increase in the proportion of total hip replacements using a dual mobility bearing in treating hip fractures but is also seen in newly identified cases in the overall data which provides longer-term outcome data for these bearings.

The highest revision rates are among younger females and the lowest among older females. When data on metal-on-metal implants are excluded, younger females have similar revision rates to younger males. Once again, it must be emphasised that implant survivorship is only one measure of success and cannot be used as an indication of patient satisfaction, relief of pain, improvement in function and the resulting greater participation in society. The data clearly show that constructs failing at different rates is associated with the age and sex of the recipients.

Overall, the number of primary hip replacements recorded annually in the registry continues to increase, now with 1,561,640 eligible for analysis. The COVID pandemic had a marked impact on the provision of hip replacement with primary THR decreasing from 99,907 in 2019 to 57,455 in 2020, but procedure volumes have now recovered and surpassed previous years to 108,558 in 2023 (the highest annual number to date), and revision THR has fallen from 8,268 in 2019 to 5,211 in 2020 and partially recovered to 6,659 in 2023. Due to late data entry for 2023 the figures listed here will be revised upwards in subsequent reports, so the recovery will be greater than the current data suggests. The overall provision of primary hip replacement has recovered to above pre-pandemic levels, but a far greater percentage are now both funded and undertaken in the private sector, with overall NHS-provision still markedly below pre-pandemic numbers.

It is interesting to examine the overall secular trends in provision of primary and revision hip replacements. Apart from the COVID-affected years of 2020 and 2021, the trend has been for an ever-increasing provision of primary hip replacement such that the volume of procedures now exceeds 100,000 cases per annum. The provision of, and presumably the requirement for, revision hip replacement increased markedly from 4,016 cases in 2005 to 10,510 in 2012 and then declined to 6,659 in 2023 (with lower numbers in COVID-affected years 2020 and 2021).

Looking at the relationship between year of primary and subsequent revision, between 2004 and 2007 the primaries undertaken each year were at higher risk of being revised than those undertaken the previous year, i.e. outcomes were getting steadily worse. This coincided exactly with the increased use of metal-on-metal stemmed hip replacements and hip resurfacings. This registry and other registries reported poor results with these types of prostheses. Their use then rapidly declined between 2007 and 2011 and the revision rates for primaries performed over that period demonstrated a pronounced decline. Because of this disproportionate effect of metal-on-metal bearings on secular trends in revision, we reported the revision rates over time excluding metal-on-metal. This showed that revision rates have been decreasing since 2008/2009 for non-metal-on-metal bearing hip replacements. The reasons for this are likely to be multi-factorial, but surgeon performance reporting, which began at this time, is likely to be a contributing factor.

In addition, in the NJR Annual Report 2009, we commented that data suggested that ceramic-on-polyethylene bearings were associated with lower revision rates. Between 2009 and 2023, the use of these bearings has increased approximately five-fold. In 2023, ceramic-on-polyethylene hybrid constructs were the most common type of hip replacement performed (25.4%), with the second commonest being ceramic-on-polyethylene uncemented hips which accounted for 21.5% of cases. The decline in revision rates for primaries performed over this period has mirrored the increase in use of these bearings. This rate of decline in revisions by year of primary surgery has slowed over time, particularly since 2013, but is still evident.

The result of surgical practice changing in response to outcomes is that procedures now achieve remarkably low long-term revision rates. The majority of patients undergoing THR are between 65 and 75 years old. It is striking that at 15 years the average revision rate for implants excluding MoM bearings is less than 5% i.e. the 10-year NICE benchmark for performance. Furthermore, revision rates well below

10% at 20 years have been achieved with cemented, uncemented and hybrid THR implants, whilst MoM resurfacing has a revision rate of 15.75% (15.21-16.31) at the same time point.

When stratifying hip constructs by the brand of the stem / head / cup (or liner / shell) and bearing materials, we report revision rates of less than 2% at ten years for 11 cemented, ten uncemented, two hybrid and two reverse hybrid constructs, where more than 250 cases remain at risk with many more combinations on track to achieve these very low revision rates. NICE currently recommend that when implants are selected for primary total hip replacement for end-stage arthritis, implants with a revision rate of less than 5% should be selected. The best rating issued by ODEP at ten years is 10A* which requires a revision rate of less than 5%. Given the large number of constructs achieving much lower revision rates than these thresholds, it should be considered whether these thresholds should be revised to encourage the selection of implants that are associated with very low revision rates for patients. We also present data here that show that it is very unusual for patients aged over 70 years to still be alive 20 years after their primary. Using existing implants and techniques, surgeons are thus capable of performing hip replacements that will last the entire life of nearly all patients above the median age of a patient undergoing hip replacement of 69 years.

This reinforces the argument that any new implants and techniques really need to focus on patients younger than 70 years of age and those undergoing revision surgery. Recent analysis of NJR data has shown strongly that revisions last significantly less long than primaries and that each subsequent revision lasts half as long as its predecessor (Deere et al 2022). 'Getting it right first time' really is the solution.

The data demonstrating how widespread adoption of technology before long-term outcomes are available can be disastrous, continues to grow. The revision rates with metal-on-metal resurfacing continue to increase over time, particularly in women, and the contrast with other implants is stark. For example, the revision rates in women receiving metal-on-metal resurfacing are six-fold higher at 15 years than that achieved with some other commonly-used alternatives. This holds true even when stratified for age. Metal-on-metal stemmed and resurfacing implants continue to fail at higher than expected rates and their use is now extremely rare. The best-performing brand of resurfacing has a revision rate of 9.9% (95% CI 9.49-10.33) at 15 years. This contrasts with a revision rate of 2.66% (95% CI 2.05-3.45) for the best-performing cemented hip replacement, 2.70% (95% CI 2.37-3.08) for the best-performing uncemented hip replacement and 2.72% (95% CI 2.24-3.30) for the best performing hybrid hip replacement defined as the stem / head / cup (or liner / shell) and bearing material combination with more than 250 cases remaining at risk.

It is important that we monitor the performance of novel bearing designs of hip replacement closely. There is now sufficient data to report on ceramic-on-ceramic resurfacings. The numbers are low and follow-up is short and thus caution is required interpreting these early data, however revision rates in young women appear to already be much higher than in young men. Patients undergoing these procedures need to be monitored very carefully. The use of dual mobility constructs continues to increase with over 27,000 of these now recorded in the registry. The early revision rates with these appear to be slightly higher than alternatives, but 10-year revision rates appear to be acceptable (3.03% (95%CI 2.49-3.68) for the commonest type (hybrid MoPoM)). Indications for usage should be carefully considered. It may be that higher early revision rates are due to appropriate case mix selection, so it is important to closely monitor the emerging data on these implants. However, a higher early rate of revision compared to unipolar bearings was not observed in patients with a fractured neck of femur. This is an area which is developing and requires more in-depth analysis in the future.

Since the 12th NJR Annual Report in 2015, our data have been presented by age and sex comparing

https://www.nice.org.uk/guidance/ta304
Deere K, Whitehouse MR, Kunutsor SK, Sayers A, Mason J, Blom AW; How long do revised and multiply revised hip replacements last? A retrospective observational study of the National Joint Registry. Lancet Rheumatol. 2022 Jun 23;4(7):e468-e479

combinations of fixation and bearing. This assists clinicians and patients in choosing classes of prostheses that are the most appropriate for particular patients. For example, in males aged 55 to 64 years, at 15 years post-surgery, hybrid and uncemented ceramic-on-polyethylene and ceramic-on-ceramic constructs, as well as cemented ceramic-on-polyethylene constructs have similarly low revision rates of approximately 5%, while cemented metal-on-polyethylene constructs have revision rates of 8.47% (95% CI 7.78-9.22) and uncemented metal-on-polyethylene bearings are 6.80% (95% CI 6.13-7.54). Metal-on-metal resurfacings in this group have a higher revision rate at 15 years of 9.01% (95% CI 8.47-9.57). Females aged 55 to 64 years have lower revision rates than males for all fixation/bearing combinations at 15 years, except for those with metal-on-metal bearings such as resurfacings, where the revision rates are markedly higher for females than males and also markedly higher than alternatives. For example, 15-year revision rates with hybrid ceramic-on-polyethylene constructs in this group are 2.89% (95% CI 2.31-3.61) compared to metal-on-metal hip resurfacing of 21.70% (95% CI 20.47-22.98).

For patients over 75 years, all combinations except those with metal-on-metal bearings have good outcomes, with cemented and hybrid ceramic-on-polyethylene constructs possibly having the lowest revision rates. The risk of revision at 20 years in this group is very small; males 6.64% (95% CI 5.52-7.51) and females 4.20% (95% CI 3.76-4.69). The 20-year mortality rate in males aged 75 to 79 years is 95.24% (95% CI 94.33-96.04) and in females aged 75 to 79 years is 90.66% (95% CI 89.84-91.45).

We have also examined outcomes of different head sizes (bearing diameters) with alternative fixation and bearing types and these results are interesting. With metal-on-polyethylene and ceramic-on-polyethylene, large head sizes appear to be associated with higher revision rates particularly with 36mm heads used with cemented fixation and heads >36mm used with uncemented fixation. Ceramic-on-ceramic bearings have lower revision rates with larger bearings when used with uncemented fixation in the short-term, but revision rates begin to rise with the largest head sizes beyond six years. Higher revision rates for 36mm compared to smaller heads are also seen in ceramic-on-ceramic hybrid fixations. This demonstrates the importance of examining the entire construct, not just the individual variables such as fixation, composition of bearing and head size.

With regard to specific branded stem / cup combinations, some of the best implant survivorships have still been found to be achieved by mix and match cemented hard-on-soft bearing constructs, although this practice remains contrary to both the MHRA and implant manufacturers' guidelines for usage.

It is encouraging that the most commonly-used constructs by brand in cemented and hybrid fixation have good results. This does not hold true for uncemented fixation, but further breakdown by bearing type for commonly-used uncemented implants shows that results are acceptable if metal-on-metal bearings are excluded. It is important to note that there is variability in brand-level constructs with variation in revision outcomes according to factors such as the bearing combination used. It is therefore important to consider the construct when selecting implants for specific outcomes. We encourage all readers to view Table 3.H8 (b) for fine details of construct performance.

Risk of re-revision rate is strongly associated with time to first revision; as 19.39% (95% CI 18.55-20.28) of hips revised within a year of primary surgery are re-revised within ten years. In contrast, when the primary lasts at least ten years the re-revision rate is 8.48% (95% CI 7.60-9.45) at ten years after the first revision. Re-revision rates up to ten years appear to be independent of the fixation and bearing of the primary hip replacement, except for resurfacing procedures which are initially associated with lower re-revision rates, but this pattern appears to begin to wane between seven and ten years after the re-revision. At 15 years re-revision rates are 17.35% (95% CI 16.00-18.80) for cemented primaries, 19.29% (95% CI 18.09-20.55) for uncemented primaries and 17.71% (95% CI 16.08-19.50) for resurfacings.

Overall, this latest report is good news for patients, clinicians and the healthcare sector. Provision of hip replacement overall has recovered in volume and now surpasses pre-COVID levels, revision rates continue to decline and clinicians increasingly use constructs with proven longevity. The detrimental effect of COVID on absolute provision has been short-lived, but profound. In 2020 there was a massive under-provision of primary hip replacement with over 42,000 fewer primary hip replacements performed than in 2019. In 2021, much of this decline in volume was reversed with only 10,000 fewer primary hip replacements than in 2019. In 2023 more primaries were performed than in 2019 (108,558 vs. 99,907), and numbers are in line with the long-term secular trend. It is noteworthy that NHS under-provision has been replaced with increased independent sector provision. The 2020/21 deficit of approximately 55,000 primary hip replacements has led to increases in waiting lists that will need comprehensive planning to resolve.

With the health service having to address an unprecedented backlog of joint replacement along with increasing pressure for cost-containment, the selection of clinically effective and value for money treatments with a good evidence-base will be increasingly important.

4. NJR Supported Research

NJR Supported Research

The NJR encourages use of the registry dataset to answer research questions that add value to our knowledge about joint replacement practice, clinical performance, cost-effectiveness and patient safety.

Researchers use the data to analyse questions about outcomes in relation to particular underlying disease and patient comorbidity, as well as examine clinical and cost-effectiveness outcomes related to the implant prosthesis used. Over the last 12 months, eight papers have been published using NJR data, covering a broad range of topics across the shoulder, hip, and knee joints.

Here we offer brief summaries for six papers that have been published during the past year which illustrate the opportunities for external researchers to access and analyse the NJR dataset to answer questions about joint replacement outcomes. Each of them demonstrates the value of the use of these collected data to the orthopaedic community to ultimately improve patient outcomes.

We also present an abstract from the University of Bristol which updates our COVID analyses from recent NJR annual reports.

The study investigates the impact of the COVID-19 pandemic on joint replacement surgeries across England, Wales, and Northern Ireland, revealing a significant deficit in procedures from 2020 to 2022. Using data from the NJR, the authors identified a shortfall of nearly 160,000 operations, amounting to over two-thirds of the expected annual volume. The independent sectors saw an increase in their share of procedures, while NHS volumes fell. The authors predict that, even with an immediate 10% increase in capacity beyond 2019 levels, it would take until 2031 to clear the backlog, underscoring the need for substantial and rapid expansion in joint replacement services to mitigate the long-term effects of the pandemic on patients in waiting far longer for their surgery.

Further details of all research publications using NJR data can be found in Appendix 4 at **reports.njrcentre.org.uk/downloads**.

Association between surgeon volume and patient outcomes after elective shoulder replacement surgery using data from the National Joint Registry and Hospital Episode Statistics for England: population based cohort study

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BMJ. 2023 Jun 21;381:e075355

https://doi.org/10.1136/bmj-2023-075355

Background

The aim of this study was to improve patient outcomes and inform future resource planning for joint replacement surgery by investigating the effect of surgeon volume on patient outcomes following shoulder replacement surgery.

Methods

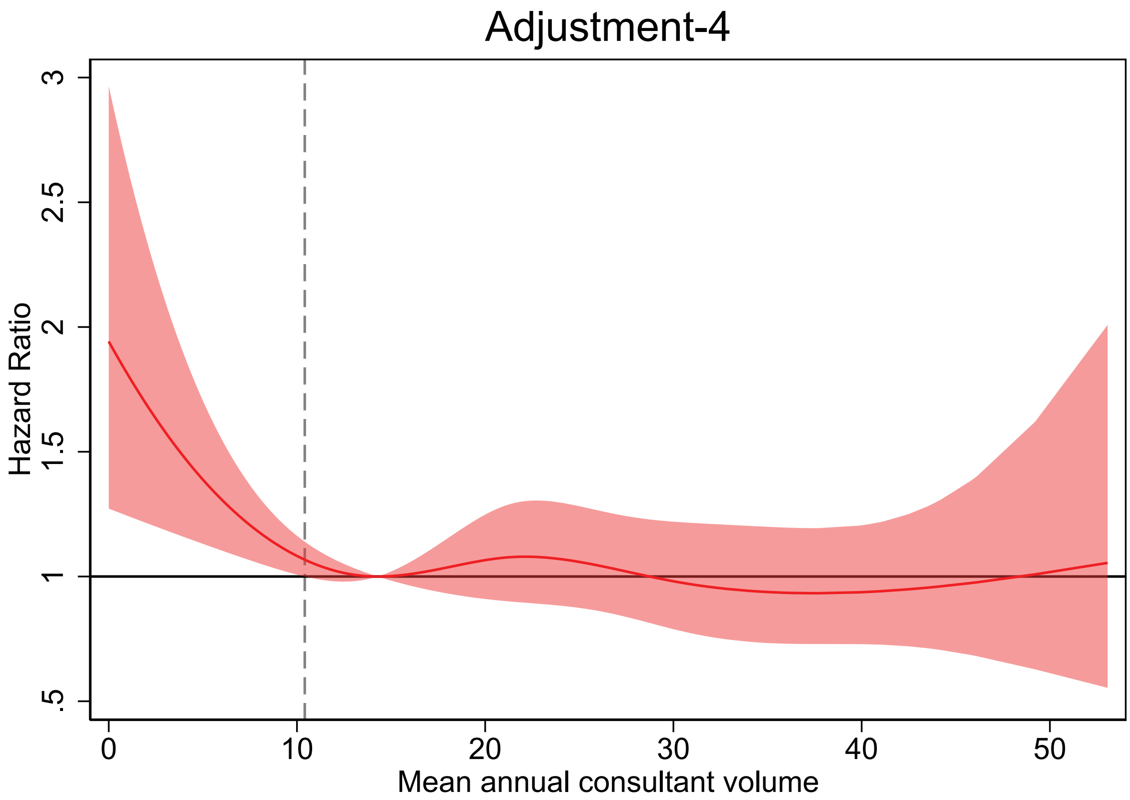
All shoulder replacements carried out at public and private hospitals in the United Kingdom from 2012 to 2021 were identified using data from the National Joint Registry linked to NHS Hospital Episode Statistics data. Multilevel survival and logistic mixed-effects models were developed to investigate the effect of surgeon volume on patient outcomes including revision surgery, reoperations, serious adverse events and prolonged hospital stay. Selection criteria included consenting patients aged 18 years or more having an elective shoulder replacement for indications other than acute trauma or malignancy.

Results

A total of 39,281 shoulder replacement procedures undertaken by 638 consultant surgeons at 416 surgical units met the selection criteria and were available for analysis. Centring restricted cubic splines of the volume variable at the local minimum inflection point identified a minimum volume threshold of 10.4 procedures per year, below which there was a significantly increased risk of revision surgery which was up to double that of the lowest risk operators (HR 1.94, 95% CI 1.27 to 2.97). A greater mean annual surgical volume was also associated with a significantly lower risk of reoperations, fewer serious adverse events and shorter hospital stay with no thresholds identified. Annual deviations in a surgeon volume did not affect patient outcomes.

Figure 4.1 Risk of revision surgery.

Association of mean annual consultant volume on risk of revision adjusted for confounding factors in a multilevel parametric survival model. Mean annual consultant volume represents the mean of the primary independent variable across all procedures undertaken by a particular consultant. Shaded areas represent 95% confidence intervals. Vertical dashed line represents the threshold of 10.4.



Conclusion

In the healthcare system represented by this registry data, surgeons averaging more than 10.4 shoulder replacements per year obtained lower rates of revision surgery and re-operation, lower risk of serious adverse events, and shorter hospital stays. This study will inform resource planning for surgical services and joint replacement surgery waiting lists while further improving patient outcomes after shoulder replacement surgery.

Inequalities in provision of hip and knee replacement surgery for osteoarthritis by age, sex, and social deprivation in England between 2007–2017: A population-based cohort study of the National Joint Registry

Erik Lenguerrand, Yoav Ben-Shlomo, Amar Rangan, Andrew Beswick, Michael R. Whitehouse, Kevin Deere, Adrian Sayers, Ashley W. Blom, Andrew Judge

PLoS Med 20(4): e1004210

https://doi.org/10.1371/journal.pmed.1004210

Background

While the National Health Services aimed to reduce the social inequalities in the provision of joint replacement observed 20 years ago, it is unclear whether these gaps have reduced. We aimed to describe secular trends in the provision of primary hip and knee replacement surgery between social groups.

Methods

We used the National Joint Registry to identify all hip and knee replacements performed for osteoarthritis from 2007 to 2017 in England. The Index of Multiple Deprivation (IMD) 2015 was used to identify the relative level of deprivation of the patient living area. Multi-level negative binomial regression models were used to model the differences in rate of joint replacement. Choropleth maps of hip and knee replacement provision were also produced to identify the geographical variation in provision by Clinical Commissioning Groups (CCGs).

Results

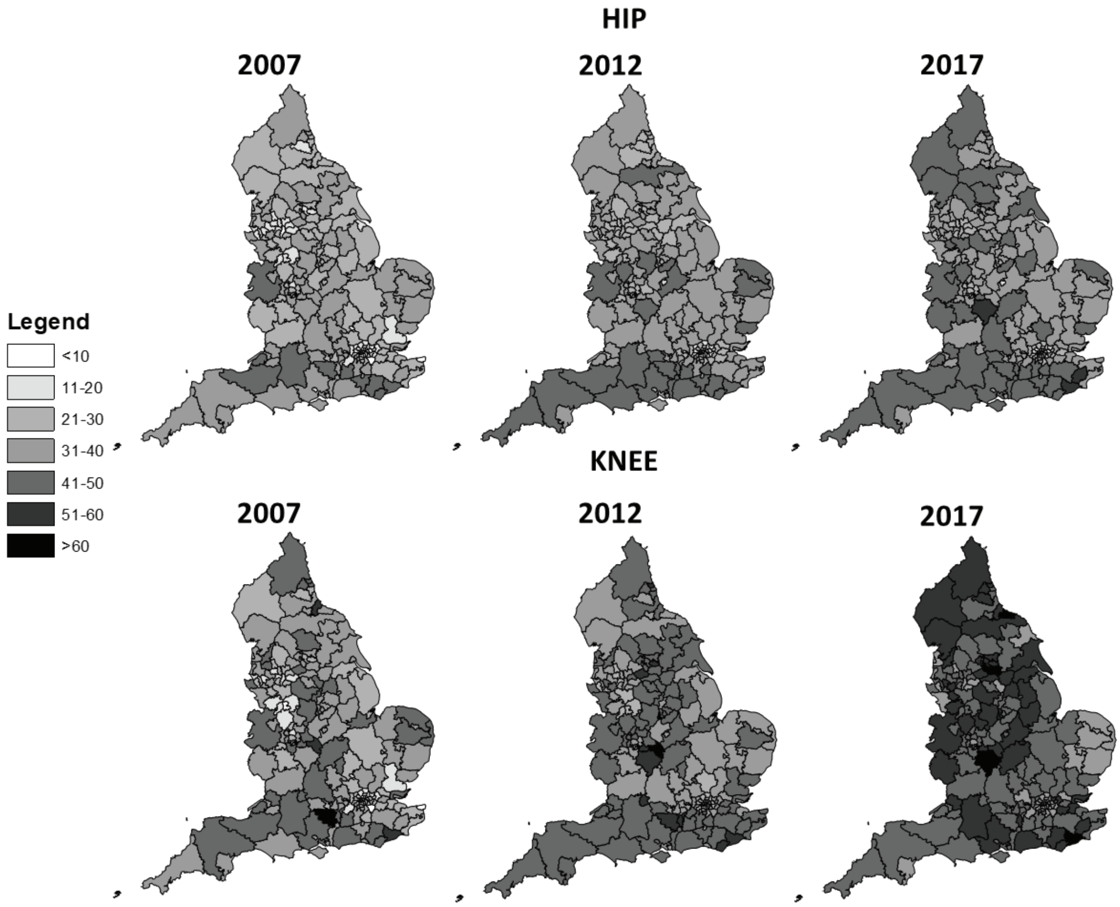
A total of 675,342 primary hip and 834,146 primary knee replacements were studied. The overall provision of hip replacement increased from 27/10,000 persons in 2007 to 36/10,000 in 2017 and from 33/10,000 persons to 46/10,000 for knee replacement.

Inequality of provision between the most and least affluent areas have widened; in hip replacement from 15 fewer arthroplasties per 10,000 persons in 2007 to 20 fewer in 2017; and for knee replacement from 7 fewer arthroplasties in 2007 to 11 fewer in 2017. In 2017, those residing in the least affluent areas were 44% less likely to receive a hip replacement and 24% less likely to receive a knee replacement than those residing in the wealthiest areas.

The age- and sex-adjusted rates of hip and knee provision for the 207 CCGs for 2007, 2012, and 2017 are presented in Figure 4.2. The provision of hip and knee replacement has increased unequally over time across CCGs. In 2007, the overall variation in rates of provision of hip replacement was 16-fold ranging from 2.9/10,000 to 46.5/ 10,000 across the CCG areas, but by 2017, the amount of geographical variation had decreased to be around 4-fold from 11.7/10,000 to 51.4/10,000. For knee replacement, variation in provision ranged from 4.9/10,000 to 61.2/10,000 in 2007 and 20.0/10,000 to 66.4/ 10,000 in 2017.

For hip replacement, CCGs with the highest concentration of deprived areas had lower overall provision rates and CCGs with very few deprived areas had higher provision rates. There was no clear pattern of provision inequalities between CCGs and deprivation concentration for knee replacement.

Figure 4.2 Directly standardised age-sex rates of joint replacement per 10,000 persons within Commissioning Care Groups.



Conclusion/Findings

We found that there were inequalities, which did not reduce over time, especially in the provision of hip replacement, by degree of social deprivation. Providers of healthcare need to take action to reduce this unwarranted variation in provision of surgery.

Survivorship of the dual-mobility construct in elective primary total hip replacement: a systematic review and meta-analysis including registry data

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Archives of Orthopaedic and Trauma Surgery (2023) 143:5927–5934

https://doi.org/10.1007/s00402-023-04803-3

Background

Dislocation is a common complication associated with total hip replacement (THR). Dual-mobility constructs (DMC-THR) may be used in high-risk patients and have design features that may reduce the risk of dislocation. We aimed to report overall pooled estimates of all-cause construct survival for elective primary DMC-THR. Secondary outcomes included unadjusted dislocation rate, revision for instability, infection and fracture.

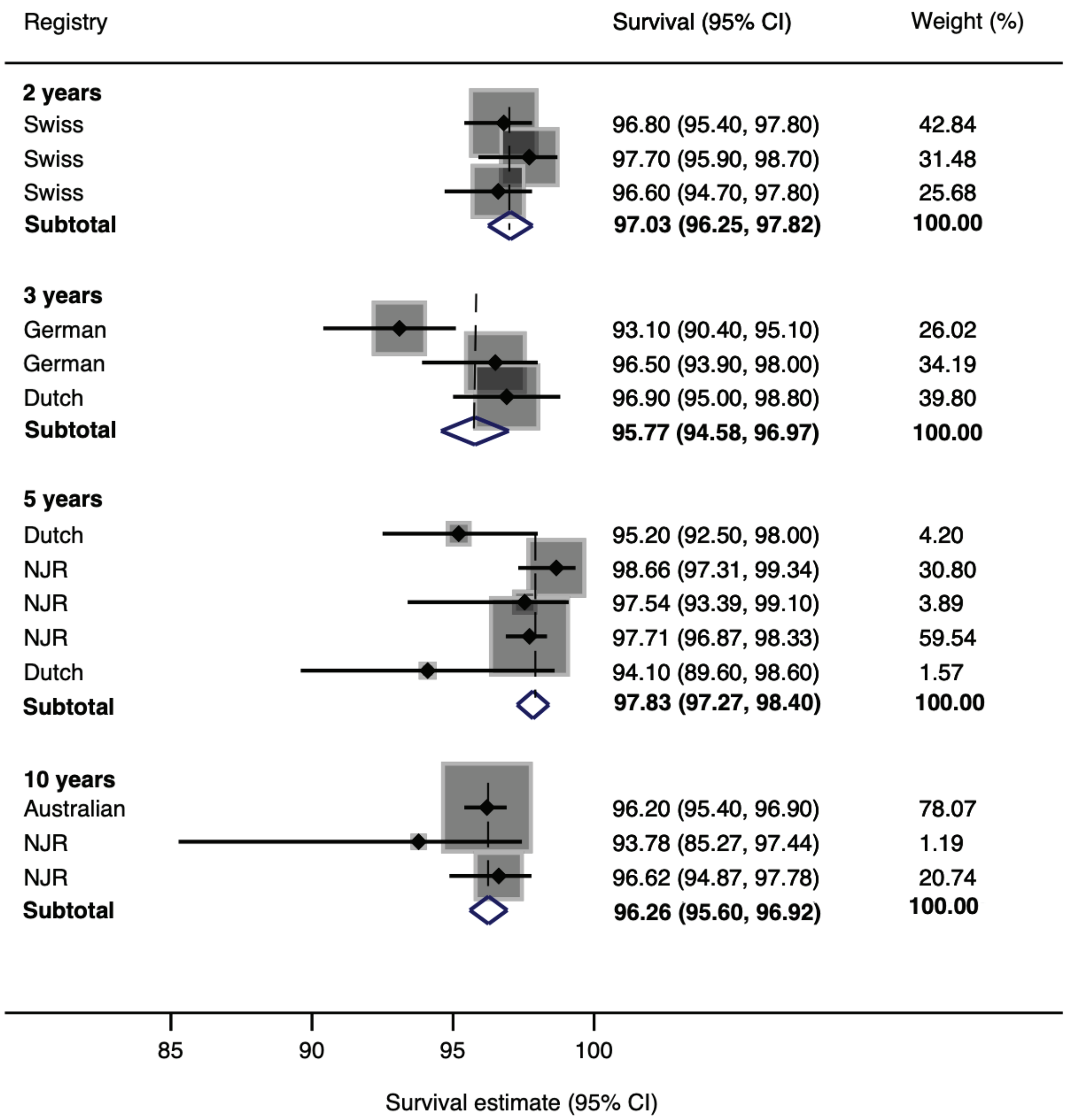
Methods

MEDLINE, EMBASE, Web of Science, Cochrane Library and National Joint Registry reports were systematically searched (CRD42020189664). Studies reporting revision (all-cause) survival estimates and confidence intervals by brand and construct including DMC bearings were included. A meta-analysis was performed weighting series by the standard error. Study quality was assessed using a non-summative scoring system.

Results

Thirty-seven studies reporting 39 case series were identified; nine (10,494 DMC-THR) were included. Fourteen series (23,020 DMC-THR) from five national registries were included. Pooled case series data for all-cause construct survival was 99.7% (95% CI 99.5–100) at 5 years, 95.7% (95% CI 94.9–96.5) at 10 years, 96.1% (95% CI 91.8–100) at 15 years and 77% (95% CI 74.4–82.0) at 20 years. Pooled joint registry data showed an all-cause construct survivorship of 97.8% (95% CI 97.3–98.4) at 5 years and 96.3% (95% CI 95.6–96.9) at 10 years (Figure 4.3). The overall rate of dislocation reported in the 39 case series (17,135 DMC-THR) was 1.1% with a mean patient age at the time of intervention to treat the dislocation of 66.5 years (weighted) at a mean follow-up of 7.3 years (2–25.3). The overall revision estimate for DMC-THR instability, infection and fracture was 0.8%, 0.4% and 0.3%, respectively.

Figure 4.3 Estimates of survival from registries at 2 years, 3 years, 5 years and 10 years.



Conclusion

At comparable time points, the survival estimate of DMC-THRs from case series was superior at 5 years but similar at 10 years when compared to registry series. The survival estimate of DMC-THRs at 20 years was from one case series that reported on first-generation DMC-THRs which may account for the apparent drop in survival after this time point.

The results in our study suggest that selective use of DMC-THR in primary THR may be justified to reduce the risk of dislocation. However, increased costs and other causes of failure must be taken into consideration with its use. In conclusion, pooled survival estimates of the DMC-THR in primary THR at 5 and 10 years reported in this study are acceptable according to the revision threshold set out by NICE.

Consultant revision hip arthroplasty volumes and new consultant volume trajectories in England, Wales, and Northern Ireland: a study using the National Joint Registry dataset

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https://doi.org/10.1302/0301-620X.105B10.BJJ-2023-0311.R1

Background

This study describes the variation in the annual volumes of revision hip replacement (RHR) undertaken by consultant surgeons nationally, and the rate of accrual of RHR and corresponding primary hip replacement (PHR) volume for new consultants entering practice.

Methods

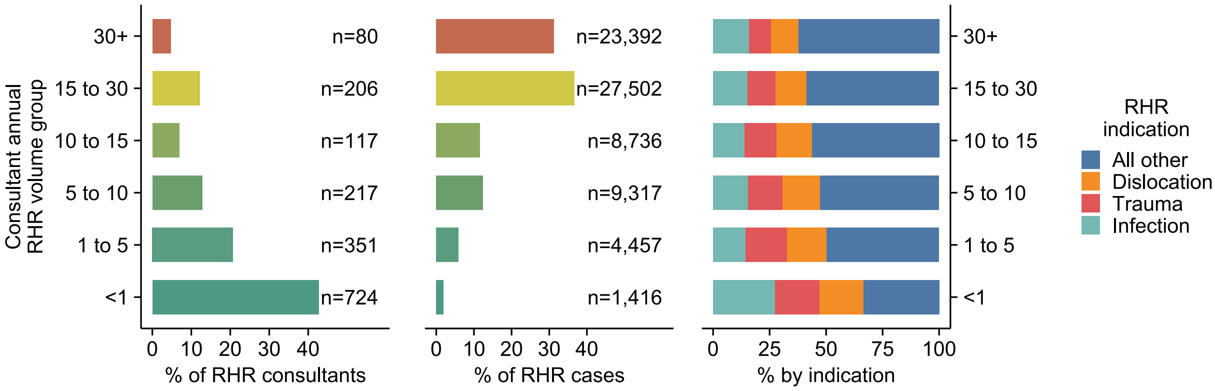
National Joint Registry (NJR) data for England, Wales, Northern Ireland and the Isle of Man were received for 84,816 RHR and 818,979 PHR recorded between April 2011 and December 2019. RHR data included first-time revisions of PHR, and any subsequent re-revisions recorded in public and private healthcare organisations. Trailing twelve-month (TTM) procedure volumes undertaken by the responsible consultant surgeon in the 12-months prior to every index procedure were determined. We identified a cohort of ‘new’ hip replacement consultants who commenced practice from 2012 and describe their rate of accrual of PHR and RHR experience.

Results

The median TTM consultant RHR volume, averaged across all cases, was 21 (IQR 23, range 0 to 181). Of 1,695 consultants submitting RHR cases within the study period, the top 20% of surgeons by TTM volume performed 74.2% of total RHR case volume (Figure 4.4). More than half of all consultants who had ever undertaken a RHR maintained a TTM volume of just one or fewer RHR, however, collectively contributed less than 3% of the total RHR case volume. Consultant PHR and RHR volumes were positively correlated. Lower-volume surgeons were more likely to undertake RHR for urgent indications (such as infection) as a proportion of their practice, and to do so on weekends and public holidays.

In 237 new consultants with follow-up available after at least 5 years in clinical practice, the median TTM volume attained were 30 PHR (IQR 3 to 68) and 0 RHR (IQR 0 to 4) with 67% having undertaken at least one RHR by this point. There were 83 new consultants who, at any time, achieved ≥15/year TTM RHR volume, on average it took them a median of 1.9 years (IQR 1.2 to 3.1) to first reach this threshold, however, it took 4 to 6 years before this volume was then consistently maintained by more than half of the consultants in this group.

Figure 4.4 Compound bar chart showing the relative proportion of consultants who, over the study period, recorded informative ranges of mean annual revision hip arthroplasty (RHA) volumes (left), the corresponding proportion of total RHA cases performed collectively by each RHA volume group (centre), and the proportion of these cases represented by each indication (right). The annotations indicate the total number of consultants included in each volume category (left), and the total number of RHA cases performed by consultants in each volume category (centre).



Conclusion

The majority of RHR were undertaken by higher-volume surgeons. There was considerable variation in RHR volumes by indication, day of the week and between consultants nationally. The rate of accrual of RHR experience by new consultants is low and has important implications for establishing an experienced RHR consultant workforce.

Survival of the Exeter V40 short revision (44/00/125) stem when used in primary total hip replacement (THR), an analysis of the National Joint Registry (NJR)

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*Jonathan Howell, Al-Amin Kassam, Matthew Wilson

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https://doi.org/10.1302/0301-620X.105B5.BJJ-2022-1124.R1

Background

The Exeter V40 femoral stem is the most implanted stem in the National Joint Registry (NJR) for primary total hip replacement (THR). In 2004, the 44/00/125 stem was released for use in “cement-in-cement” revision cases. It has however been used “off-label” as a primary stem when patient anatomy requires a smaller stem with a 44mm offset. We aimed to investigate survival of this implant in comparison to others in the range when used in primary THRs recorded in the NJR.

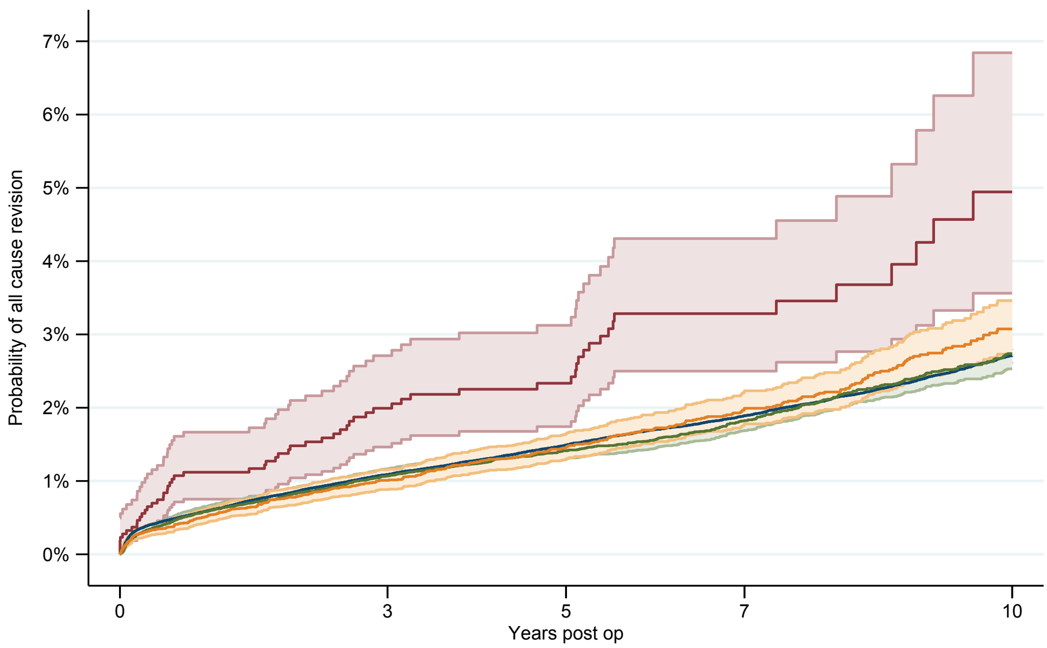
Methods

We analysed 328,737 primary THRs using the Exeter V40 stem comprising 34.3% of the 958,869 from the start of the NJR to December 2018. Our exposure was the stem, and the outcome was all-cause construct revision. We stratified analyses into four groups: constructs using the 44/00/125 (short cement-in-cement revision) stem, those using the 44/0/150 stem, those including a 35.5/125 stem and constructs using any other Exeter V40 stem. These groups were chosen to compare the short revision stem to those closest to it in geometry as well as all other stems and were defined in the pre-specified analysis plan. Crude analyses used Kaplan-Meier and adjusted analyses used Cox-proportional hazards modelling. Confounders were selected a priori and were age, gender, American Society of Anaesthesiologists (ASA) grade at the time of surgery as well as year of primary surgery and indication. Indication was categorised into osteoarthritis alone, trauma or other indications to mirror the NJR outlier analyses.

Results

In all 328,737 THRs using an Exeter V40 stem the overall all-cause construct revision estimate was 2.8% (95% CI 2.7,2.8). The 44/00/125 stem was implanted in 2,158 primary THRs, and the 10-year revision estimate was 4.9% (95%CI 3.6,6.8). This crude estimate falls within the NICE guideline 10-year revision estimate of 5%. Controlling for age, gender, year of operation, indication and ASA grade demonstrated an increased overall hazard of revision for constructs using the 44/00/125 stem compared to constructs using other Exeter V40 femoral stems (HR 1.8 (95% CI 1.4,2.3)).

Figure 4.5 Comparison of all-cause construct revision estimates by Exeter V40 stem type.



Number at risk	0	3	5	7	10
44/00/125	2158	1594	1113	611	215
44/0/150	49090	37276	27325	18321	8521
35.5/125	22496	16935	11846	7621	3329
Other Exeter V40 stems	254993	192443	140559	95614	48113

44/00/125 — 44/0/150 — 35.5/125 — Other Exeter V40 stems

Conclusions/Findings

Although the revision estimate is within the NICE 10-year benchmark, survivorship of constructs using the 44/00/125 stem appears to be lower than the rest of the range. Adjusted analyses will not account for "confounding by indication" e.g. patients with complex anatomy who may have a higher risk of revision. Surgeons and patients should be reassured but be aware of the observed increased revision estimate, and only use this stem when other implants are not suitable.

Patient-Relevant Outcomes Following First Revision Total Knee Arthroplasty, by Diagnosis: An Analysis of Implant Survivorship, Mortality, Serious Medical Complications, and Patient-Reported Outcome Measures Utilizing the National Joint Registry Data Set

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The Journal of Bone and Joint Surgery 105(20):p 1611-1621, October 18, 2023

https://doi.org/10.2106/JBJS.23.00251

Background

The purpose of this study was to investigate patient-relevant outcomes following first revision total knee arthroplasty (rTKA) performed for different indications.

Methods

Patients undergoing a first rTKA between 1/1/2009 and 30/06/2019 were included in this population-based cohort study. Revisions of partial knee replacements were excluded. Data from the National Joint Registry were linked to Hospital Episode Statistics Admitted Patient Care, NHS Patient-Reported Outcome Measures, and Civil Registrations of Death. The patient-relevant outcomes analysed were:

- Implant survivorship (up to 11 years post-operation);
- Mortality (up to 90 days post-operation);
- Serious medical complications (such as acute kidney injury, lower respiratory tract infection and myocardial infarction; up to 90 days post-operation);
- Patient-reported outcome measures (prior to rTKA and at 6 months post-operation measured using the Oxford Knee Score (OKS)).

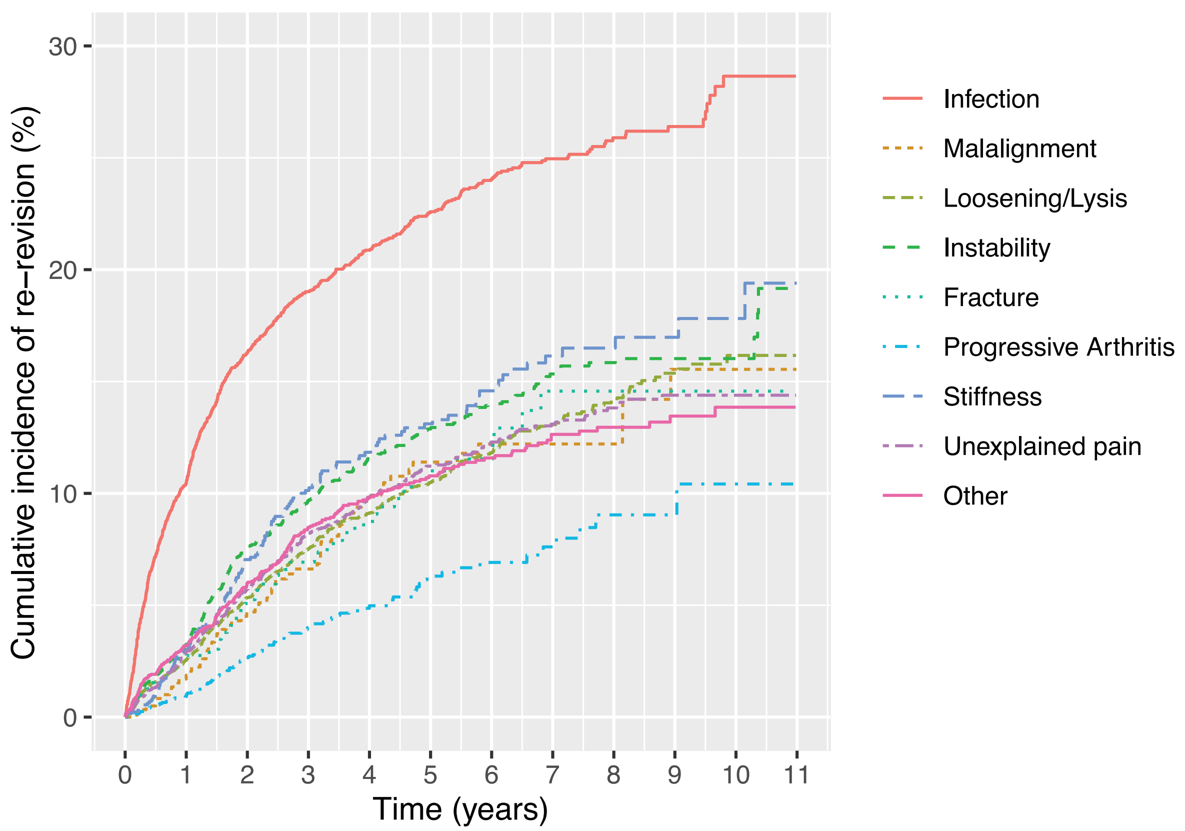
Patient demographics

24,540 first rTKAs were analyzed. The patient population was 54% female and 62% white, with a mean age at first rTKA of 69 years.

Implant survivorship

At 2 years post-operation, the cumulative incidence of re-revision surgery ranged from 2.7% (95% confidence interval (CI), 1.9% to 3.4%) following rTKA for progressive arthritis (i.e. secondary patella resurfacing) to 16.3% (95% CI, 15.2% to 17.4%) following rTKA for infection (Figure 4.6).

Figure 4.6 The cumulative incidence of re-revision TKA by indication for first-linked rTKA.



Mortality

The mortality rate at 90 days was highest following rTKA for fracture (3.6% (95% CI, 2.5% to 5.1%)) and for infection (1.8% (95% CI, 1.5% to 2.2%)) and <0.5% for other indications.

Serious medical complications

The rate of serious medical complications requiring hospital admission within 90 days was highest for patients treated for fracture (21.8% [95% CI, 17.9% to 26.3%]) or infection (12.5% (95% CI, 11.2% to 13.9%)) and lowest for those treated for progressive arthritis (4.3% (95% CI, 3.3% to 5.5%)).

PROMs

Patients who underwent rTKA for stiffness or unexplained pain had the poorest post-operative joint function (mean OKS, 24 and 25 points, respectively) and the lowest proportion of responders (48% and 55%, respectively). Patients who underwent rTKA for aseptic loosening and progressive arthritis had the best post-operative joint function (mean OKS, 30 and 31 points, respectively) and the highest proportion of responders (72% and 66%, respectively).

Conclusion

This study found large differences in patient-relevant outcomes among different indications for first rTKA. The rate of complications was highest following rTKA for fracture or infection. Although rTKA resulted in large improvements in joint function for most patients, those who underwent surgery for stiffness and unexplained pain had poorer outcomes.

Funder acknowledgement

This study was funded by an NIHR Doctoral Research Fellowship (NIHR301771). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

Resources

All statistical code for data preparation and analysis is available from GitHub: **https://github.com/shirazsabah/ox-njr-hes-ons-proms**.

An R Shiny application is available to interact with the study results: **https://shiraz-sabah.shinyapps.io/rKA-app/**.

An analysis of the effect of the COVID-19-induced joint replacement deficit in England, Wales, and Northern Ireland suggests recovery will be protracted

French JMR, Deere K, Jones T, Pegg DJ, Reed MR, Whitehouse MR, Sayers A

Bone Joint J 2024;106-B(8):834–841 2024;106-B(8):834–841

https://doi.org/10.1302/0301-620X.106B8.BJJ-2024-0036.R1

Background

The COVID-19 pandemic has disrupted the provision of arthroplasty services in England, Wales, and Northern Ireland. This study aimed to quantify the backlog, analyse national trends, and predict time to recovery.

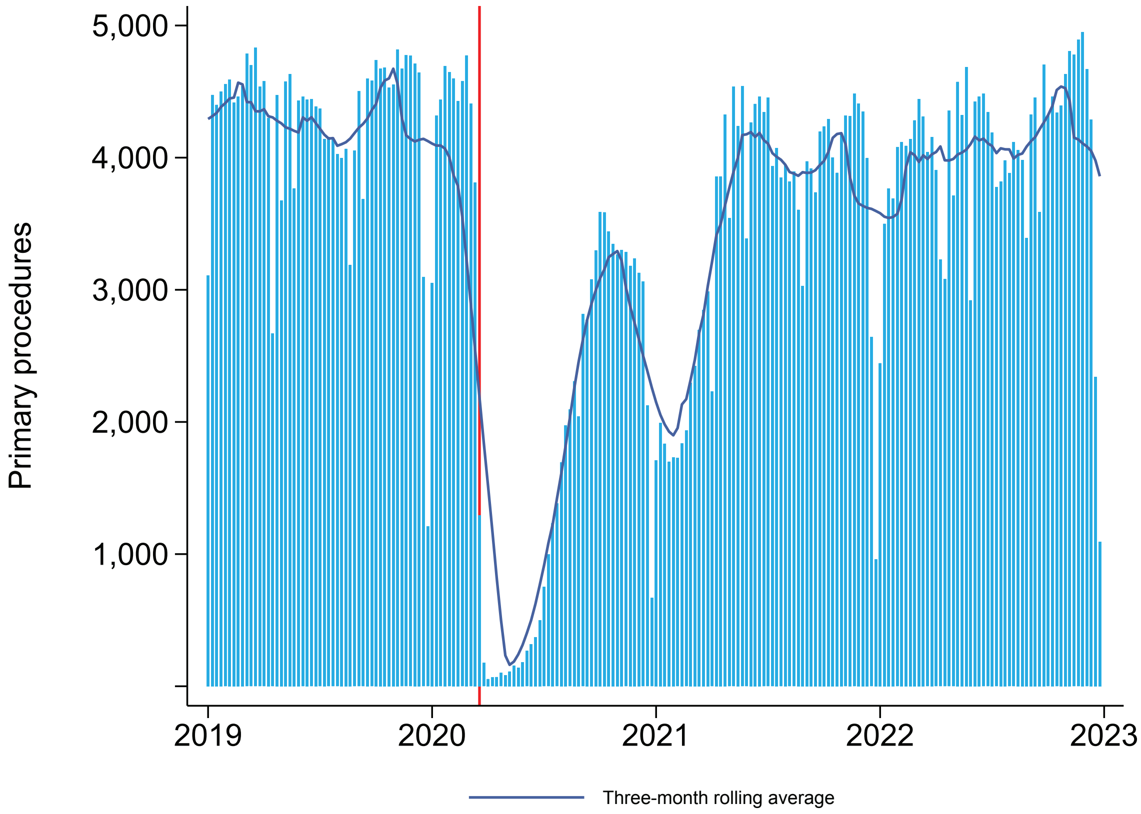
Methods

We performed an analysis of the NJR data for all independent and publicly funded hip, knee, shoulder, elbow, and ankle replacements in England, Wales, and Northern Ireland between January 2019 and December 2022 inclusive, totalling 729,642 operations. The deficit was calculated per year compared to a continuation of 2019 volume. Total deficit of cases between 2020 to 2022 was expressed as a percentage of 2019 volume. Sub-analyses were performed based on procedure type, country, and unit sector.

Results

Between January 2020 and December 2022, there was a deficit of 158,994 joint replacements. This is equivalent to over two-thirds of a year of normal expected operating activity (71.6%). There were 104,724 (-47.1%) fewer performed in 2020, 41,928 (-18.9%) fewer performed in 2021, and 12,342 (-5.6%) fewer performed in 2022, respectively, than in 2019. Independent sector procedures increased to make it the predominant arthroplasty provider (53% in 2022). NHS activity was 73.2% of 2019 levels, while independent activity increased to 126.8%. Wales (-136.3%) and Northern Ireland (-121.3%) recorded deficits of more than a year's worth of procedures, substantially more than England (-66.7%). It would take until 2031 to eliminate this deficit with an immediate expansion of capacity over 2019 levels by 10%.

Figure 4.7 Combined weekly number of primary hip, knee, shoulder, elbow and ankle procedures. The red line indicates the first national lockdown. The blue line represents the three-month rolling mean.



Conclusion

The arthroplasty deficit following the COVID-19 pandemic is now equivalent to over two-thirds of a year of normal operating activity, and continues to increase. Patients awaiting different types of arthroplasty, in each country, have been affected disproportionately. A rapid and significant expansion in services is required to address the deficit, and will still take many years to rectify.

Published papers 2023-2024

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