



Non-Arthroplasty Hip Registry

7th Annual Report 2022

Chairman’s Foreword

Presenting the annual report is an opportunity for contemplation, to examine the accomplishments over the last year and evaluate whether we have achieved outside our remit of data collection, analyses and reporting. The year 2022 bears additional emphasis as NAHR is celebrating its 10th Anniversary. The conception of NAHR was proposed and unanimously supported by the Membership of the BHS at the Annual General Meeting in Torquay (March 2011) and henceforth ventured at the 2012 Meeting in Manchester. The registry has made substantial progress in the last ten years and attained several of the objectives laid out and surpassed many milestones in the journey. The development of NAHR has, at all times, been a forthcoming process, and all BHS members are encouraged to feedback, contribute and comment on any aspect. Registries take time to mature and require sufficient data to be accumulated before a meaningful report can be presented. The first report was released in 2016, and subsequently, has been published annually. I hope the Membership have noticed how the reports have evolved with more robust analyses, supported by the larger dataset. I am particularly enthusiastic about introducing this year’s report because of the new developments driven over the last year.



Ten years of success

Amplitude provides monthly statements to track the data submission and collection process. The figure below is a snapshot of the most recent monthly update. It illustrates that the number of surgeons contributing to the registry has expanded to 110 in contrast to 33 documented in our first Annual report in 2016, and the total number of patients to more than 17,000 compared with around 2,500 in our first report.

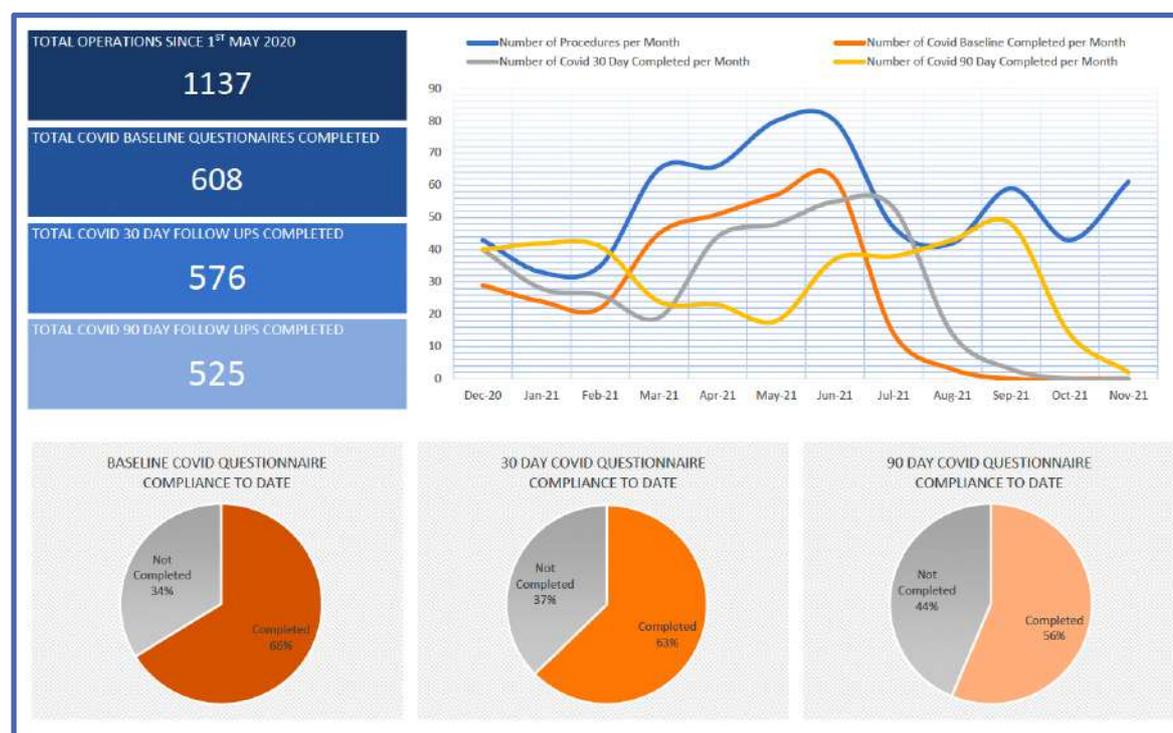
This would not have been possible without active engagement from hip preservation surgeons across the country. The power of large data has provided the scientific community with further information validating the efficacy of these procedures and indeed assisting with patient selection.



Covid surveillance report

I am proud to mention that NAHR were the only registry that had the agility to set up prospective surveillance of patients at the height of the pandemic in May 2020, to ensure that the outcome of these patients is not compromised when elective surgery resumed and to ascertain the efficacy of the safety networks established to support elective surgery. Patients were contacted preoperatively and at 30-day and 90-day intervals to confirm they hadn’t developed Covid-19 or any related complications. Figure below shows the overall compliance with the baseline data. The surveillance was stopped in July 2021, since a majority of the population was vaccinated by

then. During the study period, 4.2% of participants were re-admitted to the hospital (15.4% with hip-related problems), 2.3% of participants had developed COVID-19 at 90-day and 0.32% had developed a thromboembolic complication, post-operatively. 96-99% of the patients complied with the various guidelines, and no adverse outcomes were noted because of Covid-19, underlining the effectiveness of these measures. We have now published the results, and it is available for reading (<https://doi.org/10.1093/jhps/hnab082>)



Cumberlege Report

The Independent Medicines and Medical Devices Safety Review was announced in February 2018 and Baroness Cumberlege was tasked to investigate how the health system responds when patients and their families raise concerns about the safety of treatments. The recommendations from the Cumberlege Report were published in July 2020 (<https://www.immdsreview.org.uk/>). It provides an explicit indication that implant registries are essential and mandates that we should establish systems to record and monitor the performance of any device that has been implanted in a patient. It also instructs that additional information about outcomes must be collected and made available to suitably constructed registries to allow the relative benefits of different implants to be assessed over the appropriate follow-up period for the benefit and safety of patients. Fortunately, the NAHR has been collecting implant-related data for around three years and is therefore compliant with the submissions of this report. The minimal dataset form has been updated to capture all relevant information required to further comply with the Cumberlege report. However, it becomes the responsibility of individual clinicians and trusts to take advantage of the structure provided by NAHR and ensure this data is recorded and collected.

Research output

The NAHR data has facilitated publications by individual surgeons and practices in addition to larger population-based studies that are regularly presented at the BHS meetings annually. The direction is promising, and we have candidates potentially completing higher degrees, using the NAHR data. Although patient compliance has been identified as a problem in robust data analyses for Registry-based studies, the advantage of large numbers and surgeons with a varying range of expertise makes these studies more beneficial for the "general" orthopaedic

surgeon. If you are interested in looking at the NAHR dataset and have an attractive research proposal, please look at the website (<https://www.nahr.co.uk>). To be eligible, you'll need to be submitting data regularly to the NAHR.

Research grants

Registries can potentially be used to embed research trials and assist in outcome data collection. I am proud to announce that generous funding from Pfizer has enabled us to set up a study to assess the feasibility of improving data collection by providing support to local centres.

We have also been awarded a grant by Anika to run a trial in select centres to look at the efficacy of the AMIC (Autologous Matrix induced Chondrogenesis) procedure for chondral defects in the hips.

Research opportunities

NAHR is also delighted to announce two exciting research opportunities for enthusiastic trainees who wish to pursue a higher degree.

Post 1 - BHS/ORUK fellowship for a project based on the UK Non-Arthroplasty Hip Registry dataset. This is an opportunity for a full-time fellowship for two years.

Post 2 - Industry funded project on – 'The Use of AMIC for treatment of Chondral Defects in the Hip' - This will be a part-time fellowship for two years run as a multi-centre trial under the umbrella of the NAHR and NA-ATTC network (<https://www.theattcnetwork.co.uk/centres/northern-alliance>).

If you are keen on applying, please check details on the BHS website <https://britishhipsociety.com> or email nahr@britishhipsociety.com for further information.

Regional Representatives

Last year has seen an expansion in the NAHR team, with Paul Gaston (Edinburgh) joining the Board. Paul will lead a team of regional representatives across the UK who would promote the cause of NAHR, act as a local liaison for regional issues and facilitate surgeons in their region to contribute. A warm welcome goes to three high-volume surgeons who have joined as regional representatives - Colin Holton (Leeds), Sanjeev Madan (Sheffield) and Jonathan Hutt (London). We are hoping that this will go a long way in achieving our goal of increasing surgeon engagement and patient compliance. If you are interested to join the team, please send an expression of interest, and it will be given due consideration.

My sincere appreciations go to Richard Holleyman, a senior trainee in the North-East of England, for taking the ownership of helping us with our annual reports over the last few years.

None of these would be possible without the support of a fantastic team to help, in particular Callum McBryde for this report, and I am grateful to the whole of the NAHR board for their support and time to improve all aspects of NAHR. I would, additionally, like to extend my heartfelt gratitude to all the surgeons and patients contributing to NAHR and welcome feedback on facets we should be working on (ajay.malviya1@nhs.net).

User Group



Ajay Malviya (Chair)

Mr Ajay Malviya is a Consultant Orthopaedic Surgeon at Northumbria Healthcare NHS Foundation Trust. He trained in the Northern Deanery and has done specialist fellowships in hip preservation and joint replacement surgery in Cambridge, London and Switzerland. He specialises in hip arthroscopy for femoroacetabular impingement, trochanteric pain syndrome and periacetabular osteotomy for hip dysplasia using a minimally invasive approach. He deals with sports injuries of the hip and has published and presented widely on the results of hip arthroscopy in athletes and general population. He has completed a PhD on the role of hip arthroscopy in femoroacetabular impingement.

He was awarded the prestigious ABC (America-Britain-Canada) fellowship in 2016 by the British Orthopaedic Association that involved visits to various high-profile centres in USA and Canada learning about new systems and techniques. He is a very active researcher with more than 75 peer-reviewed publications in esteemed journals. He is in the British Orthopaedic Association Education and Careers committee and the national lead of the UK and Ireland orthopaedic in-training examination, which is an annual assessment of orthopaedic surgeons in training. He is an examiner for the Royal College of Surgeons (FRCS T&O).



Vikas Khanduja (Past Chair)

Mr. Vikas Khanduja is a Consultant Orthopaedic Surgeon & Research Lead (Elective) at Addenbrooke's - Cambridge University Hospital, specialising in hip and knee surgery and has a particular interest in arthroscopic surgery of the hip. He has been instrumental in setting up & developing the tertiary referral service for Young Adult Hip Surgery in Cambridge.

Complementing his clinical practice, his research interests centre around disease stratification of FAI using novel imaging techniques, better pre-operative planning tools using dynamic analysis and optimisation of arthroscopic management of FAI via precision surgery to improve outcomes. He has authored over 150 peer reviewed articles and three books.

Vikas is the recipient of the American and British Hip Society Travelling Fellowship in 2011, the Arnott Medal presented by the Royal College of

Surgeons of England in 2013, the Insall Fellowship presented by the American Knee Society and Insall Foundation in 2014 and the Hunterian Professorship by the RCS England in 2021.

Vikas sits on the Executive Committee of the British Hip Society as the President Elect, ESSKA and ISAKOS as the Chair of the Hip Arthroscopy Committee and the NIHR MSK NSG as the Orthopaedic Lead for the Eastern Region. He is the Past Chair of NAHR and the Education Academy in SICOT.

Tony Andrade



Mr Tony Andrade is a consultant Orthopaedic, Hip and Knee surgeon with a special interest in Young Adult Hip problems. He was appointed to the Royal Berkshire Hospital in 2002, where he established a hip arthroscopy and hip preservation service that quickly evolved into a tertiary referral centre. Since then he has been at the forefront of the evolving surgical techniques in arthroscopic and other types of hip preservation surgery, and this led to a visiting surgeon program where surgeons from the UK and across the world are able to join him to learn these surgical techniques. He established a Lower Limb Arthroplasty Fellowship in 2004, and a Hip Arthroscopy Fellowship in 2016. He sits on the UK Non-Arthroplasty Hip Registry (NAHR) user group for the British Hip Society and has been an active member of the International Society of Hip Arthroscopy (ISHA) since it was founded in 2008. He joined the board as the ISHA membership secretary in October 2012 and was the host chairman for the ISHA Annual Scientific Meeting in Cambridge in September 2015. He is the President of ISHA – The International Hip Preservation Society since October 2020.



Marcus Bankes

Mr Marcus Bankes is the senior surgeon on the Hip Unit at Guy's and St Thomas' Foundation NHS Trust and was appointed Consultant Orthopaedic Surgeon in 2002. His practice consists almost exclusively of the surgical treatment of young adult hip disorders, including arthroscopic and open hip preservation techniques and arthroplasty, particularly with ceramic-on-ceramic bearings. Recognised as an opinion leader in hip surgery, Marcus is a regular speaker at national meetings and ISHA (The Hip Preservation Society) as well as being a reviewer for a number of orthopaedic journals. He pioneered the use of the British Non-Arthroplasty Hip Registry (NAHR) and was the first Chair of its User Group. He remains on the User Group of the NAHR and has recently led on the Minimum Data Set 2.0 project. His interests outside work include film, TV, pop music, Apple electronic goods, and most sport, particularly cycling.



Tim Board

Professor Tim Board specialises in complex primary and revision hip surgery and hip arthroscopy at Wrightington Hospital, Lancashire. He trained in Manchester, gaining an MD for research into bone grafting and an MSc in Orthopaedic Engineering. Tim then undertook Fellowship training in Sydney, Hannover and Wrightington. Wrightington now performs over 1000 hip and 1000 knee replacements every year and is the tertiary orthopaedic unit in the North West.

Tim is the GM CLRN lead for orthopaedics and chairs the British Hip Society Research Committee. He also sits on the executive committee of the British Hip Society and the North West Surgical Trials Centre. He is a full time NHS consultant but has a strong academic interest in both basic science and clinical research having presented over 200 papers at National and International scientific meetings and published over 100 papers in scientific journals and written numerous book chapters. He is an Honorary Professor and has numerous research collaborations with the Universities of Manchester, Leeds and Salford.



Jon Conroy

Mr Conroy has been a Consultant at Harrogate District Foundation Trust since 2006. This has included 4 years as Clinical Director for Surgical Services. He was fellowship trained in Computer Navigation Surgery at the Prince Charles Hospital in Brisbane 2005-2006. Completing his MSc in Mechanical Engineering in 2006 he has since been involved in implant design for both Hip and Knee replacements.

The Royal College of Surgeons of England approved Harrogate Hip Fellowship has been led by Mr Conroy for almost 10 years. Specialty interests includes Robotic Hip and Knee Surgery performed at Leeds Nuffield Hospital since 2017 and a Regional Hip Arthroscopy service that has led to his position on the Non-Arthroplasty Hip Registry board.



Callum McBryde

Mr. Callum McBryde is a consultant hip surgeon at the Royal Orthopaedic Hospital in Birmingham appointed in 2011. He is proficient in all aspects of hip surgery both hip preservation surgery such as hip arthroscopy and pelvic osteotomy but also complex primary total hip replacement and hip resurfacing. He is considered an expert in the treatment of conditions such as developmental dysplasia, avascular necrosis, femoro-acetabular impingement and slipped upper femoral epiphysis. He completed his undergraduate training at The University of Manchester, completed his surgical and orthopaedic training in Birmingham whilst also completing a Doctor of Medicine higher degree at The University of Birmingham. He then completed a number of international specialist hip fellowships in Australia and Switzerland. He has won a number of prizes and accolades for his research and work including the McKee prize, the European Fellowship and the McMinn scholarship from the British Hip Society.

He has been instrumental in the development of the multidisciplinary young adult hip unit in Birmingham which is a recognised centre of excellence and national referral centre. He is recognised as an opinion leader with a large number of peer reviewed publications and is regularly invited both nationally and internationally to share his knowledge and experience to other surgeons.



Paul Gaston

After graduating from University of Edinburgh Medical School in 1993, Paul undertook surgical training in Edinburgh, followed by Orthopaedic training in Oxford and Edinburgh. He completed his training with Specialist Fellowships in Brisbane, Australia and Edinburgh, and was then appointed as a Consultant in the Arthroplasty Service at the Royal Infirmary of Edinburgh in 2004. His practice mainly involves primary hip and knee joint replacement and revision hip joint replacement. Since becoming a consultant he has developed an interest in Young Adult Hip Disorders, mainly Femoro-Acetabular Impingement (FAIS). He has been undertaking Hip Arthroscopy since 2008. Originally from Northern Ireland, he has lived in Edinburgh for 30 years and has three daughters. His interests include rugby and cycling to keep fit.



Richard Holleyman

Richard completed his undergraduate education in Newcastle (MBBS) and London (MSc) and has been a Trauma and Orthopaedic specialist registrar in the Northern Deanery since 2016. He has a passion for health research, in particular, epidemiology and data science and has worked extensively with large national datasets and with the NAHR since 2017.

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Introduction

The NAHR Board are pleased to present the 7th Annual Report of the Non-Arthroplasty Hip Registry (NAHR). Since formal data entry commenced, the NAHR has collected extensive data with more than 17,000 pathways entered. This is the 10th year of the NAHR and it is clear that it has been an undoubted success with both national and international recognition. All those involved should be congratulated in their dedication to a greater understanding of hip preservation surgery. Most importantly we must thank the patients for agreeing to share the details of their operation and the outcome of it for the benefit of future patients.

The NAHR user group have agreed that since 2020 data presented in this report would only include pathways for patients that have full details of the operative procedure recorded. There have been an increasing number of pathways on the NAHR database where non-operative management has been adopted. The focus of this report is on pathways where an operation has been performed and complete data is available. In future it may be possible for the NAHR also to report on the outcome of non-operative interventions. As of January 2022, there are 11,200 pathways that have complete data to allow analysis on the operation and they have been used for the analysis in this report. This represents the largest dataset on this type of surgery in the world and is invaluable to our understanding of the outcome of hip preservation surgery.

The impact of the COVID-19 pandemic on the provision of elective healthcare has been felt across the world. The NAHR has seen approximately a half in the number of completed pathways in both 2020 and 2021 in comparison to the years prior to the pandemic (from approximately 1600 to 800 per year). The concern for the NAHR is the impact on patients for whom delay in

treatment may lead to a worse outcome or for whom their disease may have progressed to an extent that hip preservation operations may no longer be appropriate for them. It is anticipated that as healthcare recovers following the pandemic that numbers will increase to pre-pandemic levels. What is not known is how long it will be before this will occur. They may be other factors that have also impacted on the submission of pathways to the NAHR including the re-allocation of resources previously used to support data completion and submission.

There has been a reduction in the number of surgeons submitting data to the NAHR in the last 2 years following a period of steady growth in the number of surgeons active with the NAHR. It is difficult to know whether this represents the effects of the pandemic or is because of other factors such as the concentration of hip preservation type procedures to a smaller number of surgeons. Unlike the NJR submission of data to the NAHR remains voluntary and there is currently a significant reliance on the enthusiasm of those submitting data to do so. The NAHR user group committee recognise there can be many hurdles to submit data and wish to provide as much support as is possible for those surgeons either not contributing data or those only partly submitting their data. The NAHR is arguably the most advanced, largest and most successful of registries of its type but it is recognised that not all procedures that could be recorded are being entered. Expressions of interest in becoming a regional representative for the NAHR have been received and a number across the UK are now acting in this role. It is hoped that these representatives will promote the NAHR on a more local basis and thus ensure that as many procedures that are performed in the UK are entered onto the registry.

The output from the NAHR dataset demonstrates its value. There is an ever-increasing number of academic publications and presentations in highly regarded

journals and at international and national meetings. The NAHR user group is keen to hear from those interested in asking questions of the dataset to contact the user group regarding their research question.

Current work is underway by the Board to continually develop and expand the NAHR to improve the information that it produces. In particular information on Capsular management, thromboprophylaxis, heterotopic ossification medication and adhesion prevention are going to be recorded in the MDS. It is also exciting to announce that we will be recording data on articular cartilage repair techniques and intra-articular adjuncts reflecting the ever-developing field of hip preservation. We are ready to launch MDS 3.0 in 2022 and will report on the data over the coming years.

The User Group are, once again, indebted to Mr Richard Holleyman, an Orthopaedic StR from the North-East, for his help in preparing the statistical analysis and graphical representations in this report.

Aim of the NAHR

The NAHR is open to data submission by members and non-members of the BHS. The aim is to benefit both patients and surgeons by collecting longitudinal data on patients undergoing an elective surgical procedure for hip pathology excluding patients who are having an arthroplasty or who have had an arthroplasty operation. Relevant operations include: arthroscopic and open surgery for FAI; PAO; reverse PAO for retroversion, femoral osteotomy; surgery for slipped capital femoral epiphysis (SCFE); surgery for developmental dysplasia of the hip (DDH); and other treatments for extra-articular hip problems such as trochanteric bursitis, abductor tears and external snapping of the hip. In fact, any operation other than arthroplasty and acute fracture treatment is suitable for being recorded on the NAHR. It is quite likely that private institutions as well as NHS Trusts will soon require proof that outcome data is being collected. Collection of outcome data and reflection on the results is also considered an important component of the appraisal and revalidation cycle.

The NAHR data will be used to bring direct benefits to patients by:

- *improving patient awareness of the outcomes of operations on the hip, because results are available in the public domain*
- *comparing the success rates of different operations and surgical approaches to the hip*
- *helping to identify whether they would benefit from a specific surgical technique*
- *identifying which surgical procedure is most likely to bring benefit for a specific diagnosis*

The NAHR data will bring additional long-term benefits to surgeons and hospitals by:

- *providing feedback to orthopaedic surgeons to define which patients will benefit from surgery and what details of the operative procedure will define a good result; validated outcome data will be available to the surgeon*
- *identifying which patients are likely to benefit from a particular procedure*
- *promoting open publication of outcomes following surgery*
- *comparison of patient reported outcomes for an individual surgeon with the national average and this document forms a part of the appraisal process*
- *potentially linking to Hospital Episode Statistics (HES) and NJR data to enable follow-up into arthroplasty, and accurately follow the lifespan of a patient's hip joint*

History of the NAHR

The creation of a NAHR was initiated by Professor John Timperley, Consultant Orthopaedic Surgeon at the Princess Elizabeth Orthopaedic Centre in Exeter and former President of the BHS. He identified the rise in hip preservation surgery but noted, in contrast to joint replacement surgery, a lack of outcomes data outside of small scale published series. Given his interest and expertise in joint replacement registries from around the world, setting up a registry for non-hip replacement hip surgery seemed a logical thing to do. The motion to set up such a registry was unanimously supported by the Membership of the BHS at the Annual General Meeting in Torquay in March 2011 and the membership agreed that the BHS should fund the registry. The Registry went live in March at the 2012 BHS Annual Meeting in Manchester and was formally launched at the BOA Annual Congress in September 2012. NICE (National Institute for Clinical Excellence as it was then known) Interventional Procedure Guidance on Arthroscopic (IPG408) and Open (IPG403) Femoroacetabular Surgery for Hip Impingement Syndrome, published in September and July 2011 respectively, noted that clinicians should submit details to this national registry.

The User Group, initially chaired by Professor John Timperley and then Mr Marcus Bankes, developed during 2012 and 2013 and consisted of Mr Tony Andrade, Professor Tim Board, Professor Max Fehily, Mr Paul Gaston, and Mr Matt Wilson, with assistance from Mr Johan Witt and Professor Damian Griffin. A major streamlining exercise was undertaken in 2013 to improve surgeon compliance following meetings of interested parties at the BHS in Bristol in March and of the original NAHR User group at the BOA Congress in October. Whilst many arthroscopic and hip preservation

surgeons were enthusiastic about the development of the NAHR in principle, many already had their own databases and were unsurprisingly unwilling to duplicate data entry. It was therefore decided that use of the data collection infrastructure which already existed for the NJR in every hospital in England and Wales was essential for success to minimise surgeon involvement in data collection and capture cases.

In addition, a Minimum Data Set (MDS Version 1.0) was defined which included a pre-operative specific and general health measures, namely the iHOT-12 (International hip outcome tool - 12 question version) and the EQ-5D-5L (five-dimensional measure of health-related quality of life, five level questionnaire developed by the EuroQol Group) respectively. Standardised paper data collection forms were redesigned to have a similar appearance to NJR forms to help with this process. Whilst it may seem outdated to develop a paper-based system, availability of convenient hardware, particularly in clinic and theatre environments, varies immensely between hospitals. Post-operative outcome data is electronic however, and patients are currently invited to complete outcome questionnaires at six, twelve and twenty-four months after their operation with an email, linking them directly to the online forms.

Growth of the Registry continued and the MDS Version 1.1 was launched in February 2015 to include data fields for the extent of pre-existing articular cartilage damage on both sides of the joint. Whilst there was little change in the way data was collected, there was increasing interest in non-joint replacement registries from other specialties from the BOA, led at that time by the then President Colin Howie. This led to the formation of an umbrella organisation for these registries called TORUS in 2016 of which the NAHR was an original member. The formation of TORUS provided a shared operating framework that allowed consistency of practice and a central support function (to deal with issues such as data governance, contracting and managing registry

suppliers, and resolving day-to-day issues) to reduce the burden on individual registries and introducing efficiencies. The importance of the NAHR being part of TORUS has been particularly highlighted recently in view of the introduction of GDPR. Full release of MDS Version 2.0 along with the updated GDPR complaint consent form was therefore launched and has been in use. Elements of the enhanced dataset included: labral grafting and details of the graft length and material; number and type of labral anchors used, details of extra-articular procedures and there has been a further refinement of pelvic osteotomy types recorded.

The form has undergone further developments and the MDS Version 3.0 is now available for use and will collect more information on capsular management, thromboprophylaxis, heterotopic ossification medication and adhesion prevention. It will also be recording data on articular cartilage repair techniques and intra-articular adjuncts reflecting the ever-developing field of hip preservation. Clinicians can use the NAHR to collect and display comprehensive outcome data on all their patients using various outcome measures. The information sheet, consent form and minimum dataset version 3.0, which can be downloaded [here](#), are designed to reflect the familiar format of the NJR forms. They contain a basic mandatory dataset as well as an enhanced dataset for surgeons to record additional surgical findings.

The board and the leadership have altered over time and currently consists of seven surgeons from across the country who dedicate a significant proportion of their time to the Registry. They lead by example, not just by contributing patients but also by ensuring updates, improving the quality of data analyses, working on the surgeon and patient compliance, maintaining finances, website development and annual reports. Marcus Bankes passed on the baton to Vikas Khanduja when he was elected as Chairman by the BHS membership in 2017. Whilst Marcus has been the pillar of NAHR and

established a strong foundation for the NAHR, Vikas has helped evolve NAHR further. He has made significant contributions, bringing international repute to NAHR with ongoing research and expanding the educational profile of NAHR and indeed the BHS. At the BHS AGM in March 2021, a restructuring of the board and expansion of the NAHR team was approved. It includes the formation of a group of trustees formed by the ex-Chairpersons of NAHR; the appointment of a Vice-Chairman and allocating dedicated portfolios to the current team ranging from the treasurer, research lead, compliance lead, editorial secretary and website lead. It was also decided to extend the team by appointing regional representatives (10 in total), to improve local referral pathways and enhance surgeon engagement. It is an exciting opportunity for all surgeons to be closely involved with the NAHR. Colin Holton (Leeds), Sanjeev Madan (Sheffield) and Jonathan Hutt (London) have already joined the group, and we are looking forward to other applications.

At each Annual General Meeting of the BHS, an update of the NAHR is presented and a workshop arranged to encourage surgeons to join and submit data to the NAHR. This is the 10-year anniversary of the NAHR and its success will be celebrated at this year BHS AGM. This, the 7th Annual Report, provides a summary of the data available and can be used to guide further development of the registry.

Overview of the data

Pathways per year

A pathway on the NAHR is created when a patient's details are entered for a non-arthroplasty procedure. The patient should have already completed their relevant pre-operative scores. The demographic data and in particular unique identifiers such as the NHS number allow for different treatments, potentially in different centres and by different surgeons, that follow the 'journey' of that hip through one or multiple hip preservation operations. The inclusion of an NHS number potentially allows linkage of the NAHR pathway with other registries such as the NJR. Therefore, it is highly desirable that this number is included for all patients.

There was a steady increase in the number of pathways until 2016 which plateaued from 2016 to 2019 with approximately 1600 new pathways per year during that period. For 2020 and 2021 there clearly has been the impact of the pandemic with approximately 800 new pathways during each of the last 2 years. Since 2020, our methodology has been updated such that pathways missing operative data have been excluded (from all years) which has led to a reduction in the number of pathways that are reported on within this report in comparison to historic reports.

Between January 2012 and December 2021, a total of 11,192 pathways have been entered in the registry where operative data was also recorded. There have been approximately half the number of pathways in 2021 (n= 774) in comparison to pre-pandemic levels.

Figure 1

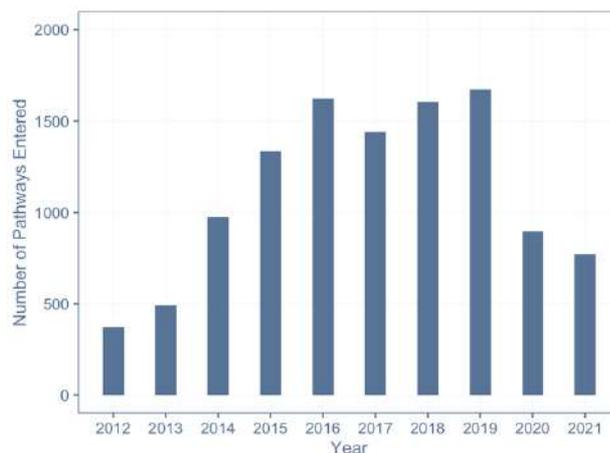


Figure 1 Pathways uploaded per year

Figure 2 shows the number of pathways by surgical approach, open or arthroscopic. Arthroscopy account for more than two thirds of recorded pathways.

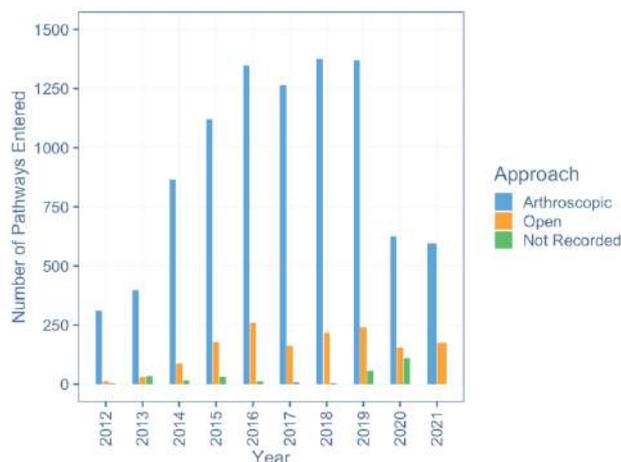


Figure 2 Pathways per year by surgical approach

Number of surgeons using NAHR

After an initial increase in the number of surgeons entering data onto the NAHR to 2018 there has been drop over the last 4 years. Figure 3 shows the number of unique surgeons entering pathways per year since 2012. This has decreased from 65 in 2018 to 59 in 2019 and then to 46 in 2021. The majority of surgeries were performed by a small number of high-volume surgeons. Explanations for this reduction include that surgeons with a low number of non-arthroplasty hip procedures have either stopped their practice or now no longer contribute to the NAHR. Whereas the NJR has a good mechanism for understanding the denominator of surgeons performing joint

arthroplasty, there is no similar surrogate in hip preservation surgery and therefore accurately calculating what percentage of surgeons are uploading data is difficult.

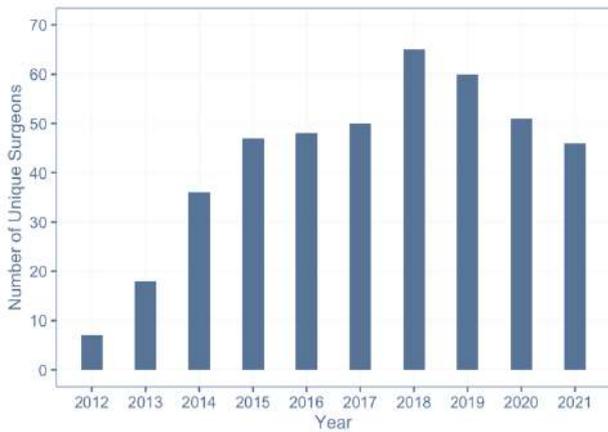


Figure 3 Surgeons contributing data to the NAHR

Surgeon procedures

Forty surgeons have submitted more than 50 cases, 27 more than 100, 15 have more than 200 and five more than 500 (Figure 4). One particularly high-volume surgeon and dedicated user of the registry has personally uploaded over 16.7% of all pathways on the registry. This contrast demonstrates the difference in attitudes of surgeons with some seeing the potential benefits to their own practices and patients in the follow-up of outcome data.

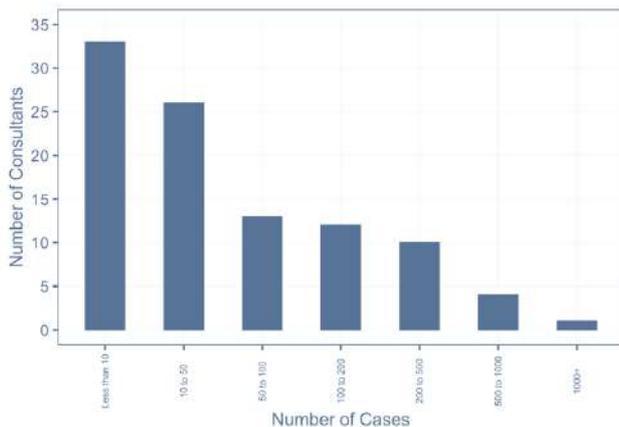


Figure 4 Number of cases per surgeon

Funding source for surgery

The funding by surgical approach is shown in Figure 5. This demonstrates that the ratio between NHS funded

procedures and independently funded procedures has changed over the last 3 years with a proportionate increase in independently funded. It is not immediately apparent as to the explanation for this but it is highly likely that the data from the independent sector was not completely recorded by the Registry or that data upload was not as accurate in the early years of the registry. It is also possible that there has been a disproportionate effect on the NHS provision of elective orthopaedic care as a result of the pandemic. It will be interesting to see if there is a recovery in these numbers over the coming years.

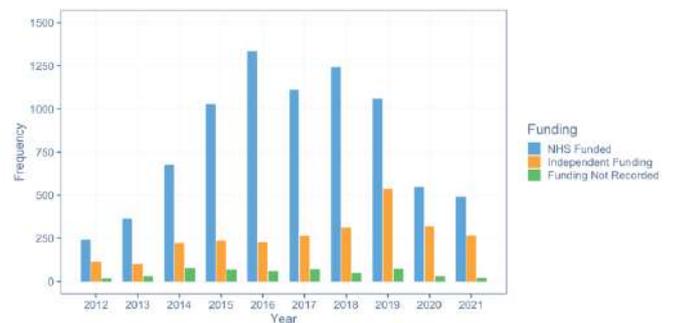


Figure 5 Funding source for procedure

comparison to prior reports due to exclusion of incomplete operative data. See Figure 7.

Demographics

Patients by age and approach

The analysis of patient age in Figure 6 demonstrates that the vast majority of arthroscopic procedures are performed on patients under the age of 55 and for open procedures under 50 years of age.

It can be seen that there are very few procedures recorded on the NAHR in patients under the age of 16. This may be due to those surgeons contributing to the NAHR being surgeons without a paediatric practice and paediatric orthopaedic surgeons performing hip preservation surgery being unaware or unsupported in data submission to the NAHR. Collaboration between the NAHR and paediatric orthopaedic surgeons remains an area of future work for the Registry.

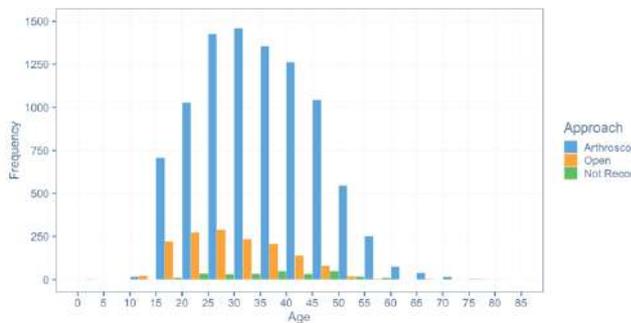


Figure 6 Patients' age distribution by approach

Gender distribution by surgical approach

Overall, the majority of patients with data entered on the NAHR are female (63.6%). Of those patients undergoing hip arthroscopy, 60% were female compared to 85% of patients undergoing open procedures, suggestive of the increased diagnosis of hip dysplasia in females, more commonly treated with open surgery than arthroscopic management. The number of procedures that have no approach specified has been dramatically reduced in

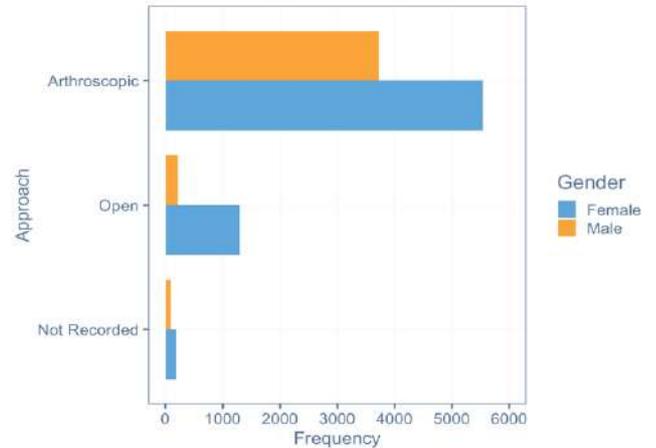


Figure 7 Gender distribution 2012-2020

Body mass index (BMI) by operation and gender

Body Mass Index (BMI) was recorded in 56.8% (N=5,865) of cases but this in 2021 66.3% of cases had their BMI recorded. Obvious outliers (BMI > 70 and <10) were removed as it is anticipated these were errors in data entry, See Figure 8.

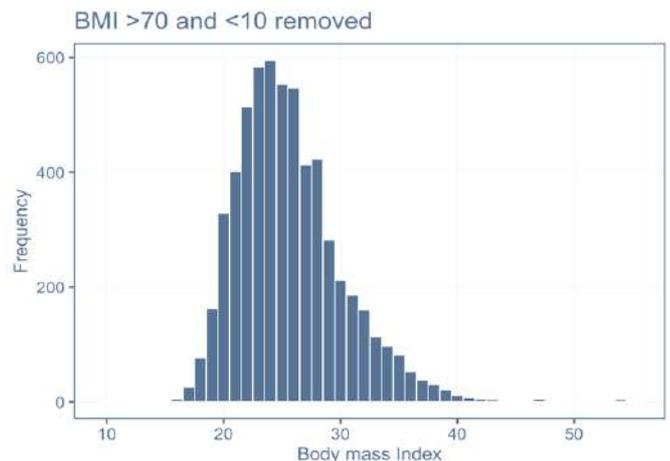


Figure 8 BMI distribution

for private patients is available on the NAHR pages of the BHS website.

Compliance

Follow-up and data linkage

In 2021 a high proportion of patients (96.5%) recorded their email address continuing the trend from 2015 onwards. Part of the proposed benefit of the NAHR is the automated email follow-up at six, 12 and 24 months and therefore inclusion of an email is essential. However, as shown in Section 7, there is a poor collection of follow-up scores.

In addition to this, a mobile phone number is requested to allow follow-up of patient via phone should emails remain unanswered. The proportion of patients who provide their mobile phone number has remained fairly static over the duration of the registry. This is shown in Figure 9.

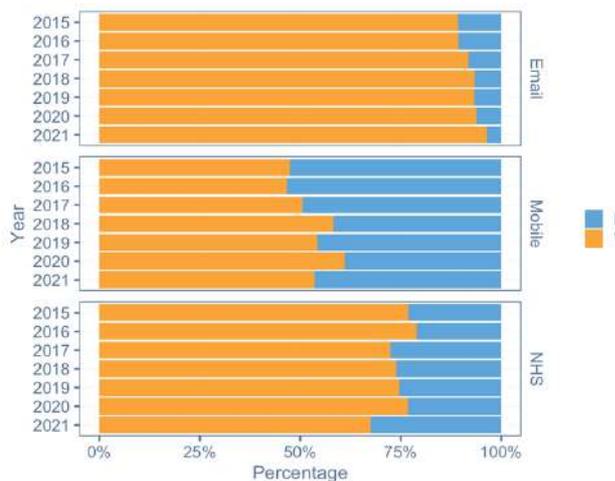


Figure 9 Patient contact details and NHS unique identifier

The recording of an NHS number has remained fairly static over the duration of registry. Obtaining an NHS number in the private sector is possible but time-consuming and this may be a barrier to increasing this figure. Clear advice on how to obtain the NHS number

Consent rates

A record that the patient has given consent to have their data recorded by the NAHR has become a mandatory field. In 2021 all patients gave consent with one patient subsequently withdrawing consent.(Figure 10)

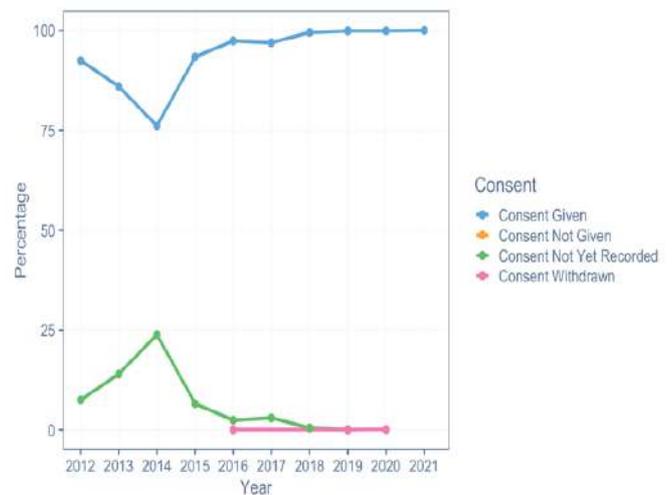


Figure 10 Consent for data collection

Collection of mandatory scores and statistics

Overview of scores

The NAHR offers clinicians the opportunity to use various hip scores for patient assessment pre- and post-operatively. The NAHR User Group, following review of evidence defined that only two hip scores would be mandatory for collection in the minimum dataset, with others being made available depending on surgeon preference. The mandatory scores are the EQ-5D-5L (including the EQ-5D-VAS) and the iHOT-12. Scores are recorded pre-operatively then routinely, via email or in person, at six months, one and two years post-operatively. Surgeons can select to use other, additional PROM scores if desired.

EQ-5D index

The EQ-5D index score is based on five domains (mobility, self-care, usual activities, pain/discomfort and anxiety/depression) each with five options (no problems, slight problems, moderate problems, severe problems and extreme problems).

EQ VAS

The EQ Visual Analogue score records the respondent's self-rated health on a 20cm vertical scale where endpoints are labelled 'Best imaginable health state' (100 points) and 'Worst imaginable health state' (0 points).

iHOT-12

This is a short form equivalent of the iHOT-33 which was developed by the Multicentre Arthroscopy of the Hip Outcomes Research Network (MAHORN). The iHOT-33 was

developed for active patients (18-60 years; > Tegner 4) presenting with a variety of hip conditions. The shorter 12 question patient-derived, patient-reported outcome measure demonstrates excellent agreement with the long version with a minimum clinically important difference of 6.1 points. This report only includes the findings related to these mandatory scores. The scores are recorded as complete or incomplete and results are shown in Figures 11-12.

Statistical note

Statistical analysis was performed by Richard Holleyman using STATA version 15 (StataCorp. 2017. *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LLC). The statistical approach was agreed previously in consultation with Keith Gray, PhD (Statistician, R&D Department, Northumbria Healthcare NHS Foundation Trust). A p-value of 0.05 was deemed statistically significant. It is acknowledged that p-value adjustment would be appropriate when making multiple comparison within each analysis/pathology cohort and future reports will aim to incorporate this.

Rates of score collection

EQ-5D index

Figure 11 shows the rate of collection of the Index scores at the various time intervals. In 2020 46.1% (n=414) patients completed a 6-month EQ-5D and in 2021 this increased to 55.8% (n=258). One of the greatest challenges that face any registry that is measuring PROMs data is patient compliance in completing the forms during follow-up. The use of e-mail and the updating of the NAHR are measures that are being employed to improve this. Further work by the user group in collaboration with Amplitude are looking at a variety of other measures to increase completion and this a major focus for the NAHR over the next year.



Figure 11 EQ-5D index score completion.

iHOT-12

The iHOT-12 score was presented to the International Society for Hip Arthroscopy (ISHA) in 2011. Since 2014, this score has been collected as part of the same scoring sheet as the EQ-5D and the collection rates since are very similar to those for EQ-5D. (Figure 12)

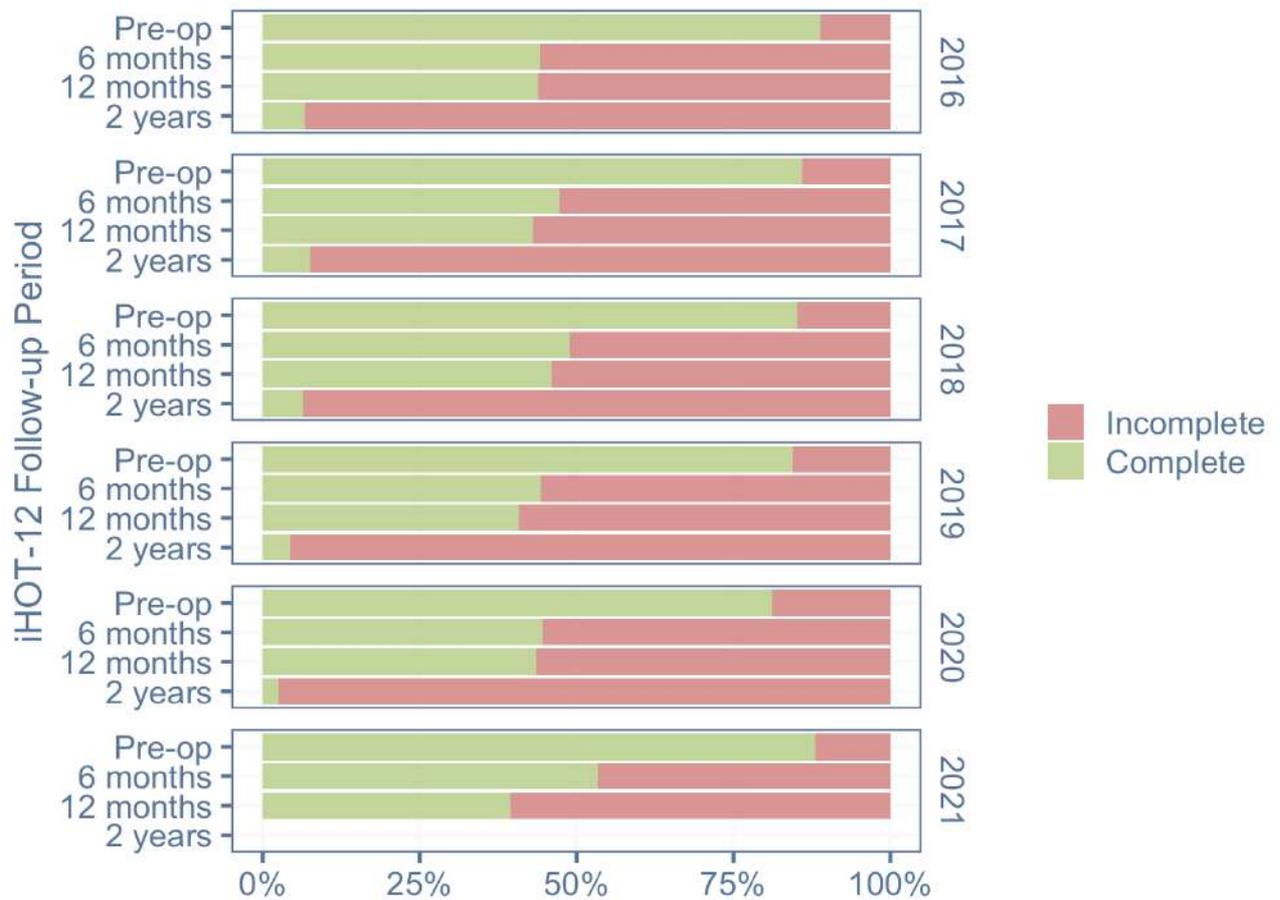


Figure 12 iHOT-12 Score completion

Surgical procedures

Overview

Figure 13 and Figure 15 show the different types of surgical procedures recorded in the NAHR, including core acetabular and femoral procedures, additional surgical procedures and the different combinations of femoral and acetabular osteotomies. (Note that the data presented in this section reports the frequency of procedures recorded and that more than one or any combination of surgical procedures may be performed in a single case).

Acetabular procedures

Labral repair (26.2% of all acetabular procedures – n.b. multiple acetabular procedures may be performed in a single patient) is the most commonly performed acetabular procedure. The increasing use of labral repair rather than labral debridement is likely to be the result of a number of factors but include the increasing evidence with the literature that labral repair appears to offer better outcomes than labral debridement where it is possible to perform labral repair. Regarding all acetabular procedures performed by an arthroscopic approach, labral repair comprises 39.2% of procedures as compared with labral debridement, which accounts for 34.9% of acetabular procedures. There has been a move from acetabular labral debridement towards acetabular labral repair over the duration of the registry, Figure 14. Labral reconstruction remains a relatively rarely performed procedure in the UK and it will be interesting to see whether this increases over the coming years.

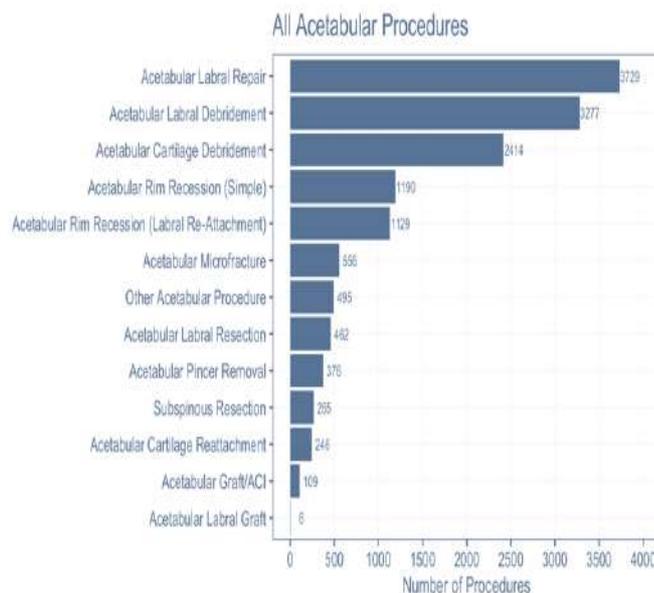


Figure 13 Acetabular procedures performed

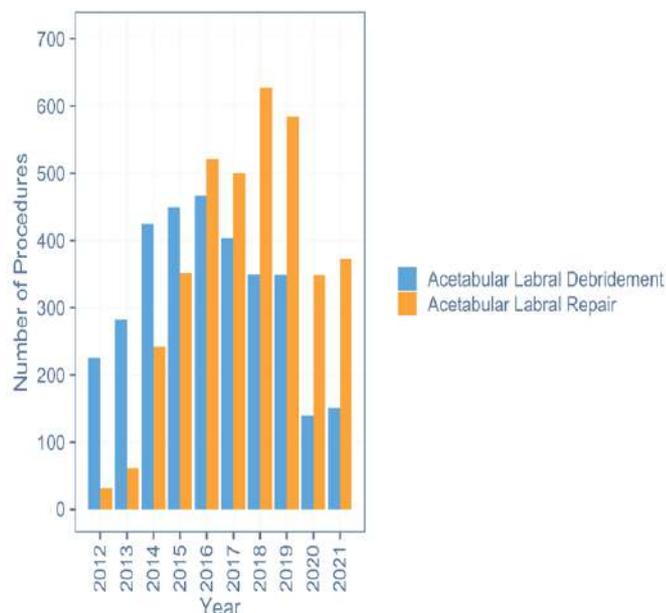


Figure 14 Arthroscopic labral debridement and labral repair per year

Femoral procedures

Figure 15 shows the range of femoral procedures recorded on the NAHR. Cam removal is the commonest femoral procedure accounting for 90% of all femoral procedures performed. Cam removal was the most common femoral procedures recorded via arthroscopy (n=6372 of 7041, 90.5%). In contrast to the acetabular side, a much smaller number of femoral cartilage procedures were recorded, including

debridement, microfracture, cartilage grafting and core decompression.

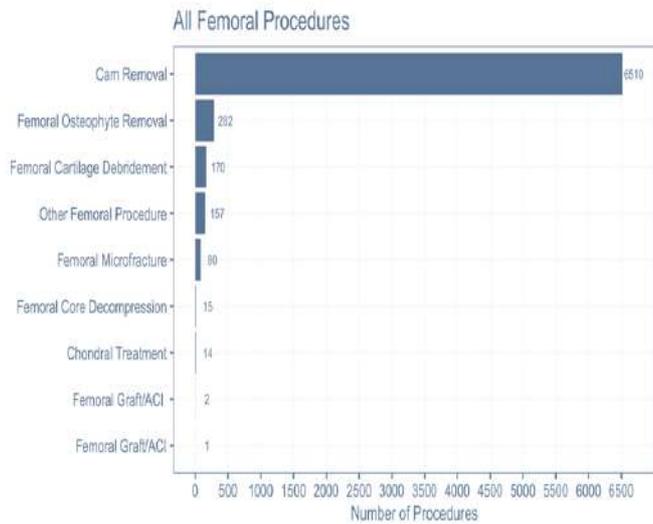


Figure 15 Femoral head/neck procedures performed

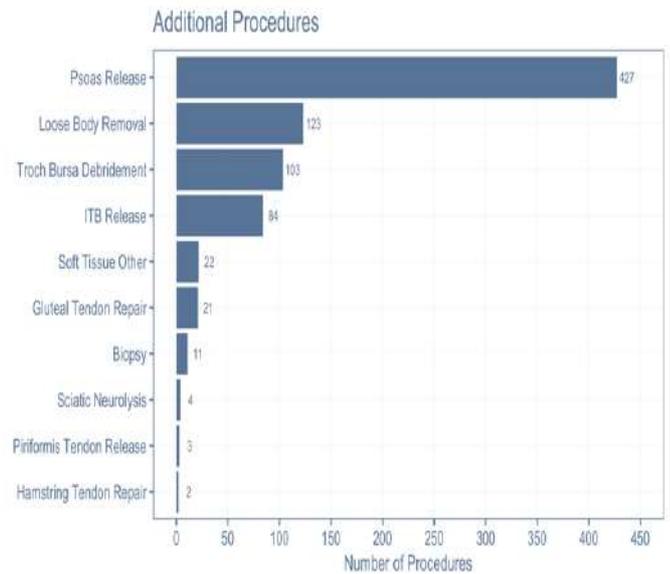


Figure 16 Additional surgical procedures

Additional surgical procedures

The NAHR dataset records a wide range of additional surgical procedures performed during hip preservation surgery, the majority of which relate to extra-articular structures and soft tissue releases. Relatively few of these procedures were recorded and the majority were performed as part of an arthroscopic approach. Figure 16 show the frequency of additional procedures recorded in the NAHR. Psoas release is still the most common additional procedure performed. The board acknowledge that there is increasing numbers of arthroscopic psoas release in patients who have had prior joint replacement within this group. Trochanteric bursal debridement has been recorded 103 times, compared to just 28 in the 2016 report. Together these two procedures account for two-thirds of all additional procedures performed. Gluteal tendon repair was performed infrequently, with only 21 cases entered of which 5 were in 2021.

Periacetabular osteotomies (PAO)

A total of 1260 periacetabular osteotomies have been reported of which 1213 were isolated and 47 combined with femoral osteotomy.

Femoral osteotomies

A total of 142 femoral osteotomies have been recorded in the NAHR, 86 of which were isolated and 56 combined with a PAO. [Figure 18](#)

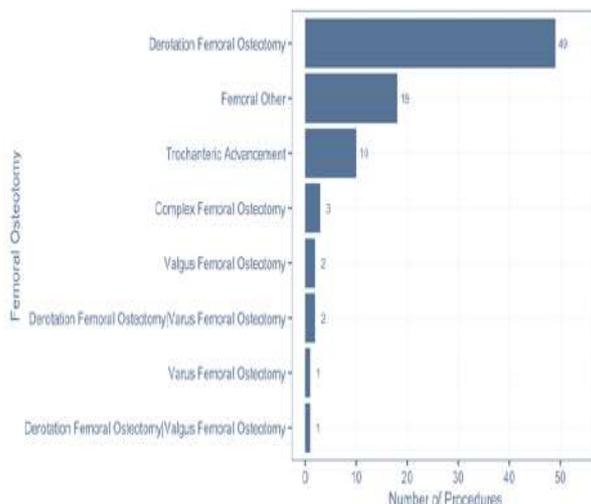


Figure 18 Femoral osteotomies performed by type

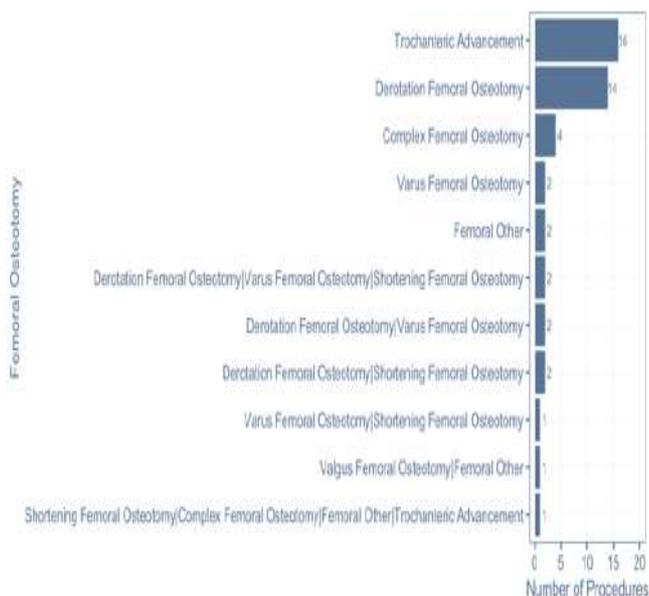


Figure 17 Combination of femoral osteotomy with PAO

Outcome scores

Overview

All scores are presented as a mean score with +/- one standard deviation error bars. In most cases, raw data

Outcomes of surgery for FAI

Overall

We have reported the outcomes of FAI surgery where cam and/ or acetabular rim recession or acetabular pincer removal has been performed. Cases for which concurrent microfracture or other cartilage procedure were excluded as in previous reports. Scores for these cases are shown in Figure 19 and Figure 20 . For the whole group with pre-op scores (3,928) there was improvement in the pre-operative iHOT-12 score at six months (mean iHOT-12 change 32.95 (n=3,928) to 58.23 (n=2,119), $p < 0.0001$ (Paired t-test) n=1,802 [n.b. lower 'n' as t-test derived from patients with both pre and post-op scores])) and 12 months (mean iHOT-12 change 32.95 (n=3,928) to 58.21 (n=1,866), $p < 0.0001$ (Paired t-test) n=1,599) post-operatively.

has also been plotted and, where appropriate, a violin plot is also provided to demonstrate the data distribution. It is acknowledged that showing two standard deviations would show 95% confidence intervals. As the primary indication of hip arthroscopy is FAI, we have reported the results for impingement surgery in detail in this section.

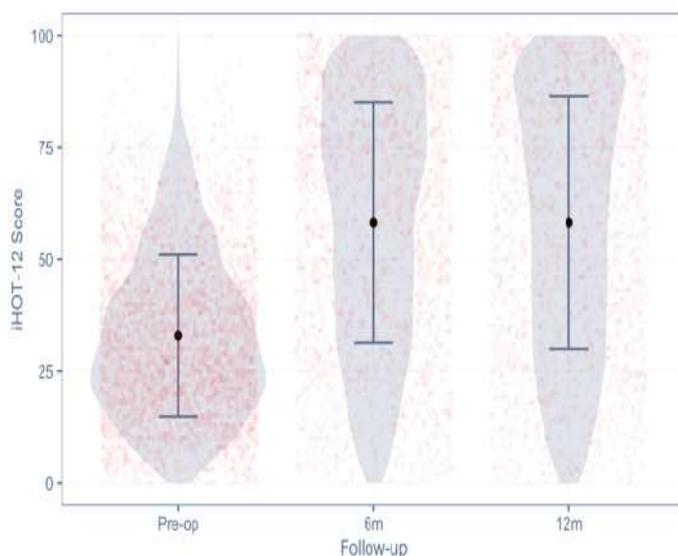


Figure 19 iHOT-12 - whole cohort for FAI

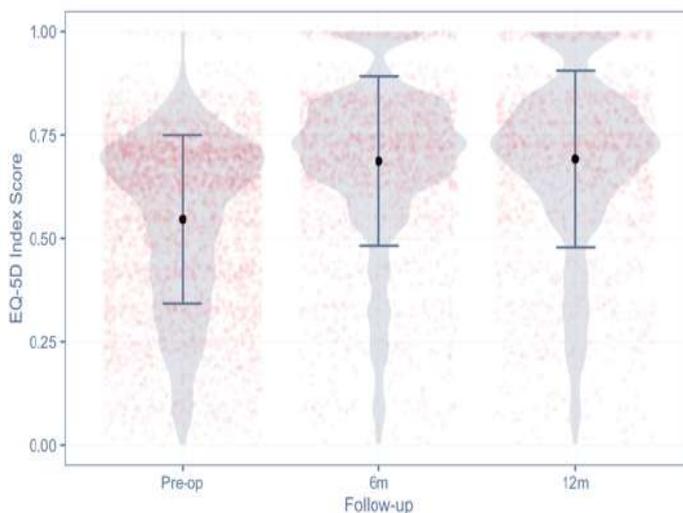


Figure 20 EQ-5D index score - whole cohort for FAI

Figure 21 shows the iHOT-12 score with gender distribution. Females may start with a lower preoperative baseline score but catch up by one year.

(n=2,289) to 59.02 (n=1,013), p<0.0001 (Paired t-test) n=879) post-operatively.

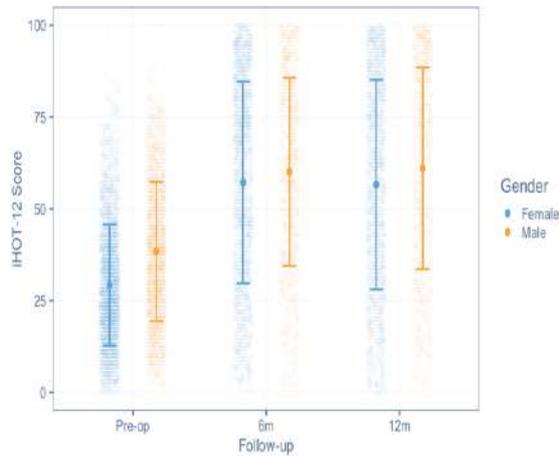


Figure 21 iHOT-12 by gender for FAI

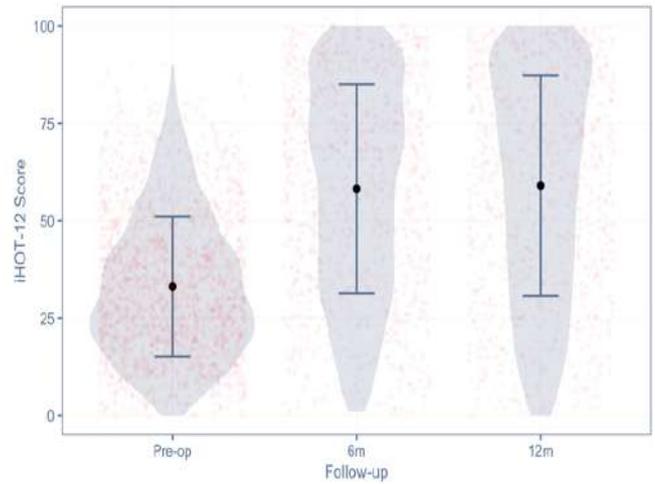


Figure 22 iHOT-12 - surgery for cam lesion

Results of surgery for cam lesions

In this group, patients who had surgery for pincer lesions or any case with cartilage debridement have been excluded. Results of the scores are shown in Figure 22 and

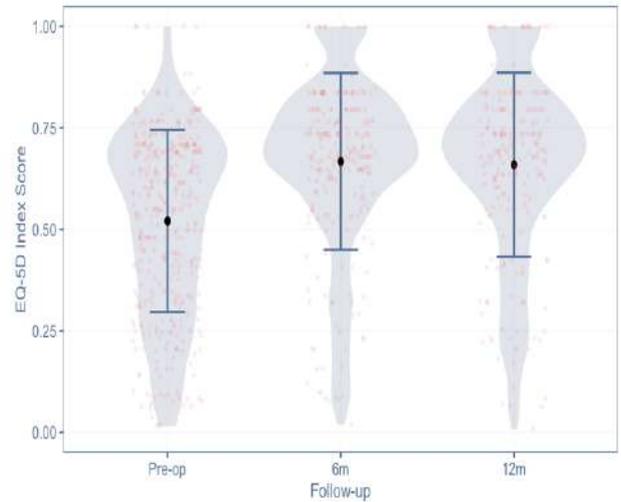
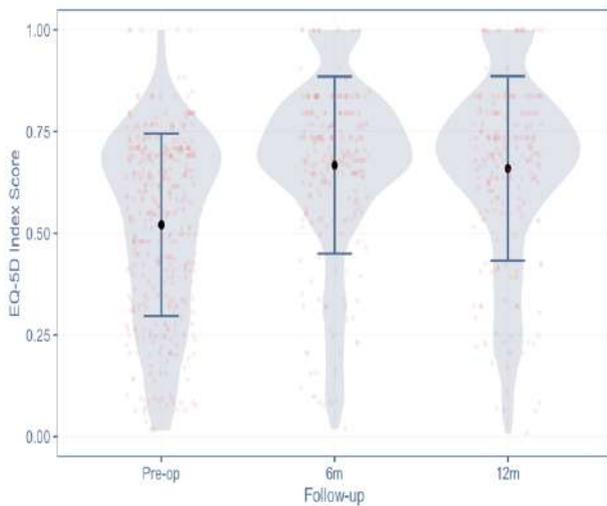


Figure 23 - EQ-5D for cam surgery

reported by gender in Figure 24. For isolated cam lesion surgery, there was improvement in pre-operative iHOT-12 scores at six months (mean iHOT-12 change 33.10 (n=2,289) to 58.20 (n=1,167), p<0.0001 (Paired t-test) n=1,017) and 12 months (mean iHOT-12 change 33.10

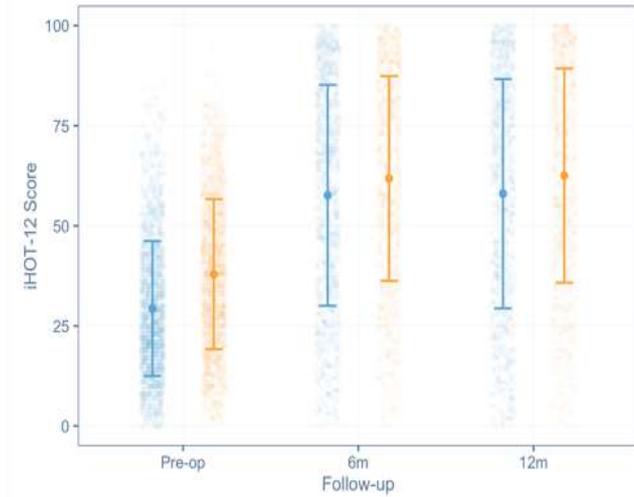


Figure 24 iHOT-12 by gender for cam

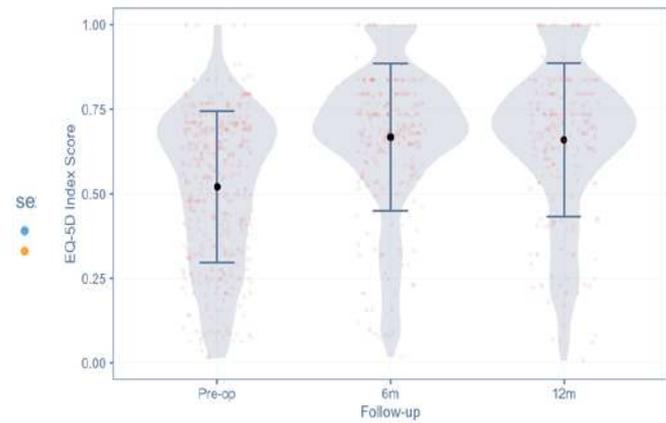


Figure 26 EQ-5D Index - surgery for pincer lesion

Outcome following isolated periacetabular osteotomy (PAO)

Results of surgery for pincer lesions

In this section, patients who had surgery for cam lesion and a cartilage procedure on the acetabular or femoral side have been excluded. For pincers there was improvement in pre-operative iHOT-12 scores at six months (mean iHOT-12 change 29.65 (n=356) to 53.47 (n=219), $p < 0.0001$ (Paired t-test) n=164) and 12 months (mean iHOT-12 change 29.65 (n=356) to 52.26 (n=208), $p < 0.0001$ (Paired t-test) n=166) post-operatively. For isolated pincer lesion surgery there was improvement in pre-operative iHOT-12 scores at six months and 12 months post-operatively. These scores are shown in Figure 25 and Figure 26.

The following figures (Figure 27 and Figure 28) show the mandatory scores for these cases in isolation. There are 1,287 PAOs recorded without simultaneous femoral osteotomy. The following graphs (Figures 30 to 33) show the three mandatory scores for these cases in isolation. For patients undergoing PAO with no concurrent femoral osteotomy there was improvement in pre-operative iHOT-12 score at six months (mean iHOT-12 change 29.42 (n=1,097) to 55.21 (n=650), $p < 0.0001$ (Paired t-test) n=586) and 12 months (mean iHOT-12 change 29.42 (n=1,097) to 62.21 (n=599), $p < 0.0001$ (Paired t-test) n=542) post-operatively.

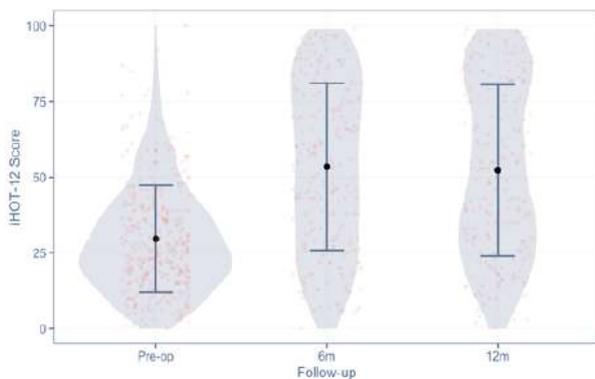


Figure 25 iHOT-12 - surgery for pincer lesion

iHOT-12 in Pelvic osteotomy

There is a trend towards improvement in the iHOT-12 score at six months and one year post-operatively.

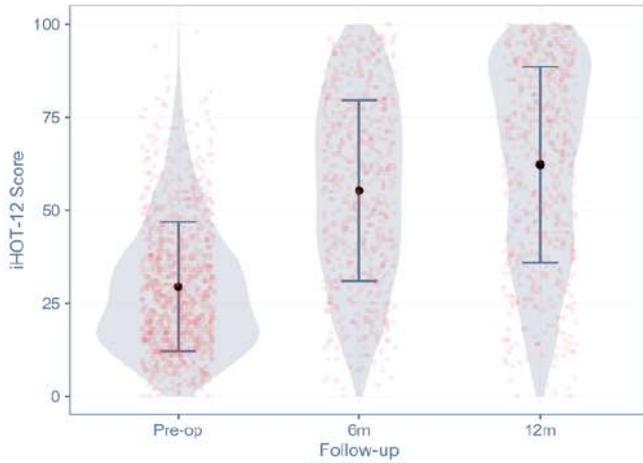


Figure 27 iHOT12 in Pelvic Osteotomy surgery

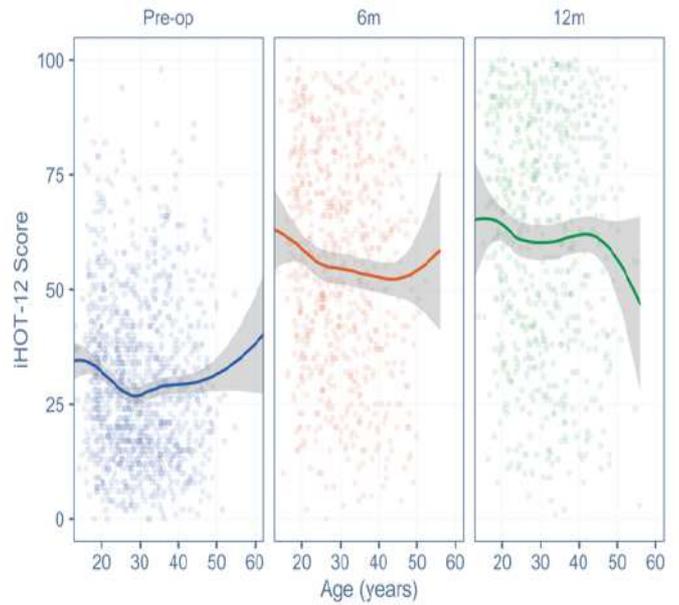


Figure 29 iHOT-12 scores with distribution for pelvic osteotomy surgery

EQ-5D index in PAO

Similar trends are shown with the index score with an improvement on the pre-operative scores, which appears to continue to improve at 12 months.

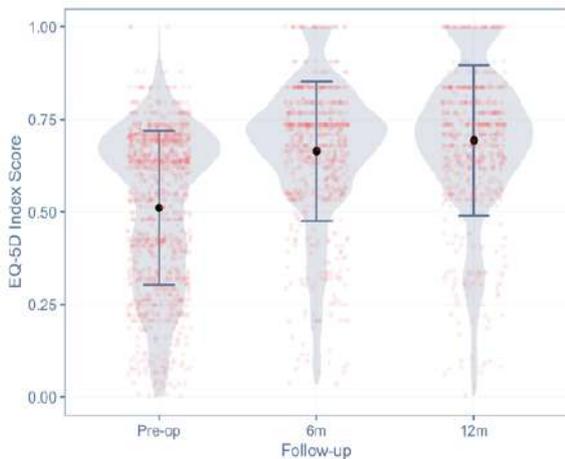


Figure 28 EQ-5D Index scores for Pelvic Osteotomy Surgery

Results of Peri-acetabular Osteotomy vs gender and BMI

Female gender is associated with a lower pre-operative iHOT-12 score but overall show a greater improvement than male patients with a PAO, Both genders showing most improvement in the first 6 months with some further improvement to the 12-month point. The vast majority of PAO surgery is performed in patients with a BMI of < 35. Higher BMI demonstrates worse scores pre-operatively and post-operatively although all groups demonstrate improvement in iHOT-12 scores post-operatively.

Results of PAO vs age

Figure 29 illustrates the iHOT-12 scores of various age groups. All ages seem to benefit from surgery. 2-year data not presented due to small numbers. The graph shows scatter plot of age vs outcome score with a LOESS method smoothing curve along with 95% confidence interval.

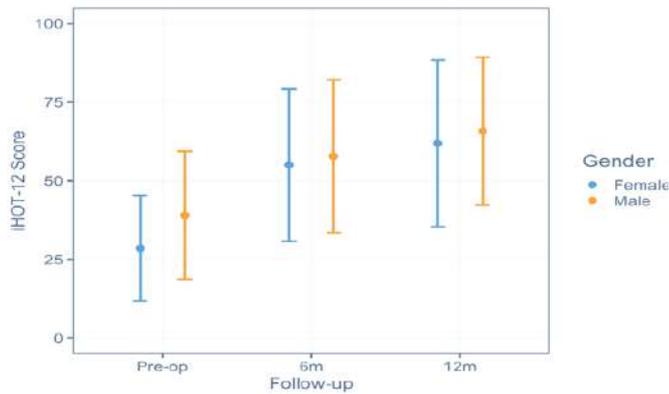


Figure 30 iHOT-12 scores with gender distribution for pelvic osteotomy

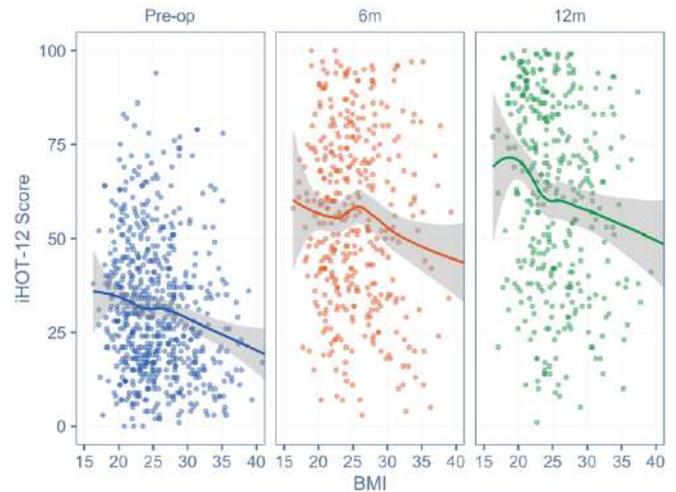


Figure 31 iHOT-12 scores with BMI for peri-acetabular osteotomy

Summary

This report is the culmination of 10 years of data collection by the NAHR. At the inception of the NAHR there was limited knowledge about the number and the outcome of hip preservation procedures performed in the UK. Now in the 7th Annual Report it can be seen clearly the benefit and strength of registry data being collected for procedures such as these. In February 2018 and Baroness Cumberlege was tasked to investigate how the health system responds when patients and their families raise concerns about the safety of treatments. The recommendations from the Cumberlege Report were published in July 2020 (<https://www.immdsreview.org.uk/>). It provides an explicit indication that implant registries are essential and mandates that we should establish systems to record and monitor the performance of any device that has been implanted in a patient. It also instructs that additional information about outcomes must be collected and made available to suitably constructed registries to allow the relative benefits of different implants to be assessed over the appropriate follow-up period for the benefit

and safety of patients. The NAHR has developed over the years to react to the changes in practice and the introduction of novel interventions. This report demonstrates the growth and plateau of hip arthroscopy over the duration of the registry but it also demonstrates changes in the frequency of techniques such as the change from labral debridement to labral repair. The NAHR has been collecting data on anchor usage for the last 3 years and should be mature enough to be reported in next year's report. This report as in previous reports shows improvements in PROMs scores for the hip preservation interventions that are recorded within this registry data mirroring results from randomised controlled studies and other published studies from smaller cohort studies.

Up until 2018 there was a year-on-year increase in both the number of procedures and number of surgeons creating pathways on the NAHR. This plateaued and then has been at half the level for the last 2 years from pre-pandemic levels. The number of unique surgeons has fallen year on year. The appointment of Regional Representatives with the support of Mr Paul Gaston to work on a local level to encourage and provide support of surgeons to enter data is an exciting development. Although, it is not clear what percentage of hip preservation

procedures that are being performed in the UK are entered onto the registry it is hoped that local knowledge of the Regional Representatives will improve compliance.

One of the greatest challenges of any registry monitoring PROMS data is data collection during follow-up. Improvements have been made over the last few years but further work in this area is a focus of the NAHR over the coming 12 months.

For a voluntary registry to be able to provide this level of data is some achievement and the BHS and

the NAHR would like to thank all of the members of the user group, all the surgeons, administrative staff and patients that have contributed data to make this possible. We hope that continued engagement with all of these groups will continue to improve data collection and quality, allowing future reports to shed even more light on this complex area of hip surgery.

Future plans

These are exciting times to be a part of the NAHR; over the last ten years, the team has strengthened because of the regular support from the BHS membership and established and proven results after hip preservation surgery. A long-term goal has been to develop a national physiotherapy protocol and a network of ESPs with representation from high-volume centres are creating one; this will benefit clinicians and patients alike.

Embedding research into a national registry is now becoming a reality, thanks to the efforts of the NAHR board. This has opened opportunities for research-minded trainees to take up a funded full-time or part-time two-year research role with the NAHR. Please encourage your trainees to consider it. In addition, there will be opportunities for travelling fellowships that will be advertised in time.

NAHR continues to look for regional representatives from across the UK. If you are interested in promoting the interests of hip preservation surgery and are committed to the NAHR philosophy, please submit an expression of interest to nahr@britishhipsociety.com.

Hospitals that have submitted data to the NAHR during 2021

Wansbeck General Hospital, Ashington
Royal Orthopaedic Hospital, Birmingham
University College Hospital, London
Guy's Hospital, London
Fortius Surgical Centre
Nuffield Health Cambridge Hospital, Cambridge
London Clinic, London
Spire Leeds Hospital, Leeds
Spire Manchester Hospital, Manchester
BMI Harrogate Hospital, Harrogate
Royal Devon & Exeter Hospital, Exeter
Nuffield Health Leeds Hospital, Leeds
Hexham General Hospital, Hexham
Royal Infirmary of Edinburgh, Edinburgh
Queen Alexandra Hospital, Portsmouth
BMI The Alexandra Hospital, Stockport
Spire Montefiore, Hove
The Vale Hospital, Hensol
Chapel Allerton Hospital, Leeds
Spire Hull And East Riding Hospital, Hull
Schoen Clinic, London
Addenbrooke's Hospital, Cambridge
Weston General Hospital, Weston-super-Mare
Wrightington Hospital, Wigan
Gartnavel General Hospital, Glasgow
Nuffield Health Glasgow Hospital, Glasgow
Spire Clare Park Hospital, Farnham
Frimley Park Hospital, Frimley
James Paget Hospital, Great Yarmouth
Circle Reading Hospital
BMI The Ridgeway Hospital, Swindon
Ramsay Pinehill Private Hospital, Hitchin
Spire Cambridge Lea Hospital, Cambridge
Hereford County Hospital, Hereford
Salisbury District Hospital, Salisbury
Great Western Hospital, Swindon
Northern General Hospital, Sheffield
Lister Hospital, Stevenage
One Hatfield Hospital
University Hospital Llandough, Penarth
Princess Grace Hospital, London
The Alexandra, Cheshire
Spire South Bank Hospital, Worcester
BMI Bath Clinic, Bath
Ramsay Berkshire Independent Hospital, Reading
Nuffield Health Hereford Hospital, Hereford
Trafford General Hospital, Manchester
Spire Portsmouth Hospital, Havant
Newham General Hospital, London
William Harvey Hospital, Ashford
Leicester General Hospital, Leicester
Royal Berkshire Hospital, Reading

Surgeons that have submitted data to the NAHR during 2021

We are grateful to the following individuals who have submitted their data to the Non-Arthroplasty Hip Registry during 2021. Their support, appreciation and understanding of what the NAHR is trying to achieve are appreciated.

Marcus Bankes
Ajay Malviya
Vikas Khanduja
Johan Witt
Callum McBryde
Colin Holton
Jonathan Conroy
Jonathan Hutt
Angelos Politis
Matthew Wilson
Paul Gaston
Andy Langdown
Max Fehily
Alistair Gray
Phillip Thomas
Sanat Shah
Roeck de
Philip Stott
Sandeep Datir
Rishi Chana
David Hollinghurst
Adekoyejo Odotola
Seb Sturridge
Arun Kumar
Christos Paliobeis
Peter Wall
Antonio Andrade
Adam Cohen
Hiren Divecha
Ivor Vanhegan
Saif Salih
Alastair Dick
Timothy Board
Azal Jalgaonkar
Marc George
Reddick Hoad
Paul Partington
James Berstock
Simon Newman
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