



# **Non-Arthroplasty Hip Registry**

**5<sup>th</sup> Annual Report 2020**

# Chairman's Foreword

## Vikas Khanduja

The User Group is responsible for overseeing the operational and strategic workflow of the NAHR and I am delighted to have performed the role of Chairman of this vibrant Committee over the past three years. Whilst I begin to comprise the foreword for our 5<sup>th</sup> annual report, it is a pleasure to reflect on our work over the last three years, the key developments of which are summarised below.



- **Number of Patient Pathways and Surgeons Contributing to the Registry**  
There has been a sustained year-on-year increase in the number of surgeons participating and the operations entered since publication of the first report. Between January 2012 and December 2019, a total of **12,992** pathways have been entered in the registry, and a total of **102** surgeons have entered data on the NAHR at some point.
- **New Consent Form and Minimum Data Set (MDS) Version 2**  
The introduction of the General Data Protection Regulation (GDPR) in May 2018 created challenges well recognised by anyone involved with the storage or transmission of patient or personal data. A new consent form has been created following multiple consultations within the User Group and the British Orthopaedic Association (BOA). Alongside the new consent form, an updated Minimum Dataset (MDS Version 2.0) has been developed and is now available to download from the NAHR website. New areas now recorded include number and type of labral anchors used for labral repair, labral grafting and details of the graft length and material, further refinement of pelvic osteotomy types recorded and the ability to record extra-articular hip procedures.
- **NAHR Website**  
In the 2<sup>nd</sup> annual report, the NAHR had laid out plans for a dedicated website and, in January 2018, we launched [www.nahr.co.uk](http://www.nahr.co.uk), the NAHR website with patient information, downloadable documents as well as the ability to log in and register for access to the NAHR. This certainly has been a major advance and is a step forwards in addressing patient and surgeon compliance.
- **Timing of Release of Annual Reports**  
We have previously released our annual report at the BOA annual congress. However, the uptake and the interest by the general orthopaedic surgeon has been limited. It was therefore decided by the User Group to release the annual report at the BHS annual meeting. This has meant that we have produced two reports in quick succession, but it has allowed us to analyse the data until the end of December 2019 and the analyses will be presented to an engaged audience in March 2020 at the forthcoming BHS annual meeting.
- **National Musculoskeletal Registry (NMR)**  
We have engaged and participated actively with NJR and BOA towards the feasibility of developing a National Musculoskeletal Registry. The vision is that this would unify all the smaller Registries under Trauma and Orthopaedic Registries Unifying Structure (TORUS) and allow collection and analyses of high quality data for the benefit of patients, surgeons and society under a single governance body. The User Group is enthusiastic about this project and will continue to engage with the BOA, NJR and DOH on the development of this ambitious and exciting proposal in the coming year.
- **Funding**  
The User Group had identified additional funding as one of the main targets for 2018-9 and other industry partners had been approached for support. I am pleased to report that we now have sponsorship agreements set up with Stryker Orthopaedics, Smith and Nephew and Arthrex. NAHR finances are ring-fenced within the BHS accounts and have therefore been protected from recent malicious financial attacks.

- **Education**

The User Group has provided high quality educational content in the form of well-designed symposia at the BOA and BHS annual congresses over the past three years. We have engaged with the BOA and BHS and ensured that non-arthroplasty Hip pathology and surgery become a part of the regular programme in their meetings. We do feel privileged and proud that the BHS is one of the very few societies in the world which has adopted non-arthroplasty Hip Surgery under its umbrella and going forward we are in the process of developing a three year structured educational programme for the BOA and BHS annual congresses.

- **Research**

One of the missions of the NAHR is also to generate evidence in the field of non-arthroplasty hip surgery. A research request form has been developed and is available for download from the NAHR website. Data requests so far have resulted in podium and poster presentations at the meetings of the International Society of Hip Arthroscopy and Hip Preservation (ISHA), SICOT, BOA and the BHS and the first two manuscripts evaluating FAI and PAO have been submitted for publication. The Registry data has also been presented at various meetings by members of the User group and provided scientific guidance to hip surgeons both nationally and internationally.

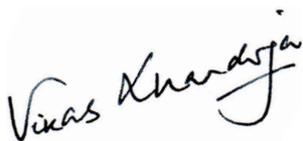
- **Patient Compliance and Surgeon Engagement**

Improvement in patient compliance and surgeon engagement remain the core themes for the NAHR. The User Group is exploring the possibility of employing a compliance facilitator via Amplitude to ensure patients can be followed up and post-op scores obtained to improve compliance. As far as surgeon engagement is concerned, we have had initial talks with PMIs and private hospitals which have been positive and the NAHR will continue to work with them to address this issue.

I believe that the Registry has come a long way in the last few years, and commitment and teamwork have been the secret of its success. There are a number of individuals to thank who have worked extremely hard to ensure that our Registry prospers. I would like to thank each member of the User Group for their enthusiasm, energy and valuable contribution and specifically to Mr. Marcus Bankes for leading on MDS Version 2 and the consent form, Mr. Ajay Malviya, Mr. Matt Wilson and Prof. Tim Board for taking on the mammoth task of preparing the annual reports, Mr. Ajay Malviya again for designing and launching the website and Mr. Tony Andrade for engaging with the Industry to raise finances for the Registry. A special mention here goes to Mr. Richard Holleyman, an Orthopaedic trainee in the Northeast who has been the backbone of running the statistics for our reports and also of immense help in the final production of the annual reports.

On a personal level I have learned a great deal from Ananda Nanu, Past President of BOA and would like to thank him for his availability and valuable advice. I would like to thank Mr. Steve Jones for his considerable support this year in his capacity as BHS President, which has been of significant value to the NAHR. I would also like to extend my thanks to Corri Conrad, David Selvey and Susan Williams from Amplitude, and Julia Trusler from BOA for their excellent support and work throughout the year in supporting us deliver our objectives. And last but not the least a big thanks to our Industry sponsors: Smith and Nephew, Arthrex and Stryker.

As I reflect on my final term as Chair of the Registry, a role that has become so much more than just work for me, I can only hope that I have contributed in some part to the vision of “improving the product” and helping to uphold its position as an example of a world-class registry for non-arthroplasty hip surgery. Finally, it’s been an absolute pleasure and an honour to Chair the NAHR and I am truly indebted to the Membership and the BHS Executive for giving me the opportunity to serve in this position.



**Vikas Khanduja**

Chairman, Non Arthroplasty Hip Registry

## User Group

### Vikas Khanduja (Chair)



Vikas Khanduja is a Consultant in Addenbrooke's - Cambridge University Hospital. Vikas has been instrumental in setting up the tertiary referral service for Young Adult Hip Surgery in Cambridge and is the Lead for Elective Clinical Trials in Orthopaedics. He is a keen researcher and has published and lectured extensively with over 100 peer reviewed articles. Complementing his clinical practice, his research is focused on pre-operative modelling of FAI to understand morphology and stresses, disease stratification via novel imaging techniques, optimisation of arthroscopic management of FAI and precision surgery via navigation and to improve outcomes.

Vikas is the recipient of the prestigious American and British Hip Society Fellowship, the Arnott Medal presented by the RCS, England and the Insall Fellowship presented by the American Knee Society and Insall Foundation. He is an enthusiastic educator and convenes the Cambridge Basic Science Course & the Cambridge ESSKA Hip Arthroscopy Course annually. He is the Speciality Editor for Hip Preservation at the BJJ and also Chairs the NAHR & the SICOT Education Academy.

### Tony Andrade



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 will become President of what is now known as ISHA – The Hip Preservation Society in October 2020.

### Marcus Bankes (Past Chair)



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



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



Jon 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



Callum McBryde is a consultant hip surgeon at the Royal Orthopaedic Hospital in Birmingham. 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 qualified as a doctor from the University of Manchester, completed his surgical and orthopaedic training in Birmingham whilst also completing a Doctor of Medicine higher degree. 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.

## Ajay Malviya



Specialist in Hip arthroscopy, Periacetabular Osteotomy and Hip replacements for active people, Ajay Malviya is a Consultant Orthopaedic Surgeon at Northumbria Healthcare NHS Foundation Trust. He trained in the Northern Deanery and has completed 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 supervises research fellows and has enabled them to complete various degrees and projects. He is in the British Orthopaedic Association educational 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 regularly teaches in national and international hip preservation courses and mentors consultant surgeons. He is an examiner for the Royal College of Surgeons (FRCS Trauma and Orthopaedics).

## Matt Wilson



Matt Wilson is a Consultant Orthopaedic Surgeon in the Exeter Hip Unit at the Princess Elizabeth Orthopaedic Centre. He qualified from St Bartholomew's Hospital Medical School in 1997 before undertaking training in Reading, Oxford, Derby and Nottingham. He undertook fellowships in hip reconstruction in Exeter and, in hip arthroscopy, Cambridge. He was appointed as a Consultant in Exeter in 2010 and, while still undertaking general trauma, his elective practice is now dedicated to hip surgery; from preservation to revision arthroplasty.

Together with his colleagues in the Hip Unit, Matt trains surgeons from around the world in the techniques of hip arthroplasty and is part of an active research unit in Exeter. He was a regional clinical coordinator at the National Joint Registry from 2010-2017 and has been a member of the NAHR user group since 2013. He is on the Editorial Board of the Annals of the Royal College of Surgeons of England and was the Rothman-Ranawat travelling fellow in 2016. He has been the Hon.

Secretary on the Executive of the British Hip Society since 2019. He lives a lovely life in the South-West with his wife, Sam, and two boys, Henry and Charlie.

## Richard Holleyman (Data Analytics & Statistical Support)



Richard Holleyman 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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# 1 Introduction

The User Group are pleased to present the 5<sup>th</sup> Annual Report of the Non-Arthroplasty Hip Registry (NAHR). Since formal data entry commenced, the NAHR has collected extensive data on over 12, 500 hip preserving operations. There has been a sustained year-on-year increase in the number of surgeons participating and the operations entered since publication of the first report.

There has been a considerable progress over the last two years in generating evidence in non-arthroplasty hip surgery. In June 2018, The Lancet published the first level one evidence output from the Femoro-Acetabular Surgery for Hip Impingement syndrome study (FASHIoN): a multicentre randomised controlled trial<sup>1</sup>. The results of this study demonstrated a clinically significant benefit of hip arthroscopic surgery over non-operative personalised hip therapy (PHT). Similar results were seen in the **FAIT** trial and published in the BMJ, which showed that patients with symptomatic femoroacetabular impingement (FAI) referred to secondary or tertiary care achieved superior outcomes with arthroscopic hip surgery than with physiotherapy and activity modification<sup>2</sup>.

There are several other randomised trials underway and the results of these studies combined with longitudinal 'real world' data from the NAHR will certainly guide future patient selection and treatment and improve outcomes. Data from the NAHR demonstrates similar improvements in iHOT scores following hip arthroscopy for FAI at one year post-operatively although any comment on longer term outcomes is currently limited by the lack of available data.

Arthroscopic surgery still represents the largest proportion of recorded surgical procedures within the NAHR and the majority of procedures with data entered have been performed in a National Health Service (NHS) facility. There is clearly work to be done to improve the

collection of data from non-arthroscopic surgeries and even more importantly to improve data collection from private healthcare providers.

Data collection in general, has improved in comparison with the previous years, but still remains a challenge particularly over the longer term, as well-functioning patients get on with their lives, are discharged from follow-up and may choose not to reply to data collection emails. Data collection rates for post-operative patient reported outcome measures are typically less than 50% and by two years have dropped so far as to render analysis impossible. The rates for consent for data collection improved significantly from 50% to over 90% between 2013 and 2015 and have remained over 90% since. Without clear patient consent, data is anonymised and therefore cannot be linked to further surgery in this registry or others such as the National Joint Registry. The ability to link data and follow a hip joint through its life was one of the founding principles of the registry and improving consent rates has become a key area for the NAHR User Group. It is quite likely that consent for some of these patients has been obtained but not marked electronically in the Registry. Efforts are ongoing to trace the consent of these patients with their relevant Consultants. To prevent this problem continuing we have introduced a system whereby a new record cannot be added on the Registry without activating the consent status.

The formation of the Trauma & Orthopaedic Registry Unifying Structure (TORUS) under the stewardship of the BOA, was seen as an essential umbrella organisation under which the growing number of UK orthopaedic registries could work, sharing guidelines, expertise and experience. Additional benefits around legal indemnity, investigation of breaches of data collection, contract negotiations with registry providers and dealing with issues related to information governance are all potential

benefits of TORUS membership. The reality of running this organisation is proving a challenge and talks about the future direction of TORUS and its associated registries are continuing. The potential option of the TORUS registries joining the National Joint Registry (NJR) or NHS Digital, has been explored in depth and a proposal was sent to the Department of Health. However, lack of funds to support such a project has meant that the merger is on hold. NAHR has actively engaged in the process and remains keen to join the collaborative as long as we maintain ownership of data within the NAHR and BHS. It is clear from discussion with the British Hip Society (BHS) members that maintaining ownership of the data in the NAHR is desirable to avoid potential inappropriate use of the data by third parties.

The NAHR User Group, chaired by Mr Vikas Khanduja, continues to meet virtually five to six times per year to drive the registry forward with the aims of improving data collection and surgeon engagement. One of the challenges faced by the User Group is funding. The NAHR is kindly supported by the BHS and its members but additional funding is needed to fund future developments. The NAHR User Group is very grateful to its primary sponsors, Stryker Orthopaedics, Smith and Nephew and Arthrex, for their generous support of the registry and their understanding of what the registry is trying to achieve. It is fortunate that the NAHR sponsorship money was ring-fenced and therefore protected from the unfortunate financial issues recently faced by the BHS. Notwithstanding this, the User Group has identified additional funding as one of the main targets for the coming year and other industry partners are being approached for support.

The User Group is dedicated to the progress of the Registry has certainly achieved its objectives set our last year:

- Ensuring that the Registry is fully GDPR Compliant

- New MDS Version 2.0 in place with the GDPR compliant consent form
- Increase funding for growth of Registry
- Articles in peer reviewed journals from the Registry
- Improve surgeon and patient compliance

The 4<sup>th</sup> Annual Report was released at the BOA Annual Congress in Liverpool and also presented at the annual meetings of ISHA, SICOT, BHS and made its presence felt in many regional meetings throughout the country. The report conclusively showed improvement in patient reported outcome measures (PROMS) following hip arthroscopy for Cam and Pincer FAI independently, and also for peri-acetabular osteotomy (PAO).

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. The NAHR remains the world's only national registry of its kind and, together with the BOA, represents an opportunity to lead the world in the field of registry data for hip preservation surgery. The data contained in this report represents the early genesis of the NAHR, but it will allow us to follow the outcome of non-arthroplasty surgery over the lifetime of our patients.

1. *Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): a multicentre randomised controlled trial.* *The Lancet.* 2018;391(10136); 2225-2235

2. *Arthroscopic hip surgery compared with physiotherapy and activity modification for the treatment of symptomatic femoroacetabular impingement: multicentre randomised controlled trial.* *BMJ.* 2019 Feb 7;364:l185. doi: 10.1136/bmj.

## 2 Aim of the NAHR

The NAHR, which is open to data submission by and UK surgeon or unit, aims to, aims to benefit both patients and surgeons by collecting longitudinal data on patients with hip pathology, whether or not they undergo surgery. 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.

### **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

### 3 History of the NAHR

The creation of a NAHR was initiated by Mr 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. Whilst the advent of tablet devices is often hailed as the convenient solution to pre-operative data collection, maintenance and theft of these devices remains a major problem. Clearly the NAHR can be used entirely without paper forms for those institutions with durable electronic systems in place. 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 has been launched and is currently in use. Elements of the new dataset include: number and type of labral anchors used for labral repair; labral grafting and details of the graft length and material; details of extra-articular procedures and there has been a further refinement of pelvic osteotomy types recorded.

The importance of the NAHR to the BHS was demonstrated further in 2016 by a vote at the annual meeting in Norwich to add another elected post to the Executive of the BHS with direct responsibility for the Registry and to chair the NAHR Steering Committee. Mr Vikas Khanduja from Cambridge was elected unopposed to the role at the BHS meeting in London in March 2017. Paul Gaston and Max Fehily stepped down from their roles in 2015 and 2016 respectively, with their roles taken over by Mr Ajay Malviya, Mr Jon Conroy, and Mr Callum McBryde.

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 2.0, which can be [downloaded here](#), are 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.

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, the 5th Annual Report, provides a summary of the

data available and can be used to guide further development of the register.

## 4 Overview of the data

### 4.1 Pathways per year

In the NAHR, a pathway is created when an operation is performed. Each patient has a maximum of two pathways, one for each hip, which follows the ‘journey’ of that hip through every hip preservation operation right to arthroplasty as the end point, if this occurs. If a patient, changes surgeons during their treatment, then the pathway follows the patient and is taken over by the next operating surgeon. Two pathways cannot be created for patients with the same demographic data, particularly unique identifiers such as the NHS number. 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.

Between January 2012 and December 2019, a total of 12,992 pathways have been entered in the registry. The number of pathways entered in the NAHR has steadily increased year on year and 2019 again saw an increase in the number entered compared to 2018, 2,450 compared to 2,238, as show in in **Figure 1**. Retrospective data submission is possible within the NAHR and, subsequent to the 2018 annual report, an additional 60 pathways have been recorded with an activity date prior to December 2018.

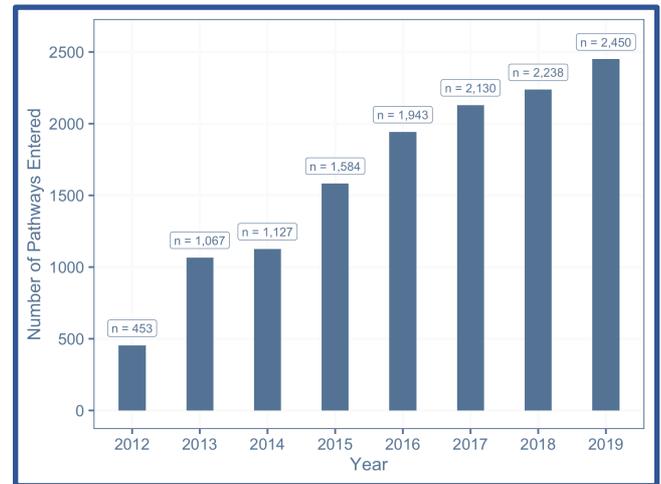


Figure 1 Pathways uploaded per year

**Figure 2** shows the number of pathways split into surgical approach. Arthroscopy accounts for at least 60% of recorded pathways, with approximately 10% open including osteotomies and open surgical dislocation for hip impingement. The proportion of patients with approach not recorded remains high at 40% for 2019, the reason for this is not clear.

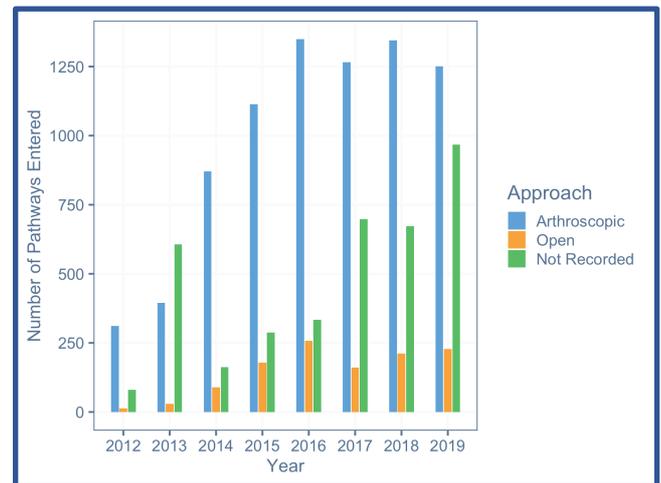


Figure 2 Pathways per year broken down to surgical approach

## 4.2 Number of surgeons using NAHR

A total of 102 surgeons have entered data on the NAHR at some point which is an increase from 94 in the 2019 report, **Figure 3** shows the number of unique surgeons entering pathways per year since 2012. This had steadily increased such that 64 surgeons have entered data in 2018, with a drop to 56 in 2019. The majority of surgeries were performed by a small number of high-volume surgeons. The number of surgeons ‘experimenting’ with the registry seems to be reducing, and the number of ‘regular’ users is increasing slowly. 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.

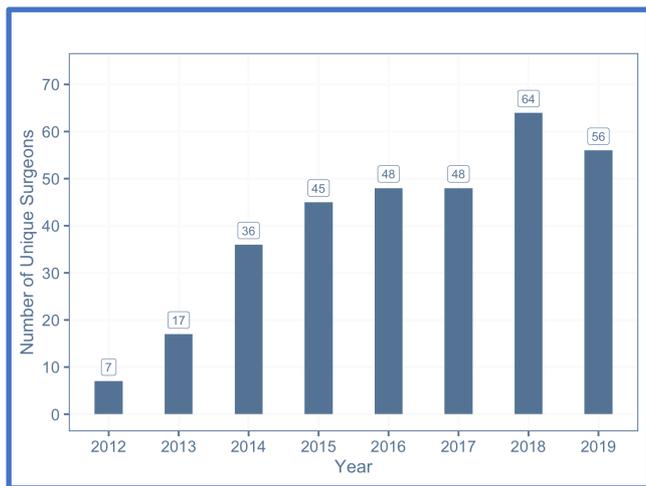


Figure 3 Surgeons adding data to the NAHR

## 4.3 Surgeon-patient procedures

Forty-three surgeons have submitted more than 50 cases, 31 have submitted more than 100 pathways and eight more than 500 (**Figure 4**). One particularly high-volume surgeon and dedicated user of the registry has personally uploaded over 13.2% 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.

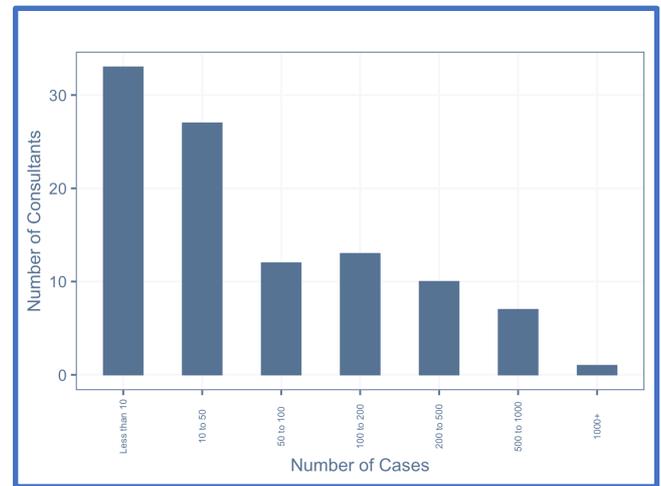


Figure 4 Procedures per surgeon

#### 4.4 Funding source for surgery

The funding by surgical approach is shown in **Figure 5**. This demonstrates that the proportion of non-arthroplasty procedures funded by the NHS have changed over time from 54% in 2012 to 69% in 2016 with a drop to 40% in 2019; while the numbers recorded in the independent sector have remained similar over this time (115, 25.4% in 2012 vs 447, 18.2% in 2018). It is highly likely that the data from the independent sector is not completely being recorded in the Registry or that data upload is not as accurate. There is a significant proportion that remains ‘not recorded’ in this category (42.3% in 2018) and this is one area of the dataset that is likely to become mandatory for completion over the next few years.



Figure 5 Funding of surgery per year

## 5 Demographics

### 5.1 Patients by age and approach

The analysis of patient age in **Figure 6** shows a skewed distribution towards a younger age for both open and arthroscopic procedures, with patients undergoing open surgery slightly younger than arthroscopic. The distribution of cases with 'no approach recorded' is slightly different which is difficult to explain. In future, as this field is made compulsory, we may see a shift in distribution.

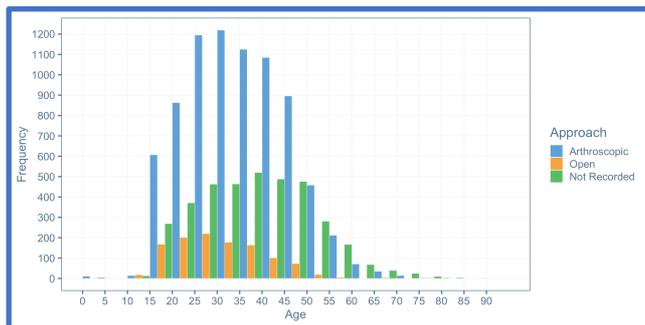


Figure 6 Patients' age distribution by approach

Given the excellent results of hip arthroplasty, several commissioners, perhaps place age restrictions on hip preservation surgery. Of the data recorded in the registry 85.8% (N=11,146) of cases entered on the NAHR were between the ages of 15 and 50 years; 53.7% (N=6983) were

between the ages of 20 and 40 years and 2.2% (N=284) of cases were performed on those aged 60 years or over. The peak age remains between 25 to 45 years (N=7,222, 55.6%).

There are large numbers of paediatric hip preservation procedures performed that are not being recorded as the Registry only recorded around 0.5% (N=65) of procedures been performed on patients less than fifteen years old. The management of slipped femoral epiphysis and Perthes is currently a topic of research and the British Orthopaedic Surgery Surveillance (BOSS) programme ([www.boss.surgery](http://www.boss.surgery)) has been running since March 2016. At the time of writing, 807 cases had been accrued by BOSS. It is not clear how many of these cases have had surgical management but very few appear to have been submitted to the NAHR. The NAHR can also be used for simply monitoring progression of outcome scores in patients being treated conservatively and therefore many patients, including those in the BOSS study could be entered regardless of whether they have undergone a procedure. One aim of the NAHR in the future would be to publicise this aspect of the Registry's work.

### 5.2 Gender distribution by surgical approach

Overall, the majority of patients with data entered on the NAHR are female (63.2%). Of those patients undergoing hip arthroscopy, 60% were female compared to 84% of patients undergoing open procedures. Again 29.6% of procedures have no approach specified, another area that will be considered mandatory moving forwards. See **Figure 7**.

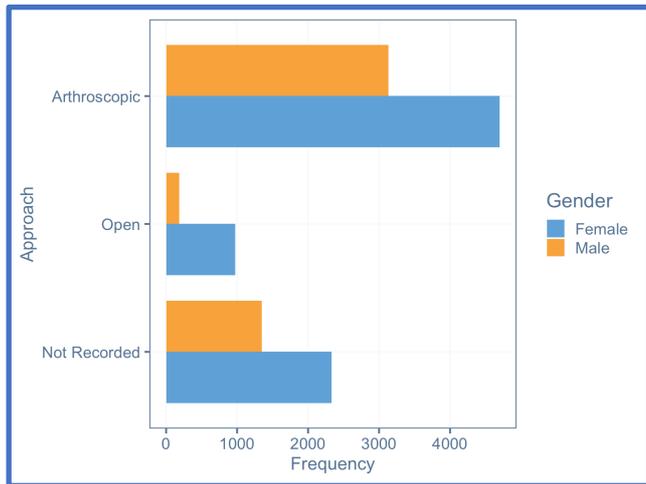


Figure 7 Gender distribution 2012-2019

### 5.3 Body mass index (BMI) by operation type and gender

Body Mass Index (BMI) was recorded in only 47.8% (N=6,213) of cases but the rate of data acquisition, in keeping with many parameters, has improved over the last few years of the register. Of the cases for which BMI is available, 49.7% (N=3,087) of patients were recorded as having a BMI of less than 25; with 34.4% (N=2,140) recorded as having a BMI between 25-30 and 15.9% (N=986) more than 30. See **Figure 8**.

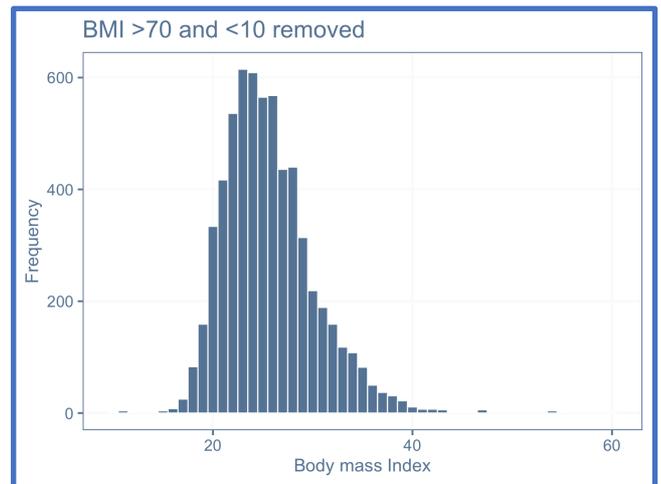


Figure 8 BMI distribution

## 6 Compliance

### 6.1 Follow-up and linkage data

In 2019 a high proportion of patients (89.7%) 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. The reasons for this are unclear and need exploring. Whether the emails are not being received or are being rejected may explain the poor compliance at later time points. An audit into this aspect is planned for the second quarter of 2020.

In addition to this, a mobile phone number is requested to allow follow-up of patient via phone should emails remain unanswered. It appears patients are increasingly reluctant to add a mobile phone number to the contact details on the consent form with only 50.9% supplying one in 2019 which has decreased from 55.1% in 2018. This is shown in **Figure 9**.

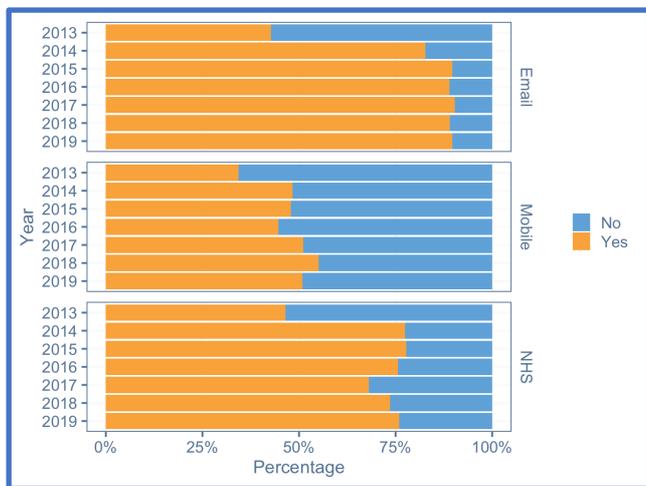


Figure 9 Pathway compliance

The recording of an NHS number has improved to 76% in 2019 after having dropped to 68.1% in 2017, perhaps related to data protection and GDPR issues. 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 for private patients is available on the NAHR pages of the BHS website.

### 6.2 Consent rates

As discussed in the Introduction, the involvement of the NAHR with TORUS has highlighted the importance of good governance and consent to data upload. The percentage of recording of consent for data upload to the NAHR has increased from 46% in 2013 to 96.2% in 2019 - see **Figure 10**. A part of this increase is due to the Consent tab being made a mandatory field on the website. It is important that surgeons are not recording any data on patients who have not given explicit consent. Reasons for non-consenting and rejection of consent via the patient portal will be explored.

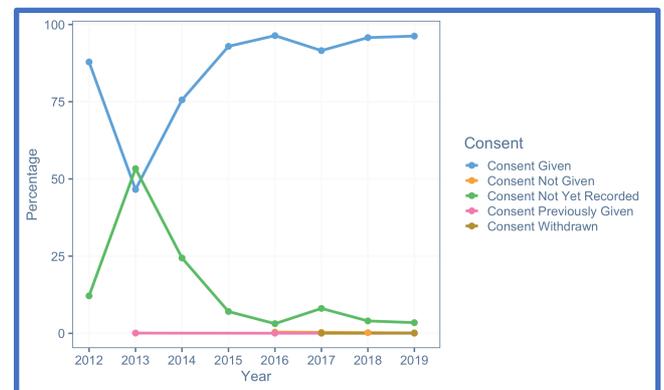


Figure 10 Recording of Consent to data collection

## 7 Collection of mandatory scores and statistics

### 7.1 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.

#### 7.1.1 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).

#### 7.1.2 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).

#### 7.1.3 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<sup>1</sup>

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**.

#### 7.1.4 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 comparisons within each analysis/pathology cohort and future reports will aim to incorporate this.

1. Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): a multicentre randomised controlled trial. *The Lancet*. 2018;391(10136): 2225-2235

## 7.2 Rates of score collection

### 7.2.1 EQ-5D Index

Figure 11 shows the rate of collection of the Index scores at the various time intervals. Rate for pre-operative score collection has increased significantly from 30.7% in 2013 to 75.8% in 2018, which however is a drop from 86.3% in 2016; perhaps related to retrospective data entry. The rates for collection at post-operative time points remain poor, with 41.5% for 6 months and 37.1% for 12 months for 2018. The figures for 2019 are low because of the lack of adequate follow up and will be reported in the next report. The 2017 rates stand at 38.8% for 6 months and 32.2% for 12 months.

With longer follow-up the 12 months' data collection should improve. The reasons for the relatively poor patient engagement need to be explored and Amplitude have offered a telephonic service to improve patient engagement and pursue non-responders for a fee which we will experiment on a trial basis. We did notice a proportion of patients with operative data and after excluding those patients, the compliance data improved for 2018; reaching more than 50% for 6 and 12 months.

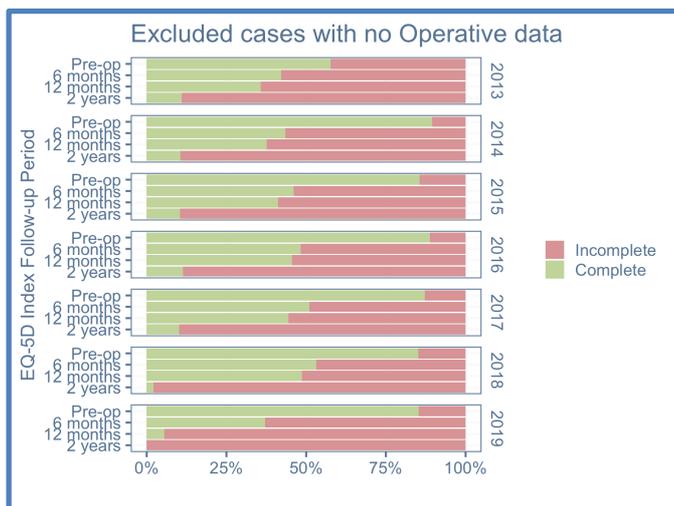
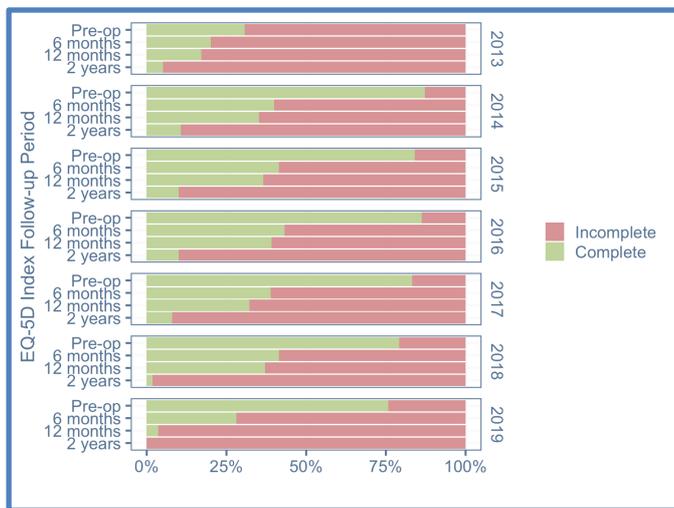


Figure 11 EQ-5D Index score collection compliance – before and after excluding cases with no operative data

### 7.2.2 iHOT-12

The iHOT-12 score was presented to the International Society for Hip Arthroscopy (ISHA) in 2011. It is therefore a relatively new scoring system but widely accepted amongst hip preservation surgeons. This may be reflected in the slightly reduced uptake of this score in the first two years of the NAHR, despite it being a mandatory score for the minimum dataset. 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.

A further analysis which has excluded patients who are not eligible for six or 12 months follow-up as the surgery was performed recently is presented in **Figure 12**. This shows a trend towards consistent improvement in return rate for both six and 12 months.

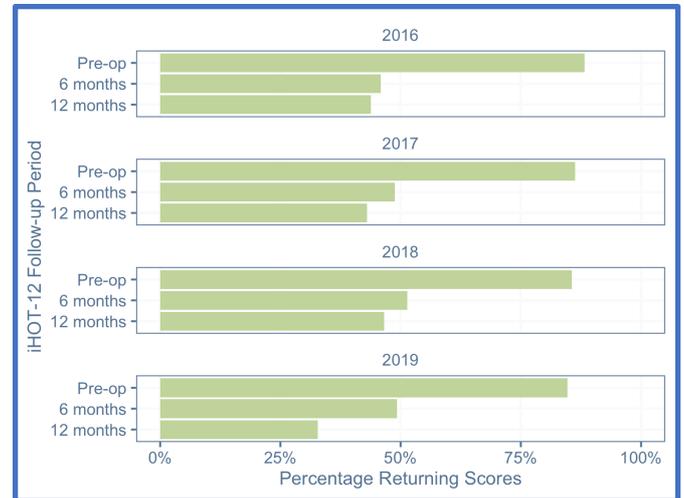
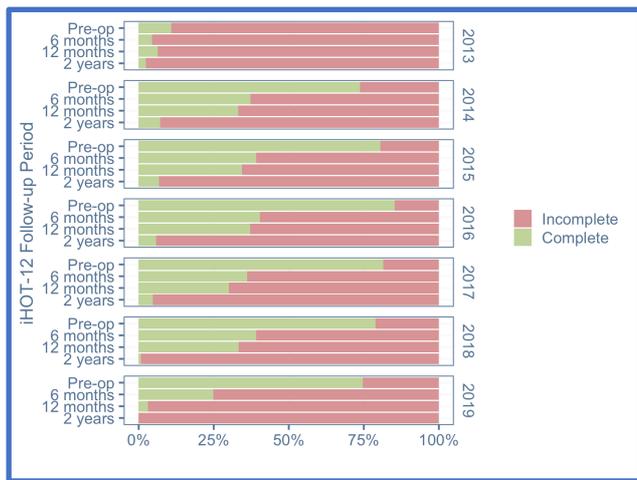


Figure 12 iHOT-12 Score Collection Compliance with and without excluding cases with no operative data and also after excluding the patient ineligible for follow-up

## 8 Surgical procedures

### 8.1 Overview

Figures 13 to 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

### 8.2 Acetabular procedures

Labral debridement remains the most commonly performed acetabular procedure in arthroscopic surgery, accounting for 24.3% of acetabular procedures compared to 24% labral repairs. Compared to the last report, there has been a reduction in the relative proportion of labral debridement procedures and an increase in labral repair. There are plans for revisions to the dataset to include labral reconstruction/ grafting, a procedure which is being

procedures may be recorded within a single patient pathway. Proportions are therefore proportions relative to all procedures recorded in the NAHR at the given surgical site ('acetabular', 'femoral', 'additional procedures') and not proportions of all pathways recorded).

increasingly performed. Regarding all acetabular procedures performed by open approach, labral debridement comprises 11.6% of procedures as compared with labral repair, which accounts for 55.8% of open acetabular procedures. The difference in these figures between open and arthroscopic surgery and labral surgery are likely to reflect the surgical challenges perceived in labral stabilisation/ repair.

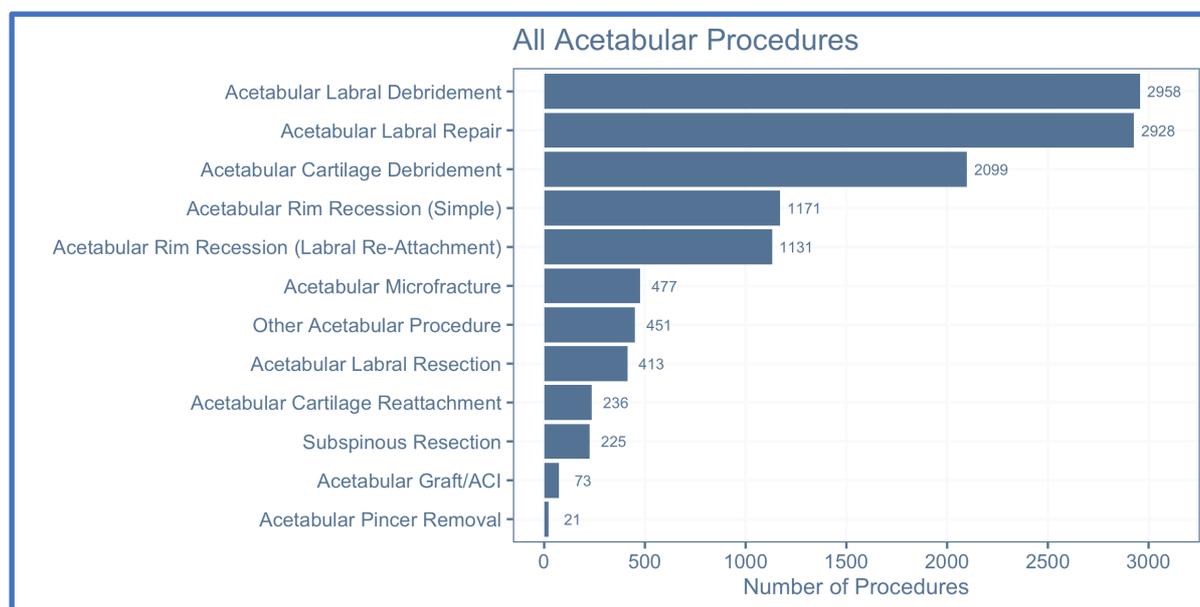


Figure 13 All Acetabular procedures

### 8.3 Femoral procedures

Figure 14 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 accounted for greater proportions of total femoral procedures recorded via arthroscopic (n=5,371 of 5,950, 90.3%) and open (n=103 of 145, 71%) approach. It is technically more challenging to perform an adequate cam resection arthroscopically with

many proponents of open surgery citing inadequate resection as a reason for failure of hip arthroscopy for FAI. Future reports may be able to study difference in outcome between these two groups. A very small number of cartilage procedures were recorded, including debridement, microfracture, cartilage grafting and core decompression.

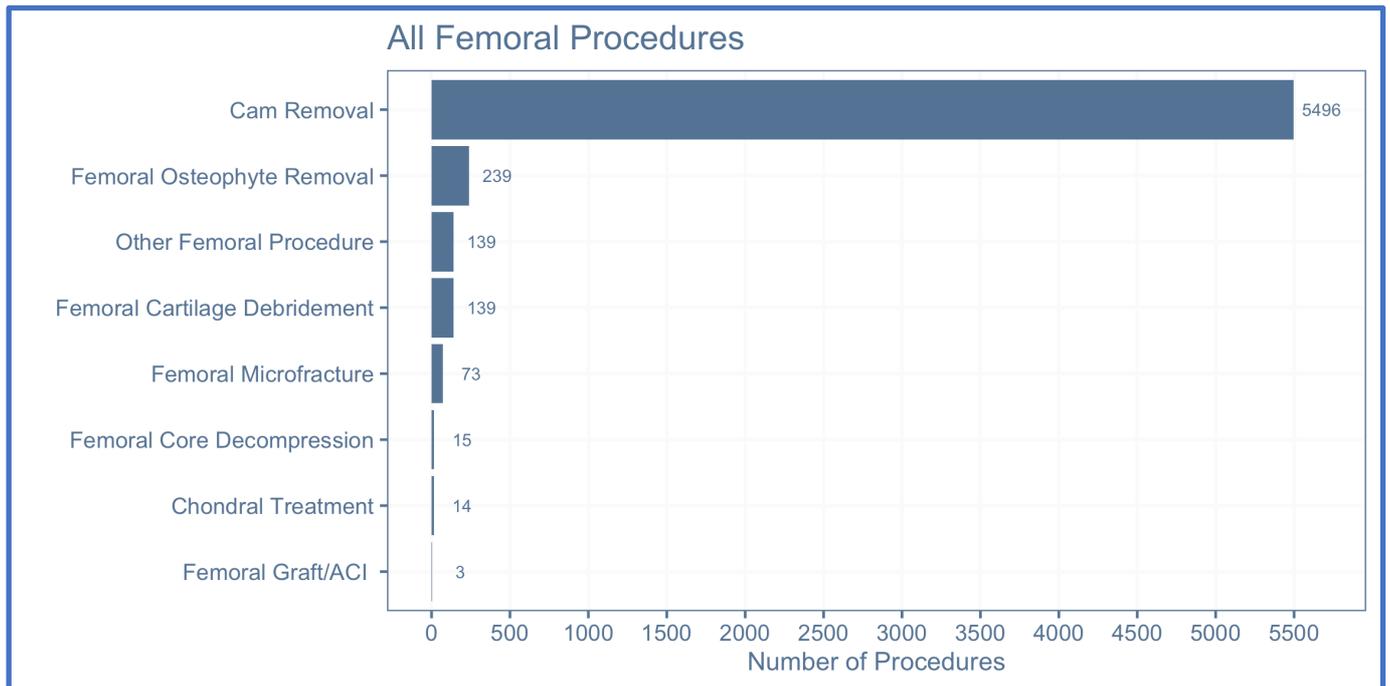


Figure 14 All Femoral procedures

## 8.4 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 15 shows the frequency of additional procedures recorded in the NAHR. Psoas release is still the most common additional procedure performed. Trochanteric bursal debridement has been recorded 95 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 15 cases entered.

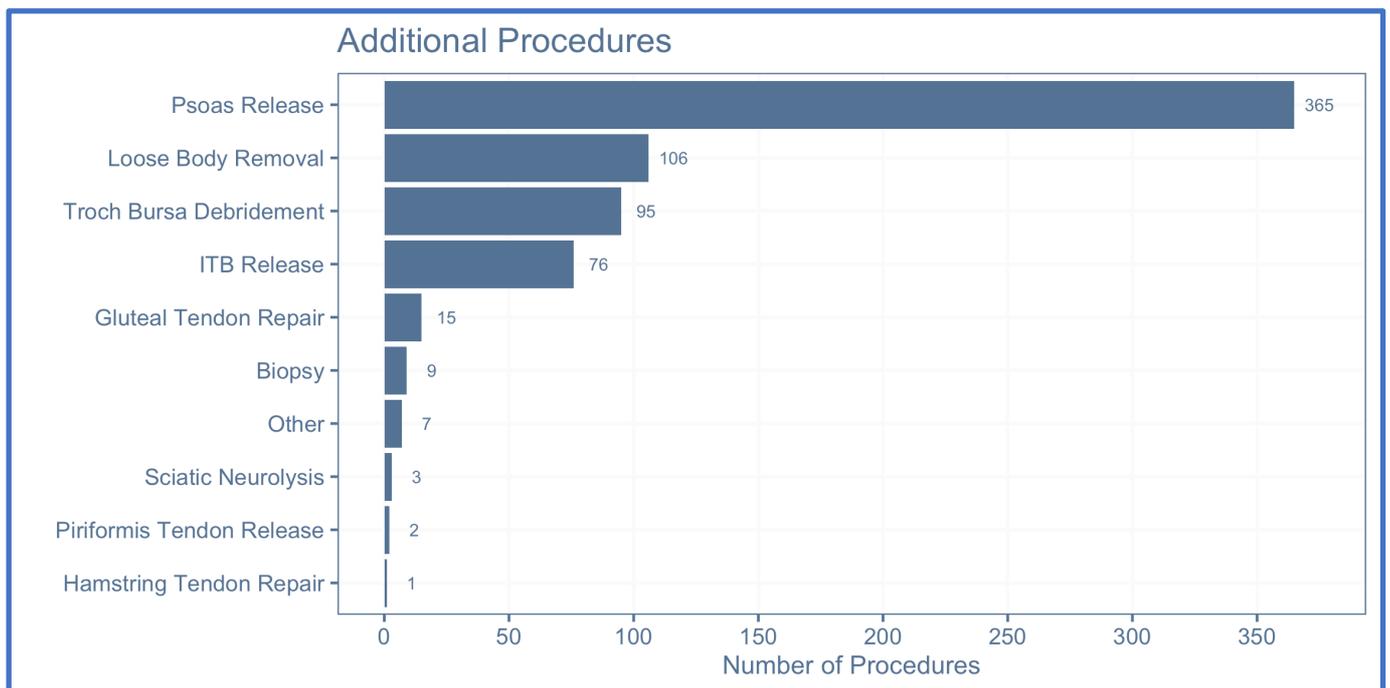


Figure 15 Additional surgical procedures

## 8.5 Periacetabular osteotomies

A total of 974 periacetabular osteotomies have been reported of which 934 were isolated and 40 combined with femoral osteotomy, the distribution of which is as below in **Figure 16**.

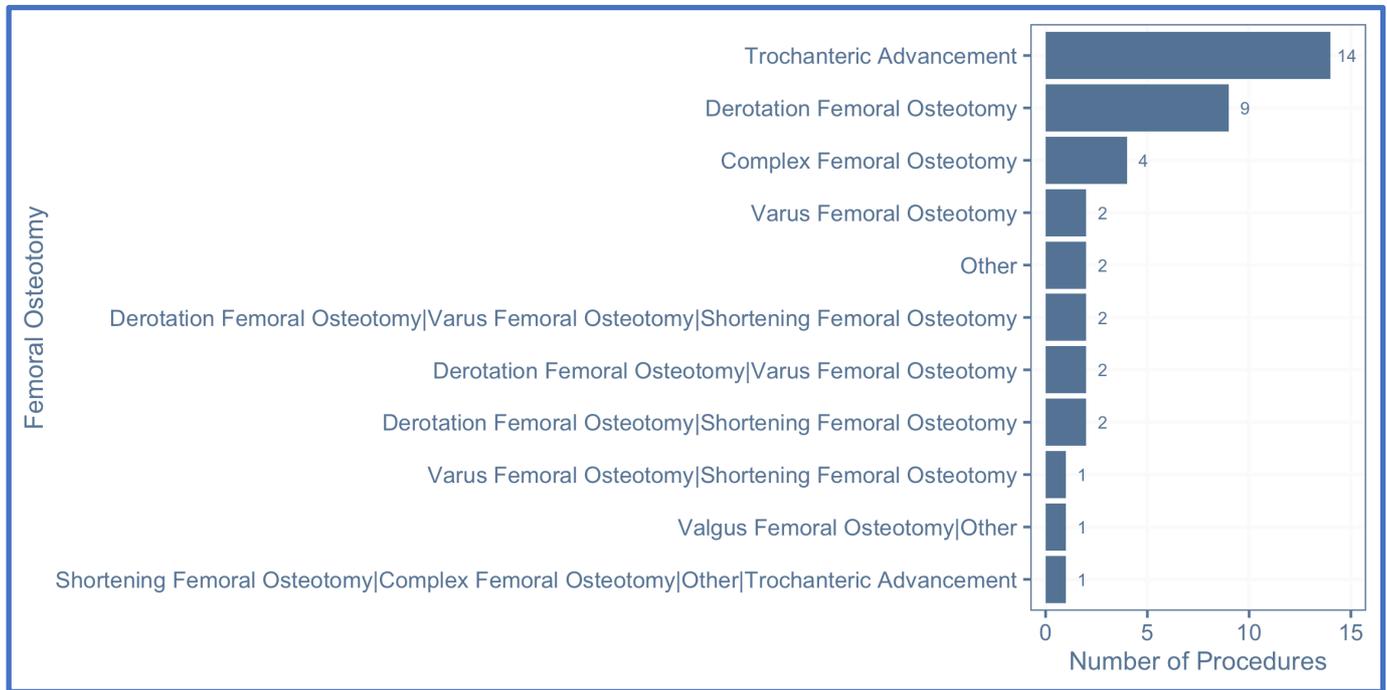


Figure 16 Combination of femoral osteotomies with PAO

## 8.6 Femoral osteotomies

A total of 106 femoral osteotomies have been recorded in the NAHR, 62 of which were isolated and 44 combined with other procedures (**Figure 17**).

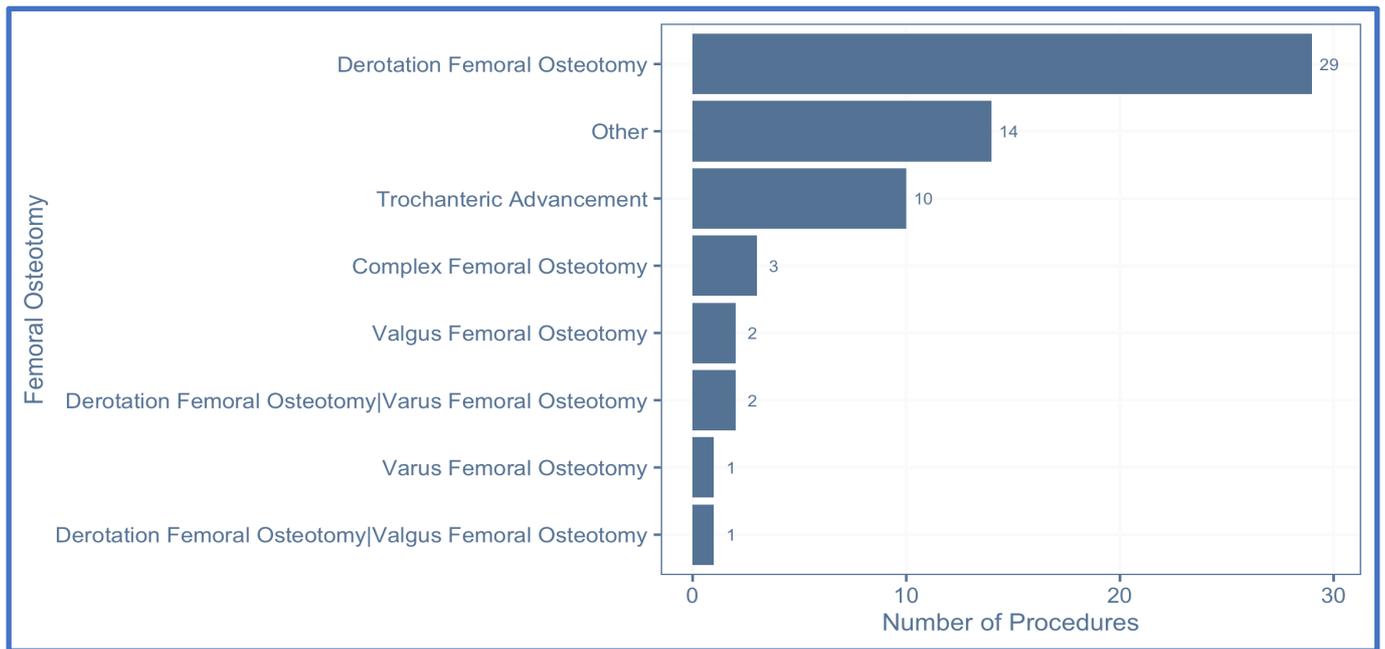


Figure 17 Types of isolated femoral osteotomies

## 9 Outcome scores

### 9.1 Overview

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

### 9.2 Outcomes of surgery for FAI

#### 9.2.1 Overall

We have reported the outcomes of FAI surgery where cam and/ or acetabular rim recession has been performed. There were 3,885 such procedures recorded in the NAHR. For the purposes of removing confounding factors given the variance in scores, patients who had additional procedures to the cartilage (approximately 2,000 cases), in the form of debridement and/or microfracture either on femoral or acetabular side have been removed in an attempt to remove confounding factors from this highly heterogeneous data. Research looking at the effect of cartilage procedures on outcome is ongoing and results will be presented in next year's report. Scores for these cases are shown in **Figures 18-20**. For the whole group there was significant improvement in the pre-operative iHOT-12 score at six months (mean iHOT-12 change 32.5 to 58.9,  $n=1,407$ ,  $p<0.0001$ ) and 12 months (meant iHOT-12 change 32.7 to 58.2,  $n=1,183$ ,  $p<0.0001$ ) post-operatively [Paired t-test]. Female gender was significantly associated with a greater improvement in iHOT-12 score (compared to pre-operative scores) at six months ( $p=0.0004$ ) and one year ( $p=0.006$ ) post-operatively, influenced by the fact that men start from a higher baseline pre-operative iHOT-12 score [independent t-test]. The two year post-op data is

not presented in the figures due to lack of numbers. ( $n = 180$ , 4.6%).

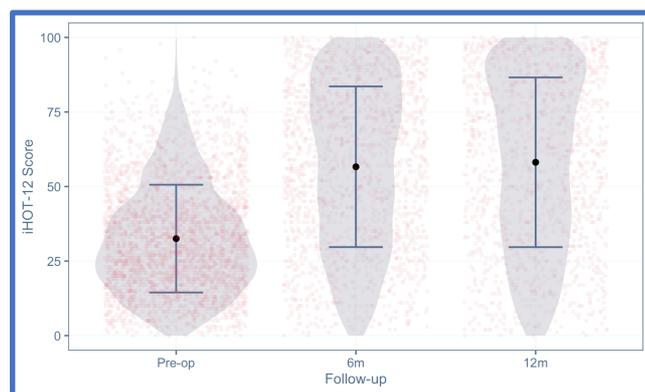


Figure 18 iHOT-12 – whole cohort

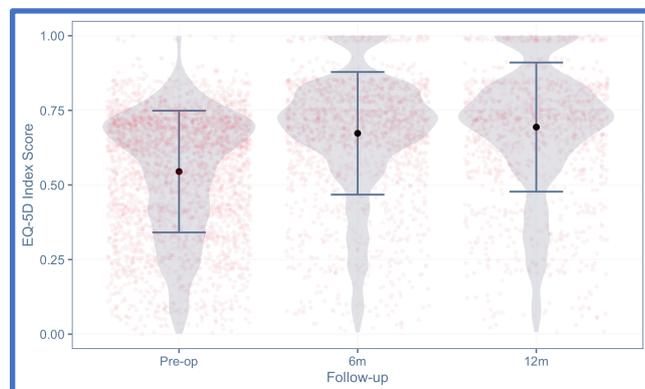


Figure 19 EQ-5D Index score – whole cohort

Figure 20 shows the iHOT-12 score with gender distribution. Females may start with a lower preoperative baseline score but catch up by one year.

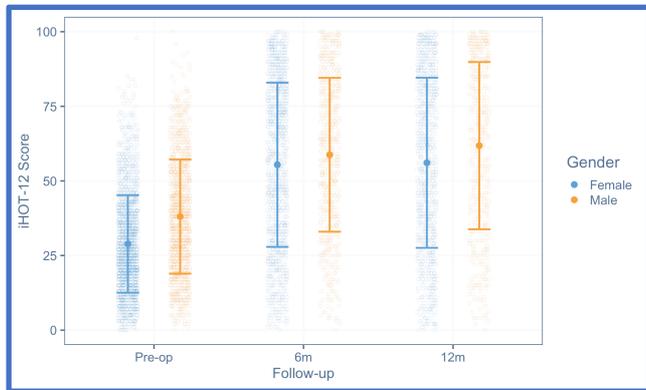


Figure 20 iHOT-12 with gender distribution

### 9.2.2 Results of FAI surgery for cam lesion

In this group, patients who had surgery for pincer lesions have been excluded. Results of the scores are shown in **Figures 21-22** and reported by gender in **Figure 23**. For isolated cam lesion surgery, there was significant improvement in pre-operative iHOT-12 scores at six months (mean iHOT-12 change 32.8 to 57.9,  $n=769$ ,  $p<0.0001$ ) and 12 months (mean iHOT-12 change 33.5 to 58.8,  $n=625$ ,  $p<0.0001$ ) post-operatively [*Paired t-test*]. In this year's analysis, female gender was no longer associated with significantly greater iHOT-12 score improvement at 6 months ( $p = 0.105$ ). There remained no significant difference in iHOT-12 improvement between genders at 12 months ( $p = 0.807$ ). Data from two years was not analysed due to small numbers who returned pre and post-operative scores ( $n=64$ ).

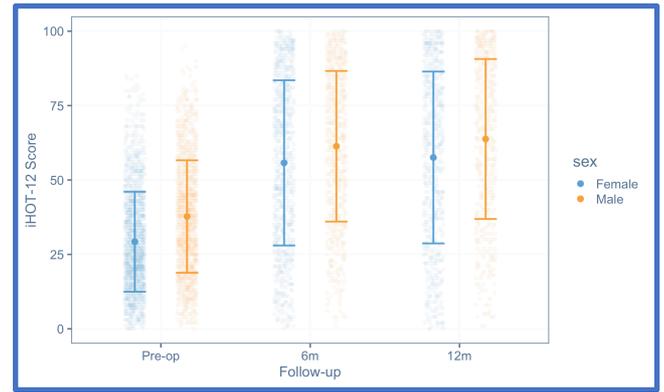


Figure 23 iHOT-12 – gender distribution – cam lesion

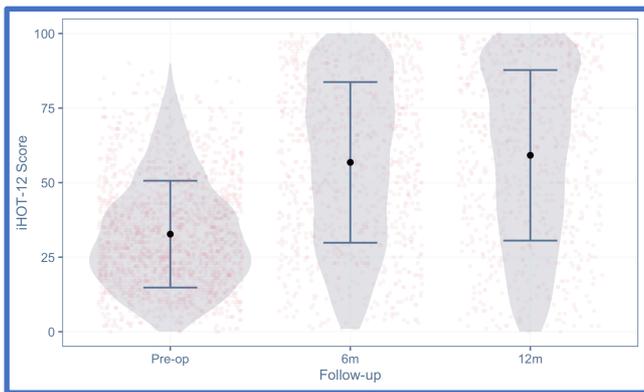


Figure 21 iHOT-12 – cam lesion

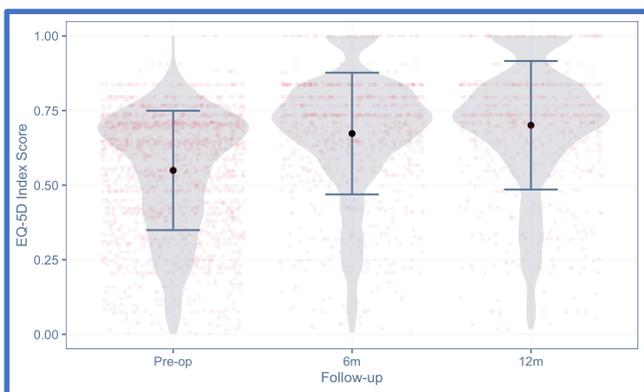


Figure 22 EQ-5D Index score – cam lesion

### 9.2.3 Results of FAI 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 isolated pincer lesion surgery there was significant improvement in pre-operative iHOT-12 scores at six months (mean iHot-12 change 29.9 to 52.4,  $n=140$ ,  $p<0.0001$ ) and 12 months (mean iHOT-12 change 30.4 to 52.3,  $n=133$ ,  $p<0.0001$ ) post-operatively [Paired t-test]. These scores are shown in **Figures 24-26**. Small numbers in the male group precluded any statistical analysis based on gender. Data from two years was not analysed due to small numbers with returned scores ( $n=27$ ).

Regarding acetabular rim recession, the NAHR records this as either complex (involving labral reattachment) or simple, which would include retro-labral rim recession, leaving the chondro-labral junction intact or rim recession of a calcified labrum with no clear labrum to detach. The outcomes of the iHOT-12 scores are shown in **Figure 26**.

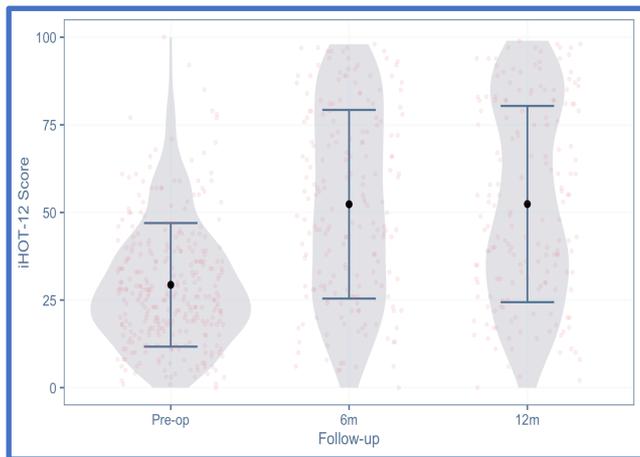


Figure 24 iHOT-12 – pincer lesion

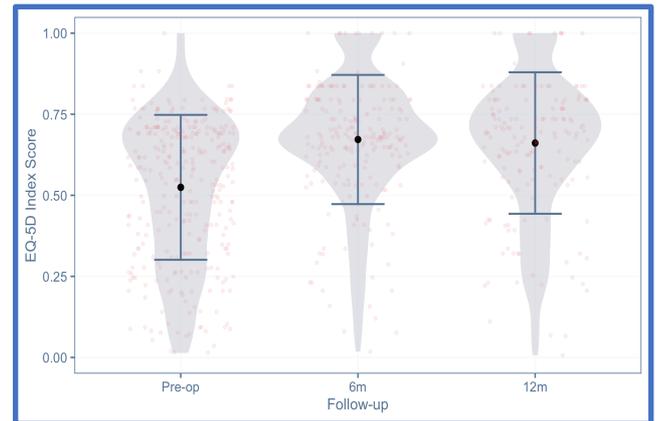


Figure 25 EQ-5D Index – pincer lesion

Between-group analysis comparing labral re-attachment vs simple rim recession showed no statistically significant difference in iHOT-12 score improvement at six months ( $n=133$ ,  $p=0.646$ ) or 12 months ( $n=128$ ,  $p=0.637$ ) post-operatively compared to pre-operative baseline [independent t-test].

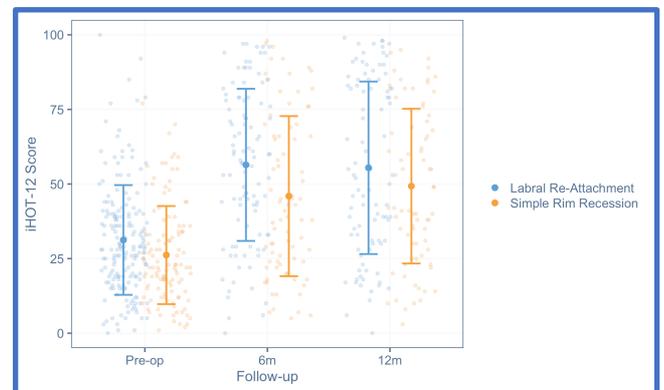


Figure 26 iHOT-12 - rim recession: simple vs complex (with reattachment)

### 9.2.4 Labral repair vs labral debridement

The optimal management of labral pathology is unclear. Although some studies have shown better outcomes with labral repair and preservation, these studies have not been randomised trials and selection bias makes interpretation difficult. Although similar bias is clearly relevant in this report, the data from the NAHR is grouped into three distinct categories – labral repair, labral debridement and those recorded as having both techniques. The outcomes of the three mandatory scores for labral debridement (LD) vs labral repair (LR) are shown in **Figures 27 and 28**. For patients undergoing pure ‘labral repair’ or ‘labral debridement’ as an acetabular procedure, there was significant improvement in pre-operative iHOT-12 scores at six months [mean iHOT-12 change LD 24.7 (n=365) vs LR 23.6 (n=402)] and 12 months [mean iHOT-12 change LD 25.4 (n=306) vs LR 26.2 (n=322)] post-operatively. There were, however, no significant between-group differences in iHOT-12 scores when comparing ‘labral repair’ vs. ‘labral debridement’ at each stage of follow-up (all  $p > 0.05$ , independent t-test). Pre-operative scores between the two groups are similar and there is a trend towards improvement out to one year with no clear difference between the two treatment groups. The EQ-5D VAS showed less evidence of an improvement post-operatively than other groups. Data from two years was not analysed due to small numbers (only 90 cases with pre and post-op scores).

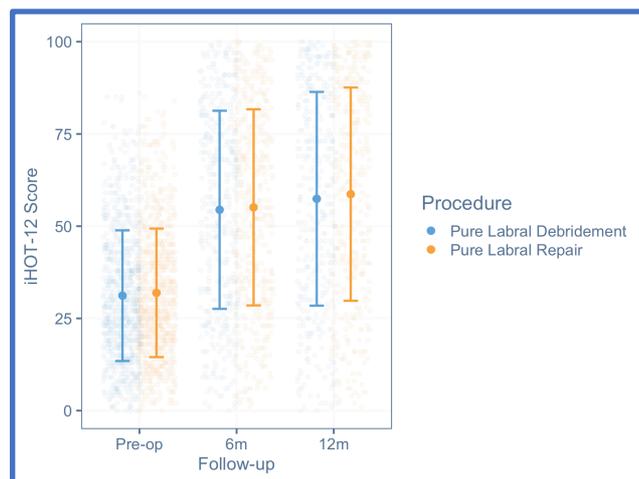


Figure 27 iHOT 12 - Labral debridement vs repair

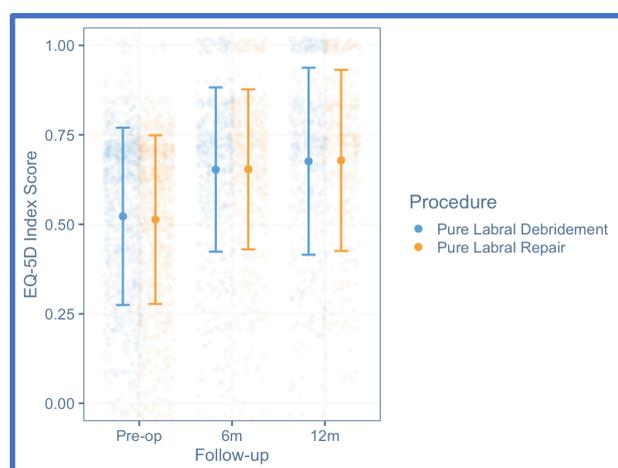


Figure 28 EQ-5D Index - Labral debridement vs Repair

**Figure 29** represents the outcome of iHOT-12 scores for the whole cohort with labral pathology against age. There appears to be good improvement with labral debridement or repair regardless of age. The graph shows scatter plots of age vs outcome score with a LOESS method-smoothing curve along with 95% confidence interval.

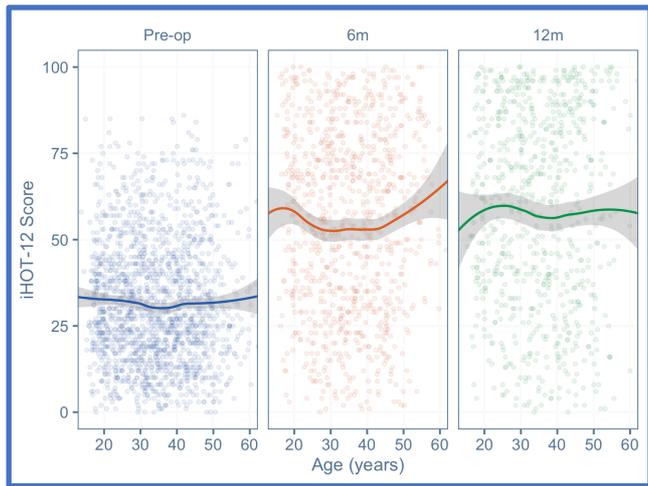


Figure 29 iHOT 12 - Labral pathology vs age

### 9.3 Outcome following isolated peri-acetabular osteotomy (PAO)

There are 964 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 significant improvement in pre-operative iHOT-12 score at six months (mean iHOT-12 change 29.2 to 57.0,  $n=422$ ,  $p<0.0001$ ) and 12 months (mean iHOT-12 change 30.0 to 64.5,  $n=364$ ,  $p<0.0001$ ) post-operatively [Paired t-test]. Data from two years was available for less than 10% of cases ( $n=88$ ).

There was no statistically significant difference in iHOT-12 scores between genders at each stage of follow-up for patients undergoing PAO. Note that there were only small numbers in the male group who returned both pre and post-op scores at 6 ( $n=29$ ) and 12 months ( $n=35$ ).

#### 9.3.1 iHOT-12 - PAO

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

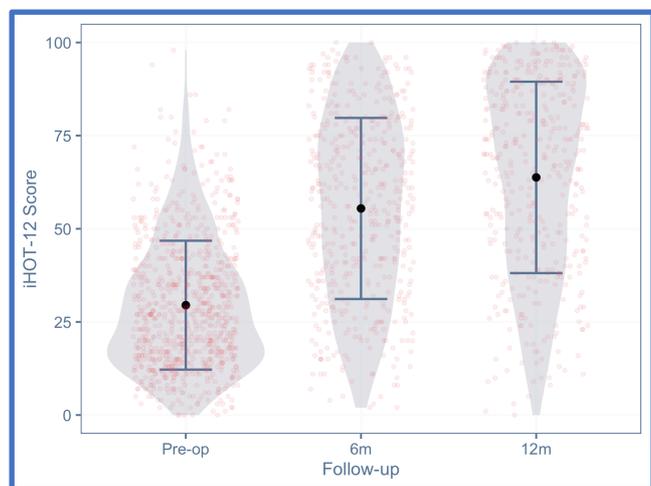


Figure 30 PAO iHOT-12 scores

#### 9.3.2 EQ-5D Index – 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.

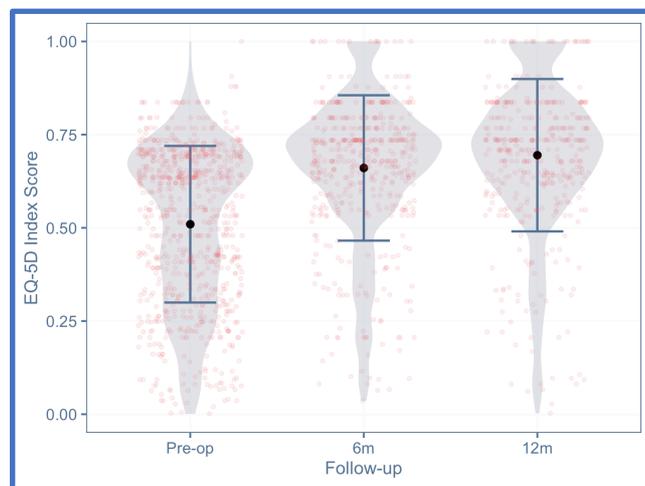


Figure 31 PAO EQ-5D Index scores

#### 9.3.2 Results of PAO vs age at time of surgery

Figure 32 illustrated the iHOT-12 scores of various age groups. All ages seem to benefit from surgery. 2-year data not presented due to small numbers. Graph shows scatter plot of age vs outcome score with a LOESS method smoothing curve along with 95% confidence interval.

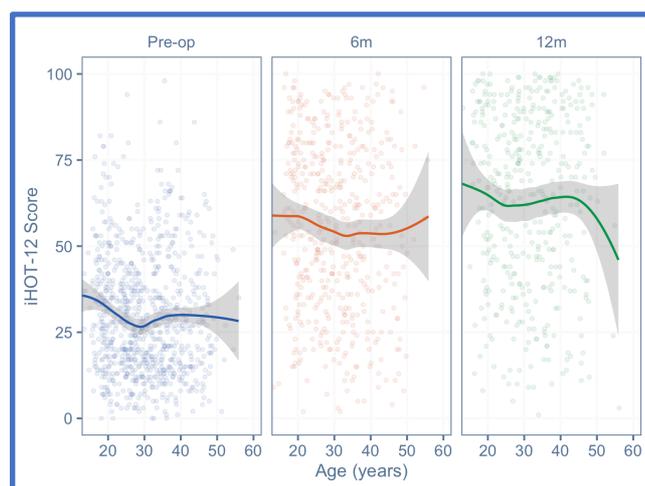


Figure 32 PAO iHOT-12 scores with age distribution

### 9.3.3 Results of PAO based on gender

Approximately 10% of patients undergoing PAO are males. **Figure 33** shows the iHOT-12 scores of patient's vs gender. Both males and females benefit equally from the procedure.

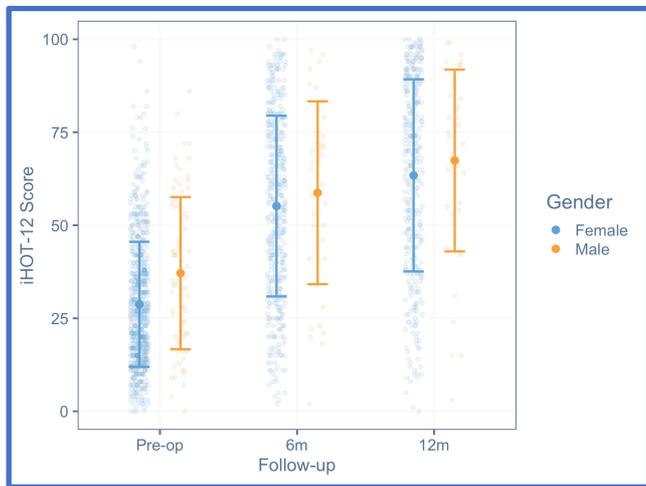


Figure 33 PAO iHOT-12 scores with gender distribution.

### 9.3.4 Results of PAO based on BMI

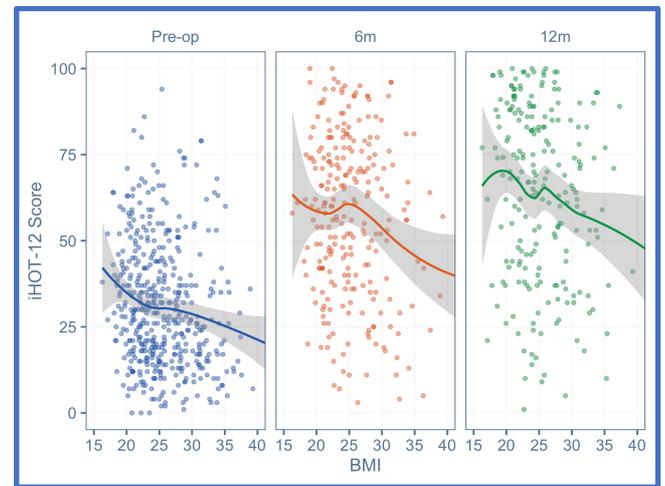


Figure 34 PAO iHOT-12 scores with BMI – LOESS line and 95%CI

## 10 Summary

The evidence for the role of non-arthroplasty hip surgery continues to develop. There are several randomised controlled studies ongoing around the world at the present time and two, FASHIoN & FAIT have already been published showing benefits of arthroscopic hip surgery over non-operative management. The improvement in clinical scores are, admittedly, modest but the data, as show in this NAHR report is highly heterogeneous and future work needs to focus on disease stratification and defining which subsets of patients benefit most from which surgical procedures.

The challenge for any registry is to develop a clearly defined minimum dataset which captures critical information, allowing useful analysis, while at the same time being succinct enough to minimise inter-recorder error and encourage complete data collection. In addition, the psychology of young adult hip pain is a confounder in both presentation and outcome and more work is needed to understand the impact of an individual's personal circumstances on the result of surgery.

The new MDS Version 2.0 is an enhancement of the previous version 1.1 and is substantial enough of a change to warrant a change in version numbers. The User Group have worked hard to add useful parameters while removing less used and less useful data points.

There has been a year on year increase in the number of pathways uploaded in 2019 compared with previous years, with 2,450 separate entries recorded. There has been a slight drop in the number of surgeons entering data this year, 56 compared with 64 the previous year. The User Group is working hard to understand if this represents low volume surgeons stopping surgery or non-submitted data. There remain a few high-volume surgeons contributing the majority of the data with over 55% of data submitted by only 10 surgeons. It is apparent

that a large number of surgeries are being performed by surgeons not entering data and this is an area that the Registry, the BHS as well as health care commissioners are keen to address.

The BHS and the registry are committed towards maintaining ownership of data in spite of the challenges of managing the increasing costs and governance regulations. Indeed, in recent years a number of patients have withdrawn consent for data collection with their records having been purged from the registry. The membership of TORUS, the BOA registry umbrella organisation, is seen as essential by all those at the registry and we hope that the BOA will continue to support TORUS in safeguarding the data use and independence of the NAHR and other smaller registries.

Compliance with recording patient contact details is seen as essential to improving longer term follow-up and the recoding of an email address has improved this year to over 90%. The recording of mobile phone details has not improved and remains around 50%. The new MDS Version 2.0 has improved methods of recording mobile number and we are hopeful that data capture will improve, and this will be reflected in next year's report. Making contact details mandatory is not considered an option as this may prejudice data entry if patients decide not to give consent because of a concern about entering email or mobile phone numbers. Recording of patient NHS numbers is also fairly static at around 75%. This represents those patients operated on the private sector not having an NHS number available. Although this is possible to overcome, again this is difficult to mandate without risking losing data entry.

Longer term data collection is the main challenge for the NAHR at present. Including only those eligible for follow-up, pre-op scores are recorded in 80% of cases but this drops to 40% at six months, 30% at 12 months and 5% at

two years. Data collection following surgery is an issue for all registries and the recent changes to data protection laws have done nothing to improve the opportunities to rectify this.

Looking at acetabular procedures, labral work is the most common surgical procedure with debridement (24.3%) and repair (24.0%) being equal in number over the duration of the registry although recent years have seen a significant increase in the rates of labral repair, likely due to a combination of improving surgical skills, training and instrumentation. Evidence for labral debridement vs repair is not level one but there is a suggestion from the literature that cases undergoing labral repair have an improved outcome. One explanation for this is that hips with a labrum which is felt more appropriate for debridement rather than repair may be in a worse general condition. Therefore, it is intuitive that those hips will have a worse outcome. Presently, the NAHR user group are closely examining the labral repair and debridement cohort with early analyses suggesting significantly improved outcomes in the repair group at 12 months follow-up after adjustment for other patient and surgical factors. This is an area that would warrant further study and data from the NAHR suggests a feasibility study for a randomised controlled study of labral repair vs debridement would be reasonable.

On the femoral side, cam removal remains the most commonly performed procedure at 90%. For isolated cam lesion removal, outcome scores are significantly improved at both six and 12 months post-operatively.

The increasing use of arthroscopic techniques for extra-articular problems are demonstrated with 95 cases of trochanteric bursal debridement recorded compared to 28 in 2016. Psoas release remains the most common extra-articular procedure performed.

There are 964 PAOs recorded on the registry and a smaller number of femoral osteotomies with derotation being

the most common type recorded. Outcome scores for PAO are again significantly improved at six and 12 months with no difference between genders although the number of males undergoing the procedure and with longer term follow-up is small.

Overall, arthroscopic hip surgery for FAI (with more complex acetabular and femoral procedures removed from analysis) demonstrates significant improvements in hip outcome scores with females having a significantly greater increase than males although men start from a significantly higher baseline score. The results from the NAHR registry support the findings of recent level one publications and are useful for surgeons, commissioners and, most importantly, patients.

For a registry to be able to provide this level of data in only its fifth report 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.

## 11 Future plans

The fifth annual report has continued to build on the work of last year. The efforts of the NAHR user group and the BHS in achieving this has to be recognised. In addition, the support of the BOA is essential to the progress that has been made and the future of the NAHR and other smaller orthopaedic registries.

Going forward, improvement in surgeon engagement and data collection remain the core themes for the NAHR. The development of a dedicated website in 2018 ([www.nahr.co.uk](http://www.nahr.co.uk)) is one step in this direction, improving access and visibility of the registry.

Attempts to improve surgeon engagement have been challenging. The possibility of mandating data entry is being explored and guidance on arthroscopic hip surgery has been developed. It is the view of the NAHR User Group that a large number of these procedures are being performed in the private sector and the majority of these are not being entered onto the registry. Clearly the CCGs have little control over this and therefore the User Group has also approached private medical insurers (PMIs) and private hospitals with initial positive results. It is clearly in the interests of the PMIs to help improve the quality of data with the NAHR. The data produced by this registry and in the literature will help guide best care for their clients and we look forward to developing closer links with other PMIs and private hospitals over the next year. Initial talks with Prof. Tim Briggs, National Director of Clinical Improvement for the NHS to understand our denominator and address mandating, have been positive and the NAHR will continue to work with him to address this issue.

Improving patient engagement with the NAHR is also key to improving long-term data. As this report clearly demonstrates, the low data returns post-operatively are a significant challenge to producing evidence of longer term results. The User Group is exploring the possibility of

employing a compliance facilitator via Amplitude to ensure patients can be followed up and post-op scores obtained. Methods of engagement such as motivational notifications for post-operative rehab, information about post-op rehab and physio regimes as well as collection of activity data are all areas that are being explored. Additionally, there is a possibility of joining forces with an existing healthcare app that monitors general well-being.

In order to develop many of these areas, finance is clearly necessary, and we are very grateful to our industry sponsors, Stryker Orthopaedics, Smith and Nephew and Arthrex who have supported the NAHR. We are approaching other industry partners for support over the next year.

Once again, the support of Amplitude, in particular Corri Conrad, David Selvey and Susan Williams, in developing the user interface and database is invaluable and appreciated.

Part of the mission of the NAHR is to use this data to generate research articles on different areas of non-arthroplasty hip surgery. A research request form has been developed and is available for download from the NAHR website. Data requests so far have resulted in podium and poster presentations at the meetings of the International Society of Hip Arthroscopy and Hip Preservation (ISHA), SICOT, BOA and the BHS. Two papers have been submitted to high impact factor journals and awaiting a decision. Going forwards, the Registry provides a perfect platform for clinical trials to be embedded within it as the infrastructure already exists.

We look forward to presenting the next report in 2021, and although the data in this report is not mature as yet, it clearly shows a trend of hip preservation procedures improving patient reported outcomes in the short-term. We hope that you have found this report interesting and thought-provoking.

## 12 Hospitals submitting data to the NAHR

- Ashford Hospital, Ashford
- Basingstoke and North Hampshire Hospital
- BMI Harrogate Hospital, Harrogate
- BMI Mount Alvernia Hospital, Guildford
- BMI Ross Hall Hospital, Glasgow
- BMI The Alexandra Hospital, Stockport
- BMI The Beaumont Hospital, Bolton
- BMI The Princess Margaret Hospital, Windsor
- BMI The Ridgeway Hospital, Swindon
- BMI The Runnymede Hospital, Chertsey
- BMI Winterbourne Hospital, Dorchester
- BMI Woodlands Hospital, Darlington
- Chapel Allerton Hospital, Leeds
- Circle Bath
- Circle Reading Hospital
- Colchester General Hospital, Colchester
- Derriford Hospital, Plymouth
- Doncaster Royal Infirmary, Doncaster
- Dorset County Hospital, Dorchester
- Evelina Children's Hospital, London
- Fortius Surgical Centre
- Frimley Park Hospital, Frimley
- Gartnavel General Hospital, Glasgow
- Great Western Hospital, Swindon
- Guy's Hospital, London
- Harrogate District Hospital, Harrogate
- Hereford County Hospital, Hereford
- Hexham General Hospital, Hexham
- Hospital of St John and St Elizabeth, London
- James Cook University Hospital, Middlesbrough
- James Paget Hospital, Great Yarmouth
- Jersey General Hospital
- King Edward VII's Hospital Sister Agnes, London
- Leeds General Infirmary, Leeds
- Leicester General Hospital, Leicester
- Lister Hospital, London
- Lister Hospital, Stevenage
- London Bridge Hospital, London
- London Clinic, London
- Musgrave Park Hospital, Belfast
- Neath Port Talbot Hospital, Port Talbot
- Northumbria Specialist Care Hospital
- Nuffield Health Cambridge Hospital, Cambridge
- Nuffield Health Chichester Hospital, Chichester
- Nuffield Health Exeter Hospital, Exeter
- Nuffield Health Glasgow Hospital, Glasgow
- Nuffield Health Leicester Hospital, Leicester
- Nuffield Health Newcastle upon Tyne Hospital, Newcastle upon Tyne
- Nuffield Health - The Manor Hospital (Oxford), Oxford
- Nuffield Orthopaedic Centre, Oxford
- One Hatfield Hospital

- Pembury Hospital, Pembury
- Peterborough City Hospital, Peterborough
- Princess Grace Hospital, London
- Queen Alexandra Hospital, Portsmouth
- Queen Elizabeth Hospital, Gateshead
- Ramsay Ashtead Private Hospital, Ashtead
- Ramsay Berkshire Independent Hospital, Reading
- Ramsay Duchy Private Hospital, Truro
- Ramsay Fitzwilliam Private Hospital, Peterborough
- Ramsay Oaks Private Hospital, Colchester
- Ramsay Pinehill Private Hospital, Hitchin
- Robert Jones & Agnes Hunt Orthopaedic Hospital, Oswestry
- Royal Berkshire Hospital, Reading
- Royal Bolton Hospital, Bolton
- Royal Bournemouth Hospital, Bournemouth
- Royal Cornwall Hospital, Truro
- Royal Devon & Exeter Hospital, Exeter
- Royal Infirmary of Edinburgh, Edinburgh
- Royal London Hospital, London
- Royal Oldham Hospital, Oldham
- Royal Orthopaedic Hospital, Birmingham
- Royal Victoria Infirmary, Newcastle Upon Tyne
- Sheffield Children's Hospital, Sheffield
- South West London Elective Orthopaedic Centre, Epsom
- Southern General Hospital, Glasgow
- Southmead Hospital, Bristol
- Spire Cambridge Lea Hospital, Cambridge
- Spire Cheshire Hospital, Warrington
- Spire Clare Park Hospital, Farnham
- Spire Dunedin Hospital, Reading
- Spire Harpenden Hospital, Harpenden
- Spire Hull and East Riding Hospital, Hull
- Spire Leeds Hospital, Leeds
- Spire Little Aston Hospital, Sutton Coldfield
- Spire Manchester Hospital, Manchester
- Spire Montefiore, Hove
- Spire Murrayfield Hospital Edinburgh, Edinburgh
- Spire Norwich Hospital, Norwich
- Spire Portsmouth Hospital, Havant
- Spire South Bank Hospital, Worcester
- Spire Southampton Hospital, Southampton
- Spire Thames Valley Hospital, Wexham
- St Albans City Hospital, St Albans
- St Anthony's Hospital, Sutton
- St George's Hospital (London), London
- St Michael's Hospital, Hayle
- Stepping Hill Hospital, Stockport
- The Alexandra, Cheshire
- The Vale Hospital, Hensol
- Torbay District General Hospital, Torquay
- Trafford General Hospital, Manchester
- University College Hospital, London
- University Hospital Llandough, Penarth
- Wansbeck General Hospital, Ashington
- Weston General Hospital, Weston-Super-Mare

- William Harvey Hospital, Ashford
- Wrightington Hospital, Wigan

### 13 Surgeons submitting data to the NAHR

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

Andrade, Antonio	Edwards, Andrew	Kumar, Arun
Ashworth, Mark	Fayad, Tony	Langdown, Andy
Aslam, Mohammed	Fehily, Max	Latimer, Paul
Bamford, David	Field, Richard	Lee, Paul
Bankes, Marcus	Garrett, Simon	Loughead, Jonathan Mark
Bartlett, Gavin	Gaston, Paul	Madan, Sanjeev
Batra, Gaurav	George, Marc	Malviya, Ajay
Biring, Gurdeep Singh	Glyn-Jones, Sion	Mason, Katy
Blakey, Caroline	Gray, Alistair	Massraf, Araz
Board, Timothy	Green, Robert	McBryde, Callum
Bonshahi, Ardeshir	Griffiths, Jamie	McClatchie, William
Brooks, Adam	Haddad, Fares	Middleton, Rob
Brooks, Ellen	Hashemi-Nejad, Aresh	Molloy, Dennis Oliver
Chana, Rishi	Hoad-Reddick, Adam	Newman, Simon
Clayson, Tony	Hollinghurst, David	Odutola, Adekoyejo
Cohen, Adam	Holton, Colin	Paliobeis, Christos
Collett, Leo	Housden, Philip	Panose, Praveen
Conroy, Jonathan	Howell, Jonathan Richard	Partington, Paul
Daivajna, Sachin	Hull, Jonathan	Patil, Sanjeev
Datir, Sandeep	Hutt, Jonathan	Politis, Angelos
Datta, Gorav	Jalgaonkar, Azal	Pollard, Tom
Davidson, Alastair	Joseph, Juhu	Rahman, Luthfur
de Roeck, Nick	Khan, Tahir	Rajpura, Asim
Divecha, Hiren	Khanduja, Vikas	Ramachandran, Manoj
Dodd, Matthew	Kiely, Nigel	Rao, Sudhir
Dunlop, Colin	Kim, Winston	Rigby, Michael
Dunlop, Douglas	Kokkinakis, Michail	Shah, Sanat
Eastaugh-Waring, Stephen	Kulkarni, Ashwin	Shardlow, David

Smoljanovic, Tomislav  
Stafford, Giles  
Stott, Philip  
Sturridge, Seb  
Talbot, Christopher  
Thomas, Phillip  
Timperley, John

Velayudham, Senthil  
Velayudham, Senthilkumar  
Villar, Richard  
Wardle, Nicholas  
White, Craig  
Whittingham-Jones, Paul  
Williams, Mark

Wilson, Matthew James  
Witt, Johan  
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Mr Callum McBryde

Mr Matthew Wilson