NHS England

GIRFT
GETTING IT RIGHT FIRST TIME

# National revision knee surgery programme

## End of pilot phase report

February 2026

British Orthopaedic Association

BRITISH ASSOCIATION FOR SURGERY OF THE KNEE

## Affiliated and collaborating organisations:

British Orthopaedic Association


## Contents

# Foreword by Professor Tim Briggs

The revision knee surgery programme represents one of the most significant service transformations in elective orthopaedics in recent years. Before its introduction, care across England was marked by unwarranted variation, low-volume practice and isolated working, with many patients not treated in the most appropriate setting. This was highlighted in the GIRFT national review of adult elective orthopaedic services in England report in 2015, with a recommendation that this service and others should be centralised into networks, enabling dedicated MDT discussion, with a central Major Revision Centre(s) for each network.

Through collective efforts across the clinical community, led by Professor Andrew Toms along with the British Orthopaedic Association (BOA) and British Association Surgery of the Knee (BASK), the pilot phase has delivered a major shift in how revision knee care is organised. Regional networks, clear clinical standards, strengthened MDT working and a fairer financial model have already improved outcomes. Re-revision rates are falling, low-volume activity is reducing, and more patients are receiving care from experienced teams working within strong governance structures.

Importantly, this progress has been achieved without new funding. By redistributing existing resource to support Major Revision Centres and the complexity of the cases they manage, we have created a sustainable model aligned with the GIRFT principle of delivering the right care, in the right place, at the right time.

The pilot phase shows the impact of clinically led change. Engagement from BASK, BOA and the wider surgical community has been exceptional, and the emerging evidence strengthens the case for minimum-volume expectations, MDT-driven decision-making and consistent organisational standards.

As we move into phase two, our focus must be on consolidation and consistency. Networks must reach full maturity, providers must engage meaningfully in MDT processes, and NHS and independent sector sites must be held to the same standards. The 2026-2029 goals provide a clear roadmap for achieving this.

Revision knee surgery remains technically demanding and resource-intensive. I am immensely proud of what has been achieved. Through continued collaboration, transparency and a relentless focus on outcomes, we will deliver even greater benefits for patients and embed this model as the accepted standard of care across England. Based on the success of this work, other orthopaedic arthroplasty specialties are now engaging to adopt similar models.

**Professor Tim Briggs CBE**

***GIRFT programme lead and NHS England National Director for Clinical Improvement, Elective Recovery and UEC***

*Professor Tim Briggs is a consultant orthopaedic surgeon at the Royal National Orthopaedic Hospital NHS Trust, where he was medical director for 15 years. He developed the GIRFT programme from his national review of orthopaedic surgery while president of the British Orthopaedic Association in 2013 and continues to lead the programme today. In 2015 he was appointed into a national director role for clinical improvement, and in 2022 appointed as National Director for Clinical Improvement and Elective Recovery for NHS England.*

## Executive summary

A new service model for revision knee surgery has been delivered by redistributing existing funding. This has directly improved patient outcomes and reduced the number of low volume surgeons and centres. This has resulted in savings for the NHS.

Continued support for the current model is required to maintain these benefits and drive further improvements and cost savings.

- Revision knee surgery is expensive, complicated and can have very poor outcomes. There are approximately 6,500 operations per year in England and Wales.
- Patient outcomes following revision knee surgery have improved following the introduction of a regional network service structure in 2022.
- The aims were to introduce national standards and guidelines for patient care, address low volume units and surgeons, and support specific nominated centres to take on complex and infected revisions.
- The service restructure has been delivered with engagement from the surgical community. It is supported by national organisations including NHS England, the British Association for Surgery of the Knee (BASK), and Getting It Right First Time (GIRFT).
- Revision knee networks have standardised care across England as defined by GIRFT, BOA and BASK revision knee working group (RKWG) best practice guidelines.
- Revision knee services have been organised, within regions, into 24 networks. These networks cover all NHS providers within England.
- Regional networks consist of several Revision Units (RUs) working with a Major Revision Centre (MRC). Some very low volume units have been designated as Primary Arthroplasty Units (PAU), and they will no longer be delivering routine elective revision knee surgery. The MRC specialises in the most complex revision work, including peri-prosthetic infection, and supports the administration and governance of the network.
- Patient care is now co-ordinated through a multidisciplinary team structure.
- The NHS trusts appointed as MRCs have been resourced to deliver this activity. This has been achieved without the requirement for new funding by ‘top slicing’ existing tariff and redistributing this money to provide infrastructure support for the networks and their MDTs and complexity top-up funding to offset the cost of providing care to the most complex revision patients.
- Both the re-revision rate (the number of patients requiring a further revision operation) and hospital length of stay have reduced following implementation of this service model.
- This is reducing the costs associated with revision knee surgery and, as a result, saving money for the NHS.

- There is robust evidence that outcomes meaningful to patients are linked to surgical volume at both a surgeon and centre level. Low-volume revision knee surgery practice is reducing in England.
- A national revision knee educational course has been developed so that revision surgeons can access specific continuing medical education.
- All providers of revision knee services are involved in continual audit to monitor delivery of care and specific patient-centred outcomes against agreed national standards.
- Specific, measurable goals have been defined for phase two of the programme (2026-2029). These will establish whether patient care continues to improve as the network model for revision knee care becomes embedded as 'standard of care'.

## Background

Despite improvements in knee replacement surgery the number of revision (re-do) knee replacements continues to rise.[1] Reasons for revision surgery include problems with implants (breakage, loosening, wear) or infection. Revision surgery is challenging, expensive, has high complication rates and can have poor outcomes.[2] These operations place a significant burden on patients, their carers and the hospital teams that deliver their care. The most complex cases include patients with periprosthetic knee joint infections, who have a higher five-year mortality rate than many cancer patients.

In 2015 GIRFT published a national review of adult elective orthopaedic services in England.[11] The GIRFT report highlighted national variation in the delivery of revision knee surgery services and emphasised the need to improve outcomes, enhance safety, address unacceptable variation in practice and identify and disseminate best practice for these services. Revision knee arthroplasty had previously been a problem too difficult to address as it required a co-ordinated approach across many domains. The GIRFT report provided the foundation for change.

Following this report Professors Tim Briggs and Andrew Toms worked alongside NHS England, NHS Improvement and specialised commissioning to develop a financial model to address these challenges, unblock the system and create an environment that supported change in practice and service improvement. At the same time, the British Association for Surgery of the Knee revision knee working group (BASK RKWG) was developed to provide clinical direction and oversight. This group focused on collaboration, clinical standards, educational priorities and the development of a research-led evidence base.

Prior to the development of the national revision knee surgery programme there was no infrastructure, organisation, patient support services or multidisciplinary teams that characterise successful networks delivering complex care within the NHS. Additionally, there were no national standards, guidelines or education programmes. The delivery of revision

services across the United Kingdom was haphazard, with care often provided by low volume centres and by surgeons who rarely do this type of surgery.[3] Within the UK this patient group represents some of the most disadvantaged, disappointed and dissatisfied patients in our health system.

The core aim of the programme is to improve patient care by addressing organisational challenges, establishing networks, producing guidelines and audit standards, and putting multidisciplinary team discussions at the centre of patient care. The results from the James Lind Alliance priority setting partnership process in revision knee replacement reinforced this, with patients' top three priorities being the investigation and management of the problematic knee replacement, the investigation and management of the infected knee replacement and the organisation and delivery of care. [4] As a result, these have been the first key areas that the revision knee surgery programme developed guidance on. These standards and guidelines have now been published and are publicly available on the British Orthopaedic Association (BOA) website.[5]

Delivering excellence in surgery was only one part of the programme. We also recognised the need to improve patient support services, provide non-surgical care for the management of patients for whom revision surgery is not indicated, support the education and training of revision knee surgeons and develop high quality evidence to support further service improvement.

## Standard of care prior to the NHS England revision knee pilot (pre-2022)

Prior to the introduction of the national revision knee surgery programme there was no formal structure defining the delivery of revision knee surgery services. Informal referral networks based on historical relationships were present in some areas, but the standard of care was for isolated working without multidisciplinary team involvement. Most of the surgeons undertaking revision knee procedures were performing low volumes (median annual volume was extremely low, at one procedure per year).[3]

Revision knee surgery was funded via a flat tariff, with all procedures attracting the same payment irrespective of case complexity. This was increasingly becoming a problem as more complex work (the treatment of prosthetic joint infections, complex multiple revisions, case requiring plastic surgical support) was gravitating towards specific centres. For these complex cases tariff did not cover the cost of delivering care, and as a result these services were running at a financial loss.

The standard of care could be summarised as:

- No clinical guidelines or standards.
- No service specification defining revision knee surgery services.
- No networks, collaboration or infrastructure.
- An inadequate payment system for case complexity (Figure 1).
- Low volume centres and surgeons.
- No evidence to support clinical decision making.
- No core education to support the professional development of revision knee surgeons.

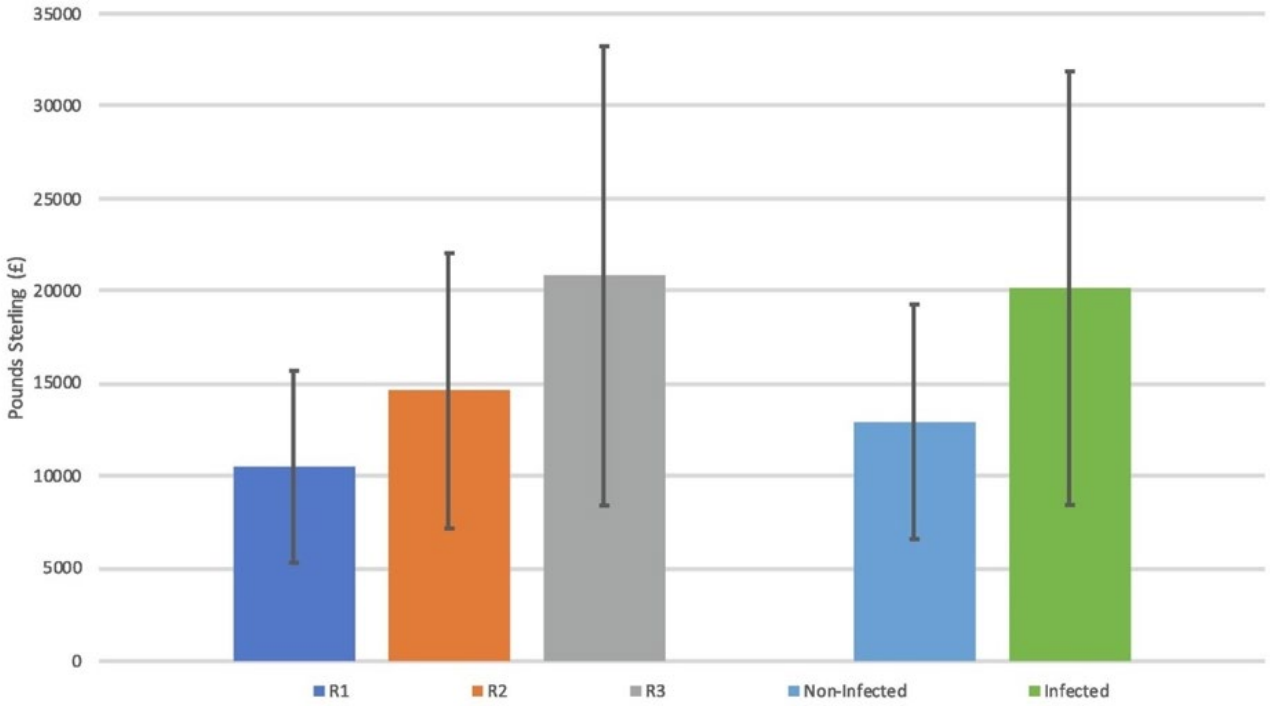


**Figure 1: Cost of delivering revision knee surgery dependent upon the complexity of the revision case (R1 least complex, R3 most complex) and dependent upon the presence of infection.**

Reproduced from Petrie et al. under Creative Commons Licence 4.0(50))[6]

## Objectives of the revision knee surgery programme

The issues highlighted with standard NHS care led the surgical community to develop a revision knee working group (RKWG) to develop a new model for care. The RKWG comprised approximately 20 revision knee surgeons who were active members of the British Association for Surgery of the Knee (BASK). At the outset it invited representation from GIRFT, medical directors and commissioners.

The RKWG defined the following core objectives:

- Develop clinical guidelines and standards of care for revision knee surgery through consensus.
- Work with NHS England to define the service specification for revision knee surgery services.
- Engage with the clinical community to identify existing networks and build new collaborations to support a network-based MDT driven model.
- Identify clinical leaders within revision knee surgery to support the delivery of the new model and service specification.
- Work alongside NHS England, GIRFT and professional organisations to ensure political support and leadership.
- Restructure finances to support network development, MDT working and provide adequate remuneration for the provision of the most complex revision work.
- Generate evidence to support the new model and embed this research within clinical practice.
- Develop education content for revision knee surgeons.
- Ensure holistic wrap around care for revision knee surgical patients, similar to cancer care.
- Support ongoing audit and governance of revision knee surgery to allow ongoing data driven service improvement.

The programme developed four key clinical goals. These goals support the improved surgical care of all patients with problematic knee replacements, including those that require revision surgery and those for whom revision surgery is not possible or not appropriate:

1. Decrease low volume surgery, both centres and surgeons.
2. Establish and support Major Revision Centres (MRCs).
3. Develop regional clinical governance via MDTs.
4. Introduce non-surgical pathways.

Delivery of these objectives is overseen by a national steering group compromising a chairperson (Prof A Toms 2018-2025, Prof P Baker 2026-Present) and consultant surgeon / allied health professional members.

The pilot phase of the programme ran for three years from 2022 to 2025. Following the pilot phase, we are now entering an 'accepted standard of care' period (phase 2) which will run between 2026-2029. Phase 2 defines a second period of evaluation that will ensure benefits are maintained and document further improvements in care.

## Clinical guidelines and standards of care

Revision knee surgery services are now underpinned by comprehensive clinical guidelines that define the expected standard of care. These documents provide standards for audit, performance management and ongoing service improvement.

**Enforcement of these standards will improve outcomes for patients and reduce the cost of revision knee surgery for the NHS.**

The revision knee surgery programme developed a comprehensive suite of clinical guidelines and standards of care documents. These documents define how revision knee services in England should be delivered and cover prosthetic joint infection, investigation of problematic knee replacement and organisation of revision services as follows:

1. Revision knee replacement surgery in the NHS: A BASK surgical practice guideline.[7]
2. Investigation and management of prosthetic joint infection in knee replacement: A BASK Surgical Practice Guideline.[8]
3. Investigation of problematic knee replacements. [9]

These guidelines were supported by a comprehensive Guide to Practice in Revision Knee Surgery, published by the British Association for Surgery of the knee (BASK) with support from the British Orthopaedic Association (BOA) and GIRFT, and summarised in three British Orthopaedic Association Standards of Care (BOASTs). [10,5]

Together these published, peer-reviewed guidelines cover:

- **Organisational aspects of revision knee surgery**, including how to set up a revision network, define surgeon and unit volumes.
- **Multidisciplinary working**, including defining the composition of the multidisciplinary team and frequency of MDT meetings.

- **Best clinical practice**, for example how to investigate and treat prosthetic joint infection and patients with painful knee replacements.

The standards set out in these guidelines form the basis for the national audit project which has been undertaken to monitor the changes in patient care which have been delivered since the implementation of revision knee networks. They provide a clear standard of care against which we have been able to audit and measure clinical practice, and to demonstrate improved clinical care, as outlined later in this report.

# Network organisation

## Network structure

During the pilot period (2022-2025) a total of 24 Major Revision Centres (MRC) and associated networks were commissioned by the regional commissioning teams (Figure 2). Modelling suggested 20 networks were required for delivery of revision knee services. However, local commissioning discussions resulted in 24 appointments in two phases. In phase 1, 19 MRC/networks were appointed and in phase 2 an additional five MRC/networks were appointed (three in the Midlands, one in the South East and one in the East of England).

Revision knee surgery services are now provided around regional networks of care. A regional network consists of a Major Revision Centre (MRC) and several Revision Units (RUs). Primary Arthroplasty Units (PAUs) undertaking only primary arthroplasty should refer their revision caseload to the MRC or RU within their regional network.

The following criteria were used to select the MRCs during the pilot phase:

- a high-volume revision knee unit with established tertiary referral practice
- a unit with multiple surgeons already supporting a regional practice
- demonstrable support from senior management and finance director to be a regional lead centre for complex revision work
- on site microbiology expertise
- direct access to plastic surgical support
- a nominated clinical lead prepared to play a significant leadership role within the new network.

The national distribution of the appointed MRCs is shown and listed below.

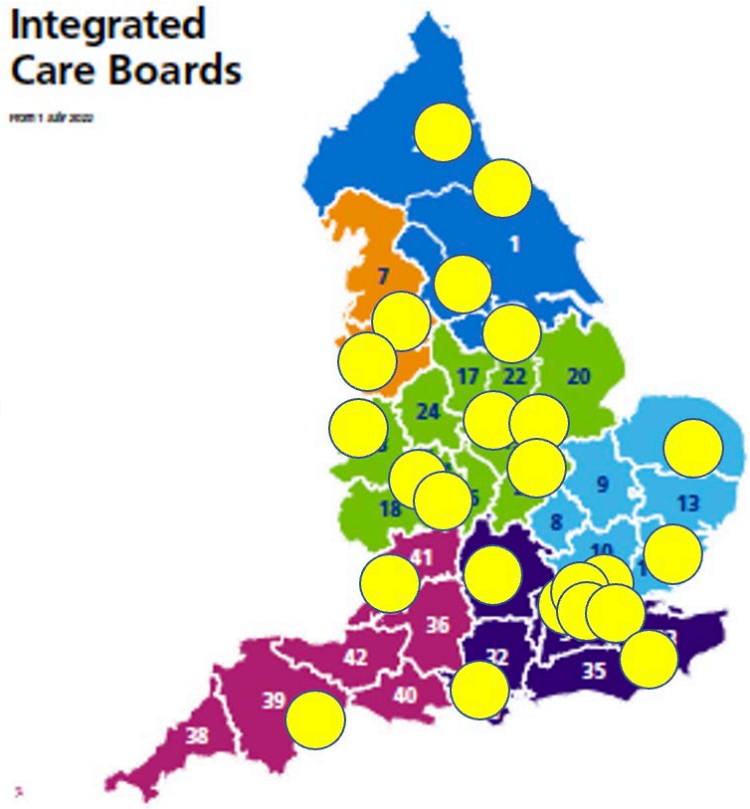


**Figure 2: Map of the 24 MRCs across England's seven regions.**

**Regional Networks:**

**London**

- Guys and St Thomas
- Barts Health
- SWLEOC
- Stanmore
- Imperial

**East of England**

- Norfolk and Norwich
- Colchester

**North West**

- Wrightington
- Liverpool

**South East**

- East Kent University Hospitals
- Nuffield Orthopaedic Centre, Oxford
- Portsmouth

**South West**

- Exeter
- Bristol

**Midlands**

- ROH Birmingham
- Nottingham
- Robert Jones and Agnes Hunt (Oswestry)
- Derby
- Leicester
- Coventry

**North East**

- Leeds
- South Tees
- Sheffield
- Newcastle/Northumbria (shared role)

## Network function

### Primary function

The primary function of the regional revision knee network and associated revision multidisciplinary team (MDT) meeting is to support patient care and clinical decision-making with respect to the delivery of revision knee surgery. The network's focus is to ensure patients receive the best care, delivered in a timely fashion by the most appropriate clinical team, in the most appropriate hospital in the region.

### Secondary function

The secondary function of the regional revision knee network and associated revision MDT is to ensure that essential organisational tasks are completed in a timely manner such as communication, documentation and delegation of clinical tasks.

The networks ensure care is delivered according to current clinical practice guidelines relating to revision knee surgery. It ensures that hospitals undertaking revision procedures within the network comply with recently established standards of care,[7–10] unit quality assessments,[11] and recently published surgical practice guidelines (BOA Elective practice guidelines) for the treatment of revision knee surgery patients.[5]

## Revision sites and service specifications

The service specifications and clinical practice guidelines for revision knee surgery describe three categories of revision sites:

- **Major Revision Centre** - the lead site for the regional network.
- **Revision Units** - units performing >30 knee revisions per year. These sites undertake revision procedures supported by the regional revision knee surgery network and regional MDT.
- **Primary arthroplasty units** - units performing <30 knee revisions per year. These sites should not undertake revision procedures and should deliver primary arthroplasty only.

To support decision-making in revision knee surgery a complexity grading classification was developed, the Revision Knee Complexity Classification (RKCC).[12] This is a critical tool to inform MDT communication and discussion and support identification of more complex cases. This grades revision knee patients from R1 (least complex) to R3 (most complex).

Revision Units will typically carry out R1 (least complex) first time revision surgeries, some R2 (moderately complex) revision surgeries and the initial assessment and care for infected knee arthroplasty cases. More complex primary revision surgery (R2 or R3) and re-operation

for infection should be discussed in the regional MDT and, if required, care transferred to the Major Revision Centre for specialist care.

All revisions should be complexity graded using the Revision Knee Complexity Classification.[9]

'Simple revisions' (RKCC grade 1 cases) should be discussed and recorded within a local revision MDT. 'Complex revisions' RKCC grades 2 and 3 should be discussed and recorded within a regional revision MDT. Where possible, discussions should occur prior to surgery but, if this is not possible (e.g. acute infection, periprosthetic fracture etc.), cases should be discussed retrospectively. The regional MDT incorporates a Prosthetic Joint infection (PJI) MDT attended by microbiology and infectious diseases consultants to aid discussion and management planning for prosthetic joint infection cases. The MDT brings together staff with the necessary expertise (knowledge, skills and experience) to ensure high quality diagnosis, treatment and care for patients. It makes recommendations for the care of patients and supports clinical decision-making; however, the final management decisions are made by the patient, in discussion with their local clinician.

A low volume unit is defined by a revision caseload of less than 30 per year. The literature suggests that there is an important link between surgical volume at the unit level and the outcome of surgery.[13,14] Units with a case load of 25-35 must closely audit their results and change practice if adverse variation in outcome is detected. Any unit undertaking revision surgery should have at least two surgeons regularly undertaking revision knee replacement procedures. High volume units need to ensure that all their surgeons meet the minimum volume caseload. A low volume surgeon is defined by a revision caseload of less than 15, irrespective of their unit volume.

These services must be job planned and supported by appropriate specialist nurses and administration staff. Surgery should only be delivered in units with ring-fenced dedicated elective orthopaedic wards and clean air orthopaedic theatres.

All units undertaking revision surgery should collect data regarding defined auditable standards of care, with regular internal and external review through regional governance and audit meetings, the GIRFT annual review and a national network reporting process. All surgeons and hospitals providing revision knee services should comply with the standards laid out in the Good Practice Guide.

Units performing revision surgery should use loan implant equipment only in exceptional circumstances.

Second opinions, dual consultant operating and clinician passports are to be encouraged. Dual consultant operating in complex revision cases should be supported within job-planning at the local level.

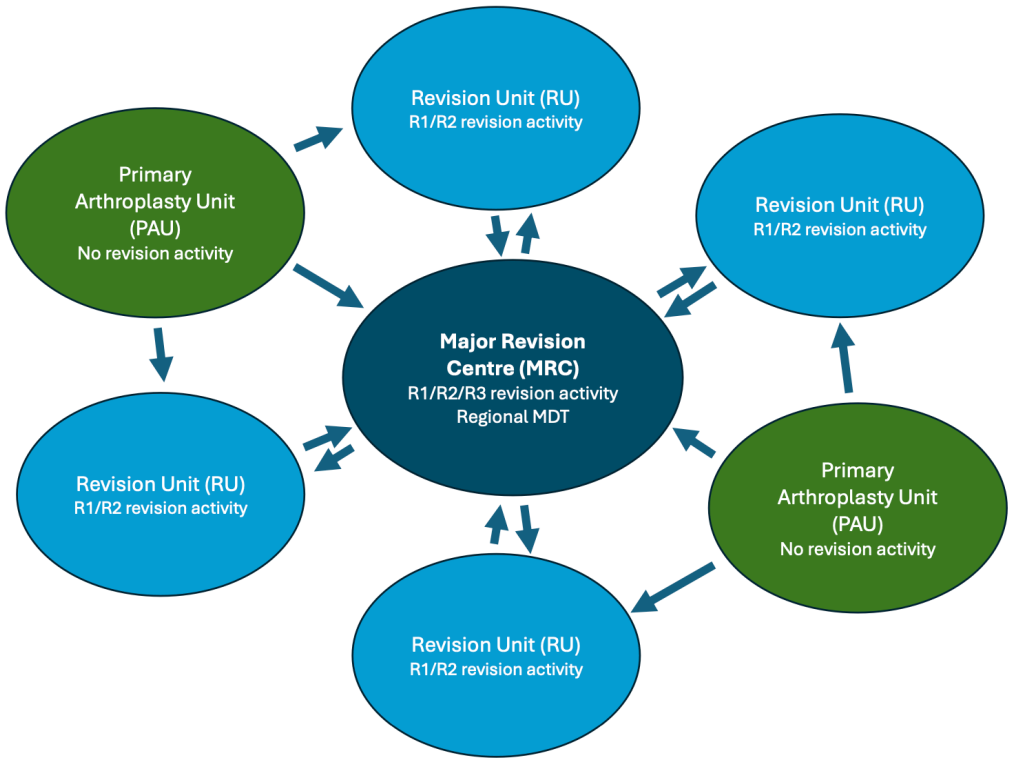


**Figure 3: Network structure comprising a Major Revision Centre (MRC) working alongside Revision Units (RUs) and Primary Arthroplasty Units (PAUs).**

Note: Patients care can move from RU to MRC and vice versa to allow delivery of care closer to home if appropriate.

## Evidence for the revision knee model and standards of care

The network MDT-led care model is acceptable to patients and is associated with improved patient outcomes. Evidence supports the introduction of minimum surgeon (15+ cases per year) and centre (30+ cases per year) volume standards.

**Enforcement of volume standards and MDT working will improve outcomes for patients and reduce the cost of revision knee surgery for the NHS.**

Research delivered by a GIRFT fellow as part of the revision knee surgery programme pilot has produced evidence that directly influences clinical care. This evidence justifies the published clinical guidelines and standards of care.[2-8] The key findings from the evidence are:

1. **There is a surgeon volume impact for revision knee surgery**: Surgeons performing 10 or more aseptic first-time revisions/year demonstrate a 22% reduction in re-revision rates. High-volume experience improves technical proficiency and patient outcomes in simple revisions.

**Evidence source:** Matthews AH, Gray WK, Evans JP, Evans JT, Lamb SE, Porteous A, Briggs T, Sabah SA, Alvand A, Toms A, Price A. Higher surgeon volume reduces early failure in first time revision of non-infected total knee arthroplasty: An analysis using data from the United Kingdom National Joint Registry. Knee Surgery, Sports Traumatology, Arthroscopy. 2025; 0-0. https://doi.org/10.1002/ksa.12690 [15]

2. **There is a centre volume impact for infection cases**: Centres performing >50 revisions/year have better outcomes for the treatment of infected revisions. Higher hospital volume (>50) correlates with a 44% reduction in re-revision rates for PJI cases.

**Evidence source:** Matthews AH, Gray WK, Evans JP, Knight R, Evans JT, Lamb SE, Briggs T, Porteous A, Sabah SA, Alvand A, Price A, Toms A. Higher hospital volume reduces early failure rates in single-stage revision TKR for infection: An analysis of the United Kingdom National Joint Registry and National Administrative Databases. Knee Surgery, Sports Traumatology, Arthroscopy. 2025;0–0. https://doi.org/10.1002/ksa.12578 [16]

**Points 1 and 2 could realise potential savings: 66 fewer re-revisions/year, equating to £1 million saved annually (as a conservative estimate if subsequent re-revisions were on average £15,000).**

3. **A network MDT-driven care model is acceptable to patients**: Patients are willing to travel further for high-quality care.

**Evidence source:** Matthews AH, Redman H, Evans JP, Lamb SE, Briggs T, Price A, Toms AD, Green J. What factors are important to patients when considering a revision total knee replacement in a network model of care? An exploratory qualitative analysis. BMC Musculoskelet Disord. 2025 Dec 4;27(1):17. doi: 10.1186/s12891-025-09354-9.[17]

4. **Longer travel distances are not associated with poorer perioperative outcomes.**

**Evidence source:** Matthews AH, Evans JP, Evans JT, Lamb SE, Price A, Gray WK, Briggs T, Toms A. What is the impact of longer patient travel distances and times on perioperative outcomes following revision knee replacement: A retrospective observational study using data for England from Hospital Episode Statistics. BMJ Open. 2025; https://doi.org/10.1136/bmjopen-2024-085201 [17]

5. **There is a significant cost to delivering complex revision knee cases and this work needs to be incentivised:** Managing 100 revision knees/year costs the treating trust at least £250,000. Complexity uplift tariffs are needed help offset costs for high-volume centres.

**Evidence source:** Reynolds PM, Al-Mouzzen L, Alexiadis A, Lau J, Waterson H, Toms AD. Regional economic burden of revision total knee replacement: A cost-complexity analysis. Knee. 2022;38:148-52.[18]

6. **Working within a revision network with a MDT governance structure improves outcomes**: Networks with MDT-led governance show significant improvements in revision outcomes at one and two years compared to non-network hospitals.

**Evidence source:** Bloch BV, Matar HE, Berber R, Gray WK, Briggs TWR, James PJ, Manktelow ARJ. The impact of a revision arthroplasty network on patient outcomes. Bone Joint J. 2023;105-b(6):641-8.[19]

7. **Non-surgical pathways improve care for patients that cannot or should not undergo revision surgery**: Non-surgical pathways are essential for better outcomes and cost savings. Not every patient needs revision surgery, alternative care must be clearly signposted.

**Evidence source:** Wylde V, Bertram W, Sanderson E, Noble S, Howells N, Peters TJ, et al. The STAR care pathway for patients with pain at 3 months after total knee replacement: a multicentre, pragmatic, randomised, controlled trial. Lancet Rheumatol. 2022;4(3):e188-e97.[20]

8. **Training new consultants within a Major Revision Centre improves the chances of the surgeons attaining the required annual revision volumes.** Consultants

appointed in MRCs performing >50 revision/year are more likely to reach and maintain minimum volume thresholds than those in lower volume centres. This supports the use of surgeon passports to perform and attend revision procedures in the MRC.

**Evidence source:** Matthews AH, Gray WK, Evans JP, Evans JT, Briggs T, Sabah SA, Price A, Toms A. The effect of minimum volume recommendations on surgeon activity for first revision total knee replacement: an analysis of 2009 -2019 United Kingdom National Joint Registry Data. Knee. 2025; https://doi.org/10.1016/j.knee.2025.05.015 [21]

9. **Evidence from the Scottish Arthroplasty Project (SAP) confirms a volume impact for non-infected knee revision surgery.** In their analyses the risk of re-revision steadily declined in centres performing >20 cases per year; risk reduction was 16% with >20 cases; 22% with >30 cases; and 28% with >40 cases. The lowest level of risk was associated with the highest volume centres.

**Evidence source:** Zapp LZ, Walmsley PJ, Moran M, Clarke JV, Simpson AHRW, Scott CE. The effect of hospital case volume on re-revision following revision knee arthroplasty. Bone Joint J 2021;103-B(4):602.609 [22]

# Impact

The revision knee surgery programme now covers almost 90% of revision knee cases performed within England. It has reduced the number of low volume surgeons and has reduced the rates of re-revision after revision knee surgery.

**The network model had delivered improved outcomes for patients. By reducing the re-revision rate it has reduced the cost of revision knee surgery for the NHS.**

## Clinical impact

The revision knee surgery programme has delivered significant changes in clinical practice, described in detail in published analysis.[23] The key changes in clinical practice include:

1. **Overall network activity:** In 2024, 84% of all revision work occured within networks (including independent sector revisions).
2. **MDT case discussions volume:** The number of cases discussed with a regional MDT is increasing year on year, with 4,000 cases discussed nationally in regional MDTs in 2023/24.
3. **Low-volume surgeons:** Low-volume surgeons (<10 cases/year) have dropped from 84% to 78% since network implementation. The majority of revision knee surgery cases are now carried out by high-volume surgeons in several regions (Figure 4).
4. **Movement across ICBs:** Patient movement across networks remains stable. There have been no major shifts across ICBs since the start of the revision knee surgery pilot.
5. **Re-revision outcomes:** Re-revision rates within one year are trending downward (Figure 5). The one-year re-revision rate has decreased by 2.3% since the start of the revision knee surgery programme.

## Other benefits

In addition to clinical benefits, the revision knee surgery programme has also delivered the following benefits to the clinical community:

- Development of a RKCC complexity grading app to support decision-making and MDT discussion.
- Introduction of an e-referral system that is aligned with the Bone and Joint Infection Registry (BAJIR).
- Updates to the Minimum Data Set (MDS) for revision knee procedures on the National Joint Registry (NJR) to support data collection and analysis.
- Introduction of phage therapy for revision knee patients (first procedure performed in Stanmore in 2025).
- Delivery of a revision knee instructional course to support surgeon education and continued professional development.

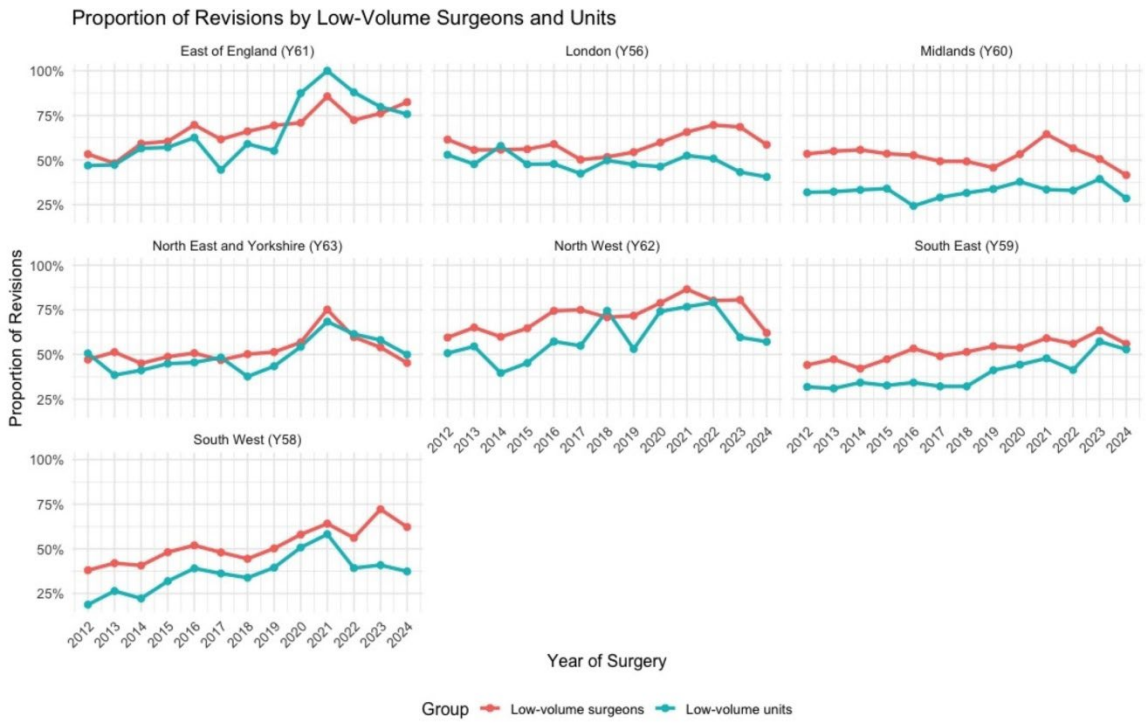


**Figure 4: Proportion of revisions by low-volume surgeons (<10/year) by region.**

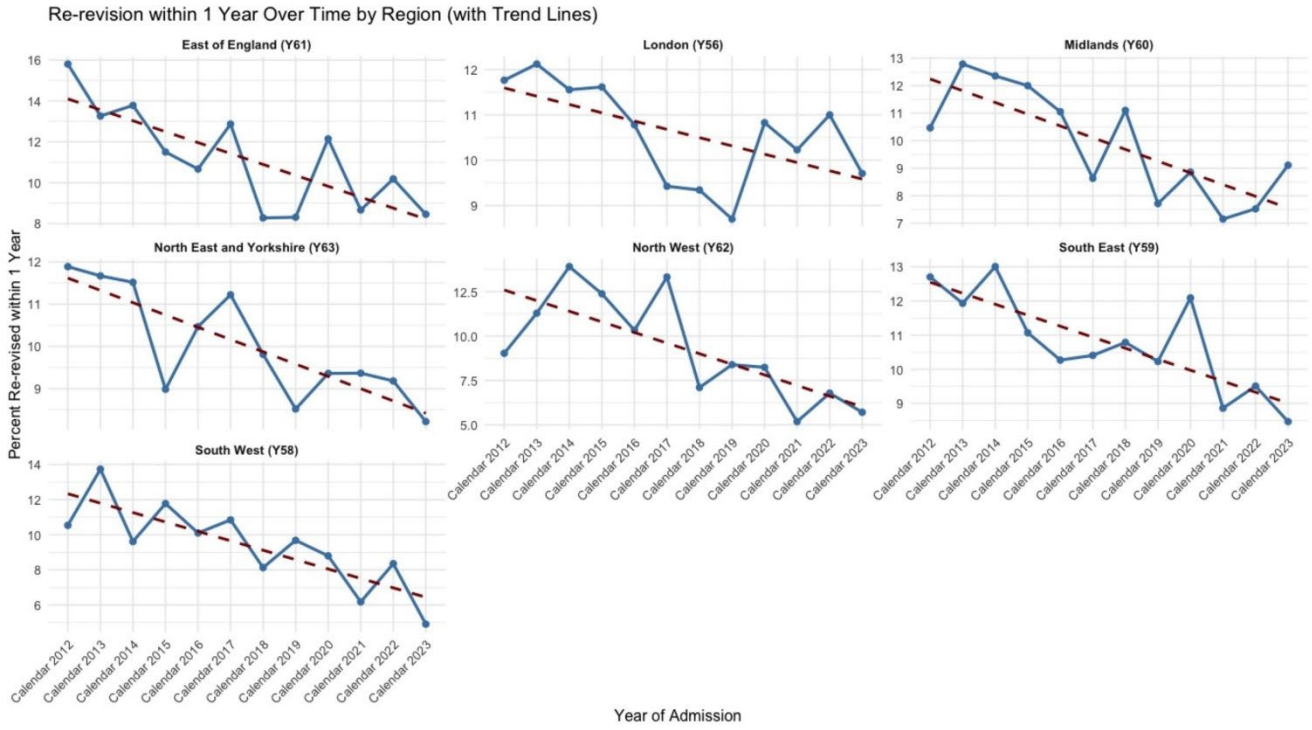


**Figure 5: Re-revision within one year of revision knee surgery by region.**

## Challenges

The revision knee surgery programme faces a range of challenges as it exits the pilot phase and enters an ‘accepted standard of care’ phase. We continue to focus on enforcing revision standards in both the NHS and IS and ensuring current finance and data arrangement are maintained.

We are now exiting the pilot phase of the revision knee surgery programme into an ‘accepted standard of care’ phase. At this time, we recognise there are several challenges that require ongoing attention. The current challenges include:

### 1. Variable engagement within networks

Most MRCs report at least one RU/PAU that is not engaging with the MDT process. All NHS trusts must engage with their networks; an escalation policy whereby MRCs facing this issue to notify the steering committee has been developed. Mediation support is available if needed. Issues can be further escalation to the GIRFT team as required.

### 2. Low-volume surgeons

There are still a significant number of low-volume surgeons performing revision knee cases. We accept that raw numbers can be misleading, and the context under which these cases are performed matters. Low volumes may be acceptable for surgeons performing debridement and implant retention procedures (DAIR) or revisions for periprosthetic fractures. We are currently working with the National Joint Registry (NJR) to access data that will allow networks to understand this issue. In addition we recognise that dispensation should be given for those retiring, newly starting, or with period of absence. Given there is now solid evidence that surgeons performing <10 aseptic revisions/year should ideally cease these procedures for elective cases, this will be an issue for the local medical directors to address.

### 3. Low-volume centres

Some trusts operate across hot and cold sites. MRCs must use local knowledge to determine whether to report these as separate or combined sites. This decision will be dependent on whether surgeons operate across both sites or whether they act as independent services, and will be made in conjunction with the regional MRC.

### 4. Independent Sector (IS) workload

Currently the IS performs approximately 1,000 NHS funded revision cases/year (1/6th of NHS revisions). Almost all IS sites are low-volume providers and most do not have a suitable MDT to provide oversight and governance for revision cases. Work is ongoing to make IS

providers aware of the expected standard of cares for NHS funded revisions and each MRC/network is supporting these discussions in their regions.

### 5. Network capacity and surgeon volume

At the start of the pilot the networks were intended to support a caseload of 300 revisions/year. Currently, several MRC networks are only supporting 100 cases or fewer. The number of MRCs may need to decrease to support suitable volumes of work to justify current funding. Specific issues are noted in two regions: London, where there are five MRC/networks and the caseload suggests a maximum of three are required; and the Midlands, where there are six MRC/networks and the caseload suggests a maximum of five are required.

### 6. Alignment with emerging revision networks

Due to the success of the revision knee surgery programme other orthopaedic specialities are now seeking to adopt a similar model of care. Networks are being developed to support hip, shoulder, elbow and ankle revision cases. The RKWG is aware of the need for a degree of alignment between these networks without compromising our own programme. The RKWG steering group is working alongside these emerging revision networks to share learning and provide support.

### 7. Maintaining the existing financial model

The changes in care and associated benefits described in this report have been delivered without the need for any new funding. Restructuring and ‘top slicing’ the flat tariff to provide infrastructure support and complexity adjusting payments must be maintained to ensure the ongoing success of the revision knee surgery programme.

### 8. Data support to allow continued audit, monitoring and governance

The pilot phase was supported by a GIRFT fellow who was able to support the collection, analysis and presentation of revision knee data. This activity and resource must now be undertaken by the national steering group and the individual revision networks. To support this activity, we are working with the NJR to access knee revision data at both a regional and national level.

## Targets for phase 2 (2026-2029)

We have set out measurable goals for the next phase of the project across five key domains – organisation, clinical outcomes, patient support, data and surgeon training and education.

In phase 2 we will build on the success of the pilot phase. These are the targets that will be delivered between 2026 and 2029:

**Organisational targets:**

- Refine network structure and MRC appointments so that each network is overseeing a minimum of 200 knee revisions annually. This may require reduction or amalgamation of existing networks and is a specific issue for the London and Midlands regions.
- >90% of IS providers are assigned to a revision network and MRC.
- >90% of NHS funded IS revisions are discussed in an MDT pre-operatively.
- >80% of R2/3 cases discussed in every regional at the network MDT.
- >90% attendance for network sites (RUs/PAU) at the regional MDT (satisfactory attendance defined as being present at >75% of meetings over a 12-month period).
- >90% attendance of microbiology/infectious disease attendance at regional Infection MDTs.
- Increase phage work and set up a supra-regional referral service.

**Clinical outcomes targets:**

- Reduction in re-revision rate (further 1% reduction from current levels by 2029).
- Reduction in the number of revision cases performed by low volume revision surgeons – exact target will be defined following a review of DAIR/PPF workload and its impact on low volume surgery.
- Reduction in the number of low volume revision centres – exact target will be defined following a review of units and amalgamation of hot and cold sites within the same trust.

**Patient support targets:**

- Identify a PPI member for the national steering group.
- Create a centralised patient and surgeon information portal.

**Data targets:**

- >95% of regional networks to gain access to their regional patient level NJR data.
- Develop a standard operating procedure for analysis and reporting of regional patient level NJR data.
- Gain approval for national NJR data access under a quality improvement request.
- Undertake an annual audit and review of regional and national practice.

**Surgeon training and education targets:**

- Develop a mentoring scheme and guidance document to support newly appointed revision knee surgeons in their early career development.
- Deliver a revision knee instructional course annually.
- Develop educational content for residents in training.
- Support two visiting fellowships for newly-appointed consultants every year.

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# Acknowledgements


### Authors

Professor Paul Baker
Professor Andrew Toms

### Co-authors

Professor Andrew Price
Mr Andrew Porteus
Mr Jon Phillips
Mr Andrew Gordon
Mr Nick Kalson
Mr Alex Matthews
Mr Abtin Alvand

### Contributors

Professor Tim Briggs
Ms Nicola Symes
Ms Justine Stalker-Booth

### Affiliated and collaborating organisations

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- A Guide to Good Practice in Revision Knee Replacement: BASK (British Association for Surgery of the Knee and supported by GIRFT) April 2023
- BASK revision knee replacement guidelines. The Knee 27(2020) 1662-1663.

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