

# Orthopaedic Elective Surgery

## Guide to delivering perioperative ambulatory care for patients with hip and knee pain requiring joint replacement surgery

March 2023



# Executive Summary

This document details an approach to delivering safe and effective elective primary hip and knee arthroplasty using ambulatory pathway principles (default 0- or 1-night stay).

Examining how centres of best practice nationally have redefined clinical pathways shows that real change is possible and can lead to much shorter lengths of stay (LoS) without compromising patient experience or care. Operating with shorter lengths of stay not only reduces inpatient stay costs but can release much needed bed days, potentially allowing departments to make efficient use of inpatient elective bed provision and protect the ring-fenced status of the required number of beds.

There are examples of NHS centres, both within the hub centre model system and at base trust hospital sites, where such practice has been adopted and they are demonstrating real change potential. This clinically-led delivery guide is intended to show elective care providers how these changes are possible and to allow integrated care systems to re-evaluate their current practice and adopt new principles as needed.

GIRFT wishes to thank clinical teams from all over England for contributing to this document, led by Claire Blandford, consultant anaesthetist at Torbay and South Devon NHS Foundation Trust.

The content in this document has been grouped together into list of **Key Principles that have underpinned the success of these models of care:**

1. **All patients are put on an ambulatory pathway by default, apart from patients who are pre-identified as requiring post-operative level 1.5 or greater care.**
2. **Enhanced post-operative management is divided into two phases with a list of discharge competences. Time achieved is documented against these competences to assess readiness for discharge.**
3. **Extension of therapy services/alternative provision options to support acquisition of mobility discharge competences until 20.00hrs on any day with elective operating (5- or 6-day service).**
4. **Patient education programmes embed the expectation of a 0- or 1-night stay as the default.**
5. **Highly refined clinical pathways providing maximal patient optimisation and enhanced recovery. Small modifications in current practice can yield cumulatively powerful results in achieving shorter stay surgery – sharing of best practice developed in centres.**
6. **Reduce variation – adherence to protocols is critical for success.**
7. **Consolidate elective inpatient bed base. Reducing LoS offers opportunities to make efficient use of inpatient elective bed provision, and protect the ring-fenced status of the required number of beds.**
8. **Multi-disciplinary engagement through clinical, managerial and executive levels is paramount to success. Teams on the ground must be empowered by their trust's executive team and management structure to be supported to achieve change.**

This document is structured as follows: key principles, detailed content, and FAQs.

## Foreword from Professor Tim Briggs

To reduce care backlogs in the wake of the pandemic, a Targeted Investment Fund (TIF) of £1.5bn capital funding is available between 2022/23 and 2024/25, with a minimum threshold of £5m for individual proposals. Investments of the TIF funding will only be considered where they support a sufficiently ambitious, credible plan for elective delivery. To access funds, systems must demonstrate how their investment proposals will achieve a material quantified increase in elective activity.

This clinically-led guide is intended to be read alongside the orthopaedic elective care pathways released by GIRFT, available [here](#). These pathways are designed around principles of care excellence and are based on existing service models that have shown how implementing high-quality care pathways can also reduce LoS as a by-product of care excellence.

While transitioning to these LoS goals may seem highly ambitious, the following providers nationally are already demonstrating that this level can be achieved:

- Hub centre:
  - South West Ambulatory Orthopaedic Centre - SWAOC (opened March 2022) has achieved day case rates for THR and TKR of 54% and discharge by day 1 of 99.3% across its first 492 patients [3/492 patients discharged day 2].
- NHS base trusts:
  - Northumbria Healthcare NHS Foundation Trust: Achieved in Quarter 1 2022/23, on consecutive unselected cases, a mean LoS for THR of 1.4 days (342 cases), TKR of 1.8 days (286 patients).
  - Royal Devon University Healthcare's Northern Devon site performs with a mean LoS of 1.5 for THR and 1.3 days for TKR [426 cases, data period = Jan-Dec 2021].
- NHS work within independent provider:
  - Calderdale and Huddersfield NHS Foundation Trust: of 187 NHS knee arthroplasty patients within the Circle Hospital, 34% (63) were discharged on the same day, 59% (111) on day 1, with only 6.6% (13) staying 2 nights [data period = Sept 21-Sept22].

It has also been demonstrated that new adoption of some of these 'hub' principles in the current climate can drive down lengths of stay. **Royal Devon University Healthcare NHS Foundation Trust – Eastern (formerly Royal Devon & Exeter Hospital) has adopted many of the SWAOC principles at its base trust, and from July to October 2022 LoS reduced from 4.5 to 1.0 days.**

This document lays out best practice suggestions which can support systems and providers working in operational environments to reduce their primary hip and knee arthroplasty lengths of stay. Our sincere thanks to our colleagues at the British Orthopaedic Association (BOA) for working alongside GIRFT to co-badge this document. We recognise that these are challenging times, hope organisations will adopt the suggestions they can at the present time and use this guide to help shape future developments.



**Professor Tim Briggs CBE**

*GIRFT programme Chair and National Director of Clinical Improvement and Elective Recovery for NHS England*

# Key principles that have enabled a step change in LoS for elective hip and knee arthroplasty at exemplar hub sites.

1. **All patients are put on an ambulatory pathway by default, apart from patients who are pre-identified as requiring post-operative level 1.5 or greater care.**

All patients (apart from the group mentioned above) are managed on an ambulatory pathway, with the aim for many to be discharged as day cases and the remainder on day one. Patients are not pre-selected for day case or inpatient stay; all are managed via day case pathways until it becomes evident they will not achieve same day discharge. This is preferable to guessing which patients are likely to achieve this because when a decision is made to take a patient off an ambulatory pathway, the door is closed to the option of them achieving this. Locations where this universal strategy has been adopted have seen impressive results, showing not to pre-judge but await the reality of the patients' progress to reveal itself.

The following operational practices support this approach in SWAOC:

- SWAOC receive patients from theatre on a patient surgical trolley rather than an inpatient bed. This post-op trolley area can be within a designated section of the ring-fenced orthopaedic ward or a dedicated post-operative care orthopaedic surgical area providing adherence to infection control ring fence policies and access to therapy/nursing services is in place;
- patients remain on this trolley and commence their recovery/discharge competences with the nursing and therapy teams;
- any patient not fit for discharge by approximately 20.00hrs on the day of surgery is transitioned from their trolley into a ward bed and will stay in hospital overnight;
- provision of clear and consistent messaging to staff and patients that ambulatory care is being undertaken;
- do not exclude patients from this pathway based on variables such as age, frailty, specific co-morbidity;
- instead optimise, enable, and assess the outcome.

There is a dedicated section in this document which discusses patients who require post-operative level 1.5 care – see [section 5](#).

**2. Enhanced post-operative management is divided into two phases with a list of discharge competences. Time achieved is documented against these competences to assess readiness for discharge.**

- First Phase - within 4 hours:
  - Patients aim to stand within 1 hour of offset of spinal motor block, assess block regression regularly and document time;
  - patients are dressed in own clothes plus eating and drinking normally; and
  - any symptoms (e.g., nausea, pain) managed aggressively.
- Second Phase - 4 hours post-op to discharge:
  - Patients are able to demonstrate safe walking, transfers, and stairs compatible with discharge

utilising mobility aids as required/instructed;

- all standard discharge criteria met; and
- all discharge instructions in place (analgesia package, discharge summary, contact details, home rehabilitation plan).

### **3. Extension of therapy services/alternative provision options to support acquisition of mobility discharge competences until 20.00hrs on any day with elective operating (5- or 6-day service)**

- Patients receive active rehabilitation as soon as they have exited theatre and quadriceps motor function has returned post spinal block. Patients are promptly transferred from primary recovery areas to a location where this rehabilitation may be intensively commenced (ring-fenced orthopaedic ward or designated post-surgical unit with trolley area), if there is delay in this happening then rehabilitation still aims to commence with therapists visiting the patient in the post-anaesthetic care unit once their motor function has been assessed as having returned.
- Many centres have therapy services finishing at 16.00hrs which is limiting, as a patient needs to have returned to the ward by 12:00hrs to have 4hrs of therapy intervention time available. Extending cover to 20.00hrs doubles this opportunity and results in a much higher rate of same day discharges.
- Adequate staffing numbers are required to ensure the staff ratio permits multiple opportunities for patients to achieve their discharge mobility competences rather than a single therapy visit per day. See [Appendix 9](#) for an example of this.
- This model does not require additional therapy input, the same amount of input is concentrated into a smaller time frame. Patients do not require additional post discharge therapy input as they still achieve all the current therapy goals prior to discharge.

### **4. Patient education programme embeds the expectation of a 0- or 1-night stay as the default**

- Expectation setting on LoS should begin at the first point of contact. This requires community services and extended scope practitioners to also be fully cognisant of the pathway.
- At every contact point this message should be reinforced. Particularly at the time of listing for a surgical procedure and at consent.
- Some organisations had highly developed 'joint school' programmes prior to the pandemic. However there has frequently been loss of suitable facilities and staffing (numbers or experience) to be able to now re-introduce these services and digital solutions should be explored.
- Patient education programmes can include video libraries, app resources, video consultations (small group or individual), face to face groups or a hybrid of these.
- Supportive written material (options of paper based and electronic available) needs to appropriately prepare patients for surgery and their rehabilitation. Emphasising the post-operative needs to prepare for before surgery (e.g., moving key equipment, ability to sleep downstairs [depending on individual circumstances], additional help from family and friends); and
- The message of 0 to 1 night stay should be embedded throughout all patient contact points.

**5. Highly refined clinical pathways providing maximal patient optimisation and enhanced recovery. Small modifications in current practice can yield cumulatively powerful results in achieving shorter stay surgery – sharing of best practice developed in centres.**

- Patient education programme completed before surgery (mandatory);
- pre-operative assessment with triage for high care requirements and shared decision making;
- optimisation pre-operatively;
- protocolised peri-operative care pathways detailing anaesthetic, analgesic, surgical, intra-operative and post-operative care requirements to provide an excellent standard of care;
- recommendation for opioid free, short duration spinal anaesthesia as the default anaesthetic technique (aim to avoid sedation or use minimal levels so that patients remain rousable);
- remove unnecessary interventions from the pathway;
- embed digital solutions for data collection and analysis to drive and maintain effective change.

**6. Reduce variation – adherence to protocols is critical for success**

- Use of best practice protocols enhances efficiency, predictability, and safety of practices – this should be applied across the patient pathway;
- with reduced numbers of implant systems and consistent surgical technique, theatre staff preparation and surgical assistance efficiency improves;
- clinicians should follow the protocols of care unless compelling individual patient clinical reason to deviate (reason should be documented in patient record); and
- GIRFT has brought about significant qualitative and quantitative improvement in orthopaedic surgery. The programme seeks to continue to reduce variation; all should aspire to the standards set by the top decile.

**7. Consolidate elective inpatient bed base. Reducing LoS offers opportunities to make efficient use of inpatient elective bed provision, and protect the ring-fenced status of the required number of beds**

- Smaller inpatient bed bases do not automatically translate into reduced capacity. Frequently SWAOC can operate on the same or even greater numbers of patients with such a model;
- shorter lengths of stay mean these bed spaces accommodate more patient throughput in a week than models with longer lengths of stay;
- these beds should be protected from the ingress of trauma patients and an elective / emergency split maintained to preserve elective throughput;
- elective pathways should be COVID secure; and
- trauma workload needs to be appropriately resourced to avoid cancellation of elective surgery. This requires adequate bed stock numbers for trauma as well as operating list availability. Thus, reducing inpatient elective bed stock can help provide additional trauma bed capacity and ultimately protect elective work, providing physical separation is maintained.

**8. Multi-disciplinary engagement through clinical, managerial, and executive levels is paramount to success. Teams on the ground must be empowered by their trust's executive team and management structure to be supported to achieve change.**

- The needs of each individual trust will vary however is likely to include staffing, physical facilities, education, and financial resources to move from their current post pandemic positions to achieving 0–1-night stay as a default;
- grass roots teams comprising representation of surgical, anaesthetic, nursing, therapy, pharmacy, administration, radiology should be formed with regular meetings;
- senior management need to be actively engaged in supporting change;
- Board/Executive commitment to addressing the current challenges; and
- digital technology to support pathway implementation, functionality, and outcome feedback.

See Page 35 for [FAQs](#)

[View metrics on the  
Model Health System >](#)

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# 1. Presentation and Referral

Section includes:

## [1.1 First presentation to clinician](#)

## [1.2 Primary care optimisation of patients for surgery](#)

## [1.3 Referrals](#)

### 1.1 First Presentation to Clinician

Osteoarthritis is diagnosed clinically and usually does not need imaging to confirm diagnosis. The following is in place, in alignment with NICE guidance <https://www.nice.org.uk/guidance/ng226> :

- good quality [shared decision making](#) makes best use of decision support tools for [knee](#) and [hip](#) osteoarthritis;
- management of the condition is guided by symptoms and physical function;
- management includes tailored information to support individual needs, exercise, support with weight management, and appropriate pharmacological management;
- referral is made for joint replacement if joint symptoms are substantially limiting quality of life, and/or non-surgical management is ineffective or unsuitable;
- people are not excluded from referral for joint replacement surgery because of age, sex or gender, smoking, comorbidities or if they are overweight /obese; and
- if referral for joint replacement is agreed, expectations are set regarding potential benefits and risk, preparation for surgery, LoS, recovery and long-term prognosis informed by the decision support tools linked above.

### 1.2 Primary care optimisation of patients for surgery

If the patient has medical problems that may affect their fitness for surgery the GP begins optimisation of these comorbidities in primary care (Diabetes, anaemia, AF etc). This can prevent delays before surgery. Areas include (but are not limited to):

- control of diabetes to an HbA1C of <69mmol/L;
- control of hypertension to <140/90 in adults aged under 80, <150/90 in adults 80yrs and over (NICE, NG136, 2019);
- patients with anaemia are investigated to establish if iron deficiency related and corrected to Hb  $\geq 130$  g/L (international consensus statement though local protocol Hb target levels are often Hb 120 ♀ or 130 ♂);
- weight management advice and programmes (aim BMI <30, reduce abdominal: chest girth to <4cm);
- smoking cessation;
- alcohol reduction; and
- strategies to reduce long term usage of opioid medications (may require involvement of the patient's chronic pain team).

Where difficulties in management of these medical issues are detected early in the pathway, best practice is early communication between the primary care and perioperative care teams. If the patient is returned to their GP or an appropriate specialty for optimisation later in the pathway, clear instructions are provided by pre-operative assessment team or referring specialist on what intervention is required and details of the threshold of improvement that should lead to re-referral back to the pathway.

Further guidance and resources can be found at: <https://www.myplannedcare.nhs.uk/care-support/>.

### 1.3 Referrals

MSK practitioners in triage roles in primary and/or community care can refer. Any referral to the Trauma and Orthopaedic department includes:

- medical history;
- nature of non-surgical management attempted;
- detail of pain or functional disability and impact on quality of life;
- confirmation that the patient would be happy to have surgical intervention if deemed necessary;
- knees – weight bearing X-ray within 12 months confirming arthritic diagnosis (standing AP, lateral and skyline);
- hips – non-weight bearing X-ray within 12 months confirming arthritic diagnosis (AP pelvis, lateral); and
- where appropriate, documentation indicates what interventions are being conducted to optimise patient for surgery.

## 2. Triage and Assessment

Section includes:

[2.1 Surgical review and assessment](#)

[2.2 Theatre scheduling](#)

[2.3 Patient education](#)

[2.4 Pre-operative](#)

### 2.1 Surgical review and assessment

This occurs within 6 weeks of referral for routine patients, and includes:

- review of medical history and imaging;
- assessment of severity of pain and impact on the patient's function, quality of life, occupation, and leisure activities;
- physical examination in deformity, range of motion, effusions, tenderness, gait guidelines;
- discussion of risk and benefits of surgery and conservative treatment;
- confirmation of patient understanding available options and how they wish to proceed;
- discussion of expectations around:
  - length of stay;
  - neuraxial as the standardised anaesthetic technique;

- recovery time;
- duration of support required;
- levels of post-operative pain;
- allow time for questions;
- reinforce expectation of LoS being 0 or 1 night and that up to moderate pain on mobilisation post operatively is to be expected; and
- introduce concept that the patient will need a relative/friend to stay overnight with them on day 0.
- pre-existing pain score is assessed at rest and movement if patient hasn't done so via a digital tool (no pain, mild, moderate to severe);
- proposed surgical site is inspected for skin or deformity issues that would affect surgery;
- high risk patients are identified based on age, comorbidities, and frailty scoring (e.g., Rockwood Clinical Frailty Scale) for Comprehensive Geriatric Assessment and possibly enhanced pre-habilitation or occupational therapy intervention (Rockwood et al, 2005); and
- patients are identified who may require a more in-depth Shared Decision-Making consultation involving the anaesthetic team before the finalising decision for surgery. The team developed a traffic light system to guide which patients should be referred to the service.

### **2.1.1 Documentation**

Documentation includes detail regarding the information that was provided to the patient as part of shared decision making that led to the decision to proceed with surgical intervention. This includes:

- description of the pain (e.g., intensity, onset, duration, character, aggravation and relieving factors, sleep deprivation due to pain);
- limitation of activities of daily living (e.g., restricted walking, night pain);
- safety issues e.g., falls;
- contra-indications to non-surgical treatments;
- listing and description of failed non-surgical treatments e.g., injections, physiotherapy, or weight loss;
- physical examination including deformity, range of motion, crepitus, effusions, tenderness, gait description (with/without mobility aids);
- results of any applicable investigations e.g., radiograph;
- other clinical judgements e.g., reasons for deviating from stepped care approach;
- areas of specifically increased risk for that patient (e.g., due to specific co-morbidities);
- any infection control measures that will be required of the patient/ system for surgery to proceed, and
- all patients are consented in accordance with Royal College of Surgeons (RCS) guidance

### **2.1.2 Listing the patient for surgery**

When a patient is listed for surgery, this action generates the following:

- patient added to waiting list, triaged as standard or urgent priority;
- patient follows the unit's agreed clinical pathway;
- booked as an expected LoS of 0- or 1-night;

- referral to pre-operative assessment services with appropriate triaging;
- requests for specialist opinions in other specialties as required on an individualised patient basis e.g.: input from cardiologist colleagues, shared decision-making clinics;
- Involvement of patient in 'pre-operative preparation education programme'.
- X-rays or further appointments depending on case complexity; and
- requirements for subsequent nursing, therapies, follow-up, Patient Reported Outcome Measures (PROMs) are activated from entry of the patient onto the clinical pathway.

Patient care is individualised; the potential date of surgery and expected LoS (default of 0- or 1-night) is discussed with the patient to help set expectations at this early stage.

Patients have a single point of contact to advise of illness or reason for delay or cancellation so that the theatre time can be reallocated.

### 2.1.3 Consent

Patients undergoing planned surgery should have the opportunity to reflect on that planned surgery and may need to ask further questions at an additional time. This may be particularly necessary when there is a significant delay prior to surgery or when there is a need to clarify the surgical plan, for example when the patient is placed on a list for surgery by a practitioner who is not able to undertake the surgery.

Consenting is a process which continues throughout care. The signing of a formal document, whilst necessary, is not evidence of adequate consent.

To provide equity of access patients are sometimes transferred from one surgical team to another. The patient must have the opportunity to meet and discuss their operation with their onward surgical care team prior to their date of surgery, thereafter the patient should remain under the care of this team for their surgical management.

The process of gaining consent should adhere to the principles detailed in the GMC guidance document 'Decision making and consent' [Decision making and consent \(gmc-uk.org\)](https://www.gmc-uk.org/standards-and-guidance/decision-making-and-consent). Dialogue should be supported by relevant information which should be shared with patients in a format of their preference (written, digital, audio, pictorial, language translation options).

## 2.2 Theatre Scheduling

Booking is done by a dedicated orthopaedic admissions team who have a close working relationship with senior clinicians and manager, not devolved to a pooled team. Geographical proximity is helpful to allow rapid communication and decision making.

All day theatre lists are booked as 4 joints as standard practice unless high complexity flagged. Cases which are pre-identified as >0-day LoS are scheduled for the afternoon. Some surgical teams will be able to operate on 5 or 6 patients whilst more junior consultants may need a period of mentoring until they are able to consistently undertake 4 joints per all day session.

An effective theatre management process is in place called 6-4-2 (which is a tool to review and lock-in elective cases and lists at 6-weeks, 4-weeks and 2-weeks in advance of admission), already adopted in many providers, it enables planning and sequencing of operating lists, whereby the theatre programme is reviewed on a weekly basis and looking six weeks ahead:

This checks the following:

- an appropriate number of theatre lists are scheduled to meet activity assumptions;
- clinicians are available and not on leave;
- the skill mix of the theatre team is appropriate and, where possible, consistent;
- operating lists are scheduled in a timely manner;
- any vacant slots created by short notice patient cancellation are filled; and
- a suitable patient order is selected considering many clinical variables, including the best list order to support day 0 discharges.

The 6–4–2 meeting is chaired by a senior decision-maker who ensures immediate action and changes.

These meetings have active engagement from senior surgical and anaesthetic clinicians to minimise on-the-day cancellations or other issues.

## 2.3 Patient Education

- Patient education begins at their first point of contact with the healthcare system. Patients are informed of intended benefits of surgical intervention, symptom management options, risks, and complications. In addition, expected LoS is specifically discussed and recorded in their consultation summary, this is 0 or 1 night for the majority of patients.
- Verbally delivered information is supported by written material (print and digital options); and
- GP advice around smoking cessation, weight loss, alcohol consumption, value of exercise and opioid reduction strategies is reiterated.

### 2.3.1 Pre-operative Patient Education Programme (PPEP)

Active participation in a pre-operative patient education programme is essential prior to patients undergoing joint arthroplasty. Patients are informed of this requirement during their outpatient consultation when a decision to proceed to surgery is undertaken, and this is documented.

Historically, many organisations had well established face to face 'joint school' programmes where patients would attend in small groups approximately 4-8 weeks prior to surgery. The cessation of such groups during the COVID-19 pandemic and ongoing concerns regarding group interventions, limited facilities, and the resource heavy nature of some of these groups has led to the development of many alternative digital solutions.

The key requirements of a patient education programme include:

- explanation of the patient pathway;
- setting appropriate expectations (e.g., early mobilisation, LoS, levels of post-op pain);
- convey key physiotherapy, occupational therapy and nursing information;

- detail the principles of Enhanced Recovery and the patient's role in their recovery; and
- the opportunity for patient questions to be addressed.

It is also a useful opportunity to be able to highlight any specific additional needs so that where possible any supportive equipment or education is provided or input from specialist teams (e.g., pain management team) is arranged, prior to the patients' admission.

Digital options include the use of video libraries, app-based solutions, small group, or individual video consultations. App-based solutions offer the opportunity to gather information from the patient both prior to and following their surgery and can facilitate targeted intervention if patient progress does not match key expected milestones.

Frequently, a hybrid approach is found to be optimal where patient information is available in both electronic and paper-based formats, supported by video and app-based resources for patients able to engage with these types of activities. This releases time for teams to be able to deliver more targeted education/ intervention to patients for whom digital solutions are not appropriate.

### **2.3.2 Specific areas PPEP should address**

- Instructions are provided on any required pre or post op infection control procedures (e.g., any COVID testing or isolation requirements/ use of decolonisation washes / notifying the hospital if symptoms of vomiting or diarrhoea in the 48hrs preceding surgical admission);
- advice provided to protect the limbs from cuts and grazes in the weeks coming up to surgery as these are a frequent cause of on-the-day cancellation;
- pre-habilitation recommends patients aim to improve their fitness and undertake aerobic exercise. Instructions on pre-operative strengthening exercises for patient to undertake provided;
- importance highlighted of following all guidance to ensure optimal recovery, earlier mobilisation, and improved outcomes;
- expectations are set around pain management, patients should be prepared that up to a moderate level of pain on mobilisation is to be expected following this type of surgery (patients should not have the expectation that they will experience no pain at all);
- expectations are set of a standardised anaesthetic technique, comprising of spinal anaesthesia, minimal or no sedation, use of music or audiobooks;
- expectations are set of early mobilisation (within 4hrs of end of operation) and LoS (0 to 1 night); and
- preparation for hospital stay including what to bring (personal care items, loose day clothing to allow for any swelling, footwear with a back in it (no mules/flip flops), set of nightwear if remaining overnight, all medication in original packaging, book/music via headphones/tablet device for distraction).
- Discharge planning starts at pre-assessment and continues in the patient education programme. Patients need to know how to prepare their discharge location for safety, ease and comfort of their recovery before their surgical admission (e.g., moving heavy pans from low shelves, stocking up with easy to cook/ready meals/frozen food) as well as what level and duration of post-operative assistance

they are likely to require from family and friends and the fact that it is their responsibility to arrange this – e.g. having someone to stay with them on their first night if discharged on day 0.

## 2.4 Pre-operative

- Pre-operative assessment is a nurse delivered, consultant-led service with an identified pre-operative assessment clinical lead (typically consultant anaesthetist/SAS with protected job planned time for the role);
- SWAOC has standardised protocols guiding the pre-operative assessment and peri-operative management of patients which are regularly updated;
- pre-operative assessment is standardised and electronic such that it allows patients to be assessed and viewed on multiple sites enabling patients to have their surgery at any of the sites within the integrated care system;
- pre-operative assessment (including therapy assessment if indicated) should be completed within a minimum 6 weeks prior to surgery and a pool of pre-assessed 'ready' patients should be available to fill last-minute cancellations; and
- ideally pre-operative assessment should be done early in the pathway to allow time for risk modification and comorbidity optimisation; and
- if pre-operative assessment is longer than 12 months previously it is advisable that a review of the information and updating of records is undertaken (this may be achieved via a telephone consultation, however sometimes a face-to-face consultation or new referral to a high risk or shared decision-making clinic is required).

### 2.4.1 Anaemia

Patients are screened for anaemia and protocols have been developed to optimise the various types of anaemia. Anaemia with Hb <130 g/L (international consensus statement though local protocols Hb levels are often Hb <120 ♀ or <130 ♂) requires additional investigations to establish whether anaemia is related to iron deficiency. If so, patients are preoperatively with oral or IV iron to reduce the need for perioperative blood transfusion and optimise the patient (Pujol-Nicolas, 2017).

It is substandard clinical practice to proceed with elective surgery with untreated iron deficiency anaemia and carries significant clinical risk.

Pathways are in place to refer to GP or colorectal teams for urgent investigation of severe unexplained iron deficiency anaemia.

### 2.4.2 Diabetes management

Guidelines for the management of diabetes are in place based around the development of a diabetes perioperative team as detailed in the National Enquiry into Patient Outcome and Death (NCEPOD) diabetes report recommendations. Ideally target HbA1c <69mmol/l. If surgery is being considered in a patient with HbA1c above this level detailed conversations are required between

the surgical and anaesthetic team and the patient where the additional risks are fully discussed and the reason for proceeding with surgery is clearly documented. Recommendations include:

- multidisciplinary management;
- preoperative assessment of diabetes with effective management and control;
- clinical lead for perioperative diabetes care;
- standardised referral process for elective surgery including HbA1c within 3/12 of surgery;
- close peri-operative monitoring;
- standardised protocol guiding clinicians on perioperative management including pre-operative patient instructions on the timing/dose of medications to take, expected intra-operative management; and
- safe handover of patients from theatre recovery to ward staff including appropriate written instructions.

### **2.4.3 Frailty**

Screening for frailty is built into the pre-operative assessment process as there is evidence that frailty is associated with increased 30-day, 90-day and 1 year mortality, post-operative complications, and death (Lin et al, 2016). Frailty is not the same as simply increased age or multiple comorbidities- patients can be frail at any age. Pre-operatively identifying patients as frail allows the opportunity to target interventions and influence a more positive outcome for the patient. This might include specific occupational therapist review, pre-operative physiotherapy advice or review in a multidisciplinary clinic (bringing together clinicians with anaesthesia and elder care experience alongside therapy teams). Frailty can be screened for using various tools, e.g.: Rockwood Clinical Frailty Scale (Rockwood et al, 2005).

### **2.4.4 Pain Management**

Use of pre-operative opioids has been shown to be associated with worse surgical outcomes in joint arthroplasty including increased risks of infection, higher readmissions, delayed discharges, prolonged hospital stays, chronic opioid dependence and higher rates of early revision arthroplasty. Supported pre-operative opioid weaning is therefore recommended (Levy et al, 2022).

Patients who would benefit from pre-operative or intra-operative input from the pain management team are identified at pre-assessment and appropriate referrals generated. This is particularly necessary for patients on pre-operative opioids where opioid reduction or alteration to non-opioid medications will significantly benefit the patient's outcomes. There may additionally be patients with complex pain, chronic pain or at high risk of an adverse pain experience that would benefit from targeted specialist pain intervention. Screening questions and a set of referral criteria have been designed between the pre-operative assessment and pain management teams to guide this process.

### **2.4.5 Medication checking**

Patients are instructed to bring all their current medications in original packaging and a copy of any prescriptions they have with them when they attend their pre-operative assessment. The practitioner



conducting the assessment then records an accurate list of the patient's medication including doses and frequency.

SWAOC has guidelines covering medications in the peri-operative period. Patients are provided with clear and written instructions on which medications they should STOP (and when to stop) and which to TAKE:

- Cessation typically involves anticoagulants and diabetes medications however there can be numerous others (e.g., certain immunosuppressant medications, effervescent preparations).
- Consideration is given to the routine pre-operative cessation of ACE inhibitors/A2RB drugs for the day before and day of their surgical intervention to reduce peri-operative haemodynamic instability. It is imperative that any regular medications which are stopped pre-operatively have a mechanism for their safe reintroduction post-operatively, when clinically appropriate.
- If there is any doubt about the peri-operative management of any medication, advice is sought from a senior member of the anaesthetic, surgical or pharmacy (medicine information) teams as appropriate. This advice, when appropriately documented, will then supersede the management outlined in this document.
- All patients are encouraged to reduce their opioid intake prior to surgery to allow for safer and more effective post-operative analgesia. Intervention from the patient's GP, chronic pain team or pain management team is recommended to assist in this process.

#### **2.4.6 Triaging patients for further assessment**

- Following a patient's pre-operative assessment, it may be that further review in a high risk or shared decision-making clinic is required;
- SWAOC has developed guidance on referral criteria to assist nurses in identifying which patients should be referred onwards (an example of such a traffic light guidance chart is presented in [Appendix 3](#));
- there are regular consultant led pre-operative assessment sessions where notes may be reviewed, clinical queries addressed, and patients may be booked for appointments;
- dedicated shared decision-making clinics, sometimes alongside cardiopulmonary exercise testing assists in making complex decisions with patients about their individual risk: benefit profile for having surgical intervention especially in high stakes decisions;
- information from the high-risk anaesthetic clinic is used to determine the level of post-operative care required;
- individualised risk prediction scores are used to guide shared decision making about whether to proceed with surgery and to determine those patients who would benefit from high care facilities post-operatively; and
- if facilities permit, advance preparation of the inpatient medication chart is considered, the standard drugs used as part of the Orthopaedic Enhanced Recovery pathway are templated to encourage consistent prescribing.

#### **2.4.7 Infection prevention**

- Locally agreed MRSA and MSSA Screening or treatment protocols;

- locally agreed skin and nasal decolonisation procedures – supply patient with skin wash and nasal decolonisation, and instruction leaflets; and
- reinforcement of instructions around infection control (e.g., any COVID related testing or isolation requirements).

#### **2.4.8 Routine Urine Screening**

Routine urine screening is NOT warranted for patients undergoing elective arthroplasty. Urine screening prior to elective arthroplasty should be reserved for patients with a present history or symptoms of a urinary tract infection (UTI).

## **3. Operation and Post Operative Care**

**Section includes:**

### **[3.1 Admission](#)**

### **[3.2 Anaesthesia: General principles](#)**

### **[3.3 Peri-operative Care](#)**

### **[3.4 Surgical Procedure](#)**

### **[3.5 Inpatient Management](#)**

### **3.1 Admission**

- Patients are admitted on the day of surgery.
- Admissions are staggered to minimise pre-operative fasting and reduce patient anxiety. Two patients being admitted initially at 07.30hrs, followed by subsequent admission slots between 10.00-12.00hrs.
- Where there is reasonable expectation of achieving same day discharge, patients are listed early on the operating list (ideally 1<sup>st</sup> or 2<sup>nd</sup>), although it is worth noting that SWAOC does demonstrate day case discharge with patients operated on in the afternoon, including cases performed by surgical trainees on afternoon operating lists and fourth on the list patients.
- Patients are able to meet and have an anaesthetic consultation with the anaesthetist who will be providing the anaesthetic care for their procedure. This is done before a patient is sent for and not conducted in the anaesthetic room. Patients have adequate time to consider and reflect on the discussion they have had with their anaesthetist and then ask questions. The anaesthetist reviews the patient's pre-operative assessment and verifies against the patients' medical history and current on-the-day status. Specific details on fasting and medication timings are also sought.
- Patients will already have been informed and received written information via their patient preparation process that a standardised anaesthetic is used for THR and TKR and in most cases be expecting neuraxial anaesthesia as the default technique. Explanation of the technique, duration of effect, discussion of risks, complications and side effects is undertaken by the anaesthetist adhering to Montgomery principles. The patient has the opportunity to ask

questions.

- There is also discussion about the planned analgesia regimen (standardised) including prescription of any required analgesic pre-medications and how their post-operative analgesia will be provided as well as expectations for their immediate post-operative recovery period, e.g., use of post op build up drinks, early mobilisation.
- It is also confirmed where there is a requirement for higher level post-operative care (e.g.: level 1.5 care) that this resource is available prior to proceeding with the patient's surgical intervention. A VTE risk assessment is completed as part of the patient's pre-operative or on-the-day assessment. This is typically commenced in pre-assessment by the nursing team however is reviewed by a clinician and any required intervention provided (joint responsibility between surgeon, anaesthetist, and nursing teams).
- Pre-warming is used routinely in the peri-operative period. This commences pre-operatively with patients asked to wear conductive fabric or forced air warming blankets or use warming mattresses for at least 30 minutes. There is good evidence that pre-warming patients results in reducing the risk of inadvertent hypothermia, which could result in coagulopathy with increased risk of transfusion, cardiac dysfunction, and risk of infection.
- SWAOC and local ICS have developed Covid-19 protected elective surgery zones and follow appropriate professional guidance on any required testing/PPE/isolation periods according to current guidelines alongside all standard infection control precautions.

### **3.1.1 Peri-operative fasting and energy drinks**

- Pre-operative fasting times are actively managed to reduce undue physiological stresses;
- recommendations are the avoidance of food for 6hrs pre-operatively;
- clear fluids and drinks such as a cup of tea or coffee with a normal amount of milk may be consumed up to 2hrs before a patient's operation;
- drinks which are heavily milk based are classed as food i.e., 6hrs restriction; and
- water can be consumed freely until the point of sending for the patient to go to theatre – consumption of water, according to patients' thirst, is in line with European Society of Anaesthesiology guidance (Smith et al, 2011).
- A regimen of pre and post operative energy drinks are provided to patients (Also see [section 3.5.1](#)). This follows the principles of enhanced recovery, has been reported to be safe and assists in; fluid management, haemodynamic stability, energy levels, ability to mobilise, wound healing, peri-operative immune function and reduced insulin resistance. This is the protocol:
  - protein-based drinks to be sipped throughout the day on the day before the patient's surgery;
  - carbohydrate-based drinks to be consumed on the morning of the patient's surgery. The final drink should be completed 2hrs prior to surgery (it is imperative that patients receive written instructions on when to take these drinks to avoid confusion);
  - guidelines from the European Society of Anaesthesiology (Smith et al, 2011) provide a grade A recommendation (evidence 1++) that it is safe for all patients, including persons living with diabetes, to drink carbohydrate rich drinks up to 2hrs before surgery, therefore it is recommended that

persons living with diabetes (of either type) should not be excluded from pre-operative drink regimens, although we note that this guidance has not been universally adopted and local policy still applies; and

- commonly used nutritionally complete drinks contain 300kcal/125-200mls/ 13g protein.

### 3.1.2 Pre-operative checklist

SWAOC has a standardised WHO surgical safety checklist protocol to ensure patient safety. It includes details related to pre- and post-surgery briefing, sign-in prior to anaesthesia, “Prep, stop, block” for regional anaesthesia, the Time Out pause before surgery commences and Sign Out.

## 3.2 Anaesthesia: General principles

- SWAOC have developed and adopted a standardised clinical pathway including anaesthetic management protocols for these surgical procedures. Compliance and patient outcomes are monitored with data collection.
- Mean arterial pressure (MAP) is monitored and maintained within 20% of normal limits for the patient. Vasopressors are used rather than excessive intravenous fluid volumes. Non-invasive blood pressure monitoring is acceptable unless invasive monitoring is specifically otherwise indicated.
- The standardised technique adopted will comprise of spinal anaesthesia, minimal or no sedation, use of music or audiobooks. However, some centres utilise a general anaesthetic-based technique also with excellent outcomes.
- For neuraxial techniques, SWAOC tailor the selection of local anaesthetic agents to the expected duration of surgery and provide low dose spinal anaesthesia. Shorter acting agents can be utilised in the majority of patients:
  - suggested regimens include:
    - 3.5- 4ml 0.25% plain racemic bupivacaine; or
    - 2% hyperbaric prilocaine (3-3.5ml) (example protocol presented in [Appendix 6](#)).
  - Patients to receive either minimal or preferably no sedation. If sedation is required then a low dose propofol target controlled infusion should be used, titrated to achieve a level of easily rousable sedation. Distraction methods such as music through headphones or films on tablets can be utilised instead with great success. There is good evidence that this increases patient satisfaction and reduces pain and anxiety. Patients should be informed of this strategy as part of their pre-operative preparation and encouraged to bring some favourite music and headphones with them to theatre or such facilities be provided by the unit.
  - The use of opioids in spinal anaesthesia should be avoided. This helps reduce the need for urinary catheterisation and reduces post-operative nausea and vomiting rates.
- General anaesthesia is a viable alternative technique and some centres have demonstrated great success with short stay outcomes using a default general anaesthetic pathway. It may also be utilised where spinal anaesthesia is contraindicated or impossible to site. The core

principles of day case anaesthesia should be followed (fast acting, short duration, easily reversible agents and be supported by motor sparing regional anaesthesia techniques appropriate to surgery to optimise recovery.

### 3.2.1 Perioperative analgesic regime

Standardised analgesic regimens should be agreed and utilised. Analgesia should commence with oral pre-medications administered prior to the patient being sent to theatres:

- paracetamol 1g; and
- NSAID or COX-II inhibitor analgesic (e.g., Ibuprofen or Celecoxib) with co-prescription of PPI (e.g., Lansoprazole 15mg).

### 3.2.2 A considered opioid strategy

Joint arthroplasty is a painful procedure (especially knee), and it is expected that patients will require strong analgesia for a short period following their surgery:

- concerns have arisen regarding use of opioids in the perioperative period from evidence in USA of a community opioid addiction crisis that has developed from unregulated continuation of medications;
- opioids have the potential for addiction, however, to deny patients effective analgesia around the time of a painful surgical procedure is unethical;
- Faculty of Pain Medicine guidance states to use modified release opioids with caution but does not advise against using them;
- the critical factor is short term use with meticulous opioid stewardship providing a strict time limited prescription with non-continuation safety-netting;
- several centres are utilising peri-operative opioids safely (South Devon and SWAOC's practice is to prescribe time-limited post-operative doses of MR oxycodone [dose adjusted to patient's age; 10mg Oxycodone MR for age <70yrs, 5mg for age 70yrs and over. 5 post-operative doses only] and/or IR oxycodone 5-10mg with appropriate age and renal impairment guidance);
- this strict non-continuation policy is reinforced in all patient literature and via electronically automated processes, this notifies the patient's GP that this medication must not be continued for any reason;
- electronic systems can be used to automate prescriptions and discharge instructions, stringent stewardship is key.
- Pre-packed discharge medication also encourages consistent prescribing and accuracy –SWAOC dispenses patient analgesia from these pre-packs whilst they are an inpatient, thereby ensuring the correct number of doses remain upon the patient's discharge.
- strong opioids (e.g., oxycodone) are not routinely used beyond 48hrs post operatively. This is within the 5-7 days maximum duration indicated in the 2021 best practice surgery and opioids guideline (FPM, 2021).
- Considerable caution is used regarding the use of oramorph as a discharge medication (TTA). In the community, deaths have been associated with oramorph used as a TTA (up to 13 reports in literature) including a young patient following Daycase orthopaedic surgery which was reported to the NPSA.

### 3.2.3 Patients with complex and/or chronic pain

- One of the following strategies are considered for patients with chronic pain/ on long term opioids or at high risk of an adverse pain experience:
  - Ketamine IV 0.5mg/kg at induction; or
  - magnesium bolus at induction followed by infusion @ 15mg/kg/hr for duration of operation.
- Pain specialists' input into these patient's care. This may be via the acute pain service and/or input from the patient's chronic pain team. Such patients are highlighted pre-operatively allowing appropriate preparation e.g., a bespoke pain management plan set up following outpatient consultation.

### 3.2.4 Regional Anaesthesia Blocks

- Motor sparing regional anaesthesia blocks are used if anaesthetic skill set allows (training need) i.e., use of femoral nerve block is avoided;
- for knees this includes:
  - pre-incision proximal Adductor canal block under ultrasound guidance using 15-20mls local anaesthetic to provide anteromedial knee analgesia; and
  - iPACK block (Injection into the space between the popliteal artery and the capsule of the knee) to provide posterior compartment analgesia with a further 15-20mls local anaesthetic.
- surgical LIA protocol adhered to (see [section 3.4.3](#)); and
- protocolised dosing regimens are required to enable motor sparing blocks to be used in conjunction with surgical LIA safely.

### 3.2.5 Non-pharmacological management of pain

- Use of ice, cyrocuffs or similar is helpful in reducing swelling and pain following knee arthroplasty; and
- distraction exercises can also assist in patients re-focusing their attention and may reduce overall levels of pain experienced.
- Patient education: expectation setting on the post-operative experience is vital prior to the patient attending for their surgery. Patients are informed that up to a moderate level of pain on mobilisation is normal and anticipated following lower limb arthroplasty. They are also counselled that whilst it may be painful to move, movement overall will reduce their pain burden. Supportive patient literature has been developed to reinforce this information.

### 3.2.6 Assessment of pain

SWAOC has adopted a functional pain assessment scoring method for arthroplasty patients. Instead of focusing solely on the level of pain the patient reports that they are experiencing it is the impact of pain upon their ability to mobilise and actively participate in their recovery that is scored as none/mild/moderate/severe.

## 3.3 Peri-operative Care

### 3.3.1 Antiemesis and Steroid use

- Dual antiemetic therapy is used to reduce rates of post-operative nausea and vomiting and first mobilisation nausea/ dizziness. Typically:
  - Ondansetron (4mg) and Dexamethasone are used as prophylactic agents, both intravenously.
- Antiemetic prophylaxis is continued routinely in the immediate post-operative period (48hrs) as a preventative rather than a reactive strategy to maximally optimise the patient, this matches the duration of very strong opioids.
- There has been much interest in the role of steroids in enhanced recovery for joint arthroplasty. Large variation exists in practice with some centres using very high doses intravenously and others utilising intra-articular steroid.
- A minimum dose of 10mg dexamethasone IV (or equivalent) is utilised in SWAOC:
  - single peri-operative doses of glucocorticoids have been shown to offer numerous benefits without reporting safety issues (Lavand'homme et al, 2022);
  - reported benefits in large, randomised control trials include reductions in pain scores, nausea and vomiting, post-operative analgesic requirement, shortened LoS and lower inflammatory markers (Lex et al, 2021);
  - repeat dosing regimens have also been shown to be effective but, to date, lack the associated published safety studies;
  - dose finding studies have not supported a definitive recommended single dose however there is some consensus that a minimum of 10mg dexamethasone (or equivalent) intravenously should be used;
  - elevations in blood glucose levels have been found in persons living with and without diabetes receiving a single bolus of dexamethasone (Gülmez et al, 2018), likewise, the surgical stress response from undergoing any major procedure will also lead to elevations of blood glucose peri-operatively due to secretion of catabolic hormones; and
  - given the desirable benefits glucocorticoid administration offers in this surgical context clinicians should determine on a case-by-case basis if they do not feel a transient elevation in blood sugar can be tolerated/managed in persons living with diabetes.

### 3.3.2 Antibiotic prophylaxis

- Selection of routine prophylactic antibiotics are guided locally by microbiology department policies as infection risks vary.
- If Gentamicin is used, the dose varies depending on the patient (weight/chronic kidney disease).
- Antibiotics are put in separate 100ml bags of normal saline and administered slowly prior to incision (maximum 60 minutes prior to incision) and sufficient post administration circulation time allowed prior to knife to skin.

- The excess association of Teicoplanin with anaphylaxis as reported in NAP 7 (17-fold more likely to cause anaphylaxis than penicillin and similar drugs) should be noted. Teicoplanin should always be administered slowly, in a volume of 100mls normal saline, with continuous monitoring in an un-sedated patient to allow optimal detection of any early signs of anaphylaxis. It should not be allowed to physically mix with Gentamicin as drug precipitation can occur.
- Single dose regimens e.g., Teicoplanin and Gentamicin facilitate day case discharge and where possible are the default practice. Accepting variation for specific allergy or under specialist microbiological guidance.

### **3.3.3 Intra-venous fluids**

- Intra-venous fluids are judiciously used;
- patients typically require 1000-1500ml maximum of crystalloid only during their operative procedure, avoiding excessive volumes;
- any intravenous fluids administered are warmed;
- post operatively fluids are seldom continued, with the only routine exception of returned cell salvage blood;
- unnecessary IV lines are removed as soon as possible; and
- over hydration is avoided – patients should drink according to thirst.

### **3.3.4 Tranexamic Acid (TXA)**

NICE guidance, as part of the Blood Management programme, is followed to guide tranexamic acid dosage and timings.

### **3.3.5 Blood conservation / management**

- Optimisation and blood conservation strategies are in place for all patients;
- the uni aims to avoid administration of allogenic blood transfusions for elective surgery, where possible, (immune compromising effects/ precious limited resource/ transfusion reaction potential); and
- intra-operative cell salvage is used for all patients on a default 'collect, decision to process' strategy unless a tourniquet is in use. It is an effective method of optimising patients for shorter stay discharge (Uys, Scates and Blandford, 2021).

### **3.3.6 Venous Thromboembolism prophylaxis**

SWAOC utilises a nationally agreed compliant thromboprophylaxis risk assessment and prophylactic management as per national guidelines for VTE.

## **3.4 Surgical Procedure**

### **3.4.1 Promote In theatre efficiency**

- The admissions area is co-located to theatres; and
- patients walk to theatre and self-position on a trolley/ operating table;



- SWAOC maximises efficiency and minimises manual handling by anaesthetising on the same table/trolley as the surgical procedure will be performed on, availability of two operating tables per list enhances efficiency;
- use surgical operating trolleys where appropriate, e.g., for knee surgery to further enhance efficiency savings avoiding patient transition at the end of the procedure;
- set trigger-points have been defined to guide team actions and build consistent processes, e.g., at cementing pre-alert telephone call to admission ward to warn of imminent send, sending at start of skin closure (local geography of facilities defines the time points selected);
- Surgical Assistant scrubs with Scrub Nurse before spinal inserted;
- Lead Surgeon is physically present in theatre ready to position as soon as the anaesthetic is complete; and
- Lead Surgeon remains in theatre until the patient is ready to transition to Post Anaesthesia Care Unit (PACU) to support maximal efficiency.

### **3.4.2 Surgical technique and joint prosthesis**

SWAOC uses ODEP 10A rated prostheses or prosthesis with a NJR proven similar track record and reduced types of each implant available. Minimal loan kit is required by the service and equipment is on the shelf for a minimum of 90% cases.

There is a clear, evidence-based, rationale for using a prosthesis which is more expensive and has less than a 10A ODEP rating. It follows therefore that while variation in implant use is acceptable, it should not adversely affect the patient outcomes or SWAOC's finances.

Any new or modified implant will have had an independent assessment by the Beyond Compliance project such that introduction of such implants is safe, stepwise, and well supported as they are monitored.

Use of joint replacements in SWAOC is as per best practice recommendations and 80% of primary hip replacements in patients aged 70 and over receive cemented or hybrid prostheses.

International studies seem to support a positive surgeon volume-outcome relationship for most procedures/conditions. The general expectation is that a surgeon has participated in the following volumes. Factors like extended leave or stage of the surgeon's career will need to be given appropriate consideration:

- 30 elective (per) joint replacement procedures per surgeon per year for high volume procedures (e.g., hip and knee replacements); and
- 10 elective joint replacements per year (Unicompartmental knee).

Optimum productivity is four cemented primary joint replacements per 8hr list (cutting time). The lists are uninterrupted, with scheduled breaks for staff. Use of two operating tables or suitable operating trollies can assist with theatre efficiency and reduces unnecessary manual handling

Surgical procedures, as per other parts of the pathway, are standardised as much as possible so that the whole process is predictably reproducible and familiar to the whole staff. This process results in shortening the operative time and enhancing safety.

The core clinical theatre team (surgeon, anaesthetist, ODP and Nursing staff) for every list is relatively consistent on a week-to-week basis and specialist orthopaedic scrub nurses who understand the procedure (especially joint replacement) to be standard. The working culture fosters development of a wider team that encourages multi-professional training and safety audits.

Knee arthroplasty is provided using 'tourniquet lite' strategies. Either avoiding use totally or using tourniquet inflation for the minimum duration possible at the lowest permissible pressure. This reduces adverse events, pain burden for the patient, reduces the amount of supplementary anaesthetic often required to overcome tourniquet hypertension and may reduce LoS (Ahmed et al, 2021). If a tourniquet is used, it is at the lowest permissible pressure, and is let down before closure, to ensure good homeostasis and closure is attained.

There is a reasonable body of evidence to suggest that drains are not necessary. Occasionally there may be specific circumstances where the surgeon may feel it appropriate. The drain should not hinder mobilisation and a clear plan for safe removal before discharge.

A high-quality submission into the National Joint Registry database is completed.

### **3.4.3 Local Infiltration by Surgeon (LIA)**

- Local Infiltration (LIA) by surgeon is undertaken for both hip and knee arthroplasty surgery.
- No single local anaesthetic regimen has been shown to be superior in outcomes. Options include the use of dilute levobupivacaine or ropivacaine with or without use of adrenaline.
- Aim is a large volume of dilute local anaesthetic: mechanism is dilution of inflammatory mediators at the operative site in addition to the sensory neural blockade.
- Minimum >60mls volume recommended for knees, >60mls for hips (ensure local anaesthetic toxicity dose limits are not exceeded).

## **3.5 Inpatient management**

- All staff and patients understand the clinical pathway and the intended goals. Consistent messaging from staff has been crucial. See **Appendix 9** for an example of this in action.
- A stay of 0- or 1-night is the default expected LoS for the majority of patients who do not require high care post-operative support.
- Patients with the potential to be a day case are booked as Management Intent = Day Case when added to the waiting list. This ensures that they have the greatest likelihood of same day discharge as both they and the team caring for them are expecting this. It also ensures that they are reflected in hospital statistics as day case activity. Patients who are booked for planned inpatient surgery but go home as day cases are not counted in national data as day case activity.
- Inpatients are as 1-night LoS at the time of listing. An ethos of short stay surgery is embedded. Irrespective of how the patient is booked, they are managed in the immediate post-operative period on a trolley and ambulatory pathway principles are adhered to.
- Physiotherapy cover finishes at 20.00hrs.
- Daily clinical review by senior clinician occurs for all patients who have not been discharged by midday of day 1. This is to assess reasons for the patient not having met discharge competences and

implement prompt action plans.

- ALL patients are managed according to the principles of enhanced recovery. Patients are not selected out due to judgements about their age, co-morbidities, or fitness. The aim is to offer all patients the opportunity to be discharged on day 0 if they are fit to do so.
- All patients return to the post op ward on a surgical patient trolley. If patients are not fit for discharge by 20.00hrs on the day of surgery, they are transferred from this trolley to an inpatient ward bed and remain in hospital overnight. This promotes maximum engagement with the principles of ambulatory care and is a clear signal to patients and staff that ambulatory care is being undertaken with the expectation of shorter stays.
- Patients who stay overnight have morning analgesia given early to enable them ideally to be up and dressed ready to complete their physiotherapy and fulfil discharge criteria that morning.

### **3.5.1 First phase of enhanced recovery: within the 4 hrs**

- Any nausea and vomiting is aggressively managed;
- cessation of IV fluids, oral fluids is done according to patient thirst, as there is no benefit of over hydration;
- post-op energy drink is administered (prior to first stand), nausea is managed actively, rather than omit this drink (use of such drinks is associated with reduced first mobilisation dizziness alongside other enhanced recovery benefits such as wound healing and immune function benefits);
- Point of care testing is provided for Hb (+/- blood glucose for diabetics);
- standard monitoring of temperature, HR, BP whilst in PACU;
- duration of stay in PACU is limited to the time required to undertake the above actions, there is no minimum time requirement in PACU, and many patients only require stays of 10-15 minutes;
- the patient returns to the ward area on a trolley to promote short stay ethos;
- offset of spinal motor block is reviewed, minimum hourly;
- the team aim to stand the patient within 1 hour of offset of spinal motor block once satisfactory proprioception has returned, time of this to be documented, use of suitable equipment (e.g., Taurus frame or similar) along with specialist training can maximally enable this process;
- following successful stand, early mobilisation commences;
- nursing staff are trained and empowered to be confident in mobilising patients;
- patient starts eating normal diet;
- pain assessment is using a functional pain scoring system; and
- facilitate post-op x-ray early to ensure that this does not delay discharge and perform patient changes into their own clothes (see [section 3.5.2](#)).

Ensure discharge medications (TTAs) have been signed and all relevant paperwork complete so this should not be a barrier to discharge.

### **3.5.2 Second phase of enhanced recovery: 4hrs post op to discharge**

- Patients work to functional goals to demonstrate safe walking, transfers, and stairs and exercises

compatible with discharge utilising mobility aids as required/instructed. 90 degrees of flexion in knees is not required for discharge;

- patients need to be able to tolerate diet and fluids;
- no urinary retention;
- observations within satisfactory limits normal for that patient;
- TTA medications available;
- safe location of discharge confirmed (with supportive adult present, telephone etc);
- post-operative emergency contact information provided (booklet or leaflet); and
- post-operative self-rehabilitation therapy plan provided to patients including referral details for local physiotherapy services as per NICE guidance.

During the second phase, patients repeat their post-operative exercises 3-4 times daily as instructed:

- to remain out of bed as much as possible, dressed in own day clothes; and
- whilst in hospital, minimum of twice daily therapy sessions to progress walking, strength, movement, and independence.

### **3.5.3 Therapy**

- Patients are enabled to independently perform routine activities like eating, dressing, and walking as early as possible to achieve discharge competences;
- standardised protocols have been established to guide therapy interventions;
- all patients have direct therapy input on the day of surgery but at the very latest this should commence within the first 24hrs (irrespective of the day of week);
- mobilisation to occur within 1 hour of offset of motor block by physiotherapists but also by nursing staff, ensure satisfactory proprioception has returned to enable safe standing/mobilisation;
- all nurses working on the ward should have competency in day 0 mobilisation;
- an initial assessment takes place as soon as possible after the patient returns from recovery;
- encourage patients to get dressed in their own clothes and be wearing any hearing aids or glasses they require prior to mobilising to reinforce that they are in the rehabilitation phase of their recovery and help preserve dignity;
- encourage patients to mobilise to the toilet rather than using bed pans/urinary bottles, mobilisation initially with member of staff until confidence/competence is established;
- encourage patient to commence their post-operative exercises asap and repeat these minimum three times per day;
- meals are taken sitting out in the chair not recumbent in bed;
- analgesia and supportive medication (antiemetics etc) have been / are given prior to mobilisation;
- the team check support is in place for discharge; and
- check equipment is in place for discharge if needed.

### 3.5.4 Pain management

- Ice therapy for knees is used as required/ prescribed;
- pain at rest and during movement is assessed using functional pain scoring, reinforce realistic pain management expectations;
- prescribed baseline analgesia is administered regularly alongside supportive medications to minimise side effects (e.g., laxative, antiemetics, PPI);
- regular paracetamol (1g qds, unless patient weight <50kg then adjust dose);
- use of NSAIDS (Ibuprofen;400mg) or Celecoxib (200mg) subject to standard contraindications;
- opioids are a time limited prescription and if patients are discharged with them then a pathway ensuring rigorous opioid stewardship is in place and only short durations used; and
- there is good evidence for the use of some non-medical pain management techniques e.g.: listening to music, cold therapy, relaxation, distraction, self-massage).

### 3.5.5 Other

- Patients undergo x-ray prior to discharge to confirm prosthesis placement and enable potential virtual follow-up;
- any bulky dressing is removed within 24hrs for knees and prior to discharge for hips;
- Consultants have ceased use of wool and crepe for knee arthroplasty;
- providing the post op haemoglobin point of care test in the first phase of enhanced recovery was satisfactory and the patient is clinically achieving all expected progression milestones then routine post operative blood tests are not indicated (Silverstein et al, 2022); and
- exceptions are to monitor INR for recommencement of warfarin, or blood glucose monitoring for persons living with diabetes.
- Routine urinary catheterisation is avoided. If patient has not voided their bladder or is symptomatic, then use a bladder scanner to determine volume. Use of in-out catheter with appropriate aseptic precautions.

Patients who are identified as requiring post-operative level 1.5 care will deviate from the above timescales. The principles of enhanced recovery are applied, however the speed at which the patient reaches these goals is likely to take longer.

For patients who are significantly co-morbid, or frail then falls assessments and active screening for delirium is undertaken.

## 4. Follow up Procedures

**Section includes:**

[4.1 Patient information provided prior to discharge](#)

[4.2 Wound care](#)

### [4.3 Discharge medication](#)

### [4.4 Therapy on discharge](#)

### [4.5 Follow-up review](#)

### [4.6 Outpatients review](#)

### [4.7 Implant specific](#)

## **4.1 Patient information provided prior to discharge**

Post-operative information resources (e.g., booklet/ app/leaflets):

- emergency contact information post discharge for support/advice/queries;
- instructions on how and when to take TTA medications;
- wound care instructions;
- complications to be aware of (must specifically include DVT awareness and prevention);
- exercise requirements (ideally reinforced with pictures and or videos/apps to assist);
- advice on falls prevention;
- manufacturer's instructions for any equipment or mobility aids provided; and
- discharge letter.

(NB: research has shown that the cessation of traditional hip precautions is not associated with increased rates of post-operative dislocations or readmissions, but rather shows a trend towards lower rates of dislocations and reductions in lengths of stay (Machin et al, 2022). Therefore, adherence to hip precautions is no longer routinely required.)

## **4.2 Wound care**

- Oozing should have ceased by 72hrs;
- patients are advised that the surgical dressing should not be changed or disturbed;
- patients have a contact number for clinical advice. This is provided via an information booklet/sheet or via a sticker affixed to the dressing with this information;
- patients are advised to phone this number to contact the ward or wound clinic if there are any concerns, rather than the GP or emergency departments. A hub and spoke telemedicine review service allows Consultants at base sites to support the nurse-led wound clinics;
- if patients present with problems to the peripheral site hospitals, they are not empirically treated with antibiotics as it may diminish ability to later isolate an organism to treat; and
- suture removal takes place at the GP surgery (staples or non-absorbable 10-14 days post-op).

## **4.3 Discharge medication**

- Analgesia is provided for 2 weeks post-op with graduated stepping down during this period;
- any opioids issued at discharge are for a short, time-limited prescription and have strict non-continuation stewardship in place;
- co-administration of prophylactic medications is standard in all TTAs to minimise the side effect burden rather than be reactionary introductions once symptoms develop:

- laxatives (e.g., macrogols 1 sachet bd; for the duration of any strong opioids or codeine medications);
- PPI prophylaxis (e.g., lansoprazole 15mg od for the duration of any NSAID/COX-II or Aspirin therapy). Note lansoprazole is associated with less hyponatraemia than other PPI agents; and
- antiemetics – see [Section 3.5](#).
- VTE prophylaxis as per national guidance (NG89 NICE);
- patients informed of potential side effects of medications; and
- use of non-medical pain management techniques (cold therapy, relaxation, medication, self-massage) is recommended.

#### 4.4 Therapy on discharge

Patients are provided with a rehabilitation plan to follow as part of their post-discharge recovery. Clear instructions given prior to the patient leaving hospital, describe the technique and importance of conducting post-discharge exercises. This is reinforced with written and/or video material.

- Patients also have information on how to access therapy advice and support post discharge.
- Based on updated NICE guidance (2022) it is no longer recommended that routine review of all post operative arthroplasty patients be conducted. This applied to knee as well as hip arthroplasty. Instead, referrals for post-discharge therapy input should only be conducted for patients who are unable to follow a self-directed rehabilitation programme.
- NICE recommend that group or individual outpatient rehabilitation should be offered to patients who:
  - have difficulties managing activities of daily living; **or**
  - have ongoing functional impairment leading to specific rehabilitation needs; **or**
  - find that self-directed rehabilitation is not meeting their rehabilitation goals; **or**
  - live with cognitive impairment.

#### 4.5 Follow-up review

Arthroplasty patients attend a single surgical review between 6 weeks and 3 months post-operatively. Patients are put on a PIFU pathway with safety netting or considered for further outpatient follow-up if not meeting their expected milestones. Depending on local provision, follow-up appointments can be attended virtually.

- The safety netting provision for post-op patients has been key, some examples include:
  - Patients who are discharged on day 0 receive a telephone follow-up the next day from the hospital (i.e., within 24hrs of discharge). This is done by the department that discharged them e.g., orthopaedic ward or day surgery unit.
  - Follow-up calls are made by staff who have this responsibility specifically allocated to them, ensuring a robust process that does not get omitted. Patients who are operated on and discharged on a Friday receive a telephone call on the Saturday.

- The purpose is to assess how the patient has progressed since discharge, exclude any concerning symptoms that require more formal review (e.g., excessive vomiting, wound problems, signs of a DVT) and offers a valuable opportunity to gather patient feedback, audit outcomes and drive continuous service improvement.
- Data is collected electronically to allow audit.
- Knowing this telephone call will happen the next day provided supportive safety netting for the patient when they are discharged. They were informed of this practice prior to discharge and the best number to contact them on was established and recorded.
- Local PROMs for surveillance.
- Timely triage via telephone, website or web application for patients on PIFU pathway to access to clinical assessment and multidisciplinary support if required.
- If there is provision locally, access to Arthroplasty Care Practitioners can be given for advice and access to clinical assessment if required.

#### 4.6 Outpatients review:

- A single post-surgery follow-up, followed by PIFU pathway has been found to be sufficient for patients meeting their expected milestones.
- Patients failing to meet expected milestones have required a further follow-up appointment during the first-year post-op, with an X-ray on arrival. This has been delivered by an appropriately qualified member of the MDT.
- There can be exceptional circumstances (patient, surgeon or implant-related) requiring extended follow-up. *Beyond Compliance* recommendations have been followed.
- Patients with bilateral disease, requiring surgical treatment of both sides, are listed for surgery on the second side, as opposed to waiting for a new referral. Post-operative anaemia is considered in determining the timing for second side surgery.

##### 4.6.1 Novel or modified implants:

Novel or modified implants should be followed-up annually for the first five years, two yearly to ten and three yearly thereafter or as agreed with *Beyond Compliance*.

## 5. Patients with level 1.5 care needs

It is recognised that a proportion of patients awaiting hip and knee replacement surgery have significant co-morbidities or requirement for social support. Advice regarding patients with co-morbidities requiring level 1.5 care post-operatively is covered in this section. Patients with co-morbidities which are not severe enough to require level 1.5 care are likely to be appropriate for the ambulatory pathways detailed within this document and in fact are a population group who benefit even more from the attention to detail within these pathways which focus on normalising their physiology to minimise any risk of post-operative hypotension, renal impairment or subsequent cognitive dysfunction. If patients require additional social care, this is likely to be in place pre-operatively and should be continued for as long as required post-operatively. These



patients should be treated using the same principles detailed within this document and potentially benefit even more from the early mobilisation and maintenance of normal levels of physical activity.

This delivery guide has referred throughout to the expectation that patients will follow an ambulatory 0 – 1 night discharge pathway. There is a proportion of patients who have additional needs and who have been assessed as requiring post-operative level 1.5 care or greater to support their clinical pathway.

The expectation in this group is not that they will be discharged on the same day of surgery or by midday on day 1, however they are still cared for and managed according to the principles of enhanced recovery:

- Level 1.5 care patients receive the same peri-operative management however are likely to benefit from use of invasive blood pressure monitoring, use of vasopressors and possibly direct urine output monitoring.
- Patients still receive single shot opioid free spinal anaesthesia, alongside LIA +/- motor sparing regional anaesthesia as the default anaesthetic technique.
- Maintaining high care patients without sedation minimises the cerebral, hepatic, renal and haemodynamic impact of sedating medication.
- Mean arterial pressure (MAP) is typically maintained within 10-15% of the patient's normal blood pressure, use of vasopressor rather than excessive intravenous fluid to achieve.
- High care units (level 1.5 facilities) are supported by clinicians with intensive care experience who can escalate care further if indicated.
- Mobilisation on the day of surgery is still indicated, staff receive additional training and support to develop experience and confidence in doing this. There is an aim to mobilise all high care patients within 6hrs of the end of their surgical procedure (ensuring motor offset of spinal) unless mobilising is technically impossible.
- Active rehabilitation is a core element of recovery in high care environments.
- Twice daily review(s) by clinician with dedicated high care training experience to assess suitability for step down to standard care.
- There is an aim to remove invasive monitoring, excess IV lines and urinary catheters as soon as possible.
- Patients eat and drink normally whilst in high care, avoiding excessive intravenous fluids.

## 6. Standards for good governance and efficiency metrics

**Section includes:**

[6.1 Governance and efficiency metrics](#)

[6.2 Efficiency metrics](#)

In SWAOC, both clinical quality and efficiency is driven by clinicians with consistency of approach across all members and clinical pathways. The metrics below are regularly assessed.

The team have developed policies to assess clinical harm including a root cause analysis if patients cannot be operated on or followed up within the nationally or professionally mandated Referral to Treatment (RTT) standard.

## 6.1 Governance and efficiency metrics

- Compliance with the National Joint Registry (NJR) including high linkability;
- six monthly reviews of NJR data by surgeons;
- percentage of cemented hip replacements for patients more than 70 years age;
- percentage use of ODEP 10A rated prostheses;
- evidence of MDT involvement in the use of any novel prosthesis or loan kit;
- monitoring of any novel or modified implants (Beyond compliance), including long term follow up;
- emergency readmission with overnight stay within 30 days;
- return to theatre within 30 days;
- percentage of procedures with infection;
- surgical site infection rate (Health Security Agency (Previously PHE) and GIRFT surveillance projects);
- dislocation rates for hip replacement;
- SMR for joint replacement surgery;
- length of stay metrics: including day case rates and median LoS: Review action plans to target the top decile of LOS;
- audit of actual v/s expected discharge dates including weekend discharge rates;
- documentation of clinician attendance at multidisciplinary team meetings;
- an annual transparent surgical review meeting with all surgeons and NJR data to improve 1-, 5- and 10-year outcomes in joint replacement;
- individual clinical outcomes using data from NJR and NCIP to be utilised for annual appraisal;
- individual surgeon volumes by procedure; and
- PROMS compliance and adjusted health gain on PROMS, ideally at surgeon level. This is now provided by the NJR for all surgeons in England;
- patient experience surveys (FFT);
- interventions evidence-based on National Clinical criteria including NICE;
- target reduction in certain procedures e.g., knee arthroscopy prior to joint replacement surgery;
- audit of postoperative therapy requirements in the community; and
- review of litigation data.

## 6.2 Efficiency Metrics

- Review of Model Health System data;
- outpatient utilisation including virtual clinic usage;

- percentage of patients who required surgery after the first medical appointment;
- average percentage of pre-operative outpatient appointments per patient;
- average radiological investigations per patient;
- equity of patient access standards;
- mean waiting times for the first appointment;
- percentage of patients waiting for more than 18/52 and 52 weeks for surgery;
- percentage of patients pre-assessed within six weeks of surgery;
- on-the-day cancellations for non-clinical reasons;
- percentage of theatre utilisation and average hip / knee joints done on an 8-hour list;
- peer reviewed prosthesis costs;
- requirement of loan kit(s) required by the service and their costs;
- average cost per procedure or Weighted Activity Unit (WAU);
- new to follow-up ratio; and
- training metrics (Specialty Registrars (including cases performed under supervision), junior doctors and nursing staff).

[View metrics on the Model Health System >](#)

## FAQs

### *1. Why is it important that patients are initially managed on a trolley following their surgery?*

Management of the patient's care initially on a trolley helps to reinforce visually to both patients and staff that this patient is part of a short-stay surgical care pathway, essentially it helps to embed the ethos. Post operatively as soon as their spinal has worn off, patients are encouraged to get dressed in their day clothes, be eating and drinking, mobilising to the toilet facilities rather than using commodes and actively working towards achieving their discharge competences with the nursing and therapy teams. Placing the patient in an inpatient bed does not assist in the acquisition of the above goals. As stated, before any patient who is not ready for discharge on the evening of day 0 will remain in hospital overnight and they would transfer from trolley to an inpatient bed that evening.

### *2. How do you manage post op bloods and short stay surgery?*

Patients should not require routine post operative bloods. Anaemia should have been optimised pre-operatively and we recommend that intra-operatively blood conservation strategies are utilised including cell salvage, if available. With the use of pre-operative electrolyte / energy drinks, minimised fasting periods and judicious administration of intravenous fluids patients should be eating and drinking orally rapidly after their surgery. We suggest patients have their haemoglobin checked via point of care testing in recovery. Post operatively providing the patient is achieving all their post-operative care goals, is mobilising effectively and has observations within normal limits; then no further routine blood tests should be needed,

apart from those for other specific management indications on an individual patient basis (such as blood glucose monitoring for persons living with diabetes, INRs for warfarinisation).

### *3. Is using opioids for post-operative patient analgesia against recommendations?*

Opioids offer powerful and effective analgesia however concerns have arisen, especially reflecting on the USA data about the potential for significant community addiction. The Faculty of Pain Medicine do not advise absolutely against their use, but state modified release opioids must be used with caution. The critical issue in opioid usage post-operatively is one of stewardship. Unregulated discharge of patients into the community with opioid analgesics post-operatively is not recommended. However, using opioids within a very strict prescribing framework, for an ultra-short, time-limited window, with rigorous non-continuation procedures embedded has been shown to be safe and effective by several high performing units nationally. The use of post-operative opioids is therefore only recommended within this strict remit. There are further details and examples of practice in [section 3.2.2](#) of this document. Patients who are on long term opioid medications pre-operatively should have supported weaning from or at least attempt dose reduction to reduce their chances of adverse outcomes related to their surgery. Further details in [section 2.4.4](#).

### *4. Should we be using local infiltration analgesia (LIA) or regional blocks for TKR?*

Both, they are not mutually exclusive options. Use of LIA has been well established in many centres although there is no single definitive regimen that has emerged as superior. The general principle involves large volume infiltration of dilute local anaesthetic and likely involves dilution of inflammatory mediators as part of its mechanism of action. There is considerable variation in outcome following LIA, likely related to varying technique among surgeons. The use of proximal adductor canal and iPACK blocks offers motor sparing analgesia and facilitates early mobilisation. The insertion of targeted local anaesthetic, under ultrasound guidance offers patients augmented analgesia and peripheral nerve blocks are associated with longer duration of effect compared to LIA. It also confers the benefit of analgesia commencing prior to knife to skin. Specific training may be required to ensure anaesthetists have these blocks within their skill set. SWAOC adopted protocolised dosing regimens of local anaesthetic to enable motor sparing blocks to be used in conjunction with surgical LIA safely.

### *5. Do patients feel unsupported at home following a 0–1-night discharge pathway?*

Patient feedback from multiple centres collected at day 1 and 7 show this is not the case. However, a key requirement is that the patient must be appropriately prepared for surgery. i.e., they must have realistic expectations of their post operative pain and general management, the level of additional support from family/friends they will require and how to prepare their home environment and themselves for their procedure aftercare. Patients should be further supported on discharge with the provision of contact numbers and should receive a routine follow-up check in telephone call within their first 24hrs at home (irrespective of day of week) following a 0-day discharge. Appropriate written and verbal information to support discharge is critical. This should cover instructions on medications, therapy requirements, practicalities such as washing and dressing.

### *6. How long do the spinal anaesthetics mentioned in this guide last?*

The answer to this will depend on whether time of surgical anaesthesia is assessed or total time to motor offset i.e.: quadriceps function restoration. The time in which the spinal block provides sufficient anaesthesia to permit surgery to be undertaken is obviously much shorter, however the 'tail' effects of residual motor blockade that can hamper rehabilitation and affect same day discharge rates must also be born in mind if longer acting agents are selected. Data from SWAOC has shown a typical time from insertion to motor offset of spinal block to be on average 250mins (for 100mg dose of 2% hyperbaric prilocaine) and 330mins (for 10mg dose of 0.25% racemic bupivacaine). The surgical anaesthesia duration for these two agents would be approximately 110mins and 160mins respectively.

#### *7. Does using cell salvage matter?*

If available, using cell salvage offers significant potential advantage, especially in the goal to maximally optimise patients for short stay discharge. Blood is a precious resource and as we are currently seeing subject to critical national shortages. Returning as much 'lost red cell volume' to patients will help normalise their physiology, reduce the requirement for volume replacement with crystalloid solutions and assist in enhanced recovery management. A large-scale US study has shown that programmes with a greater number of enhanced recovery components in hip or knee arthroplasty are associated with fewer complications and reduced LoS (Memtsoudis et al, 2020). This is especially pertinent in a population where rapid mobilisation is the intended goal.

Additionally, avoiding the use of allogenic blood transfusions offers benefits in reducing risks of transfusion associated adverse events including transfusion reactions and the immune system impact of receiving donor packed red cells.

Centres where cell salvage is used on a routine basis for all primary hips and knees have shown worthwhile volumes can be collected and returned. Data from Torbay and South Devon NHS Foundation trust has shown mean volumes of 135ml (86-203 [66-663ml]) for primary THR and 138ml (108-208 [63-322ml]) for primary TKR when they introduced routine collection in 2019 (Uys, Scates and Blandford, 2021). It is recommended that collection only is set up until the volume of collection can be assessed as sufficient to warrant processing for re-transfusion. This can be introduced as a low-cost intervention as a collection system can cost approximately £20 per set. A major advantage of the default collection strategy is it embeds practice, supports training and familiarity, and avoids the second-guessing selection aspect as to which patients are more likely to bleed more, this is seldom accurately predicted by clinical staff. The value in TKR needs to be assessed against tourniquet use. Minimal or no tourniquet strategies are recommended practice by GIRFT and as such cell salvage can still be usefully deployed. However, if a surgeon utilises a tourniquet throughout the procedure, then cell salvage will offer no benefit.

# Acknowledgements

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# Further Reading and References

## GIRFT Resources

[A national review of adult elective orthopaedic service in England](#) (GIRFT, March 2015)

[A follow-up on the GIRFT national specialty report on orthopaedics](#) (GIRFT, February 2020)

[Best practice hip arthroplasty surgery documentation](#) (GIRFT, BHS and BOA, July 2017)

[Best practice hip arthroplasty surgery documentation – one page summary](#) (GIRFT, BHS and BOA, July 2017)

[Best practice for knee arthroplasty surgery documentation](#) (GIRFT, BASK and BOA, July 2017)

[Best practice for knee arthroplasty surgery documentation – one page summary](#) (GIRFT, BASK and BOA, July 2017)

[Design and layout of elective surgical hubs](#) (GIRFT, April 2022)

[Establishing an effective and resilient workforce for elective surgical hubs](#) (GIRFT, June 2022)

[Getting the most out of GIRFT](#) (GIRFT, July 2021)

[Learning from Litigation Claims](#) (GIRFT, May 2021)

[National Day Surgery Delivery pack](#) (Centre of Peri-operative Care, British Association of Day Surgery, GIRFT, September 2020)

[Orthopaedic Surgery: SWAT \(South Warwickshire Accelerated Transfer\) Programme](#) (GIRFT, May 2022)

[Planning effective surgical hubs guide](#) (GIRFT, March 2022)

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## National and Society Guidance

### [Beyond Compliance](#)

[Consent: Supported Decision-making – A guide to good practice](#) (RCS, November 2018)

[Decision making and consent](#) (GMC, 2020)

[Guidelines for the provision of intensive care services](#) (FICM and ICS, version 2.1, July 2022)

[High and Lows: A review of the quality of care provided to patients over the age of 16 who had diabetes and underwent a surgical procedure](#) (NCEPOD, December 2018)

[Hypertension in adults: diagnosis and management](#) (NICE, August 2019, updated March 2022)

[Making a decision about hip osteoarthritis](#) (NHS England, 2022)

[Making a decision about knee osteoarthritis](#) (NHS England, 2022)

[My Planned Care](#) (NHS My Planned Care, 2002)

[National Wound Care Strategy Programme](#) (NWCSP, April 2020)

[Next steps in increasing capacity and operational resilience in urgent and emergency care ahead of winter](#) (NHS England, August 2022)

[NICE Osteoarthritis in over 16s: diagnosis and management](#) (NICE, 2022)

[Shared Decision Making](#) (BMJ Best Practice, 2022)

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[Surgery and Opioids: Best Practice Guidelines 2021](#) (FPM, March 2021)

[Transforming musculoskeletal and orthopaedic elective care services](#) (NHS England, December 2017)

# Appendices

**Appendix 1:** GIRFT Total Primary Hip Replacement Pathway

**Appendix 2:** GIRFT Total and Uni Primary Knee Replacement Pathway

These pathways are available via [Orthopaedic Surgery – Getting It Right First Time – GIRFT](#)

**Appendix 3:** SWAOC medical grounds for patient selection

**Appendix 4:** SWAOC LIA protocol

**Appendix 5:** SWAOC motor sparing regional anaesthesia protocol

**Appendix 6:** SWAOC perioperative care protocol

**Appendix 7:** SWAOC secondary recovery pathway

**Appendix 8:** SWAOC anaesthesia for patients undergoing THR/TKR/UKR



## **Appendix 9: SWAOC Physiotherapy case study**

## **Appendix 10: SWAOC Patient Post-operative Self-medication chart**

These documents are available for use as templates via [Orthopaedics - Getting It Right First Time - FutureNHS Collaboration Platform](#)

### **GIRFT High Volume Low Complexity Programme and elective recovery**

With demand for hospital treatment outstripping capacity prior to COVID-19, the demands of delivering care during a pandemic led to significant backlogs and longer waits for patients.

There is a significant need to improve the productivity and resilience of services, many of which are still disrupted by the consequences of the pandemic and impacted by ongoing operational pressures. Waiting times vary considerably across different parts of the country, but also between individual hospital trusts in the same system. In 2020, GIRFT established the High Volume Low Complexity ('**HVLC**') programme with the NHS London Region to address these challenges.

The HVLC programme promotes productivity through optimised delivery of services.

### **About GIRFT and the GIRFT Academy**

Getting It Right First Time ('**GIRFT**') is an NHS programme designed to improve the quality of care within the NHS by reducing unwarranted variation. By tackling variation in the way services are delivered across the NHS, and by sharing best practice between trusts, GIRFT identifies changes that will help improve care and patient outcomes, as well as delivering efficiencies such as the reduction of unnecessary procedures and cost savings.

The GIRFT Academy has been established to provide easily accessible materials to support best practice delivery across specialties and adoption of innovations in care.

Importantly, GIRFT Academy is led by frontline clinicians who are expert in the areas they are working on. This means advice is developed by teams with a deep understanding of their discipline.

**GIRFT Academy has also published other pathways and case studies on the best practice library. These are available at: Best Practice Library –**

<https://www.gettingitrightfirsttime.co.uk/bpl/orthopaedics/>

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