

Elective Hip or Knee Replacement Pathway

**Good clinical and operational practice guidance
Post-COVID Transformation & Recovery programme
May 2020**

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1 Introduction

- 1.1 Getting It Right First Time (GIRFT) is an NHS improvement programme led by frontline clinicians designed to improve the quality of care within the NHS by reducing unwarranted variations. By sharing best practice nationally it identifies changes that will help improve care and patient outcomes and delivers efficiencies such as the reduction of unnecessary procedures and cost savings.
- 1.2 Over the past few months, the NHS has seen an unprecedented pace of transformation as a result of COVID-19. The Trauma & Orthopaedic community was at the forefront of implementing rapid collaborative change and innovations as a response to the COVID-19 pandemic where elective and trauma service was significantly impacted. It is recognised that positive practice has arisen during this period all over the country^{1,2,3} especially in areas of Outpatients, Diagnostics, Management & Governance of minor Injuries, and medical rotas that will support improved outcomes and patient experience to become part of the 'new normal' and can be applied for the betterment of the NHS.
- 1.3 With orthopaedic services making up 25% of all surgical interventions, the service is particularly impacted by the cessation of elective activity. This has created new challenges: higher numbers of patients on the waiting list, longer waiting times and managing services whilst maintaining safety for patients and staff in light of the pandemic. This will mean every opportunity will need to be taken to improve efficiency.
- 1.4 As we now look to restarting elective services the GIRFT programme recommends the use of this unique opportunity to combine the GIRFT datasets and review the service on the basis of recent experience. This will transform the way in which services are designed, coordinated and delivered as the NHS moves into the recovery and transformation phase post Covid-19, and will improve the quality and standard of care for patients.
- 1.5 GIRFT has brought about significant qualitative and quantitative improvement in orthopaedic surgery^{4, 5}. In its drive for continuous improvement it recommends using the greater potential to utilise networks, theatre space and resources to maximise productivity within the regions and minimise disruption as a result of COVID-19. Breaking down barriers between organisations and teams will be crucial to delivering this. To fully harness this opportunity to embed positive change, it is crucial the programme moves at pace, following the lead set by colleagues across London over recent weeks.
- 1.6 The GIRFT team are already underway with the development of the model, data provision and best practice development. The GIRFT programme believes that achieving the median is no longer acceptable and the current top decile performance nationally

should now be set as the 'GIRFT standard' for all services within the NHS as they restart. By setting this high standard for care and reducing any unwarranted variation there is a potential to further improve metrics detailed in section 13.4 that include:

- Release bed days
- Reductions in readmissions
- Enhanced patient experience
- Improve patient flow by increasing capacity of emergency beds & trauma theatres
- Make A&E more efficient
- Improvement in training standards
- Improved long term survivorship of implants
- Procurement savings

- 1.6 GIRFT will be looking for units to deliver further innovations and improvements, which we will capture and incorporate into regular iterations of this document to enable the rapid dissemination of learning nationally. This initiative aims to review clinical pathways for hip & knee degenerative joint disease in its London hub and develop a 'best of the best' clinical pathway to improve patients' experience of care and expedite recovery from elective hip & knee joint replacement surgery in the shortest possible time, without compromising safety.
- 1.7 The GIRFT guide provides the integrated care systems with a sequential process based on best practice, national guidelines and expert decision making for the management of all patients referred with hip and knee pain that resultantly require surgical intervention (usually joint replacement surgery).
- 1.8 The GIRFT hot and cold site pilot programmes⁵ have shown that it is critical that inpatient elective work is centralised to one geographical area or site with day surgery cases done in dedicated units at different areas or sites. The elective areas should be COVID-19 free, equipped with ring fenced elective orthopaedic base, laminar flow theatres, appropriate medical, diagnostic and specialty support including immediate back up high dependency services to patients who are higher risk as per the recommendation of the Faculty of Intensive Care Medicine⁶
- 1.9 There must be an emphasis on enhanced recovery programmes that will improve patient flow and reduction in total use of bed days. In recent years there has been progress in hip and knee replacement enhanced recovery with units having implemented some or all components of enhanced recovery. There still is variation in length of stay with patients been discharged variably from on day 0 (day case) to units having mean inpatient stay of more than 5 days. It is critical that all patients who have been listed for surgery should have the principles or culture of enhanced recovery applied as part of a formal programme with optimum post-operative support in the community.

1.10 Shared decision making⁷ should be built into points along the care pathway when a decision needs to be made. This is particularly relevant when people face ‘high value’ decisions where the choice can have a significant impact (positive or negative) on their lives. At these decision points, options should include medical treatments, doing nothing and (where relevant) the option of psychosocial/community support.

2 Key Recommendations

General	
	Inpatient elective work is centralised to one geographical area or site.
	The ICS should create COVID-19 free zones where elective surgery is performed.
	All patients should be admitted to dedicated ring fenced orthopaedic elective wards and all support services available during operating hours (incl. x-ray and path labs).
	Emphasis must be placed on the enhanced recovery programme and each patient pathway that involves elective surgery should have the principles or culture of enhanced recovery.
	The integrated care system should establish systems for advice and guidance such that primary care networks and secondary care work in conjunction to improve communication and streamline the pathway for patients.
	In line with the NHS Long Term Plan the ICS should encourage virtual consultation and improve patient convenience, specialist accessibility and ease clinical space shortage.
	MSK specialist Triage referral management system is in place with a clear referral management plan.
	Regular job planned multi-disciplinary team meetings with clear terms of reference about decision making and governance.
	ICS should put resources into patient education programmes (e.g. Joint School).
	The integrated care system (or the region) should have one ICS PTL per sub speciality so that patients can be offered surgery within nationally agreed standards.
	The integrated care system (or the region) should consider a ‘clinician passport’ such that clinicians can move between hospitals.
	There should be a clear policy to assess clinical harm if patients cannot be operated or followed up with in line with the nationally mandated RTT standard.
	Comprehensive elective service should be incrementally provided over 7 days where possible, after taking into consideration issues with staff wellbeing and recruitment.
	The ICS should model the capacity they will generate by peer reviewing themselves within the top decile.
	The ICS should have a standardised WHO surgical safety checklist protocol across all its hospitals to ensure patient safety.
	The ICS should have a patient level information and costing system in place such that true costs of a procedure are easily available for comparison.

Specialist	
	First OP appointment should occur within six weeks of referral for routine patients.
	Shared decision making should be built into points along the care pathway.
	Patients should have single point of contact to advice of illness or reason for delay or cancellation so others can take operation slot
	There should be (virtual) consent clinics in place at around the time of the preoperative assessment.
	Pre-assessment teams should be multidisciplinary and include representation from Clinical Pharmacy and Pain Management.
	Pre-assessment should be complete within a minimum of 6 weeks of surgery if not sooner and a pool of pre-assessed patients should be available to fill last-minute cancellations.
	Clear preoperative anaemia screening and treatment protocols must be in place. It is substandard clinical practice to proceed with elective surgery with iron deficiency anaemia and carries significant clinical risk.
	Pre-operative Education Group (Joint School) with appropriate and comprehensive professional input.
	Patients should be admitted on the day of surgery and admissions should be staggered.
	Neuraxial (single spinal) rather than general anaesthesia for elective patients where possible.
	Use of ODEP 10A rated prostheses for all patients and reduce types of each implant available.
	Use of joint replacements as per best practice recommendations and that 80% of primary hip replacements in patients aged 70 and over receive cemented or hybrid prosthesis.
	An expectation of procedure volumes per surgeon
	A clear strategy for blood management. Cell salvage is critical part of that strategy.
	A standardised post op pain management plan essential
	7 day senior review should occur for all patients with seven day physiotherapy service.

3 First presentation with hip or knee pain

3.1 Expectation of clinician

Attempt at conservative treatment for at least 3 months prior to referral (unless in exceptional circumstances) e.g. medication (anti-inflammatories, analgesics), physiotherapy, support with lifestyle and weight loss for patients with BMI >30 (e.g. exercise group ESCAPE, community referrals/support).

If referral is deemed necessary, have a conversation with patient about likely outcome from referral being surgical intervention, including need to plan for recovery time and support from carers.

3.2 It is recommended that MSK specialist Triage⁸ referral management system is in place

3.3 Making a referral

Any referral to the Trauma and Orthopaedic department should include:

- Medical history.
- Detail of failed attempts at conservative treatment to date.
- Detail of pain or functional disability and impact on quality of life.
- Confirmation that the patient would be happy to have their joint replaced if deemed necessary.
- Knees - weight bearing X-ray within 6 months (standing AP, lateral and skyline).
- Hips – non-weight bearing X-ray within 6 months (AP pelvis).
- Where appropriate, documentation should also be provided to indicate:
- Advice and guidance in relation to weight loss (patients with BMI>30, abdominal girth>4cm over chest).
- Information and support for smoking cessation provided if required.
- Recommendation of achieving minimum aerobic exercise of 150 minutes per week.

3.4 Optimising patients for surgery

If the patient has medical problems that may affect their fitness for surgery the GP should begin optimisation of these comorbidities in primary care (Diabetes, AF etc). This may prevent delays before surgery. Where difficulties in management of these medical issues are detected early in the pathway, best practice would be 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 should be provided by pre-operative assessment team.

4 Surgical review and assessment

4.1 First OP appointment should occur within six weeks of referral for routine patients. It should be a face to face appointment.

4.2 Clinics should be organised around team-based specialties, with patients pooled by sub-specialty rather than assigned to specific consultants.

4.3 Assessment by medical specialist in outpatients

- Review medical history and imaging.
- Assess 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/ description as per FRCS (Orth) guidelines.
- Discuss risk and benefits of surgery and conservative treatment.
- Confirm if patient understands options and how they wish to proceed.
- Discuss expectations around length of stay, recovery time and support required with time for questions.
- Assess pre-existing pain score at rest and movement if patient hasn't done so via portal (no pain, mild, moderate to severe).
- Identify high risk patients based on age and comorbidities for Comprehensive Geriatric Assessment and more in depth Shared Decision Making consultation involving the anaesthetic team before finalising decision for surgery in this group of patients.

4.4 Documentation

It is important to include enough 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 must include:

- 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. fall.
- Contra-indications to non-surgical treatments.
- Listing and description of failed non-surgical treatments e.g. injections, physical therapy or weight loss.
- Physical examination inc deformity, range of motion, crepitus, effusions, tenderness, gait description (with/without mobility aids) as per FRCS (Orth).
- Results of any applicable investigations e.g. radiographs.
- Other clinical judgements e.g. reasons for deviating from stepped care approach.
- As per documenting need for joint replacement surgery guidelines.
- All patients should be consented in accordance with RCS guidance^{9,10}.

4.5 Multi-disciplinary team meetings

There should be established multidisciplinary team meetings where treatment plans for complex or revision procedures including specialist equipment or loan equipment is agreed. The remit of the MDT should encompass regular review of the clinical and efficiency metrics as described in section 13.3 and 13.4. The local MDT should regularly link with the regional centre and develop a functional hub and spoke clinical network.

4.6 Listing the patient for surgery and preparation

When a patient is listed for surgery the action should generate the following:

- Referral to 'Joint School'.
- Triage pre-assessment and referral to pre-operative assessment.
- Wait listing of the patient*.
- Order for phases 1, 2 and 3 of nursing, medical inpatient and therapies care.
- Order 2 week therapies f/up, 6 week surgical f/up, 6 months PROMs and 1 year virtual f/up including an X-ray order.

It is important to make patients feel that their care is individualised. The potential date of surgery and likely discharge would preferably be mutually agreed upon at the time of listing patients for surgery in the outpatient clinics. Patients should have single point of contact to advice of illness or reason for delay or cancellation so others can take operation slot

4.7 Consent Clinic

There should be (virtual) consent clinics in place at around the time of the preoperative assessment. It is not acceptable to formally obtain consent for planned elective surgery on the day of admission. Signing of a formal document, whilst necessary, is not evidence of adequate consent. Consenting is a process which continues throughout care^{9, 10}.

4.8 The implication of this is that the patient 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. It is expected that after this consent stage patients will stay with a specific surgical team throughout their onward care.

4.9 Patient education and counselling

- Educating patients before surgery leads to reduction in length of stay and has a beneficial effect on their anxiety. It should be carried throughout the care process.
- Provide the patient with all relevant information and advice, reiterating GP advice around smoking cessation, weight loss, alcohol consumption and exercise.
- In some cases a dietetic review may be needed to achieve adequate nutritional status.
- The expected length of stay should be specifically discussed and recorded in their consultation summary.
- The feeling of individualised care should also be re-enforced in the meetings with Physiotherapists and Occupational Therapist in the pre-operative education group. This enables patients to take responsibility for participation in their recovery after surgery.

5 Pre-surgery education and preparation

5.1 Pre-operative Education group (Joint School) attendance

Attendance at Joint School is a required step prior to surgery and should be documented. Patients attend 4-8 weeks prior to surgery.

The following teams should be represented to give advice and information:

- Physio and Occupational therapy team
- The nurse specialists who will look after the patient
- Pain management team

The process highlights the principles of Enhanced Recovery to the staff regularly. The patients care needs post discharge are highlighted and any supportive equipment the patient may need on discharge is identified, supplied and fitted before the patient's admission (wherever possible).

Patients should aim to bring their support person with them.

5.2 Key outcomes of Joint School

- Highlight the importance of following all guidance from POA, joint school, surgeon and other members of the hospital team to ensure optimal recovery, improved pain management, earlier mobilisation and improved outcomes.
- Overview of surgical procedure - Benefits, symptom management, risks and complications.
- Set expectations around pain management.
Information about benefits of spinal anaesthetic technique, use of music and audiobooks. Early mobilisation and length of stay for optimal patient-reported outcome measures and to avoid dissatisfaction from unmet expectations.
- Preparation for hospital stay including what to bring (named toiletries, 2 sets of loose day and night clothes and appropriate footwear that can fit into a locker), what to expect the night before and morning of surgery (showering, pre-op drinks) and other advice (exercise in hospital, medication, visiting times).
- Discharge planning should start at pre-assessment and in joint school.
- Highlight the need to prepare discharge destination for safety, ease and comfort following discharge (stock up on meals to avoid errands during recovery, ensure home is cleaned prior to surgery, store items you need to access to avoid bending or reaching).

5.3 Checklist for completion of joint school:

- Safety advice given regarding home environment,
- Identify if OT assessment is needed.
- Identify if patient has had a fall in the previous 12 months.
- Patients are provided with a booklet or a DVD that gives them an overview of their prospective admission and recovery, as well as a brief introduction about the

hospital/Unit. Some units have Apps and patients are encouraged to download them via the App Store or Play Store.

- Smoking cessation: local audits suggest that 10% of patients smoke. These patients should receive a brief intervention from their surgeon about the benefits of smoking cessation and again offered referral into a smoking cessation service.
- Carbon monoxide measurement should preferably be available in clinics.

6 Pre-operative assessment and preparation

6.1 The process of determining patient's anaesthetic fitness for surgery starts in the outpatient clinic. The aim is to optimise patients for surgery and to avoid cancellations on the day of surgery. Cancellations on the day of surgery lead to negative patient experience and financial loss, most of which could be avoided.

6.2 The preoperative assessment should be standardised and electronic such that it allows patients to be assessed on multiple sites and the patients can have their surgery at any of the sites within the integrated care system.

6.3 Pre-assessment should be complete within a minimum 6 weeks of surgery and a pool of pre-assessed patients should be available to fill last-minute cancellations. Ideally if pre-assessment should be done early in the pathway to allow time for risk modification, comorbidity optimisation

6.4 Anaemia

Patients should be screened for anaemia. Hb <13 (international consensus statement though local protocols Hb levels are often HB <12 ♀ or <13 ♂) are treated preoperatively with oral or IV iron to reduce the need for perioperative blood transfusion.

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

Pathways should be in place to refer back to GP or colorectal teams for urgent investigation of severe unexplained IDA

6.5 Diabetic management:

Guidelines for managing diabetic patients should be in place based around the development of a diabetic perioperative team as detailed in the NCEPOD diabetic report recommendations¹¹. Ideally target HbA1c <69mmol/l. Recommendations include : Multidisciplinary management.

Preoperative assessment of diabetes control and 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.

Safe handover of patients from theatre recovery to ward staff.

6.6 Pain Control

The pain control team should be part of the Pre-assessment clinic and a proper program should be set up for opiate reduction or change to other pain regimes prior to surgery to avoid issues peri-operatively.

6.7 Infection control

Skin examination on surgical site.

MRSA & MSSA Screening:

Using a single swab which is tested for both MRSA and MSSA Patients with +MRSA require 5 days treatment and clear result for 3 weeks after

Advice provided includes:

- Showering on the night before and morning of surgery.
- Use of clinell wipes or antimicrobial body wash before surgery.
- Remove nail varnish, avoid shaving, apply nasal gel twice daily from day before surgery.

6.8 Medication checking

- There should be a clear local ICS guidelines stating how medications should be administered or omitted in the peri-operative period and inform peri-operative management of many common medications (e.g. Statins, ACE inhibitors, Aspirin, oral anti-coagulations).
- Patients, their medication, and the proposed surgery, should be considered in a holistic manner with risks and benefits considered for each case. If there is any doubt about the peri-operative management of any medication, advice should be sought from a senior member of the anesthetic, surgical, specialty team or pharmacy (medicine information) as appropriate. This advice, when appropriately documented, will then supersede the management outlined in this guideline.
- Patients are seen by the clinical pharmacy team who will obtain a full medication history at pre-assessment.
- The patient is provided with advice on any medication that may need withholding pre-operatively.
- Continue any long-term analgesia including opioids and anti-hypertensives but not blood thinners unless stated.
- All patients should be encouraged to reduce their opioid intake prior to surgery to allow for safer and more effective post-operative analgesia.
- There should be a standardised local protocol about post-operative analgesia that avoids opiates on discharge.
- Make sure patients have their own supply of over the counter pain medication and laxatives for when they go home.
- The pharmacy team also provides verbal counselling on the medication usually started post-operatively, as well as a written patient information leaflet for the patient to take home.

- 6.9 If electronic patient records permit advance preparation of the inpatient treatment chart should be considered and the pharmacy team aim to see the patient on the day of surgery to ensure regular medicines are continued or withheld as per guidance on peri-operative medicines management. The standard drugs used as part of the Orthopaedic Enhanced Recovery pathway are prescribed by selecting the EPR template.
- 6.10 A specialist nurse phones the patient two nights before surgery. It is critical to reiterate to the patient the medicines that need to stop on this call.

7 The day of surgery

- 7.1 All patients are admitted for surgery within 18 weeks.
- 7.2 All patients should be admitted to a dedicated ring fenced orthopaedic elective ward and all support services available during operating hours (incl. x-ray and path labs).
- 7.3 Patients should be admitted on the day of surgery. Admissions should be staggered over the day to minimise pre-operative fasting and reduce patient anxiety.
- 7.4 If the patient is listed for a day case joint replacement and for optimum chance of success the patient should be first (ideal) or second on a morning list.
- 7.5 The consent form signed at the time of the consent clinic is confirmed on the day of surgery by the operating surgeon. The operating surgeon should verify the surgical site marking as per best practice protocol that is standardised across the ICS to avoid any never events. It is recommended that indelible marker pens are used to ensure that marking is visible after surgical drapes have been applied.
- 7.6 Confirm patient understanding of post-operative pain management, ambulation and carer role (Nurse, Surgeon and Anaesthetist).
Verify medical history and clearance for surgery (Nurse, Surgeon).
Order necessary medications (Anaesthetist).
VTE risk assessment completed (any doctor).

7.7 Peri-operative fasting and Carbohydrate Drinks

The pre-operative fasting times are actively managed to reduce undue physiological stresses. The policy is to stop taking solid food 6 hours prior to surgery but continue with clear fluids up to 2 hours (or even less as per local ICS guidelines) prior to surgery. The use of high energy drinks pre-operatively has been reported to be safe and may have a positive influence on wide range of peri-operative markers of clinical outcome

Ensure patients have a supply of pre-op drinks for night before and day of surgery (non-diabetics).

	Morning List	Afternoon List
Admitted	0730	1130
Eat Until	Midnight	0630
Drink Until	0630 – have a glass of water at this time *	1100- have a glass of water at this time *
Pre op CHO drink	Before Midnight	Before 0630
Post Op CHO drink	In Recovery	

Post-operatively, in recovery, patients are offered a choice of high energy carbohydrate (CHO) drinks if they are not feeling nauseated. Commonly used drinks contain 300kcal/200mls.

7.8 Pre-warming should be used routinely in the pre-operative phase. Patients are asked to wear conductive fabric or forced air warming blankets for at least 30 minutes for pre-warming. 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.

7.9 **Pre-operative checklist**

The ICS should have a WHO surgical safety checklist protocol to ensure patient safety. It should include details related to pre and post-surgery briefing, sign in prior to Anaesthesia, “Stop before you block” for regional anaesthesia, The Time Out Pause before surgery commences and Sign Out.

8 **Anaesthetic guideline**

8.1 Neuraxial (single spinal) rather than general anaesthesia is recommended for elective patients where possible. Patients usually have a low dose spinal anaesthesia using 3.5-4ml 0.25% plain bupivacaine (or rarely 2ml of 0.5% Bupivacaine (heavy), with light sedation (e.g.propofol).

8.2 If patient unable to tolerate spinal anaesthetic or specifically requests GA then general anaesthetic +/- regional technique is acceptable but using fast acting, easily reversible agents for GA.

8.3 Avoid using opiates for the spinal anaesthetic as this helps to reduce the unwanted need for urinary catheterisation.

8.4 **Standard intraoperative analgesic regime**

- Paracetamol IV 1g.
- Often oral opiate prescribed prior to theatre.
- Fentanyl PCA –IV for rescue analgesia if rarely required.
- Ketamine IV 0.5mg/kg at induction for patients with chronic pain issues.

- Knees only
Pre-incision Adductor canal block under ultrasound guidance using 10-20 mls local anaesthetic.
Avoid femoral nerve motor block as it prevents post-operative mobilisation.
 - I. Surgeon does local infiltration as per local agreed drug recipe.
 - II. Alternative is to use IPACK (local anaesthetic infiltration in the interspace between the popliteal artery and capsule of the posterior knee) - 60mls saline + 40mls 7.5mg Ropivacaine + 0.5ml epinephrine 1:1000 + 30mg ketorolac 1ml (if can tolerate NSAIDs + EGFR >60 otherwise 400mg ibuprofen).
- Hips only
Local anaesthetic infiltration to incision site.

8.5 Antiemesis

Ondansetron (4mg) +/- Dexamethasone is used as prophylactic anti-emetics, intravenously.

8.6 Antibiotic prophylaxis

The routine prophylactic antibiotics should be according to the local protocol as infection risks will vary. If gentamicin is used it the dose will vary depending on the patient (weight/chronic kidney disease). Antibiotics are put in separate 100ml bags of normal saline and given 30 minutes prior to incision.

8.7 Intra-venous fluids are judiciously used and we prefer not to give any post-operative intravenously fluids, rather patients are encouraged oral intake in recovery. Unnecessary tubes should be removed as soon as possible.

8.8 Tranexamic Acid (TXA)

As part of the Blood Management programme patients receive a combination dose of IV TXA at induction with topical administration to deep tissues prior to closure with a maximum combined dose of TXA is 3g.

9 Joint replacement prosthesis and surgical technique

- 9.1 Use ODEP 10A rated prostheses for all patients and reduce types of each implant available (single supplier for 90%). Minimal loan kit should be required by the service.
- 9.2 Any new or modified implant should 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 monitored¹².
- 9.3 Use of joint replacements as per best practice recommendations and that that 80% of primary hip replacements in patients aged 70 and over should receive cemented or hybrid prosthesis. There should be a clear, evidence-based, rationale for using a device

which is not at the cheaper end of the scale and which has less than a 10A ODEP rating^{4,5,13}

- 9.4 International studies seem to support a positive surgeon volume-outcome relationship for most procedures/conditions and the expectation is that a surgeon has the following volumes⁵.
 - > 30 elective (per) joint replacement procedures per surgeon per year.
 - > 10 elective unicompartmental joint replacements per year.
- 9.5 Optimum productivity is four 4 cemented primary joint replacements per 8hr list (cutting time). The lists should be uninterrupted with scheduled breaks for staff.
- 9.6 Surgical procedures, as per other parts of the pathway, should be standardised as much as possible so that the whole process is predictably reproducible and familiar to the whole staff. This process will result in shortening the operative time and hence the surgical stress and blood loss.
- 9.7 Cell salvage is critical part of blood management strategy and should be available for cases where the need for blood may be triggered (e.g. revision joint replacement surgery). The ODA or an anaesthetic nurse can be upskilled to be able to set up cell salvage systems. In TKR where tourniquet is positioned there may also be a need for a system of auto-transfusion in recovery.
- 9.8 It is recommended that the core clinical theatre team (Surgeon, Anaesthetist, ODP and Nursing) for every list is consistent on a week to week basis.
- 9.9 A high quality submission into the National Joint Registry database must be completed.
- 9.10 Data should be captured at the point of care that will measure procedure time and all the consumables used such that a high level of information and costing is available at patient level.

10 Venous Thromboembolism prophylaxis

- 10.1 Utilise a locally agreed compliant thromboprophylaxis risk assessment
Prophylactic managed as per guidelines for VTE in adult elective total hip replacement or total knee replacement.

11 Inpatient management

- 11.1 7 day senior review should occur for all patients with seven day physiotherapy service.
- 11.2 **Phase 1 of enhanced recovery: within the first 24 hrs**
Administer post-op recovery medications.
Monitoring temperature, HR, BP, assess for respiratory problems.
In recovery – Patient to commence breathing, circulatory, range of movement and strengthening exercises as taught in Joint School.

Therapy:

- The important aspect of Enhanced Recovery is to enable patients to independently perform routine activities like eating, dressing and walking as early as possible.
- Mobilise on the day of the surgery, by physiotherapists but also by nursing staff.
- Establish a standardised protocol to follow for assessment for day 0 mobilisation.
- Nurses should have competency in day 0 mobilisation.
- An initial assessment takes place 2 hours after the patient returns from recovery.
- Encourage patients to get dressed in their own clothes prior to mobilising to reinforce that they are in the rehabilitation phase of their recovery.
- Encourage patients to achieve independent mobility for toileting needs on the first day.
- Mobilisation twice daily (movement and strength assessed, assisted walking with frame, sit out several times throughout the day and have all meals in the chair).
- Oxycodone 20-30 mins prior to mobilising on day 1 and 2 if required.
- Check support in place for discharge or Section 2 if needed.
- Check equipment in place for discharge if needed.

Early Pain management

- Use ice therapy as prescribed.
- Assess pain at rest and movement 0-3 and set realistic pain management goal Regular paracetamol (1g qds).
- NSAIDS ibuprofen (400mg) if not on aspirin for patients with eGFR>60 and no other contraindications.
- Oral opiates (e.g. Oxycodone 10mg bd or 5-10mg Oxycodone 5-10 mg up to every 2 hours if pain assessed as ≥ 2 (if eGFR <60 or >80 years) for a maximum of 48 hours with no opiates prescribed at discharge.
- There is good evidence that listening to music reduces post-operative pain, anxiety and the use of analgesia; and it also increases patients' satisfaction.

Other

- Falls assessment.
- X-ray to confirm prosthesis placement.
- All bulky dressing removed within 24 hours for knees and prior to discharge for hips.
- Check INR and renal function if taking oral anticoagulants alert 24 hours post-surgery if on oral anticoagulants.
- Assess for respiratory disease/other complications.
- All inpatients prescribed with Sennakot, lactulose and antiemetics.

Phase 2 of enhanced recovery: within the first 48 hrs

- Continue own exercises 5 times daily.
- Aim to remain out of bed as much as possible, dressed in own day clothes.
- Twice daily therapy sessions whilst in hospital to progress walking, strength, movement and independence.
- Referral to social services if needed.

Phase 3 of enhanced recovery: discharge criteria

- Criteria-led discharge should be in place on all wards.
- Reasonably pain free on regular analgesia.
- Voiding urine without catheter.
- Individual therapy goals achieved.
- Patient ambulant with walking aid.
- Able to manage stairs safely (+/- appropriate aid).
- Able to transfer independently (+/- appropriate aid).
- X-ray checked, wound checked.
- Satisfactory post-operative bloods (FBC and U&E).
- All occupational therapy equipment in place.
- Physio and surgical follow-ups in place.
- All occupational therapy equipment in place.
- Care package in place (if needed).

12 Follow up Procedures

12.1 Patient information provided on the ward prior to discharge

- Falls prevention leaflet.
- Manufacturer's instructions for any equipment or mobility aids provided.
- Discharge booklet.
- DVT leaflet (mandatory).
- Wound care instructions.
- Exercise advice (booklet format) and a mobility progression plan.
- Discharge letter.
- For primary total hip replacement patients are advised to wash and dress their lower half in sitting and to apply caution when getting in and out of the car.
- If the consultant specifies full hip precautions due to increased risk of dislocation the advice given will be do no hip flex more than 90 degrees, no internal rotation, no adduction for 6/52.

12.2 Wound care

- Oozing should have ceased by 72 hours.
- Patients are advised that the surgical dressing should not be changed or disturbed. A sticker is applied to the dressing with this information and the emergency contact number.
- Patients are advised to phone this number to contact the wound clinic if there are any concerns, rather than the GP.
- A hub and spoke telemedicine review service allows consultants at base sites to review wounds over video link.
- If patients present with problems to the peripheral site hospitals they should not be empirically treated with antibiotics as it may diminish ability to later isolate an organism to treat.
- Suture removal at GP surgery (staples or non-absorbable 10-14 days post-op).

12.3 Pain management and other prescriptions on discharge

- Analgesia provided 6 weeks post-op¹ (Tramadol or Codydramol).
- Avoid opiates at discharge but if rarely required patients should also be referred to the community chronic pain team.
- VTE prophylaxis as per local protocol.
- Patient asked to complete daily portal to gauge pain:
 - I. Were you able to sleep last night?
 - II. Pain scores at rest and movement
 - III. Did you take any additional painkillers to those prescribed? If so, what & and how regularly?
- Discuss individual patient pain management goals in terms of ADLs, physical therapy, long term activity goals and a level of comfort that optimises healing.
- Consider delirium and possibility of over or under treatment in older adults.
- Discuss side effects with patients.
- Non-medical pain management techniques (cold therapy, relaxation, medication, self-massage).

12.4 Therapy on discharge

- Patients expected to return for follow-up physio sessions following discharge at a hospital closest to where they live.
- There should be a named therapy contact at the base hospital.
- There is a domiciliary physiotherapy service for patients who are unable to attend an outpatient department, or have specific functional goals to achieve in the home environment e.g. stairs practice if a patient went home to downstairs living.
- All patients will attend physio appointment within 2 weeks following surgery to receive tailored exercise programme:

- I. Discuss individual patient activity goals.
- II. Continue daily exercise as prescribed.
- III. Expectations setting.
- IV. Dependent on outcome of first physiotherapy review further appointments will be arranged and tailored advice given.

12.5 Follow-up appointments:

At six weeks:

Surgical outpatient appointment to review clinical progress post-surgery.

If no clinical concerns patient officially discharged from pathway and moves to 'surveillance' phase. Patient may require further imaging and follow up if any clinical concern.

At six months:

Patient completes oxford hip and knee score 6 months' post-surgery (either via portal or paper).

At one year and after:

Virtual follow-up clinic 1 year on.

Biannual questionnaires by post/email.

If asymptomatic (<70 years) arrange 7 years after surgery and 3-yearly after that.

Patients can be followed up in a virtual clinic with assessment with AP and lateral hip radiographs.

A process should be in place that can implement a 'patient initiated follow up' providing patients the means of self-accessing services if needed¹².

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

13 Standards for good governance and efficiency metrics

- 13.1 It is critical that both clinical quality and efficiency is driven by clinicians with consistency of approach across all members and clinical pathways. The metrics below should be regularly assessed.
- 13.2 There should be a clear policy to assess clinical harm including a root cause analysis if patients cannot be operated or followed up with in the nationally or professionally mandated RTT standard.

13.3 Clinical or governance metrics

- Surgical site Infection rate (PHE and GIRFT surveillance projects)
- Percentage of procedures with infection.
- Return to theatre.

- Emergency readmission within 30 days.
- Percentage of patients who required surgery after the first medical appointment.
- Percentage of cemented hip replacements for patient more than 70 years age.
- Revision rates for both elective hip and knee replacements after 1 and 5 years.
- Percentage of 10A rated prosthesis and compliance with the rational implant selection framework.
- Activity levels per surgeon.
- Documentation of Attendance at Multidisciplinary team meetings.
- Evidence of MDT involvement in the use of any novel prosthesis or loan kit.
- Develop and review action plans to target the top decile of LOS amongst peers.
- Audit of actual v/s expected discharge dates including weekend discharge rates.
- Compliance with the National Joint Registry including high linkability.
- SRR and SMR for joint replacement surgery (NJR).
- PROMS compliance and adjusted health gain on PROMS.
- Patient experience surveys (FFT).
- Six monthly review of NJR.
- Interventions are evidence based on National Clinical criteria including NI
- Audit of postoperative physiotherapy in the community (especially upper limb surgery).
- Review of litigation data.

Efficiency Metrics

- Mean waiting time for the first appointment.
- Clinic utilisation.
- Average percentage of pre-operative outpatient appointments per patient.
- Average radiological investigations per patient.
- Percentage of patients pre-assessed within six weeks of surgery.
- Percentage of patients waiting for more than 18/52 and 52 weeks for surgery.
- Patients on the day cancellations for non-clinical reasons.
- Percentage of theatre utilisation and average joints done on an 8-hour list.
- Peer reviewed Prosthesis costs.
- Loan kit costs.
- Average cost per procedure.
- Target reduction in certain procedures e.g. knee arthroscopy prior to joint replacement surgery, arthroscopic sub acromial decompressions.
- New to FU ratio.
- Minimum 30% of outpatient appointments are virtual (The NHS Long Term Plan).
- Training metrics.

14 Exemplars

Reduction in ALOS: 'exemplar' LOS has been based on benchmarks and GIRFT clinical lead input			
Patient cohorts	Top decile	Top Decile	Source of best practice
Elective primary	ALOS 1.8 days	ALOS 2 days	Elective ALOS of 1.8 in Northumbria, 2.4 in South Warwickshire and 2.4 in York. ALOS <2 achieved in Northumbria and South Warwickshire
Elective revision	ALOS 2 days	ALOS < 5 days	Elective ALOS of 2.0 in South Warwickshire, 2.4 in Northern Devon and 2.7 in Milton Keynes.
The Pod or Mass Clinic model with reduction in RTT and appointments per patient			Imperial College Healthcare NHS Trust (Li et al https://www.boa.ac.uk/uploads/assets/6ca3bb97-5620-4847-a474675e86fff47b/innovation-in-education-free-papers.pdf): All new patients are reviewed in a one stop subspecialty based clinics at intervals, with all the respective subspecialty Consultants and their registrars. Theatre schedulers are also present along with a walk-in pre-assessment service as well MSK physiotherapists. The patients are reviewed by Registrars and they approach the Consultant with the shortest waiting list

15 Recommendations for Transformation and Recovery

- 15.1 The integrated care system should establish systems for advice and guidance such that primary care networks and secondary care working in conjunction improve communication and streamline the pathway for patients (Cinapsis).
- 15.2 In line with the NHS Long Term Plan the ICS should encourage virtual consultation and improve patient convenience, specialist accessibility and ease clinical space shortage. In order to achieve this, criterion should be locally developed for face to face and virtual consultations. Appropriate governance process, training and infrastructure for video consultations should be immediately developed. It will be expected that the first consultation will be face to face due to the need to physically clinically assess the patient, the benefit to clinicians of the nonverbal communication and inclusion of family and friends if desired by the patient. Following this innovation there will be a change in patient

expectations and the ICS needs to put resources in patient education programmes (e.g. Joint School) as patients will be more willing to be educated on their disease or their postoperative course.

- 15.3 By centralising elective services into larger units larger teams with broader resilience will be formed. It is recommended that elective service is incrementally provided over 7 days where possible after taking into consideration any issues with staff wellbeing and recruitment.
- 15.4 The Integrated Care System (or the region) should have one ICS PTL per sub speciality so that patients can be offered surgery within nationally agreed standards.
- 15.5 The integrated care system (or the region) should consider a 'Clinician passport' such that clinicians can move between hospitals. This will help clinicians to make use of any capacity within the system or region, and maintain their surgical skills or professional development by still being involved in delivery of optimum volume of procedures in the regional hub (revision surgery, low volume joint replacement surgery).
- 15.6 The ICS must improve IT transfer between hospitals and region such that patients and clinicians can transfer between sites and improve patient access. Virtual desktops improve the ability to access investigation results remotely and hence patient care.
- 15.7 IT improvements will increase the opportunity for increased flexible working, including working from home as well as within the region, reducing decision making time and shortening clinical pathway.
- 15.8 The ICS should create COVID-19 free elective surgery zones with regular patient and staff testing and use of appropriate PPE as per professional guidance.
- 15.9 To understand the true cost of a surgical procedure there should be a robust information system that provides accurate patient level costing by capturing data at the point of care, procedure time, cost analysis by procedure including prosthesis and all consumables, and live indication of available stock and automated reordering of consumable stock.
- 15.10 The ICS should consider procuring at the system level or in regional collaboration.
- 15.11 The ICS should model the capacity they will generate by peer reviewing themselves amongst the top percentile and put systems in place to achieve this as soon as possible. Savings generated from such efficiency should be put back in the system to reduce waiting times for elective Orthopaedic work.

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