University Hospitals of Leicester NHS
NHS Trust

Guidelines for Pharmacological and Mechanical Thromboprophylaxis for venous thromboembolism.

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Summary of key changes:
Section added regarding Thromboprophylaxis for Covid 19 patients (due to the retirement of Covid-19 specific guidelines), section 4, p7.
Change in guidance regarding VTE risk assessment of 16 and 17 year old in-patients. Appendix 1 p14.

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Abbreviations:

VTE – venous thromboembolism
RA – risk assessment
DVT – deep vein thrombosis
PE – pulmonary embolism
LMWH – low molecular weight heparin
UFH – unfractionated heparin
DOAC – direct oral anticoagulant
NOAC – novel oral anticoagulant
AES – anti-embolism stockings
IPCS – intermittent pneumatic compression sleeves

Key words: Venous Thromboembolism. VTE. Deep vein thrombosis. DVT. Pulmonary Embolism. PE. Thromboprophylaxis. Low Molecular Weight Heparin. LMWH. Direct Oral Anticoagulants. DOAC. Antiembolism stockings. AES.

Guidelines for Pharmacological and Mechanical prophylaxis for venous thrombosis.

University Hospitals of Leicester NHS
NHS Trust

Trust Thrombosis Committee

1. INTRODUCTION

1.1. This document sets out the University Hospitals of Leicester (UHL) NHS Trust process for venous thromboembolism (VTE) risk assessment (RA), and pharmacological & mechanical

1.2. Venous thromboembolism (VTE) is the term used when part of a blood clot formed in a deep vein becomes dislodged from its site of origin and travels through the venous blood vessels. The initial thrombus most commonly occurs in the deep veins of the legs (though can occur elsewhere) referred to as a deep vein thrombosis (DVT). Dislodged thrombus travelling to the lungs is known as a pulmonary embolism (PE) and is a potentially fatal development which presents significant on-going risk to hospitalised patients.

1.3. Pharmacological and mechanical devices for thromboprophylaxis such as low molecular weight/unfractionated heparin (LMWH/UFH), direct oral anticoagulants (DOACs) anti-embolism stockings (AES) and intermittent pneumatic compression sleeves (IPCS) are used prophylactically to reduce the risk of DVTs and PEs for patients assessed and found to be at increased risk of venous thrombosis. They help prevent deep vein thrombosis by anticoagulation, increasing blood flow and reducing venous stagnation.

1.4. The decision to offer thromboprophylaxis to patients should always begin with a VTE RA, to determine whether the patient is at increased risk of venous thrombosis, using the appropriate UHL VTE RA tool. The correct VTE RA tool used throughout UHL will be the latest electronic assessment and should be completed before regular prescription medication is prescribed. For areas where electronic VTE RA is not used, e.g. in some day-case settings, the appropriate paper alternative is: appendix 2a surgical, appendix 2b medical, appendix 2c obstetric.

1.5. Before administering pharmacological or mechanical thromboprophylaxis ensure the risk assessment is completed and any indicated thromboprophylaxis is prescribed.

1.6. The purpose of this guideline is to provide direction regarding the most suitable pharmacological and/or mechanical thromboprophylaxis and subsequent safe administration/application and appropriate care in relation to this.

- In circumstances where LMWH is contraindicated seek expert advice when necessary, e.g. senior team/haematology/pharmacy.
- For patients unable to take products derived from porcine origin (e.g. religious or ethical beliefs - most of the LMWH available in the UK is of porcine origin) alternative pharmacological agents should be discussed with pharmacy/haematology and the patient.
- In circumstances where AES are contraindicated (for example a good fit is not possible) IPCS may be considered and vice versa.
- For medical patients, (**excluding patients suffering acute stroke for whom there is specific NICE guidance**, (appendix 3) AES/IPCS are not normally required if the patient is prescribed and receiving pharmacological thromboprophylaxis in accordance with NICE guidance (appendix 3). Occasionally clinical factors may indicate otherwise and deviation from this guidance should be documented.

1.7. Though the instruction in this guidance applies to all UHL staff, information relating to IPCS is particularly pertinent to Operating Department, Surgical Ward and Intensive Care staff caring for very high risk patients undergoing surgical procedures (appendix 4).

1.8. Practical application of mechanical thromboprophylaxis devices +/- pharmacological thromboprophylaxis varies across the UK. There is evidence that mechanical prophylaxis alongside pharmacological thromboprophylaxis is effective at reducing the risk of DVT and PE, but it is difficult to draw conclusions on the relative effectiveness between the different approaches and methods of application. This document has evolved from NICE guidelines CG92 (replaced by NG89), NG89[1] and RCOG Green-top Guideline No.37a[2], and reflects directives from NHS England; NHS Standard Contract[3].

Examples of mechanical thromboprophylactic devices are set out in the table 1 below (this list is not exhaustive).

Device type	Product name	Manufacturer/ Supplier	Main product variations	UHL provider
Class I anti-embolism stockings (AES). (Class II and III graduated compression stockings (GCS) are available for purposes other than VTE thromboprophylaxis)	TED (ThromboEmbolism Deterrent)	Cardinal Health	Available sizes. Sigel compression profile (mmHg) at ankle/calf.	▪
	Saphena	G+N		
	Preventex	URGO		
Intermittent pneumatic compression Sleeves (IPCSs) (aka; intermittent pneumatic compression devices (IPCD) intermittent compression devices (ICDs), sequential compression devices (SCDs))	Kendal	Cardinal Health	These devices can deliver pressure uniformly (whole device inflates simultaneously), sequentially (device inflates from the distal compartment to proximal compartment) or asymmetrically (only the posterior compartment of the sleeve inflates)	▪
	Flowtron	ArjoHuntleigh		
	Venaflow	DJO		
Foot pump	A-V impulse	Covidien	Not used within UHL	
Electrical	GEKO	ArjoHuntleigh	Not used within UHL	

Table 1

2. SCOPE

2.1. This document sets out the processes to follow for assessing risk of VTE in patients aged 18 years and over who require hospital treatment and the prescribing of thromboprophylactic measures. **This document is one of three related to thromboprophylaxis across UHL and should be considered as general guidance. The two remaining guidelines relate to the specialities of:**

Orthopaedics & Fracture Clinic C10/2013 (http://insitetogether.xuhl-tr.nhs.uk/pag/pagdocuments/Venous%20Thromboprophylaxis%20UHL%20Musculoskeletal%20Guideline.pdf)

Obstetrics C5/2001 (http://insitetogether.xuhl-tr.nhs.uk/pag/pagdocuments/VTE%20(Venous%20Thromboembolism)%20in%20Pregnancy%20UHL%20Obstetric%20Guideline.pdf).

For other VTE related guidance please see here

The advice in this guideline does not cover the care and treatment that should be offered to:

- people who are cared for at home or in residential care homes.
- people who are admitted to hospital because they have a diagnosis or signs and symptoms of DVT or PE.

This guideline is intended to support registered staff, e.g. doctors, nurses, physiotherapists, operating department practitioners, occupational therapists, and non-registered staff, e.g. health care assistants and allied health professionals, with the management of patients requiring pharmacological and/or mechanical thromboprophylaxis.

These guidelines apply to patients deemed at increased risk of VTE due to procedural or patient factors. Appendix 5 identifies cohorts of patients whose reason for admission share similar

characteristics which do not put them at increased risk VTE due to their contact with the Trust. However an individual assessment is required to identify those who may be at increased risk due to patient related, rather than procedurally related, increased risk.

Within the scope of the document are patients aged 18 years and over in the setting of:

- Inpatient admissions; people admitted to and discharged from hospital, including patients in the Emergency Department if a decision to admit has been made,
- Patients with lower limb devices such as plaster casts and braces, including in the outpatient setting – in the outpatient setting VTE RA specifically relates to an L-TRiP score in the VTE risk management for ambulatory adults with immobilized leg click here to view.
- People attending hospital for day procedures including haemodialysis, cancer treatment and surgery.

Updated NICE guidelines (NG89 March 2018) recommends that VTE RA (and any subsequently required thromboprophylaxis) should be carried out for 16 and 17 year old patients. UHL has taken the decision not to include this age group for mandatory VTE RA on admission based on evidence set out in appendix 1. **However, clinicians are reminded to use clinical judgement regarding VTE risk for all age groups regardless of local or national guidelines**

3. VTE RISK ASSESSMENT AND PHARMACOLOGICAL & MECHANICAL THROMBOPROPHYLAXIS.

3.1. All patients aged 18 years and over admitted to UHL will have a VTE risk assessment completed on admission to identify those at increased risk of VTE.

3.2. Patients aged 16 and 17 years may have specific indications for thromboprophylaxis and VTE RA may be carried out. However routine VTE RA is not recommended by UHL. This advice derogates from NICE NG89[1] on the basis of local evidence which demonstrates extremely low incidence of VTE in this age group and that VTE RA is unlikely to reduce occurrence (appendix 1. Agreed at EQB December 2018). Additionally, no current pharmacological thromboprophylaxis is licensed for use in this age group therefore the outcome of routine VTE RA may present increased risk to both patient and prescriber. Prescribing pharmacological thromboprophylaxis in this age group should only be considered with the agreement of the patients named consultant and must be clearly documented.

3.3. Patients known to be at increased risk include surgical, medical and obstetric patients where increased risk of VTE is identified on the VTE RA tool. For these patients thromboprophylactic measures must be considered.

See the 'Quick reference' guide, appendix 9, for *procedurally specific* details of NICE NG89 thromboprophylaxis recommendations. It is recommended that you familiarise yourself with NICE NG89 https://www.nice.org.uk/guidance/ng89/chapter/Recommendations

3.4. The VTE RA is completed by appropriately trained clinical staff. 'Appropriately trained' is defined as suitably qualified staff (doctors and other prescribers) for whom VTE RA is deemed part of their role and who have successfully completed the online (HELM) training module. It is the responsibility of the patients' medical team to validate the assessment at the first senior review (within 14 hours as stipulated by NHSI 'Seven Day Services Clinical Standards' – standard 2, p2).

3.5. **Patient reassessment**: patients must have their VTE risk *re-assessed* at a minimum of when there is a significant change in their condition, e.g. new onset infection, sudden or increasing loss of mobility, post operatively, change of ward.

3.6. VTE risk assessment should be considered during each Board/Ward round. The patients' named consultant has overall responsibility for ensuring timely VTE RA is carried out and

any required thromboprophylactic measures are prescribed and administered, although individual practitioners also have a professional responsibility to ensure compliance with the Trust thromboprophylaxis guideline.

3.7. It is essential an assessment is made of the patient's condition and their suitability for pharmacological/mechanical thromboprophylaxis using the latest electronic UHL VTE RA tool (or paper tool if electronic assessment is not used in your area; appendices 2a / b / c). Record risks, contraindications, and prophylactic measures on the tool. All methods of thromboprophylaxis whether pharmacological or mechanical ***must be prescribed*****.**

3.8. Patient/admission related increased risk factors should be indicated by a tick in each box that applies using the appropriate assessment tool. More than one risk can be indicated.

- Any indication of increased risk should prompt thromboprophylaxis, after consideration of contraindications, in accordance with NICE guidance or locally agreed variation – locally agreed (UHL) variation to NICE guidance applies to;

- Routine VTE risk assessment of 16 & 17yr olds (appendix 1)
- Acutely ill medical patients (appendix 7).
- Extended (post-discharge) thromboprophylaxis for specific orthopaedic patients. Seek expert orthopaedic opinion for current guidance. C10/2013 http://insitetogether.xuhl-tr.nhs.uk/pag/pagdocuments/Venous%20Thromboprophylaxis%20UHL%20Musculoskeletal%20Guideline.pdf
- The combined use of AES & IPCS in a locally agreed Very High Risk group of surgical patients (appendix 4). There is a poor evidence base for combined mechanical device use and this guidance is derived from local expert opinion.

  The appropriate thromboprophylaxis prescription is identified in 'STEP 3' of the VTE RA tool and in the final section (above the addressograph) on the 'pregnancy and post-natal' VTE RA tool. If you have any doubt regarding the prescribing of thromboprophylactic measures seek advice/clarification from a senior clinician or specialist disciplines such as haematology, pharmacy, tissue viability nurse, VTE nurse.

- The risk factors described on the VTE RA tool may not be exhaustive. Clinicians should consider additional risks for individual patients and offer thromboprophylaxis as appropriate. **Document variation from guidance in the patients' notes.**
- Any increased risk factors indicated on the VTE RA tool should be reviewed with consideration given to bleeding risk and harm from mechanical injury. Indicate on the tool all of these risks that exist.
- More than one risk can exist.
- Any identified risks should prompt clinical staff to consider if bleeding/mechanical harm risk is sufficient to preclude pharmacological or mechanical thromboprophylaxis.
- Individual patient factors will always determine action taken in relation to thromboprophylaxis. Where apparently conflicting actions occur, e.g. the patient is at increased risk of VTE and also has an increased risk of bleeding, yet pharmacological thromboprophylaxis is prescribed, **the reasons for this must be clearly documented in the patients' notes.**
- In circumstances where the action to take is not clear, e.g. extremes of body weight (<40kg appendix 6) seek specialist advice e.g. haematology/pharmacy.
- Date and sign the risk assessment tool and prescribe thromboprophylaxis as appropriate.

4. COVID 19 - THROMBOPROPHYLAXIS FOR PATIENTS WITH COVID 19.

This guidance is taken from NICE guideline ng191 section 5.3.

For young people and adults with COVID-19 that is being managed in hospital, assess the risk of bleeding as soon as possible after admission or by the time of the first consultant review.

Offer standard prophylactic dose of LMWH as soon as possible, and within 14 hours of admission, to young people and adults with COVID-19 who need supplemental oxygen via: continuous positive airway pressure (CPAP), non-invasive ventilation (NIV) or invasive mechanical ventilation, and who do not have an increased bleeding risk.

Continue management with a standard prophylactic dose of LMWH for a minimum of 7 days, including after discharge.

Consider a treatment dose of LMWH for young people and adults with COVID-19 who need low-flow supplemental oxygen via face mask/nasal specs, but not via CPAP/NIV/Intubated as above and who do not have an increased bleeding risk.

Continue management with a treatment dose of LMWH for 14 days or until discharge, whichever is sooner. Dose reduction may be needed to respond to any changes in a person's clinical circumstances.

Only offer an intermediate or treatment dose of an LMWH to young people and adults with COVID-19 who are receiving high-flow supplemental oxygen, CPAP, NIV or invasive mechanical ventilation *as part of a clinical trial*.

For people with COVID-19 who do not need low-flow supplemental oxygen, follow the standard pharmacological thromboprophylaxis recommendations in this guideline.

Do not base prophylactic dosing of heparin on levels of D-dimer.

For people at extremes of body weight or with impaired renal function, consider adjusting the dose of LMWHs in line with the summary of product characteristics and locally agreed protocols.

For people who cannot have LMWHs, use fondaparinux sodium or unfractionated heparin (UFH).

For people who are already having anticoagulation treatment for another condition when admitted to hospital:

- continue their current treatment dose of anticoagulant unless contraindicated by a change in clinical circumstances.
- consider switching to LMWH if their current anticoagulant is not LMWH and their clinical condition is deteriorating.

If a person's clinical condition changes, assess the risk of VTE, reassess bleeding risk and review VTE prophylaxis.

Ensure that people who will be completing VTE prophylaxis after discharge are able to use it correctly or have arrangements made for someone to help them.

People with COVID-19 and additional risk factors

For women with COVID-19 who are pregnant or have given birth within the past 6 weeks, follow the advice on VTE prevention in the Royal College of Obstetricians and Gynaecologists guidance on coronavirus (COVID-19) in pregnancy

5. STAT DOSE ON ADMISSION.

5.1. Pharmacological thromboprophylaxis is routinely administered on UHL wards at 6pm. Clinicians should consider if an additional stat dose is required on admission if the patient is at risk of VTE but there is a considerable time interval (>12hours) until the 6pm dose

5.2. **Be aware that VTE RA and pharmacological thromboprophylaxis administration may have been carried out in ED prior to the patients' arrival to an in-patient area.**

5.3. It is the responsibility of the patients' primary medical team to validate the risk assessment and ensure appropriate thromboprophylaxis is prescribed. **Re-assessment should take place as the patients' condition changes, e.g. new onset infection, sudden or increasing loss of mobility, post operatively, change of ward.**

5.4. Patients at increased risk of VTE during their in-patient spell may remain so for several weeks post discharge. VTE risk must be assessed as part of discharge planning and the outcome indicated to the patient and relevant carers along with their GP using the UHL discharge letter. It is the responsibility of the patients named consultant to determine the need for any post-discharge thromboprophylaxis, and where necessary ensure this information is clearly communicated to the discharging team. When prescribing post discharge thromboprophylaxis (whether pharmacological or mechanical) the duration (number of days to continue *after* discharged) should be made clear.

5.5. Although NICE NG89 recommends that acutely ill medical patients should receive a minimum of 7 days of thromboprophylaxis, UHL has taken the position that this is only applicable whilst they remain in-patients (appendix 7). If discharged within 7 days, acutely ill medical patients should only be prescribed post discharge thromboprophylaxis on a case by case basis.

6. PATIENT INFORMATION

6.1. It is well known that patients show better compliance with treatment, so aiding recovery, if they are well informed regarding what to expect following discharge from hospital.

6.2. Patient facing clinical staff of all disciplines have a role to play in ensuring that patients are aware of their increased risk of venous thrombosis, both whilst in hospital and following discharge, and the steps they can take to reduce the risk.

6.3. The patient information leaflets 'Reducing the risk of blood clots while you are in hospital' (https://yourhealth.leicestershospitals.nhs.uk/library/trustwide/350-reducing-the-risk-of-blood-clots-while-you-are-in-hospital) and 'Reducing the risk of blood clots when you go home' (https://yourhealth.leicestershospitals.nhs.uk/library/trustwide/351-reducing-the-risk-of-blood-clots-when-you-go-home) should be provided to all patients/carers during admission. Additionally, this information should be reinforced verbally at prominent points during the admission, e.g. post operatively/as their condition changes/following ward transfer, and particularly at discharge. This applies to all patients regardless of their VTE risk status.

6.4. Patients may wish to know that all low molecular weight heparins are of **animal origin**. To have these administered may not comply with their personal beliefs. If this is the case, please discuss with the medical team *before any upcoming doses are missed*. Fondaparinux may be a suitable synthetic alternative; however haematology advice should be sought in this scenario.

6.5. **Please note;** it is generally advisable to rely on your patient to request information regarding animal products. Bear in mind that many medicines contain products of animal origin – including the glycerine coating of many capsules/tablets. It is not possible to obtain the information regarding the origin of the glycerine – even from the manufacturer, therefore alternative medicines will not always be available.

7. Mechanical thromboprophylaxis. Application and management guide.

N.b. Mechanical thromboprophylaxis devices require formal prescription.

Always consider that AES could be used as a ligature!

7.1. With the exception of Theatre departments the UHL Mechanical Thromboprophylaxis Tool on Nerve Centre must be used on application of mechanical thromboprophylaxis devices. Theatre departments should use the appropriate section of the surgical Mechanical Thromboprophylaxis Documentation tool (appendix 2a1) for reasons of familiarity of device use and logistical reasons.

7.2. Mechanical thromboprophylaxis poses considerable, though often overlooked, risk of harm to patients. Use of the UHL Mechanical Thromboprophylaxis Tool will assist with assurance that the risk is monitored and minimised. Skin integrity of both lower limbs must be assessed and documented regularly using the BESTSHOT tool in Nerve Centre.

7.3. Ensure that patients requiring AES/IPCS have their legs measured following manufacturers guidance and the correct size fitted; where a suitable fit is unavailable refer to medical staff who should consider alternative mechanical thromboprophylactic measures, if available/suitable, for at risk patients. At risk patients should also receive pharmacological thromboprophylaxis where there are no contraindications. Patients at high risk are those where risk factors are identified during the VTE risk assessment process.

NOTE; at risk medical patients receiving pharmacological thromboprophylaxis would not usually also require mechanical thromboprophylaxis.

Contraindications for AES/IPCS

AES/IPCS must not be applied if the following conditions are observed/diagnosed, without specific documented evidence in medical notes identifying the reason for deviation from this guidance. For example, there may be circumstances where AES are contraindicated due to an existing wound, conversely there may be circumstances where a surgeon may specifically request AES over a surgical wound to reduce oedema and so promote healing. In such circumstances caution and clinical judgement must be applied along with increased vigilance and monitoring. Always seek medical advice if the diagnosis or prescription is unclear.

a) Peripheral Vascular Disease or recent vascular surgery.
b) Insensate leg; e.g. numbness due to local anaesthesia, neuropathy, diabetes.
c) Cellulitis.
d) Dermatitis.
e) Massive oedema.
f) Leg/foot ulcers/wounds.
g) Gangrene.
h) Fragile “tissue paper” skin.
i) Cardiac failure.
j) Major limb deformity preventing correct fit.
k) Unusual leg size or shape.
l) Allergy to material of manufacture.
m) Suspected or confirmed acute DVT or PE.
n) Presence of malignancy in legs.

Application of AES/IPCS (Click here and select the video image to view Cardinal Health (current supplier) AES training video, and here for the IPCS training videos)

a) AES are designed for non-ambulatory patients and should be compliant with the Sigel profile of compression producing calf pressure of 14-15mmHg as recommended by NICE Guideline NG89 (2019)[1].They are not indicated for the treatment of a known deep vein thrombosis and should not be confused with Class II or III graduated compression stockings. Table 2 below.

b) Prior to application, the UHL Mechanical Thromboprophylaxis Tool in Nerve Centre must be completed and used throughout the period of application (with the exception of UHL Theatre departments, see section 5.1 above).

Stockings Conforming to UK Drug Tariff Specification		
Compression class	Pressure at the ankle in mmHg	Indications for use
II	18 -24	Varicose veins of medium severity Venous ulcer treatment and prevention of recurrence Mild leg swelling Varicose veins during pregnancy
III	25-35	Gross varicose veins Severe venous insufficiency Gross leg swelling Venous ulcer treatment and prevention of recurrence

Table 2

c) Patients need to understand why these devices are required and the benefit of wearing them. This is particularly pertinent to stroke patients and their carers (appendix 3). Verbal information should be offered and the patient and/or carer should receive the UHL leaflets regarding VTE risk reduction set out in section 4.

d) Where necessary, patients should be shown how to use them, how long to use them and possible adverse effects with an explanation of what to do in such circumstances. **By applying these devices staff implicitly declare they have received adequate training.**

e) If contraindications are suspected – **DO NOT APPLY** – seek expert advice e.g. patients medical team/tissue viability nurse/VTE nurse, document any deviation clearly in the patients' records.

f) If oedema or post-operative swelling develops, ensure that legs are re-measured, and the device re-fitted accordingly.

g) Patients who are prescribed mechanical thromboprophylaxis need to be encouraged to wear these day and night from admission until they no longer have significantly reduced mobility *compared to their normal state*.

h) These devices must be removed daily for hygiene purposes and regularly to inspect skin condition – the regularity of skin inspection will be dictated by the patients' individual circumstances but should be a minimum of 4-6 hourly. When evaluating skin particular attention should be made to bony prominences and heels.

i) Re-evaluation of use and fit should occur frequently as the patients' condition changes.

j) Discontinue the use of the device if there is marking, blistering or discolouration of skin particularly over heels and bony prominences, or if the patient has pain or discomfort. If suitable, offer an alternative mechanical device. For non-surgical patients AES are not usually used in combination with IPCS. Where this occurs it must be ***at the specific request of, and documented by, the treating clinician***.

k) These devices may be used in combination with pharmacological thromboprophylaxis or in place of pharmacological thromboprophylaxis where pharmacological thromboprophylaxis is contraindicated.

l) Ensure that patients wear AES correctly and offer assistance if they are not e.g. tops of stockings rolled down causing a potential tourniquet effect to the leg.

m) AES can be laundered following manufacturer's instructions. AES may not be laundered on wards so encourage relatives/carers to take them home to wash. If facilities are not available for patients to launder AES, they should be replaced every 3 days.

n) **For general medical patients**; where Pharmacological thromboprophylaxis is appropriate these devices are not usually an additional requirement (appendix 3). ☞

o) **For stroke patients**; AES are contraindicated. IPCS should be considered by the patients' medical team in accordance with NICE guidance (appendix 3).

p) **For 'In-Patient' (i.e. not Day Case – see next page) surgical patients at**;

LOW RISK of VTE (appendix 4)

- Do not require mechanical or pharmacological VT thromboprophylaxis.
- Should be advised/encouraged to mobilise early and avoid dehydration.

HIGH RISK of VTE (appendix 4)

- Do not require IPCS. AES and pharmacological thromboprophylaxis should be prescribed and administered/applied as directed post-surgery.
- AES should be applied on admission once the patient is identified as high risk on the VTE risk assessment tool (unless contraindicated) and should not routinely wait until the patient is in theatre.
- Patients arriving in theatre for surgery directly from ED will have AES fitted in theatre.
- Continue AES postoperatively until the patient is mobile/has returned to their normal state of mobility.
- Prescribe low molecular weight heparin (LMWH) post procedure (unless contraindicated). For patients where LMWH is contraindicated e.g. coagulopathy, risk of bleeding, etc. consider AES +/- IPCS. The mechanical thromboprophylaxis of choice should continue until the contraindication has subsided and the patient is receiving LMWH.
- *Where pharmacological thromboprophylaxis remains contraindicated* then the mechanical thromboprophylaxis of choice (where not contraindicated) will be required until pharmacological thromboprophylaxis is no longer contraindicated or would normally cease.

VERY HIGH RISK of VTE (appendix 4)

AES and IPCS perform separate roles in VTE prevention; AES ensure suitable compression of the deep lower limb venous system, particularly during anaesthesia, which maintains venous flow rate whilst IPCS act to propel blood flow in the direction of the heart; combined these may be beneficial for VTE prevention in very high-risk patients. Additionally, this combination will reduce periods where no mechanical thromboprophylaxis is in action, such as if IPCS are removed/disconnected in the theatre department prior to transfer to the ward.

- AES should be applied on admission once the patient is identified as very high risk using the VTE risk assessment tool (unless contraindicated) and should not routinely wait until the patient is in theatre. With the exception of stroke patients, IPCS will generally be applied in theatre.
- Very high-risk patients arriving for surgery from ED may have AES and IPCS fitted in theatre.
- If there are no contraindications, in very high-risk patients, continue AES and IPCS combination postoperatively until the patient receives pharmacological thromboprophylaxis then review.
- Prescribe LMWH post procedure (unless contraindicated). For patients where LMWH is contraindicated e.g. coagulopathy, risk of bleeding, etc. combined AES/IPCS should continue until the contraindication has subsided and the patient is receiving LMWH.
- *Where pharmacological thromboprophylaxis remains contraindicated* then AES/IPCS combination (where not contraindicated) will be required until pharmacological thromboprophylaxis is no longer contraindicated or would normally cease.

Appendix 4 is a printable 'quick reference' table providing an overview of the surgical risk stratification described in this policy.

Appendix 8 is a printable 'quick reference' algorithm providing an overview for AES/IPCS prescribing and application.

8. DAY CASE PROCEDURES.

8.1. UHL performs circa 20,000 Day Case interventions per month, including Haemodialysis, Chemotherapy and Surgical procedures. From the point of view of the intervention, for the majority of these patients there is no evidence to suggest that contact with hospital for short periods increases their risk of VTE. These patients are reported as 'Cohort' patients for the purposes of Trust wide/national reporting; in other words, from a reporting point of view, they are considered as 'risk assessed as low risk of VTE' from the intervention standpoint en-masse. **However**, whilst the procedure itself may not carry a perceived increased risk of VTE for the duration of the in-patient spell, this does not mean that the patient does not bring increased risk with them in the form of personal increased risk factors, such as cancer, previous VTE, obesity or thrombophilia, and patients may recover differently to that which is anticipated. Additionally, as more complex procedures, which would currently be considered procedures of higher risk of VTE, become available for day case treatment, there is an increasing need to be vigilant to increased risk of VTE in Day Case patients. Therefore, UHL recommends that admitting teams of day case procedure patients consider VTE risk assessment at the time of admission, and again at the point of discharge and indicate this by completing the relevant VTE risk assessment form on Nerve Centre.

8.2. DAY CASE PATIENTS RECEIVING A LOCAL ANAESTHETIC

Day Case patients receiving local anaesthesia would not routinely require pharmacological or mechanical thromboprophylaxis from a procedural point of view unless the procedure or recovery phase is expected to significantly reduce their mobility compared to their normal state. However, they may bring an increased risk of VTE specific to their personal history, as stated above. These patients require a VTE risk assessment using the appropriate VTE risk assessment pathway in Nerve Centre prior to the procedure, along with a VTE risk assessment at discharge to ensure correct management is in place.

8.3. DAY CASE PATIENTS RECEIVING A GENERAL ANAESTHETIC

Many Day Case patients receiving general anaesthesia would not routinely require pharmacological thromboprophylaxis from a procedural point of view, however, there is a particular risk that should be taken into account as increasingly complex procedures are carried out as day case; where total anaesthesia + surgical time exceeds 90 minutes, or 60 minutes for pelvic/lower limb surgery there is increased risk of VTE. Additionally, patients may bring increased risk of VTE specific to their personal history, as stated above (e.g., cancer, previous VTE, obesity or thrombophilia). These patients require a VTE risk assessment using the appropriate VTE risk assessment pathway in Nerve Centre prior to the procedure, along with a VTE risk assessment at discharge to ensure correct management is in place.

Where the Day Case patient receiving a general anaesthetic has a VTE risk assessment outcome of 'Low Risk', anti-embolism stockings should be applied in accordance with UHL's inclusion in a multicentre study of the effectiveness of anti-embolism stockings (PETS study), unless contraindicated

Many Day Case patients receiving general anaesthesia would not routinely require pharmacological thromboprophylaxis from a procedural point of view, however, there is a particular risk that should be taken into account as increasingly complex procedures are carried out as day case; where total anaesthesia + surgical time exceeds 90 minutes, or 60 minutes for pelvic/lower limb surgery there is increased risk of VTE. Additionally, patients may bring increased risk of VTE specific to their personal history, as stated above (e.g., cancer, previous VTE, obesity or thrombophilia). These patients require a VTE risk assessment using the appropriate VTE risk assessment pathway in Nerve Centre prior to the procedure, along with a VTE risk assessment at discharge to ensure correct management is in place.

- **Where the Day Case patient receiving a general anaesthetic has a VTE risk assessment outcome of 'Low Risk', anti-embolism stockings should be applied in accordance with UHL's inclusion in a multicentre study of the effectiveness of anti-embolism stockings (PETS study), unless contraindicated.**

9. NURSING CARE: EARLY MOBILISATION AND HYDRATION

- Encourage people to mobilise as soon as possible.
- Do not allow people to become dehydrated unless clinically indicated.

10. RESEARCH.

Many areas across UHL engage in research with the aim of improving patient outcomes. The area of thromboprophylaxis is no different. Therefore, it is recognised in these guidelines that deviation from the recommendation of the guidelines is permissible for research approved by UHL in relation to VTE risk assessment and mechanical/pharmacological thromboprophylaxis in accordance with the stated aims of such research.

11. MONITORING COMPLIANCE.

VTE risk assessment:	Thromboprophylaxis:
VTE risk assessment compliance is monitored monthly via Informatics reporting, which is presented at senior Trust level.	Appropriate prescribing and administration of thromboprophylaxis is monitored monthly via the Hospital Associated Thrombosis process.
Additionally, a Trust wide VTE risk assessment and thromboprophylaxis audit is carried out annually.	

12. REFERENCES

[1] 'Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism' NICE Clinical Guideline (NG89). March 2018. https://www.nice.org.uk/guidance/ng89

[2] Thrombosis and Embolism during Pregnancy and the Puerperium, Reducing the Risk. Royal College of Obstetrician & Gynaecologists. 2015. https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg37a/

[3] NHS Standard Contract 2019/20 Particulars. P48 https://www.england.nhs.uk/wp-content/uploads/2019/03/23-FL-Ps-comp-May-18-vs-Mar-19.pdf

[4] Guidance notes to accompany VTE risk assessment data collection. https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2021/06/NHS_Improvement_VTE_Guidance_March_2019.pdf

[5] "significantly reduced mobility is used to denote patients who are bedbound, unable to walk unaided or likely to spend a substantial proportion of the day in bed or in a chair." P27

[6] Medicines of animal origin https://www.health.qld.gov.au/__data/assets/pdf_file/0024/147507/qh-gdl-954.pdf

Appendix 1

VTE risk assessment of 16 and 17 year old in-patients

Until recently, UHL diverged from NICE guideline NG89, which recommends VTE risk assessment of 16 and 17 year old in-patients, due to the lack of supporting evidence of increased risk of VTE due to hospitalisation in this age group, and the use of LMWH and anticoagulants being off-license when prescribed for patients under the age of 18 years. However, as UHL Paediatric department have begun to routinely assess paediatric patients up to the age of 16 years. It is felt that for UHL to assess patients up to the age of 16 years, and then from the age of 18 years, it would be incongruent not to routinely assess 16 and 17 year old in-patients. Therefore, UHL recommends routine VTE risk assessment for this age group along with standard adult thromboprophylaxis where indicated in the assessment outcome.
The VTE risk assessment forms on Nerve Centre are age specific. I.e., clinicians assessing patients over the age of 16 years will automatically be presented with the Adult VTE risk assessment form and, for patients up to the age of 16 years, will automatically be presented with the Paediatric VTE risk assessment form, regardless of the environment in which they are being cared for. For Paediatric VTE risk assessment and thromboprophylaxis guidance see UHL guideline "Venous Thromboembolism (VTE) Prophylaxis in Children".

Appendix 2a Please note; VTE risk & AES/IPCS assessments are to be completed on Nerve Centre. This document should only be used in circumstances where Nerve Centre is unavailable.

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Affix Addressograph.

VTE Risk Assessment Tool for Surgical Patients

VTE Risk Assessment tool for Low Molecular Weight Heparin (LMWH), Anti-Embolic Stockings (AES) and Intermittent Pneumatic Compression Sleeves (IPCS), reflecting International Consensus Statement 2002 and 2010 NICE Guidelines

Ward:.....**Date:**.....

N.b. Attach completed form to patient notes

SECTION A

RISK FACTORS. **If your patient has any one of these risk factors they MUST be given LMWH +/- AES unless contraindicated**	**TICK**
Anaesthetic + surgery time ≥90mins/60mins if pelvic or lower limb surgery	
Aged >60 having minor surgery (operation + anaesthetic time lasting <90 minutes<60mins if pelvic or lower limb surgery)?	
Is classed as obese (BMI greater than 30)?	
Has history of VTE or 1st degree family history of VTE?	
Has Thrombophilia?	
Has malignant, infective or inflammatory disease or other significant medical co-morbidity	
Has varicose veins with a history of phlebitis (which are not being operated upon)?	
Is dehydrated?	
Is totally immobile (any age) for ≥3 days?	
Is partially immobile (over 60) for ≥3 days?	
Is taking/has taken an oestrogen containing contraceptive pill or HRT in the last 4 weeks?	
Is pregnant or <6 weeks post-partum?	
No Risk Factors	

CONTRAINDICATIONS – *if none; indicate this in the final row of each section.*

Contraindications to AES	TICK	**Contraindications to LMWH**	TICK
Severe PVD or vascular surgery		Active bleeding	
Cellulitis		Inherited or acquired bleeding disorders	
Dermatitis		Acute stroke	
Massive oedema		Uncontrolled hypertension (230/120 or higher)	
Insensate leg (numbness) due to local anaesthesia block, neuropathy, diabetes etc.		Lumbar puncture/ epidural or spinal within previous 4hrs or due in next 12hrs	
Leg/foot ulcers/wounds		Platelets <75 (seek specialist haematology	
Gangrene		Previous Heparin induced Thrombocytopenia	
Fragile 'tissue paper' skin		**Renal Failure CrCl <30mls/min (reduce dose)**	
Cardiac failure			
Major limb deformity preventing correct fit		Eye or spinal surgery	
Allergy to the material of manufacture		Surgery or injury with high bleeding risk	
No contraindications		**No contraindications**	
Contraindications to intermittent pneumatic compression Sleeves (IPCS). As for AES plus;			
Suspected or acute DVT or PE		Presence of malignancy in legs	
Only prescribe IPCs following due consideration of guideline "Guidance for Pharmacological and Mechanical Thromboprophylaxis for Venous Thromboembolism"		**No contraindications**	

IF ANY OF THESE CONTRAINDICATIONS (CI) APPLY - DO NOT PRESCRIBE WITHOUT DOCUMENTING THE REASON

Have you prescribed LMWH (Follow speciality policy.) **For patients with a body weight <50kg or >150kg seek specialist haematology advice**	Yes	No	CI
Have you prescribed AES / IPCs (please circle type prescribed)?	Yes	No	CI
Have you given your patient verbal and written information regarding VTE risk reduction?	Yes	No	CI
Sign & print by Doctor: **Date:**			

Reassessment by medical team (within 24hrs of admission, then every 48-72hrs)

Reassessment Date	**Have risk factors altered?**	**Have contra-indications altered?**	**ACTION TAKEN e.g., nil/see notes**	**Doctors Signature**	**Reassessment Date**	**Have risk factors altered?**	**Have contra-indications altered?**	**ACTION TAKEN e.g., nil/see notes**	**Doctors Signature**
	Yes / No	Yes / No				Yes / No	Yes / No		
	Yes / No	Yes / No				Yes / No	Yes / No		

Appendix 2a1 Please note; VTE risk & AES/IPCS assessments are to be completed on Nerve Centre. This document should only be used in circumstances where Nerve Centre is unavailable.

SECTION B

Following prescription this section can be completed by Registered Nurses and Health Care Assistants who have been trained to measure and apply AES.
Ensure you are familiar with the measurement and fitting instructions of the current UHL supplier.

Ensure the reason for AES and Thromboprophylaxis are explained to the patient

Stockings MUST be removed, and legs washed at least daily

Skin must be assessed, and condition recorded at least 4-6 hourly

Clean stockings should be re-applied every 3rd day or if any change in measurement

Stockings MUST be measured in accordance with manufacturer instructions

Daily Assessment Chart

Ward	Date	Right leg (cm)		Left leg (cm)		Size applied; printed on AES sticker	If available, affix AES product sticker. Record evaluation of skin/leg condition e.g., oedema etc.	Assessor;		
		Calf	Length	Calf	Length			Signature	Print name	Designation

Appendix 2b Please note; VTE risk & AES/IPCS assessments are to be completed on Nerve Centre. This document should only be used in circumstances where Nerve Centre is unavailable.

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NHS Trust

Affix patient addressograph

Prevention of DVT and PE in Medical Patients

- Thrombotic risk assessment is required for all patients **on admission** to hospital.
- During inpatient stay this should be repeated within 24 hours and then every 48-72 hours and as risks change.

All medical patients should be kept well hydrated and encouraged to mobilise.

In addition LMWH should be given daily for ADULT patients deemed at risk:

Step 1:

Complete the thrombotic risk table by signing the appropriate box

			Admission date	Reassess date	Reassess date	Reassess date
Reduced mobility	**+ 1 of**	Severe cardiac failure				
		Acute respiratory failure				
		Active Cancer / Inflammatory Bowel Disease				
		Acute infectious disease				
		Previous VTE or 1^0 family history of VTE				
		Known thrombophilia				
		Obesity (BMI>30 kg / m^2)				
		Varicose veins with phlebitis				
		COCP / HRT or tamoxifen				
		Pregnancy or <6 weeks postpartum				
No increased risk factors						

CONTRAINDICATIONS TO LMWH

- Active bleeding or Known bleeding disorder or platelets <75x 10^9/l
- Haemorrhagic stroke or risk of CNS bleed such as head injury or Uncontrolled hypertension (230/120 or higher)
- Not routinely used in ischaemic stroke unless haemorrhagic risk excluded
- Risk of gastrointestinal bleed
- Bacterial endocarditis, pericarditis or thoracic aortic aneurysm (discuss with cardiologist)
- History of Heparin induced thrombocytopenia (consider if platelets fall after 5-10days treatment
- On anticoagulation therapy
- Renal failure GFR<30ml/min (reduce dose of LMWH)
- Other conditions with high risk of serious bleed (Discuss with consultant if risk/benefit balance not clear (e.g. ischaemic stroke)

No contraindications. LMWH prescribed				
LMWH contraindicated. Peripheral pulses intact– anti-embolic stockings prescribed				
Have you given your patient verbal and written information regarding VTE risk reduction?				

Please note these are guidelines only and do NOT replace good clinical judgement.
The risk factors identified are not exhaustive. Clinicians may consider additional risk in individual patients and offer thromboprophylaxis as appropriate.

Appendix 2c Note; VTE risk & AES/IPCS assessments are to be completed on Nerve Centre. This document should only be used in circumstances where Nerve Centre is unavailable.

PREGNANCY AND POSTNATAL VTE RISK ASSESSMENT

Insert date of assessment in the appropriate column and tick all factors that apply.

Pre-existing factors- Date	Score
Previous VTE (except a single event related to major surgery)	4
Previous VTE provoked by major surgery	3
Known high-risk thrombophilia	
Medical disorder e.g. Nephrotic syndrome, sickle cell, heart or lung disease, SLE, IV drug user, Cancer, Myeloproliferative disorder e.g. thrombocythaemia, polycythaemia vera	3
Age ≥40 years	1
Obesity BMI>30	1
Obesity BMI>40	2
Parity ≥3	1
Smoker	1
Gross varicose veins	1
First degree family history of unprovoked or oestrogen related VTE	1
Known low-risk thrombophilia	1
Assisted conception (antenatal only)	1
Total number of pre-existing risk factors	
Assessment completed by – sign and print name	

New onset or transient factors- Date	Score	Date					
ADMISSION to hospital (antenatal or postnatal)	1						
Dehydration and/or hyperemesis.	3						
Covid 19 Positive	2						
Current infection e.g. COVID, pyelonephritis, chest infection, cellulitis, HIV, post-partum wound infection or postnatal re admission	2						
Multiple pregnancy	1						
Midcavity or rotational delivery							
Caesarean Section in labour	**3**						
Elective caesarean section	2						
Immobility or paraplegia (Long term)	2						
Pre-eclampsia	1						
New onset proteinuria >3g/day	2						
PPH >1L or blood transfusion given	2						
Stillbirth in current pregnancy	2						
Preterm birth <37w in current pregnancy	1						
Prolonged labour >24hrs	1						
Total number of combined pre-existing and new onset / transient factors							
Assessment completed by – sign & print name							

Thromboprophylaxis management:	Duration of thromboprophylaxis:
Antenatal: Women with **a score of 4 or more**	Start thromboprophylaxis and continuefor remainder of pregnancy and for 6 weeks postpartum
Antenatal: Women with **a score of 3 or more**	Start thromboprophylaxis and continue for the remainder of the pregnancy if >28 weeks and for 6 weeks postpartum.
Postnatal: Women with **a score of 3 or more**	• Start thromboprophylaxis and continue for 7 days postpartum. • If 3 scored as a result of admission in labour thrombopropylaxis is only required whilst in hospital Consultant unit only) and not required on discharge home • A VTE risk assessment should be documented on discharge and therefore the score of 1 for admission (Antentally or postnatally) should be subtracted from the final score

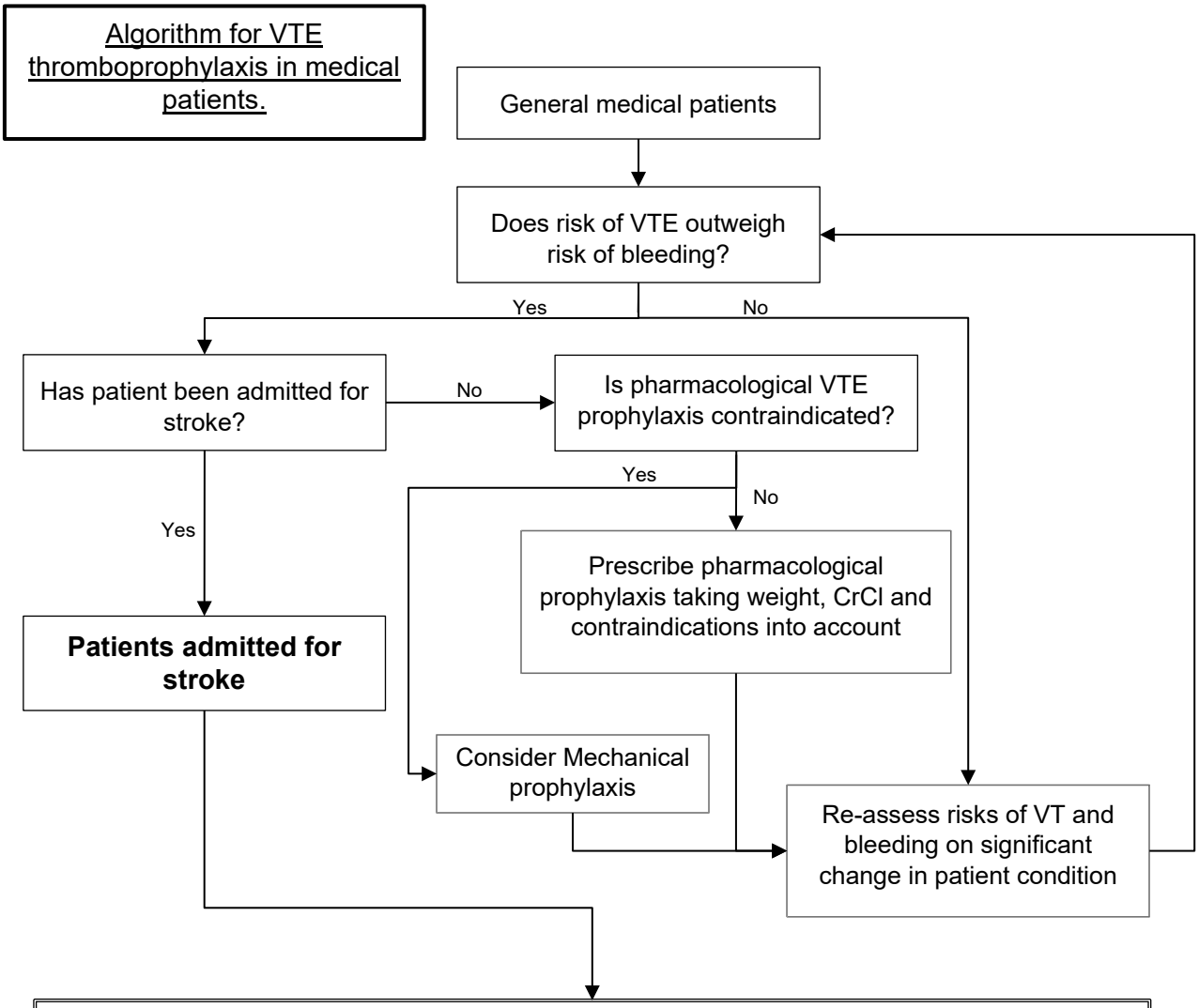
Pre-pregnancy or booking weight	Enoxaparin dose
< 50kg	20mg OD
50-90kg	40mg OD
91-130kg	60mg OD
131-170kg	80mg OD
>170kg	0.6mg/kg/day

High Risk.
Has patient been seen or discussed in Haem / Obs Clinic?
Yes: see individual plan of care
No: Urgent referral
Requires antenatal prophylaxis with LMWH
AES should be worn

High risk thrombophilia: Antithrombin deficiency, Protein S or C deficiency, Homozygous factor V Leiden, compound heterozygote

Low risk thrombophilia: Heterozygous factor V Leiden, Prothrombin gene mutation

Algorithm for VTE thromboprophylaxis in medical patients; *note the Stroke pathway*.



Do not offer anti-embolism stockings for VTE prophylaxis to patients who are admitted for stroke.

Consider intermittent pneumatic compression for VTE prophylaxis in immobile patients who are admitted within 3 days of acute stroke. Explain to the patient or their family members or carers (as appropriate) that:

- it reduces the risk of deep vein thrombosis and may provide an increase in survival
- it will not help them recover from stroke, and there may be an associated increased risk of surviving with severe disability

When using intermittent pneumatic compression for patients who are admitted for stroke, provide these for 30 days or until the patient is mobile or discharged, whichever is sooner. For patients where the 30-day course of IPC has been completed, a standard (non-stroke) VTE risk assessment should be undertaken, and VTE prophylaxis offered accordingly.

Where intermittent pneumatic compression is contraindicated, not tolerated or not available, a senior clinician should review individual VTE and bleed risk to establish if VTE prophylaxis with LMWH is indicated, and this should be documented.

Consensus of risk factors for VTE in surgical patients

Very high risk

As for 'High risk' +

- History of/ current DVT/PE. (Ensure no lower limb DVT prior to IPCs)
- High risk thrombophilia, i.e. Acquired Anti Thrombin 3 deficiency (in Anti Phospholipid Syndrome/Ascites/nephrotic syndrome)
- Super morbid obesity (BMI >45)
- Poly trauma patient
- Current/anticipated use of inotropes
- Patient requires ITU care post operatively
- Multiple risk factors; ≥3 factors.

High risk

- Anaesthetic + surgery time ≥90mins/≥60mins if pelvic or lower limb surgery
- Aged >60 having minor surgery (operation + anaesthetic time lasting <90 minutes/ <60mins if pelvic or lower limb surgery)
- Is classed as obese (BMI greater than 30)
- Has history of VTE or 1st degree family history of VTE
- Has malignant, infective or inflammatory disease or other significant medical co-morbidity
- Has varicose veins with a history of phlebitis (which are not being operated upon)
- Is dehydrated
- Is totally immobile (any age >18years) for ≥3 days
- Has/is expected to have significantly reduced mobility (over 60) for ≥3 days[1]
- Is taking/has taken an oestrogen containing contraceptive pill or HRT in the last 4 weeks
- Is pregnant or <6 weeks post-partum

Low risk

- No risk factors
- Surgery <90mins/<60mins if pelvic or lower limb

[1] 'significantly reduced mobility' is used to denote patients who are bedbound, unable to walk unaided or likely to spend a substantial proportion of the day in bed or in a chair. NICE NG89.

Appendix 5

Day Case procedures where VT risk assessment can be done by cohort

Medical Day case patients:

Haemodialysis
Routine day case chemotherapy
Diagnostic and therapeutic interventional cardiology day case procedures
Bronchoscopy
Pain team local and regional analgesia
Medical day case reviews not associated with an interventional invasive procedure including transfusions, IV infusional therapies
Endoscopy including sigmoidoscopy, colonoscopy, gastroscopy including PEG insertion. PIG insertion, biopsy and dilation
Drainage of ascites
Interventional Radiological procedures
Medical Minor day procedures performed under LA including joint infection, bone marrow examination, aspiration of fluid, lumbar puncture, line insertion
Day case biopsies including renal biopsy, muscle biopsy and liver biopsy
Electrophysiological investigations
Endocrine and Neurology challenge tests

Surgical Specialities Day Case procedures

Minor Daycase surgical procedures under local or regional anaesthesia of less than 90minutes duration, or under short GA estimated to last less than 30 minutes where there is no immobilisation of the lower leg or general immobility afterwards including:

a. Dermatological procedures
b. Ophthalmological procedures
c. Daycase carpal tunnel release
d. Daycase Lumbar puncture
e. Non-cancer ENT surgery lasting < 90 mins
f. Non-cancer plastic surgery lasting < 90 mins
g. Non-cancer Dental or maxillofacial procedures lasting <90 mins

Biopsies
Day case prostate biopsy (cohort assessed as balance of risk for bleeding rather than thrombosis)

Outpatient/day case cystoscopy and cystoscopic procedures

Upper and Lower GI endoscopy including PEG, PIG, stents and biopsies

Daycase gynaecological procedures:

Hysteroscopy

Colposcopy

Out-patient ambulatory treatments:

Essure sterilisations

Polypectomies

Novasure endometrial ablations

Medical TOPs

ED/EDU attendances not requiring hospital admission for more than 23hrs

All patients admitted for intra-abdominal or lower limb day case surgery lasting more than 90 minutes require individual VT assessment

All surgical patients undergoing a procedure which would impair mobility post procedure require individual VT assessment

This is general guidance only and clinical judgement must always be used. Patient cohorts at substantial on-going risk who are repeat attendees to the hospital site should have their risk documented at the start of their patient pathway (e.g. cancer patients) but are presumed to be at no more than their baseline risk when attending for short infusions and interventions.

Approved by: UHL Thrombosis Committee, Medical Director & East Midlands Regional VTE leads & Medical Directors. August 2010.

University Hospitals of Leicester NHS
NHS Trust

To be used in conjunction with the VTE risk assessment pathway

Thromboprophylaxis

ADMINISTRATION GUIDE

Enoxaparin (Inhixa®)

Some of the doses below are off label and differ from the SPC.

As this is the recommendation from UHL, prescribers will be protected by UHL vicarious liability

Enoxaparin dosage for Adult, non-pregnant, non-orthopaedic (see specific guidelines) patients deemed to be at risk of thrombosis (medical/surgical)

	Renal Function	
Bodyweight	**CrCl ≥30ml/min**	**CrCl <30ml/min**
<50kg	**20mg OD** 	**20mg OD** 
50-100kg	**40mg OD** 	**20mg OD** 
>100-150	**40mg BD** 	**40mg OD** 
>150kg	**60mg BD** 	**40mg OD** 

CrCl <15ml/min Monitor heparin assay on Day 4 and every 4 days to ensure there is no accumulation. Aim for peak levels <0.3iu/ml

Appendix 7.

Providing extended thromboprophylaxis to all acutely ill medical patients

NG 89 recommends that:

Acutely ill medical patients

- 1.4.6 Offer pharmacological VTE prophylaxis for a minimum of 7 days to acutely ill medical patients whose risk of VTE outweighs their risk of bleeding:
- Use LMWH as first-line treatment.
- If LMWH is contraindicated, use Fondaparinux sodium. [2018]

Despite this recommendation the NICE guidance provides no specific evidence to support this.

From interrogating our own database, the risk of having a VTE following hospital admission or up to 90 days post discharge is 0.15%. This equates to approximately 260 acutely unwell medical patients each year of patients. Of these cases less than 10 patients will have had a potential preventable VTE where there has been an issue with regard to the thromboprophylaxis that has been given. These figures have remained relatively stable since 2013.

To enable compliance with NICE guidance we would require a significant change in the manner in which patients are discharged. This would include increased amount of time by nurses to provide patient education as well as increasing the amount of support required to be given by primary care including the need for district nurses to attend.

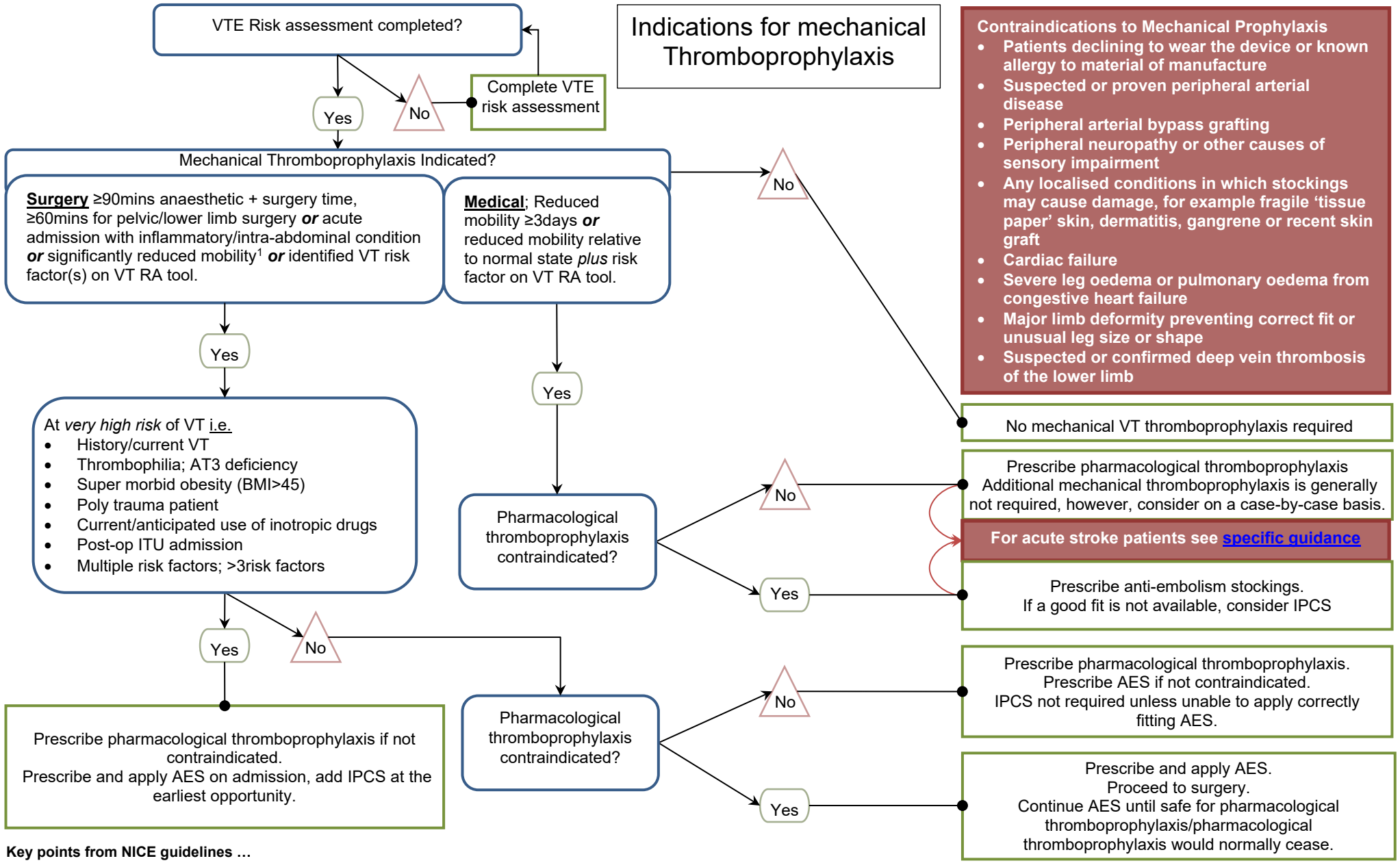
From reviewing our data if this recommendation had been introduced in 2016 it would have affected 21,669 patients receiving 83,814 additional doses of heparin whilst in 2017 it would have affected 23,433 patients with 88,769 additional doses of heparin.

On reviewing our data with regard to hospital acquired VTE, the largest common group is for patients with active cancer are the group most likely to develop a HAT, accounting for approximately 25% of all cases. Therefore, rather than suggesting that all patients should have a minimum of 7 days we would suggest that VTE prophylaxis is only continued in high-risk medical patients. The largest high-risk group is medical patients with active cancer. This would affect approximately 25% of this group of patients; however, such patients are more likely to stay in hospital longer and therefore have less overall effect on the cost pressures. From reviewing the data this would impact primarily on the following medical specialities: oncology, haematology, medicine and respiratory.

To achieve this, we would propose altering the wording in the ICE discharge letter under the section headed **VTE Assessment completed on Discharge:** to include those groups where extended thromboprophylaxis is required e.g., THR/TKR, NOF#, Achilles rupture, history of VTE (and in plaster), medical patients with active cancer, to act as a prompt when typing the TTO. We would ask the pharmacy department to monitor this.

Dr N. Langford. June 2018.

Appendix 8.



Key points from NICE guidelines …

- **Any mechanical prophylaxis must be continued until the patient is mobile or no longer considered at increased risk of VTE**

[1] **significantly reduced mobility is used to denote patients who are bedbound, unable to walk unaided or likely to spend a substantial proportion of the day in bed or in a chair. NICE NG89.**

Appendix 9.

Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism.

Quick reference guide

NICE guideline Published: 21 March 2018 nice.org.uk/guidance/ng89 **https://www.nice.org.uk/guidance/ng89/chapter/Recommendations**

VTE risk assessment within 14 hrs of admission.
Balance the person's individual risk of VTE against their risk of bleeding when deciding whether to offer pharmacological thromboprophylaxis

VTE risk re-assessment.
General medical/surgical/obstetric patients: On change of condition, e.g., new onset infection, sudden or increasing loss of mobility, post operatively, change of ward
Palliative care: Review VTE prophylaxis daily for people who are having palliative care, taking into account the views of the person, their family members or carers (as appropriate) and the multidisciplinary team.
People admitted to critical care: Reassess VTE and bleeding risk daily. Assess VTE and bleeding risk more than once a day in people admitted to the critical care unit if the person's condition is changing rapidly.
Spinal injury: Reassess risk of bleeding 24 hours after initial admission in people with spinal Injury
Major trauma: Whenever their clinical condition changes and **at least daily**

Significantly reduced mobility.
People who are bed bound, unable to walk unaided or likely to spend a substantial proportion of their day in bed or in a chair

People using antiplatelet agents.
Consider VTE prophylaxis for people who are having antiplatelet agents for other conditions and whose risk of VTE outweighs their risk of bleeding. Take into account the risk of bleeding and of comorbidities such as arterial thrombosis.

People using anticoagulation therapy.
Consider VTE prophylaxis for people at increased risk of VTE **who are interrupting** anticoagulant therapy.
Consider bridging potential gaps in anticoagulation with LMWH for patients with sub therapeutic anticoagulation levels or who need to temporarily cease their anticoagulation for a procedure – **be particularly vigilant if the procedure is delayed.**

Patient /GP information.
Provide patients/carers with both verbal and written information regarding VTE risk reduction/symptom recognition on admission **and** discharge. Provide these two leaflets to reinforce the information: 'Reducing the risk of blood clots while you are in hospital' https://yourhealth.leicestershospitals.nhs.uk/library/trustwide/350-reducing-the-risk-of-blood-clots-while-you-are-in-hospital **and**
'Reducing the risk of blood clots when you go home' https://yourhealth.leicestershospitals.nhs.uk/library/trustwide/351-reducing-the-risk-of-blood-clots-when-you-go-home
Accurately complete the mandated VTE assessment section of the GP ICE letter.

Quick guide	Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications)		Extend thromboprophylaxis post discharge if:
	Pharmacological	Mechanical	
• Medical patients. • Acutely ill medical patients. • Renal patients	If using, start it as soon as possible and within 14 hours of admission, unless otherwise stated in the population-specific recommendations below. **Consider unfractionated heparin in renal failure.**	Add if pharmacological contraindicated and/or patient considered very high risk, e.g., previous VTE, strong family history, bleeding disorder. Use either anti-embolism stockings (AES) or intermittent pneumatic compression sleeves (IPCS) if AES not appropriate.	If offering pharmacological prophylaxis to patients with active cancer who are receiving chemo/radiotherapy, continue it on discharge for the duration of their treatment.
• People with cancer	Do not offer VTE prophylaxis to people with cancer who are receiving cancer modifying treatments such as radiotherapy, chemotherapy or immunotherapy **and who are mobile**, **except** for people with myeloma who are receiving chemotherapy with Thalidomide, Pomalidomide or Lenalidomide with steroids. Choose either: Aspirin (75 or 150mg) or LMWH. Also, consider pharmacological VTE prophylaxis with LMWH for mobile people with pancreatic cancer who are receiving chemotherapy.		
• Acute coronary syndromes	People receiving anticoagulant drugs as part of their treatment for an acute coronary syndrome do not usually need VTE prophylaxis. See also recommendation re 'People using anticoagulation therapy' above.		
• Acute stroke patients	Do not offer pharmacological thromboprophylaxis to acute stroke patients until the type of stroke has been established and the patient has had a senior review.	**Do not** offer anti-embolism stockings to people who are admitted for acute stroke **Consider** intermittent pneumatic compression for VTE prophylaxis for people who are immobile and admitted with acute stroke. If using, start it within 3 days of acute stroke. (Cont.' overleaf)	Not recommended

Quick guide	Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications) Pharmacological	Mechanical	Extend thromboprophylaxis post discharge if:
		Explain to the person admitted with acute stroke and their family members or carers that intermittent pneumatic compression: • reduces the risk of DVT and may increase their chances of survival • **will not help them recover** from stroke, and there may be an associated increased risk of surviving with severe disability. When using intermittent pneumatic compression for people who are admitted with acute stroke, provide it for 30 days or until the person is mobile or discharged, whichever is sooner	
• Palliative care	Consider pharmacological VTE prophylaxis for people who are having palliative care. Take into account temporary increases in thrombotic risk factors, risk of bleeding, likely life expectancy and the views of the person and their family members or carers (as appropriate). Do not offer VTE prophylaxis to people in the last days of life.	Not recommended	Not recommended
• People admitted to critical care	Provide LMWH to people admitted to the critical care unit if pharmacological VTE prophylaxis is not contraindicated.	Consider if pharmacological prophylaxis is contraindicated based on their condition or procedure. If using, start it on admission and continue until the person no longer has reduced mobility relative to their normal or anticipated mobility.	Dependent on diagnosis
• Anaesthesia	Do not routinely offer pharmacological VTE prophylaxis to people undergoing a surgical procedure with local anaesthesia by local infiltration **with no limitation of mobility**.	Do not routinely offer mechanical VTE prophylaxis to people undergoing a surgical procedure with local anaesthesia by local infiltration **with no limitation of mobility.**	Not recommended

Quick guide	Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications)		Extend thromboprophylaxis post discharge if:
	Pharmacological	Mechanical	
• General surgical patients	Balance the person's individual risk of VTE against their risk of bleeding when deciding whether to offer pharmacological thromboprophylaxis to surgical and trauma patients. If using pharmacological VTE prophylaxis for surgical and trauma patients, start it as soon as possible and within 14 hours of admission, unless otherwise stated in the population-specific recommendations	Start on admission. Choose either: AES or IPCS. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.	If total anaesthesia and surgical time is more than 90 minutes or the person's risk of VTE outweighs their risk of bleeding. Where provided, continue pharmacological thromboprophylaxis for a minimum of 7 days and mechanical thromboprophylaxis until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.
• Lower limb immobilisation **use the L-TRiP VTE risk assessment tool**	Consider pharmacological VTE prophylaxis for people with lower limb immobilisation whose risk of VTE outweighs their risk of bleeding.	Not recommended	Consider stopping prophylaxis if lower limb immobilisation continues beyond 42 days.
• Fragility fractures of the pelvis, hip and proximal femur	Consider pre-operative VTE prophylaxis for people with fragility fractures of the pelvis, hip or proximal femur if surgery is delayed beyond the day after admission. Give the last dose no less than 12 hours before surgery for LMWH or 24 hours before surgery for Fondaparinux sodium	Consider IPCS for people with fragility fractures of the pelvis, hip or proximal femur at the time of admission if pharmacological prophylaxis is contraindicated. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.	Offer VTE prophylaxis for a month to people with fragility fractures of the pelvis, hip or proximal femur if the risk of VTE outweighs the risk of bleeding.

Quick guide	Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications)		Extend thromboprophylaxis post discharge if:
	Pharmacological	Mechanical	
• Non-arthroplasty orthopaedic knee surgery	Generally, not needed for people undergoing arthroscopic knee surgery where total anaesthesia time is less than 90minutes and the person is at low risk of VTE. Consider LMWH 6–12 hours after surgery for 14 days for people undergoing arthroscopic or other knee surgery if total anaesthesia time is more than 90minutes or the person's risk of VTE outweighs their risk of bleeding.	Not recommended	Consider LMWH for 14 days if total anaesthesia and surgical time is more than 90minutes or the person's risk of VTE outweighs their risk of bleeding.
• Foot and ankle orthopaedic surgery	Consider for people undergoing foot or ankle Surgery that requires immobilisation or when total anaesthesia time is more than 90minutes or the person's risk of VTE outweighs their risk of bleeding. Use of the L-TRiP score can be considered.	Not recommended	Continue until the person returns to their anticipated best level of mobility. Consider stopping prophylaxis if immobilisation continues beyond 42 days
• Upper limb orthopaedic surgery	Generally, not needed if giving local or regional anaesthetic for upper limb surgery. Consider for people undergoing upper limb surgery if the person's total time under general anaesthetic is over 90 minutes or where their operation is likely to make it difficult for them to mobilise.	Not recommended	Not recommended

<table>
<tr><td>Quick guide</td><td colspan="2">Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications)

Pharmacological

Mechanical</td><td>Extend thromboprophylaxis post discharge if:</td></tr>
<tr><td rowspan="2">• Elective hip replacement

• Elective knee replacement

Also see <u>Orthopaedic thromboprophylaxis guidelines</u></td><td><u>hip</u>, Choose any one of:
- LMWH for 10 days followed by aspirin (75 or 150 mg) for a further 28 days.
- LMWH for 28 days combined with anti-embolism stockings until discharge.
- Rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery.
<u>knee</u> Choose any one of:
- Aspirin (75 or 150 mg) for 14 days.
- LMWH for 14 days combined with anti-embolism stockings until discharge.
- Rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery.
-</td><td>Consider anti-embolism stockings until discharge from hospital if pharmacological interventions are contraindicated in people undergoing elective <u>hip</u> replacement surgery.

Consider intermittent pneumatic compression if pharmacological prophylaxis is contraindicated in people undergoing elective <u>knee</u> replacement surgery.
Continue until the person is mobile.</td><td><u>hip</u>, Choose any one of:
- LMWH for 10 days followed by aspirin (75 or 150 mg) for a further 28 days.
- LMWH for 28 days

<u>knee</u> Choose any one of:
- Aspirin (75 or 150 mg) for 14 days.
- LMWH for 14 days</td></tr>
<tr><td colspan="3">Consider one of the following if none of the options above can be used:
Apixaban is recommended as an option for the prevention of venous thromboembolism in adults after elective hip or knee replacement surgery
Dabigatran etexilate, within its marketing authorisation, is recommended as an option for the primary prevention of venous thromboembolic events in adults who have undergone elective total hip replacement surgery or elective total knee replacement surgery.</td></tr>
<tr><td>• Elective spinal surgery</td><td>Consider for people whose risk of VTE outweighs their risk of bleeding, taking into account individual patient and surgical factors.</td><td>Offer mechanical VTE prophylaxis on admission</td><td>Continue for 30 days or until the person is mobile or discharged, whichever is sooner</td></tr>
</table>

Quick guide	Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications)		Extend thromboprophylaxis post discharge if:
	Pharmacological	Mechanical	
• Spinal injury	Consider LMWH 24 hours after initial admission for people who are not having surgery in the next 24–48 hours	Consider AES or IPCS on admission for people with spinal injury.	Continue for 30 days or until the person is mobile or discharged, whichever is sooner
• Major trauma	Consider for people with serious or major trauma as soon as possible after the risk of VTE outweighs the risk of bleeding. Continue for a minimum of 7 days.	IPCS on admission to people with serious or major trauma. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.	Dependant on diagnosis
• Abdominal surgery • Bariatric surgery	Offer for a minimum of 7 days for people whose risk of VTE outweighs their risk of bleeding, taking into account individual patient factors and according to clinical judgement.	Start on admission. Choose either: AES or IPCS. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.	Consider extending pharmacological prophylaxis to 28 days for people who have had major cancer surgery in the abdomen.
• Cardiac surgery/ Vascular surgery *Open vascular surgery or endovascular aneurysm repair* • Thoracic surgery	Consider for a minimum of 7 days for people who are undergoing cardiac/ thoracic/ open vascular surgery or major endovascular procedures, including endovascular aneurysm repair surgery, **and are not having other anticoagulation therapy**,	**Cardiac/Vascular surgery:** Consider on admission for people who are undergoing cardiac surgery. **Thoracic surgery:** Start on admission. Choose either: anti-embolism stockings or intermittent pneumatic compression.	**All:** Where provided, continue pharmacological thromboprophylaxis for a minimum of 7 days and mechanical thromboprophylaxis until the person no longer has significantly reduced mobility relative to their normal or anticipated expectation of mobility.
• Lower limb amputation	Consider pharmacological VTE prophylaxis with LMWH for a minimum of 7 days for people who are undergoing lower limb amputation whose risk of VTE outweighs their risk of bleeding.	Consider intermittent pneumatic compression, on the contralateral leg, on admission.	

Quick guide	Thromboprophylaxis (based on patients' weight, CrCl and in the absence of contraindications)		Extend thromboprophylaxis post discharge if:
	Pharmacological	Mechanical	
• *Varicose vein surgery*	Generally, not needed for people undergoing varicose vein surgery where: total anaesthesia time is less than 90minutes and the person is at low risk of VTE. Consider pharmacological VTE prophylaxis with LMWH, starting 6–12 hours after surgery and continuing for 7 days for people undergoing varicose vein surgery if: total anaesthesia time is more than 90minutes or the person's risk of VTE outweighs their risk of bleeding.	Consider on admission if pharmacological prophylaxis is contraindicated continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.	Continue for 7 days if total anaesthesia time is more than 90minutes or the person's risk of VTE outweighs their risk of bleeding.
• Head and neck surgery *Oral and maxillofacial surgery* *ENT surgery*	Consider for people undergoing oral or maxillofacial surgery whose risk of VTE outweighs their risk of bleeding	From admission for people who are at increased risk of VTE **and** high risk of bleeding. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility	Where used continue for a minimum of 7 days
• Interventions for pregnant women and women who gave birth or had a miscarriage or termination of pregnancy in the past 6 weeks who are admitted to hospital or a midwife-led unit	Consider LMWH where risk of VTE outweighs risk of bleeding. Start it as soon as possible/within 14 hours of admission. Continue until there is no longer an increased risk of VTE or until discharge. Do not offer/stop VTE prophylaxis for women admitted to hospital or a midwife-led unit who are in active labour. If using LMWH in women who gave birth or had a miscarriage or termination of pregnancy, start 4–8 hours after the event unless contraindicated and continue for a minimum of 7 days.	Consider for women who are likely to be immobilised or have significantly reduced mobility relative to their normal or anticipated mobility for 3 or more days after surgery, including caesarean section. Use IPCS as first-line treatment. If IPCS is contraindicated, use AES Continue until the woman no longer has significantly reduced mobility or until discharge from hospital.	Where provided, continue for a minimum of 7 days