Leicestershire Partnership NHS Trust

Prevention of Venous Thromboembolism (VTE) Policy for In Patient Adult Patients

Policy outlining the assessment and treatment of patients at risk of venous thromboembolism in hospital

Key Words:	VTE, DVT, PE, blood clot, TED stockings, heparin	
Version:	2	
Adopted by:	Trust Policy Committee	
Date this version was adopted:	October 2020	
Name of Author:	Jonathan Dexter – Consultant Nurse, CHS	
Name of responsible Committee:	Patient Safety Improvement Group (PSIG)	
Please state if there is a reason for not publishing on website:	n/a	
Date issued for publication:	October 2020	
Review date:	June 2023	
Expiry date:	*June 2024*	
Target audience:	All qualified medical and nursing staff within LPT	
Type of Policy	√	Clinical
Which Relevant CQC Fundamental Standards?	1,2,4,21	

Contents

Version Control and Summary of Changes

Version Number	Date	Comments (description change and amendments)
1.0	August 2012	New policy
1.1	March 2013	Update – content harmonisation including community hospitals settings
1.2	June 2013	Update – Risk assessment reused
1.4	Jan 2017	Updated Version
1.5	Feb 2018	Updated Ulearn training Change in audit compliance indicator to come in line with NICE guidance
1.5	August 2018	Update on Platelet monitoring requirements from 5-7 days to 5 days
2.0	February 2020	Full review

All LPT Policies can be provided in large print or Braille formats, if requested, and an interpreting service is available to individuals of different nationalities who require them.

Did you print this document yourself?
Please be advised that the Trust discourages the retention of hard copies of policies and can only guarantee that the policy on the Trust website is the most up-to-date version.

For further information contact:

Lead Pharmacist
Pharmacy Department
Leicestershire Partnership NHS Trust

Head of Nursing
Community Hospitals
Community Health Services
Leicestershire Partnership Trust

Consultant Nurse
Community Hospitals
Community Health Services
Leicestershire Partnership Trust

Definitions that apply to this Policy

Thrombus	A blood clot which forms within a blood vessel, partially or completely obstructing the flow of blood within that vessel
Embolism	A foreign body, such as a blood clot or an air bubble that travels through the bloodstream and becomes lodged in a blood vessel, partially or completely obstructing the flow of blood within the affected vessel
Deep vein thrombosis	A blood clot in one of the deep veins of the body. Most commonly occurs within the deep veins in the leg
Pulmonary embolism	When an embolism blocks the blood supply to the lungs. May occur when all, or part of a deep vein thrombosis breaks off and travels through the bloodstream to the lungs
Clinically silent	There are no obvious clinical signs, e.g. pain, swelling
Due Regard	Having due regard for advancing equality involves: • Removing or minimising disadvantages suffered by people due to their protected characteristics. • Taking steps to meet the needs of people from protected groups where these are different from the needs of other people. • Encouraging people from protected groups to participate in public life or in other activities where their participation is disproportionately low.
SCDs	Sequential Compression Devices
AES	Anti-Embolism Stockings

Equality Statement

Leicestershire Partnership NHS Trust (LPT) aims to design and implement policy documents that meet the diverse needs of our service, population and workforce, ensuring that none are placed at a disadvantage over others. It takes into account the provisions of the Equality Act 2010 and advances equal opportunities for all. This document has been assessed to ensure that no one receives less favourable treatment on the protected characteristics of their age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex (gender) or sexual orientation.

In carrying out its functions, LPT must have due regard to the different needs of different protected equality groups in their area. This applies to all the activities for which LPT is responsible, including policy development, review and implementation.

Due Regard

This policy sets out Leicestershire Partnership Trust's (LPT) policy for ensuring the safe and appropriate use of VTE prophylaxis. Every effort has been made to ensure all equality groups (protected characteristics) are given equal access to service provision, especially in the context of disability. This is demonstrated through the provision of risk assessment and decision making tools to guide staff in the identification of VTE risk and the appropriateness of VTE prophylaxis. In addition, there is emphasis to involve the patient in the decision making process and a patient and carer information leaflet is available. This leaflet will be available in different languages, Easy Read and Braille formats. Consideration is also given to those for whom the use of drugs of animal origin is of concern.

1.0 Summary

The purpose of this policy is to ensure that:

- All adult patients admitted to inpatient areas within LPT are assessed for their risk of developing venous thromboembolism (VTE) within 24 hours of admission using the VTE risk assessment tool (appendix 6)
- **Steps 1** of the assessment tool can be completed by a registered nurse, advanced nurse practitioner (ANP) or medical practitioner
- **Steps 2, 3, 4 and 5** of the assessment tool can only be completed by an ANP / non-medical prescriber (with relevant competencies) or medical practitioner.
- Training for staff is once only, utilising the E-Learning Department of Leicestershire Partnership Trust (Academy) online training module
- The appropriate level of prophylaxis for the prevention of VTE is offered to all patients relevant to their risk and clinical condition
- Staff are able to provide accurate advice to patients relating to VTE risk and prophylaxis
- Staff recognise the need to re-assess for VTE risk when a patient's condition changes and take appropriate action

It should be recognised that any recommendations in this policy must be implemented with consideration to the individual patient's clinical condition. Clinical judgement will need to be used in establishing whether or not the risks of prophylaxis outweigh the benefits.

2.0 Introduction

Hospital-acquired venous thromboembolism (VTE), also known as hospital-acquired or hospital-associated thrombosis (HAT), covers all VTE that occurs in hospital and within 90 days after a hospital admission. It is a common and potentially preventable problem. VTE most frequently occurs in the deep veins of the legs or pelvis (a deep vein thrombosis [DVT]). If it dislodges and travels to the lungs, it is called a pulmonary embolism, which in some cases can be fatal.

Hospital-acquired VTE accounts for thousands of deaths annually in the NHS, and fatal pulmonary embolism remains a common cause of in-hospital mortality. HAT accounts for 50–60% of all VTE seen. In 2013–14, there were around 24,700 admissions for pulmonary embolism and 19,400 for DVT in England. In 2013 in England and Wales, there were 2,191 deaths recorded as due to pulmonary embolism and 2,816 due to DVT. Treatment of non-fatal symptomatic VTE and related long-term morbidities is associated with a considerable cost to the health service.

People admitted to hospital or mental health units have varying risk factors for VTE. The spectrum of VTE risk is broad, and understanding the scale of the problem has led to a paradigm shift in

preventing and managing VTE in the NHS. In particular, patients now undergo VTE risk assessment as a routine event in all NHS care pathways. By July 2013, 96% of adult admissions to NHS-funded acute care hospitals were risk assessed for VTE compared with less than 50% of patients in July 2010.

VTE prophylaxis has been shown to reduce the incidence of DVT. It includes mechanical methods (such as anti-embolism stockings and intermittent pneumatic compression devices), and pharmacological treatments (such as heparin and other anticoagulant drugs).

All hospital acquired Thrombosis (HAT) should be considered as potentially avoidable and investigated for learning.

The risk of developing VTE depends on the condition and/or procedure for which the patient is admitted, level of mobility, and on any pre-disposing risk factors (such as age, obesity and concomitant conditions).

Pharmacological and mechanical devices for thromboprophylaxis such as low molecular weight/unfractionated heparin (LMWH/UFH), direct oral anticoagulants (DOACs), anti-embolism stockings (AES) and sequential compression devices (SCD) are used prophylactically to reduce the risk of deep vein thrombosis and pulmonary embolus in 'at risk' non ambulatory patients. They help prevent deep vein thrombosis by anticoagulation, increasing blood flow and reducing venous stagnation.

This policy makes recommendations on assessing and reducing the risk of VTE in patients in hospital. The recommendation takes in to account the potential risks of the various options for prophylaxis and patient preferences.

3.0 PROCEDURE / IMPLEMENTATION

3.1 Assessment of risk

The following assessment should be undertaken on all patients when initially admitted, repeated at 24 hours and 72 hours, and if their clinical condition changes.

The tool must be completed on the electronic prescribing system (EPMA).

STEP ONE
Can be completed by a registered nurse, Advanced Nurse Practitioner (ANP) , non-medical prescriber (with relevant competencies) or medical practitioner.

Action for initial assessment on admission of general patient groups

Tick all patient's as	**Action**
• Surgical	Assess
• medical expected to have ongoing reduced mobility relative to normal state **	Assess
• medical patient NOT expected to have significantly reduced mobility relative to normal state **	Assessment not required

Table 1

RISK ASSESSMENT FOR VENOUS THROMBOEMBOLISM (VTE)					
(STEP 1) Assess all patients admitted to hospital for level of mobility (tick one box). All surgical patients, and all medical patients with significantly reduced mobility, should be considered for further risk assessment.					
Mobility - all patients (tick one	**Tick**		**Tick**		**Tick**
Surgical patient	☐	Medical patient expected to have ongoing reduced mobility relative to normal state	☐	Medical patient NOT expected to have significantly reduced mobility relative to normal state	☐
				Risk assessment now complete	☐

Have had or are expected to have significantly reduced mobility (bedbound, unable to walk unaided or spending a substantial amount of time in bed / chair) for 3 or more days (including prior to hospital admission)

OR

Have reduced mobility relative to their baseline **AND One or more** risk factors (table 2)

The medical patient (including those patients with mental health illness) should have a holistic assessment of their function both before and after admission, there must be consideration into their mobility status. This applies to all patients within LPT. Their functional status must be noted.

STEP TWO

Thrombosis risk can be completed by an ANP / non- medical prescriber (with relevant competencies) or medical practitioner.

Review the patient and procedure- related risk factors and ***Tick*** any such risk for thrombosis risk, which should prompt consideration for thrombo-prophylaxis.

Patients are considered at increased risk of VTE if they have ONE of the following :

Have had or are expected to have significantly reduced mobility (bedbound, unable to walk unaided or spending a substantial amount of time in bed / chair) for 3 or more days (including prior to hospital admission)

OR

Have reduced mobility relative to their baseline **AND One or more** risk factors (table 2)

Initial Assessment	Re-assessment		
○ At admission	○ Within 24 hours of admission	○ Within 72 hours of admission	◉ **Due to a change in clinical situation**

The risk factors identified are not exhaustive. Clinicians may consider additional risks in individual patients and offer thromboprophylaxis as appropriate.

Thrombosis risk

Patient related	Tick	Admission related	Tick
Active cancer or cancer treatment	☐	Significantly reduced mobility for 3 days or more	☐
Age > 60	☐	Hip or knee replacement	☐
Dehydration	☐	Hip fracture	☐
Known thrombophilias	☐	Total anaesthetic + surgical time > 90 minutes	☐
Obesity (BMI >30 kg/m²)	☐	Surgery involving pelvis or lower limb with a total anaesthetic + surgical time > 60 minutes	☐
One or more significant medical comorbidities (eg heart disease;metabolic,endocrine or respiratory pathologies;acute infectious diseases; inflammatory conditions)	☐	Acute surgical admission with inflammatory or intra-abdominal condition	☐
Personal history or first-degree relative with a history of VTE	☐	Critical care admission	☐
Use of hormone replacement therapy	☐	Surgery with significant reduction in mobility	☐
Use of oestrogen-containing contraceptive therapy	☐	New Stroke	☐
Varicose veins with phlebitis	☐	Is the patient on an oral anticoagulant? Tick if YES, then no further action required	☐
Pregnancy or < 6 weeks post partum (see NICE guidance for specific risk factors)	☐	Patient being administered regular antipsychotic medication	☐

Table 2

Additional risk factors to consider within the assessment process :

- Antipsychotics
- Clozapine
- Poor oral intake
- Restraint
- Catatonia
- Neuromuscular syndrome (fever and rhabdomyolysis)

STEP THREE

All patients must have haemorrhagic risk completed by an ANP / non- medical prescriber (with relevant competencies) or medical practitioner. (Table 3).

Review the patient and procedure-related risk factors. ***Tick*** any bleeding risk, which should promp consideration of whether the bleeding risks is sufficient to preclude pharmacological intervention

Any tick should prompt clinical staff to consider if bleeding risk is sufficient to preclude pharmacological intervention.

Bleeding risk

Patient related	Tick	Admission related	Tick
Active bleeding	☐	Neurosurgery, spinal surgery or eye surgery	☐
Acquired bleeding disorders (such as acute liver failure)	☐	Other procedure with high bleeding risk	☐
Concurrent use of anticoagulants known to increase the risk of bleeding (such as warfarin with INR >2)	☑	Lumbar puncture/epidural/spinal anaesthesia expected within the next 12 hours	☐
Acute stroke	☐	Lumbar puncture/epidural/spinal anaesthesia within the previous 4 hours	☐
Thrombocytopaenia (platelets< 75x10□/l)	☐	Emergency Department patient not expected to be admitted - VTE assessment not indicated	☐
Uncontrolled systolic hypertension (230/120 mmHg or higher)	☐	Paediatric patient (<16 years) - VTE assessment not indicated	☐
Untreated inherited bleeding disorders (such as haemophilia and von Willebrand's disease)	☐	Antiembolism stockings are contraindicated in this patient	☐

Table 3

In patients whom pharmacological thromboprophylaxis is contraindicated, mechanical thromboprophylaxis should be offered.

Haematology advice must be contacted for treatment advice where the overall risks of bleeding and VTE are difficult to discern.

Seek medical advice from Haematology for patients who are at very high risk of VTE and for whom mechanical and pharmacological VTE prophylaxis are contraindicated.

If the risk of bleeding outweighs the risk of VTE, consider mechanical VTE prophylaxis's.

If the risk of VTE outweighs the risk of bleeding, consider pharmacological VTE.

STEP FOUR

Document appropriateness of thrombo-prophylaxis

Assess and decide on the appropriateness of thrombo-prophylaxis

STEP FIVE

Prescription of thrombo-prophylaxis. Prescribe thrombo-prophylactic measures in the electronic prescribing and medicines administration system (EPMA) patient record.

In conjunction with the referring clinician's medical management plan should be utilised in the assessment of patients admitted to LPT care.

The following appendices enclose flow diagrams based on NICE guidance (2018, updated 2019).

- Hip Fracture (Appendix 7)
- Elective Hip and Knee Replacement (Appendix 8)
- Lower Limb Immobilisation (Appendix 9)
- Stroke (Appendix 10)
- Palliative Care (Appendix 11)
- General Medical Patients (Appendix 12)
- Sequential Compression Devices (Appendix 13)
- Mental Health Illness (Appendix 14)

NICE recommend medical patients who have reduced mobility relative to their normal state and have one or more of the risk factors identified in Appendix 6 should be considered for thromboprophylaxis.

There is little evidence for the extended use of thromboprophylaxis in medical patients and

some LMWH are currently off label for this use.

Drug	UK Marketing Authorisation includes prophylaxis of venous thromboembolism in medical patients?	What is the treatment duration specified within the Marketing Authorisation?
Dalteparin Sodium	Yes (5,000 IU in 0.2ml))	Treatment is prescribed for up to 14 days.
Enoxaparin Sodium	Yes (40mg (4,000IU) is recommended dose).	Treatment is prescribed for a minimum of 6 days and continued until the return to full ambulation for a maximum of 14 days

Prophylaxis should be discontinued as soon as the patient's mobility has returned to their normal state and their acute illness has resolved or the recommended duration of prophylaxis has been completed.

3.1.2 Patient information

All patients should be provided with written and verbal information regarding the risks of VTE and how to reduce these. Please provide all patients with VTE patient information leaflet. (Appendix 18)

Provide written information on:

- the risk and possible consequences of VTE
- importance of VTE prophylaxis of possible side-effects
- the correct use of VTE prophylaxis (for example and humanism stockings)
- how patients can reduce their risk of VTE (such as keeping well hydrated and, if possible exercising and becoming more mobile

3.2 Electronic Prescribing and Medicines Administration (EPMA)

An electronic prescribing and medicines administration system (EPMA) is in use within LPT.

This system allows for the electronic prescribing of all anticoagulation agents. This system incorporates an electronic VTE risk assessment which facilitates the patient assessment process and enables auditing as per LPT requirements.

Routine VTE prophylaxis for patients in whom there is no identified bleeding risk, should be with a low molecular weight heparin (LMWH) e.g. Dalteparin, the choice of which should fall within formulary guidelines.

Should a patient express concern about the use of drugs of animal origin, the most appropriate alternative should be discussed with the pharmacy department.

The checking and administration of prophylactic LMWH should be undertaken in line with the medicines code.

EPMA should reflect one of the following actions for all inpatients:

- Prescribe an Anti-Coagulant
- Prescribe Anti-Embolism Stockings (AES also known as TED)
- Prescribe a Sequential Compression Device (SCD), also known as Intermittent Pneumatic Compression
- Prescribe 'VTE No Intervention Required' – A note should be added to the prescription with the clinical rationale.

3.3 Pharmacological VTE Prophylaxis

If the risk of VTE outweighs the risk of bleeding, consider pharmacological VTE:

Thromboprophylaxis should be commenced as soon as possible after the risk assessment has been completed.

Thromboprophylaxis should be continued until there is a change in the patient's clinical condition the patient is deemed to no longer be an increased risk of VTE according to reassessment using the VTE risk assessment tool on EPMA.

Patients who have been prescribed pharmacological prophylaxis do not require anti-embolism stockings

3.4 Dosing

Routine VTE prophylaxis for patients in whom there is no identified bleeding risk, should be with a low molecular weight heparin (LMWH) e.g. Dalteparin, the choice of which should fall within formulary guidelines.

The checking and administration of prophylactic LMWH should be undertaken in line with the medicines code.

EPMA should reflect one of the following actions for all inpatients:

- Prescribe an Anti-Coagulant
- Prescribed T.E.D Anti-Embolism Stockings
- Prescribed a Sequential Compression Device (SCD)
- Prescribe 'VTE No Intervention Required' – A note should be added to the prescription with the clinical rationale.

.

It is noted for reference that some trusts use a dosing regimen taking into account the patients weight and eGFR. An example of this approach used by University Hospitals Of Leicester is included as Appendix (Appendix 17) . Should there be any query regarding dosing then advice should be taken from the pharmacy department.

3.5 Mechanical Thromboprophylaxis

If the risk of bleeding outweighs the risk of the VTE, consider mechanical VTE prophylaxis. Anti-embolism stockings (AES) are indicated for the prevention of VTE in patients for whom pharmacological VTE is contraindicated.

Anti-embolism stockings need to be prescribed on EPMA.

Mechanical thromboprophylaxis poses considerable, risk of harm to patients and staff must ensure that patients requiring Anti-embolism stockings (AES) have their legs measured following manufacturers guidance and the correct size fitted. The patient's skin integrity of both lower limbs must be checked regularly.

AES must not be applied if the following conditions are observed / diagnosed without specific documented evidence in the patients' medical record identifying the reason for deviation from this guidance. Always seek medical advice if diagnosis unclear.

Do not offer anti-embolism stockings to patients who have:

- Suspected or proven peripheral arterial disease
- Peripheral arterial bypass grafting (recent vascular surgery)

- Peripheral neuropathy or other causes of sensory impairment - for example, diabetes
- Any local conditions in which anti-embolism stockings may cause damage – for example,
  - Fragile 'tissue paper 'skin
  - Dermatitis
  - Cellulitis
  - Gangrene
  - Recent skin grafting
- Known allergy to material of manufacture
- Severe leg oedema
- Major limb deformity
- Unusual leg size or shape preventing correct fit

Use caution and clinical judgement when applying anti-embolism stockings over venous ulcers or wounds (NICE Guideline NG89, 2018)

AES are designed for non-ambulatory patients and should provide graduated compression and produce a calf pressure of 14-15 mmHg (this relates to a pressure of 14-18 mmHg at the ankle and is in line with British Standard (BS 661210:2018 Specification for graduated compression hosiery, anti-embolism hosiery and graduated support hosiery.)

Ensure that people who need AES have their legs measured and the correct size of stocking is provided. AES should be fitted and patients shown how to use them by staff trained in their use.

If there is suspicion of arterial disease, advice / opinion should be sought before fitting anti-embolism stockings.

If oedema or post-operative swelling develops, ensure that legs are re-measured and the device re-fitted accordingly. A clinical assessment should be undertaken prior to new stockings being fitted.

Patients need to be encouraged to wear mechanical devices day and night from admission until they no longer have significantly reduced mobility compared to their normal state.

These devices must be removed daily for hygiene purposes and to inspect the patients skin condition. When evaluating skin particular attention should be made to bony prominences and heels. Daily assessment of peripheral leg pulses should be undertaken to ensure good blood flow.

The area behind the knee and thigh must be checked for signs of restriction, ensuring that there is no bunching of thigh length stockings. Daily assessment of peripheral leg pulses should be undertaken to ensure good blood flow.

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.

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.

If mechanical VTE prophylaxis is deemed appropriate based on patient choice and individual patient factors, please ensure:		
• Those patients who need anti-embolism stockings have their legs measured and that they are provided with the correct size of stocking.		
For thigh-length stockings	For knee length stockings	

1. Measure the circumference of both thighs at their widest point	1. Measure the circumference of both calves at their widest point	**The current stockings using the manufacturer's measurement table**
2. Measure the circumference of both calves at their widest point	3. Measure the distance from the popliteal fold to the heel	
4. Measure the distance from the gluteal furrow (buttock fold) to the heel		

- **Prescribe generically as "Anti –embolism stockings" on EPMA**
- Prescribe anti-embolism stockings at the appropriate length (i.e. below knee, thigh length) on EPMA using the note to appear when charting. The choice between filing or knee length should be based on clinical judgement patient preference
- Anti-embolism stockings that provide graduated compression and produce a calf pressure 14-15 mmHg are used
- That patients are shown how to use their anti-embolism stockings
- Mechanical VTE prophylaxis is continued until the patient's level of mobility is no longer significantly reduced (which may be beyond the date of discharge)
- Patients are encouraged to wear their anti-embolism stockings day and night until they no longer have significantly reduced mobility
- Removal of anti-embolism stockings daily for hygiene purposes and to inspect skin condition. In patients with a significant reduction in mobility, poor skin integrity or any sensory loss, inspect the skin daily particularly over heels and bony prominences

The use of anti-embolism stockings is stopped if there is marking, blistering or discolouration of the skin, particularly over the heels and bony prominences, or if the person experiences pain or discomfort. Ensure an incident form (eIRF) is completed and inform the medical team and ensure a care plan is updated.

3.6 On-Going Intervention and re-assessment

Patients must be regularly assessed during their inpatient stay for their current risk of VTE and requirement for prophylaxis.

This must be on admission and then 24 hours following admission, reassessment must take place during their inpatient stay for the current ongoing risk of VTE and requirement for prophylaxis as or if their condition changes.

Assessment and re-assessment –

- On admission
- Within 24 hours
- At 72 hours
- As the clinical condition changes

and then :

- MHSOP / AMH / LD / CAMHS* (over the age of 16) – weekly at Consultant Ward round (repeated every 7 days or when the patients mobility or clinical condition changes) - to aid this process LPT have daily reports of who require assessments and some services have weekly reports to aid assessment and compliance.

Prophylaxis should be discontinued as soon as the patient's mobility has returned to their normal state and their acute illness has resolved or the recommended duration of prophylaxis has been completed.

3.7 Recommendations for platelet Monitoring / Monitoring

Patients initiated on LMWH should be monitored for Heparin induced Thrombocytopenia (HIT) 5 days post initiation. Additional monitoring of platelets should be undertaken if bleeding/bruising is noted and if on longer than 3 months (Appendix 15).

3.8 Prophylaxis Post Discharge / Discharge planning

If the medical management plan requires on –going pharmacological and / or mechanical prophylaxis post discharge this should be prescribed as part of the patients discharge medications including clear instructions for administration by community nurses if required. This should be documented on the discharge letter informing the GP that the patient has been discharged with pharmacological and / or mechanical VTE prophylaxis to be used at home, along with indication and intended duration.

Patients discharged anti-embolism stockings must :
• Understand the benefits of wearing them • Understand the importance of wearing them correctly • Understand the need to remove them daily for hygiene purposes • Are able to remove and replace them , or have someone available who will be able to do this for them • Know what to look forward there is a problem-for example, skin marking, blistering or discolouration, particularly over the heels and bony prominences • Know to contact their GP if there is a problem
Patients discharged on low molecular weight heparin ensure that :
• Patient understands the correct use duration of thrombo- prophylaxis Patient is instructed to read the patient information leaflet supplied with a subcutaneous injection • The patient is unable to self-administer the subcutaneous injection district nursing or GP practice administration must be organised by the ward before discharge

• Patients going home with subcutaneous injections are provided with a sharps bin, verbal information safe management and disposal is provided • Inform the patient that it is illegal to dispose syringes, needles and shop bins in the household waste. The patient must contact the local council to collect and dispose of used syringes, needles and shops bins

The responsible doctor/nurse practitioner must ensure the following is included in the discharge TTO and discharge summary
• The GP must be notified to ensure appropriate arrangements are in place before discharge i.e. district nurses • mechanical thromboprophylaxis: size of the anti-embolism stockings • pharmacological thromboprophylaxis : indication, dose, frequency, route and duration • ensure the patient is prescribed uninterrupted anticoagulant therapy until the patient can be reviewed by the GP (usually 14 days) • if a finite period thromboprophylaxis is required and is clinically appropriate to do so, then prescribe the entire quantity of LMWH be supplied • Note that it may not be safe to discharge some patients with two weeks or more supply of LMWH. In such cases, dialogue with the GP is required for early GP follow-up • the GP is informed in a timely manner • all relevant results are recorded

4.0 Purpose

The purpose of the policy is to ensure the NICE guidance and the NHS Resolution standards are met across the Trust, thus reducing the incidence of harm and hospital acquired VTE.

5.0 Duties within the organisation

The Trust Board has a legal responsibility for Trust policies and for ensuring that they are carried out effectively.

Trust Board sub-committees have the responsibility for adopting policies and protocols.

Directorate Directors and Heads of Service are responsible for ensuring that policy is embedded across their Directorates / Services.

Managers and Team Leaders will be responsible for:

- implementation of the policy within their clinical area
- overseeing audits and any required service improvements
- overseeing the outputs of the safety thermometer

5.1 Responsibility of staff

The VTE Risk Assessment Tool (Appendix 6) must be completed on the electronic prescribing system for all patients being admitted to hospital within 24 hours of admission

The risk assessment comprises of 5 relevant steps.

Steps 1 can be completed by a registered nurse, ANP or medical practitioner.

Steps 2, 3, 4 and 5 can only be completed by an ANP, medical practitioner or non-medical prescriber (with relevant competencies).

5.2 Medical and ANP staff will be specifically responsible for :

- Prescribing required prophylaxis on the basis of the assessment
- Checking of platelets 5 days after initiation of LMWH and action of results as required
- The reassessment of risk of VTE at 24 hours, 72 hours and when a patient's condition changes and at ward round
- The reassessment of the risk of VTE when the patient is discharged from hospital. The requirement for on-going prophylaxis must be recorded within the discharge documentation
- Updating the patient's electronic patient record.

5.3 Nursing teams will be specifically responsible for :

5.3.1 Assessing the patient's mobility on admission. This will include their usual baseline and current status

5.3.2 Ensuring all patients are kept well-hydrated

5.3.3 Encouraging all patients, where appropriate, to mobilise

5.3.4 Informing medical staff of any change in the patient's condition which may impact on their risk of developing VTE and also if they exhibit symptoms of VTE - for example calf pain, swelling, shortness of breath or chest pain

5.3.5 Explaining the importance of prevention and providing access to a patient information leaflet "Preventing blood clots when you are in hospital and at home – A patients guide". (Appendix 17)

5.3.6 Liaising with community services for follow up at point of discharge and completing discharge documentation

5.3.7 Completing SCD paperwork where indicated for stroke patients

5.3.8 Updating the patient's electronic patient record.

6.0 Procedure if VTE is suspected

Even when appropriate risk assessments have been undertaken and suitable prophylaxis prescribed and administered, some patients may go on to develop a VTE. If this is suspected, initiate monitoring of observations in accordance with the use of NEWS 2 process and common symptoms of VTE development (see below)

Warning signs (common symptoms of VTE development)	
DVT	**PE**
DVT mainly affects the large veins in the lower leg and thigh, almost always on one side of the body at a time. The clot can block blood flow and cause:	PE, or pulmonary embolism, can be fatal and occurs when the DVT breaks free from a vein wall and blocks some or all of the blood supply to the lungs, causing
Leg pain or tenderness of the thigh or calf	Unexplained shortness of breath
Leg swelling (oedema)	Rapid breathing

Skin that feels warm to the touch	Chest pain anywhere under the rib cage (may be worse with deep breathing)
	Fast heart rate
	Light headedness or passing out

Immediate advice should be sought from the responsible clinician with referral to acute hospital facilities if appropriate.

Refer to Appendix 19 for the Two Level DVT Wells Score (table 1) and for the Two Level PE Wells Score (table 2). These are clinical prediction rules for estimating the probability of DVT and PE.

Hospital acquired Thrombosis is to be considered as a potentially avoidable harm and needs to be reported as an incident and investigated to consider learning.

7.0 Education and Training

VTE training is once only via e-Learning recorded on uLearn.

Staff must complete the pre-learning questionnaire, the modules and the post- learning assessment. The assessment score should be 90% or above on completion of the course. If below this score the training will need to be repeated until 90% pass is achieved.

A completed certificate of achievement must be given to the line manager for inclusion in the personal files. A copy must be kept by the individual completing the course for their personal portfolio.

Compliance of training will be monitored by OLM with quarterly flash reports.

8.0 Monitoring Compliance and Effectiveness

Ref	Minimum Requirements	Evidence for Self-assessment	Process for Monitoring	Responsible Individual / Group	Frequency of monitoring
	95% of adult inpatients have a documented VTE risk assessment within 24 hours of admission to hospital	Section 2.1	Annual audit	CEG	Annually
	95% if found to be at risk of VTE, the patient received appropriate prophylaxis	Section 2.1	Annual audit	CEG	Annually

9.0 Links to Standards

This policy document links to 'Venous Thromboembolism' and to CQC Outcome 1: Respecting and involving people who use services, CQC Outcome 2: Consent to care and treatment, CQC Outcome 4: Care and welfare of people who use services and CQC outcome 21: Records.

TARGET/STANDARDS	KEY PERFORMANCE INDICATOR
CQC Fundamental Standards Consent You (or anybody legally acting on your behalf) must give your consent before any care or treatment is given to you.	Consent to be included in the VTE audit tool
CQC Fundamental Standards Safety You must not be given unsafe care or treatment or be put at risk of harm that could be avoided. Providers must assess the risks to your health and safety during any care or treatment and make sure their staff have the qualifications, competence, skills and experience to keep you safe.	Included as part of the VTE audit tool

10.0 References

1. National Institute for Health and Clinical Excellence 'Venous thromboembolism: reducing the risk.' *NICE clinical guideline 92* 2010, updated 2015.

2. National Institute for Health and Clinical Excellence 'Venous thromboembolism: reducing the risk for patients in hospital.' *NICE clinical guideline 92 January* 2010, updated June 2015.

3. Venous thromboembolic diseases: diagnosis, management and thrombophilia testing. NICE guideline [NG158] Published date: 26 March 2020. https://www.nice.org.uk/guidance/ng158

4. National Institute for Health and Clinical Excellence 'Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism. NICE guideline (NG89), March 2018, updated August 2019.

5. Guidelines for Pharmacological and Mechanical Thromboprophylaxis for venous thromboembolism. University Hospitals of Leicester NHS Trust, v3 February 2016, review August 2022.

6. Linkin, L.A., Dans, A.L., Moores, L.K, Bona, R., Davidson, B.L., Schulman, S., Crowther, M. & American College of Chest, P (2012). Treatment and prevention of heparin-induced thrombocytopenia : antithrombotic therapy and prevention of thrombosis, 9th edition; American College of chest physicians evidence-based clinical practice guidelines, Chest, 141, e495S-e530S

7. Watson, H., Davidson, S., Keeling D. 2012, Guidelines on the diagnosis and management of heparin induced thrombocytopenia, 2nd edition. British Journal

of Haematology, 159, 528 – 540

Appendix No	Name
Appendix 1	Training requirements
Appendix 2	The NHS constitution
Appendix 3	Stakeholders and consultation
Appendix 4	Self assessment
Appendix 5	Due regard screening

Appendix 6	VTE Risk Assessment Tool
Appendix 7	Hip Fracture decision making tool
Appendix 8	Elective Hip and Knee replacement decision making
Appendix 9	Lower Limb Immobilisation
Appendix 10	Stroke decision making tool
Appendix 11	Palliative Care decision making tool
Appendix 12	Medical Patients decision making tool
Appendix 13	Sequential Compression Devices
Appendix 14	Psychiatric Illness
Appendix 15	Monitoring of platelets
Appendix 16	Drug monitoring Guidelines for LPT
Appendix 17	UHL Body weight dosing
Appendix 18	Patient Information Leaflet Preventing blood clots when you are in hospital and at home - A patient's guide

Appendix 19	Two - Level DVT Wells score (table 1) Two – Level PE wells score (table 2)
Appendix 20	Data Privacy Impact Screening Assessment

Appendix 1 Training Requirements

Training Required	**YES**	NO
Training topic:	VTE	
Type of training: (see study leave policy)	☐ Mandatory (must be on mandatory training register) ✓Role specific ☐ Personal development	
Division(s) to which the training is applicable:	✓ Adult Mental Health & Learning Disability Services ✓Community Health Services ☐ Enabling Services ☐ Families Young People Children ☐ Hosted Services	
Staff groups who require the training:	*Please specify…* All Qualified Nursing Staff	
Regularity of Update requirement:	Once only	
Who is responsible for delivery of this training?	Ulearn module	
Have resources been identified?	Ulearn module	
Has a training plan been agreed?	Ulearn module	

Where will completion of this training be recorded?	✓ ULearn ☐ Other (please specify)
How is this training going to be monitored?	Compliance of training will be monitored by OLM with quarterly flash reports

Appendix 2 The NHS Constitution

The NHS will provide a universal service for all based on clinical need, not ability to pay.

The NHS will provide a comprehensive range of services

Shape its services around the needs and preferences of individual patients, their families and their carers	✓
Respond to different needs of different sectors of the population	✓
Work continuously to improve quality services and to minimise errors	✓
Support and value its staff	✓
Work together with others to ensure a seamless service for patients	✓
Help keep people healthy and work to reduce health inequalities	✓
Respect the confidentiality of individual patients and provide open access to information about services, treatment and performance	✓

Appendix 3 Stakeholders and Consultation

Key individuals involved in developing the original document

Name	Designation
Caroline Barclay	Consultant Nurse Advanced Practice
Richard Wong	Consultant Geriatrician UHL
Sudip Ghosh	Clinical Director for Specialist Services & Research
Rachel Marsh	Consultant Stroke Physician

Key individuals involved in developing the revised document

Name	Designation
Caroline Barclay	Consultant Nurse CHS
Jonathan Dexter	Consultant Nurse Advanced Practice
Prof Sudip Ghosh	Clinical Director for Specialist Services & Research
Dr David Eveson	Consultant Stroke Physician

Circulated to the following individuals for comments

Name	Designation
Joanne Charles	Divisional Lead Pharmacist
Tracey Yole	Deputy Head of Nursing CHS – Community
Sarah Latham	Deputy Head of Nursing CHS – Community Hospitals
Zayad Saumtally	Deputy Head of Nursing MHSOP
Caroline Barclay	Consultant Nurse
Jude Smith	Head of Nursing CHS
Dr Noel O'Kelly	Associate Medical Director CHS
Dr Matthew Noble	Consultant Psychiatrist MHSOP
Dr Katy Hinchcliffe	Consultant Psychiatrist MHSOP
Sarah Clements	Hospital Matron – CHS
Emily Jarvis	Matron – MHSOP
Nikki Beacher	Head of Service
Michelle Churchard	Head of Nursing AMH/LD Services
Jackie Moore	Senior Physical Health Nurse - AMH
Samy Vinaylingum	Advanced Nurse Practitioner
Martine Pritchard	Advanced Nurse Practitioner
Heather Darlow	Governance Lead CHS
Andrew Moonesinghe	Pharmacy Lead. LPT
Sue Arnold	Lead Nurse, Patient Safety, LPT
Tracy Ward	Head of Patient Safety, LPT

Appendix 4

Self-Assessment Sheet: Venous Thromboembolism criteria as a minimum, the *approved* documentation must include a description of the:

Criteria: Organisations providing acute and community services and non-NHS providers must have an approved documented process for the prevention and management of venous thromboembolism	Self Assessment Compliant	Comment/evidence See epma
Your documented process must include:		
a) how patients are assessed for their risk of developing venous thromboembolism (VTE), including timescales	Compliant	Risk assessment form to be completed within 24 hours of admission
b) prophylactic treatment regime for high risk patients	Compliant	Guidance provided on risk assessment form and flow charts
c) procedure to be followed if VTE is suspected	Compliant	Patients may be treated locally or transferred to acute for diagnostics and further treatment subject to the outcome of the ANP / medical practitioners assessment
d) management of the patient once a positive diagnosis has been made	Compliant	Patients with confirmed VTE can be treated within community hospital following diagnostics.
e) how the organisation trains staff, in line with the training needs analysis	Compliant	Training link embedded in policy document.
f) how the organisation monitors compliance with all of the above.	Compliant	Safety Thermometer in CHS Division and bi-annual audit. Training recorded in personal files.

Appendix 5 **Due Regard Screening Template**

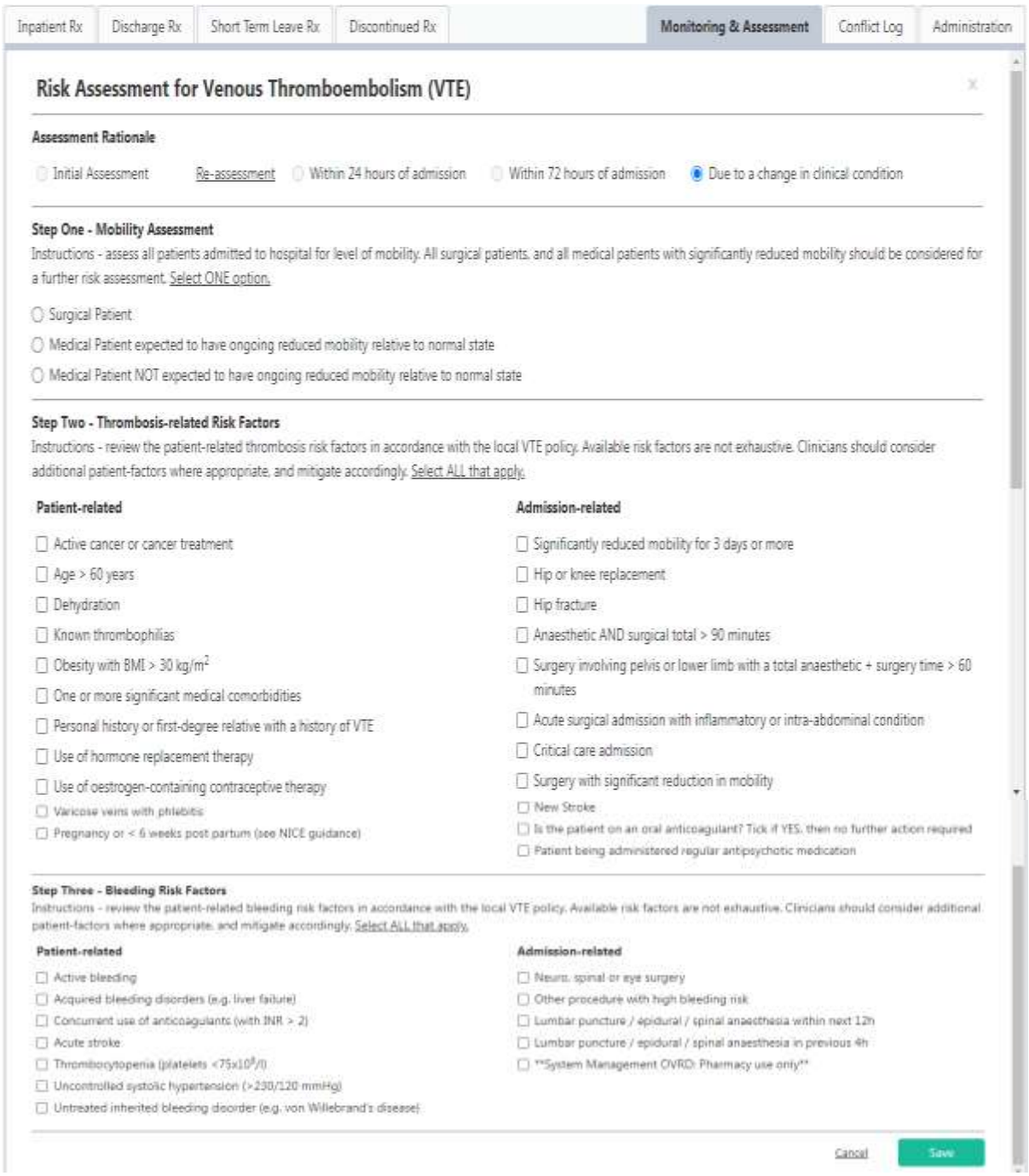
Section 1	
Name of activity/proposal	VTE Policy
Date Screening commenced	June 2020
Directorate / Service carrying out the assessment	Consultant Nurse on behalf of LPT
Name and role of person undertaking this Due Regard (Equality Analysis)	Jonathan Dexter
Give an overview of the aims, objectives and purpose of the proposal:	
AIMS: **To have a policy for the assessment and prevention of venous thrombo-embolism**	
OBJECTIVES: **To have a policy for the assessment and prevention of venous thrombo-embolism**	

Section 2	
Protected Characteristic	**If the proposal/s have a positive or negative impact please give brief details**
Age	No impact,
Disability	No impact,
Gender reassignment	No impact,
Marriage & Civil Partnership	No impact,
Pregnancy & Maternity	No impact,
Race	No impact,
Religion and Belief	No impact,
Sex	No impact,
Sexual Orientation	No impact,
Other equality groups?	No impact,

Section 3			
Does this activity propose major changes in terms of scale or significance for LPT? For example, is there a clear indication that, although the proposal is minor it is likely to have a major affect for people from an equality group/s? Please tick appropriate box below.			
		No	
High risk: Complete a full EIA starting click here to proceed to Part B		Low risk: Go to Section 4.	**x**

Section 4			
If this proposal is low risk please give evidence or justification for how you reached this decision:			
The assessment process and use of bed rails is to be applied to all adults who may use / use bed rails.			
Signed by reviewer/assessor	J Dexter	**Date**	12.06.2020
Sign off that this proposal is low risk and does not require a full Equality Analysis			
Head of Service Signed		**Date**	

Appendix 6



Inpatient Rx | Discharge Rx | Short Term Leave Rx | Discontinued Rx | **Monitoring & Assessment** | Conflict Log | Administration

Risk Assessment for Venous Thromboembolism (VTE)

Assessment Rationale

○ Initial Assessment Re-assessment ○ Within 24 hours of admission ○ Within 72 hours of admission ◉ Due to a change in clinical condition

Step One - Mobility Assessment

Instructions - assess all patients admitted to hospital for level of mobility. All surgical patients, and all medical patients with significantly reduced mobility should be considered for a further risk assessment. Select ONE option.

○ Surgical Patient

○ Medical Patient expected to have ongoing reduced mobility relative to normal state

○ Medical Patient NOT expected to have ongoing reduced mobility relative to normal state

Step Two - Thrombosis-related Risk Factors

Instructions - review the patient-related thrombosis risk factors in accordance with the local VTE policy. Available risk factors are not exhaustive. Clinicians should consider additional patient-factors where appropriate, and mitigate accordingly. Select ALL that apply.

Patient-related

☐ Active cancer or cancer treatment
☐ Age > 60 years
☐ Dehydration
☐ Known thrombophilias
☐ Obesity with BMI > 30 kg/m^2
☐ One or more significant medical comorbidities
☐ Personal history or first-degree relative with a history of VTE
☐ Use of hormone replacement therapy
☐ Use of oestrogen-containing contraceptive therapy
☐ Varicose veins with phlebitis
☐ Pregnancy or < 6 weeks post partum (see NICE guidance)

Admission-related

☐ Significantly reduced mobility for 3 days or more
☐ Hip or knee replacement
☐ Hip fracture
☐ Anaesthetic AND surgical total > 90 minutes
☐ Surgery involving pelvis or lower limb with a total anaesthetic + surgery time > 60 minutes
☐ Acute surgical admission with inflammatory or intra-abdominal condition
☐ Critical care admission
☐ Surgery with significant reduction in mobility
☐ New Stroke
☐ Is the patient on an oral anticoagulant? Tick if YES, then no further action required
☐ Patient being administered regular antipsychotic medication

Step Three - Bleeding Risk Factors

Instructions - review the patient-related bleeding risk factors in accordance with the local VTE policy. Available risk factors are not exhaustive. Clinicians should consider additional patient-factors where appropriate, and mitigate accordingly. Select ALL that apply.

Patient-related

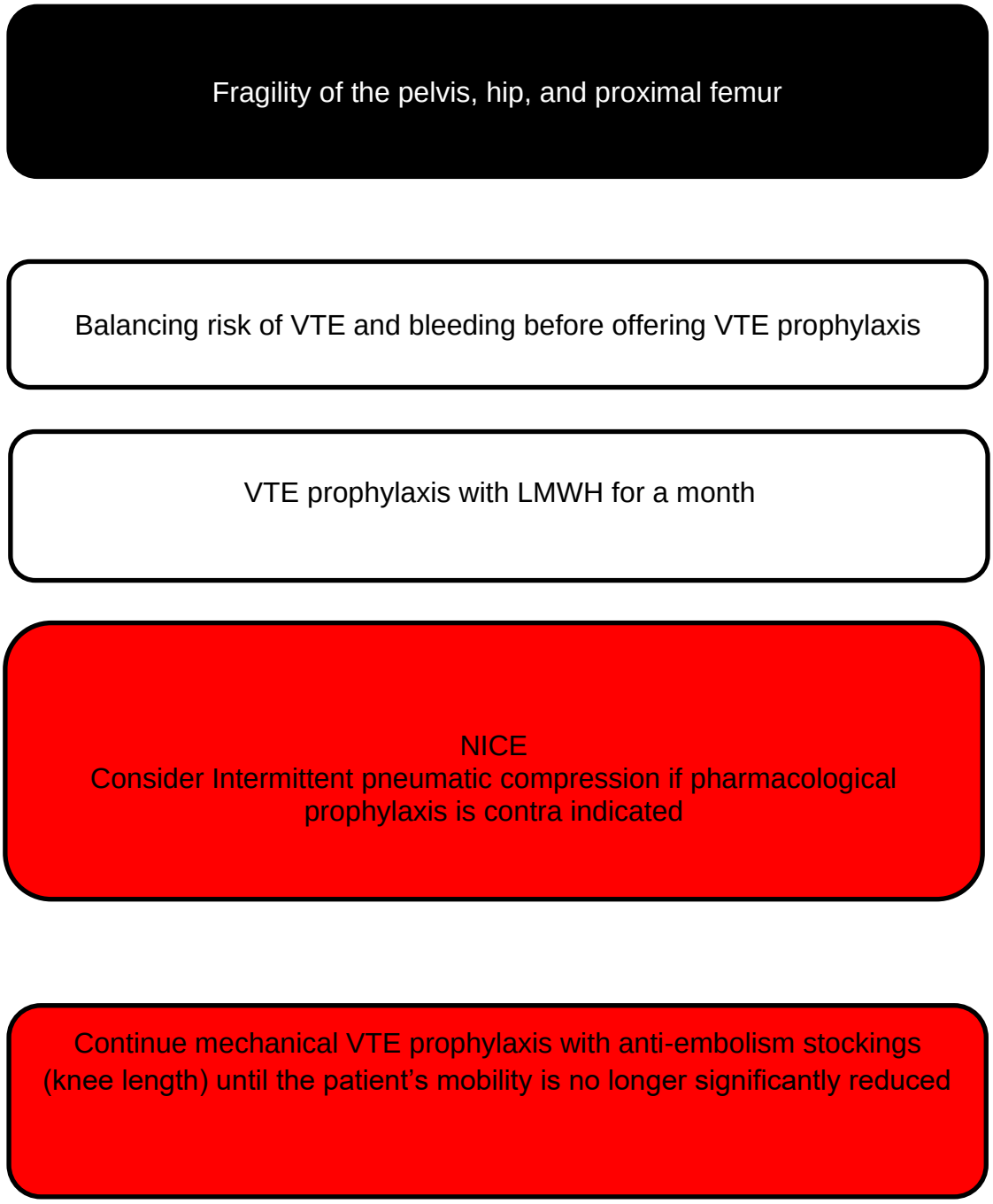
☐ Active bleeding
☐ Acquired bleeding disorders (e.g. liver failure)
☐ Concurrent use of anticoagulants (with INR > 2)
☐ Acute stroke
☐ Thrombocytopenia (platelets <75x10^9/l)
☐ Uncontrolled systolic hypertension (>230/120 mmHg)
☐ Untreated inherited bleeding disorder (e.g. von Willebrand's disease)

Admission-related

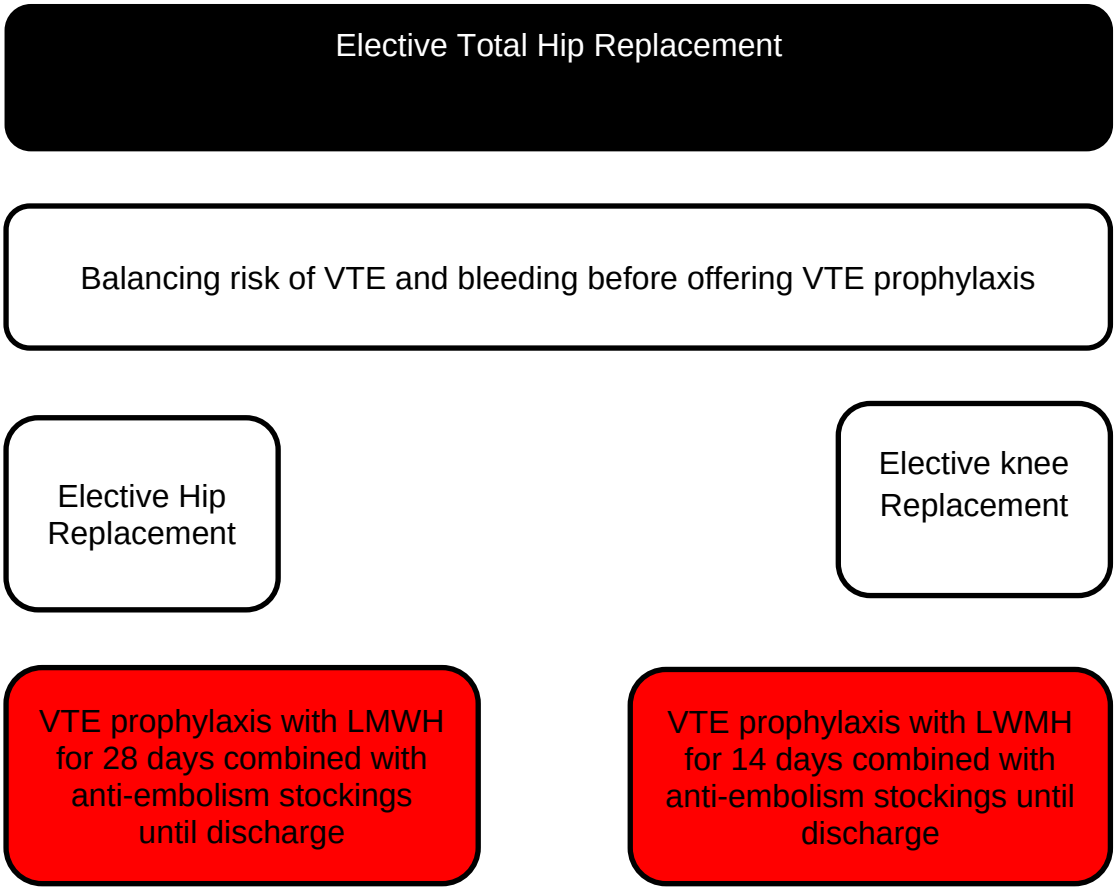
☐ Neuro, spinal or eye surgery
☐ Other procedure with high bleeding risk
☐ Lumbar puncture / epidural / spinal anaesthesia within next 12h
☐ Lumbar puncture / epidural / spinal anaesthesia in previous 4h
☐ **System Management OVRD: Pharmacy use only**

Cancel Save

Appendix 7


Fragility of the pelvis, hip, and proximal femur
Balancing risk of VTE and bleeding before offering VTE prophylaxis
VTE prophylaxis with LMWH for a month
NICE
Consider Intermittent pneumatic compression if pharmacological prophylaxis is contra indicated
Continue mechanical VTE prophylaxis with anti-embolism stockings (knee length) until the patient's mobility is no longer significantly reduced

Appendix 8


Elective Total Hip Replacement
Balancing risk of VTE and bleeding before offering VTE prophylaxis
Elective Hip Replacement
Elective knee Replacement
VTE prophylaxis with LMWH for 28 days combined with anti-embolism stockings until discharge
VTE prophylaxis with LWMH for 14 days combined with anti-embolism stockings until discharge

Appendix 9

Lower limb immobilisation

Any clinical decision taken to manage the affected limb in a way that would prevent normal weight – bearing status or use of that limb, or both

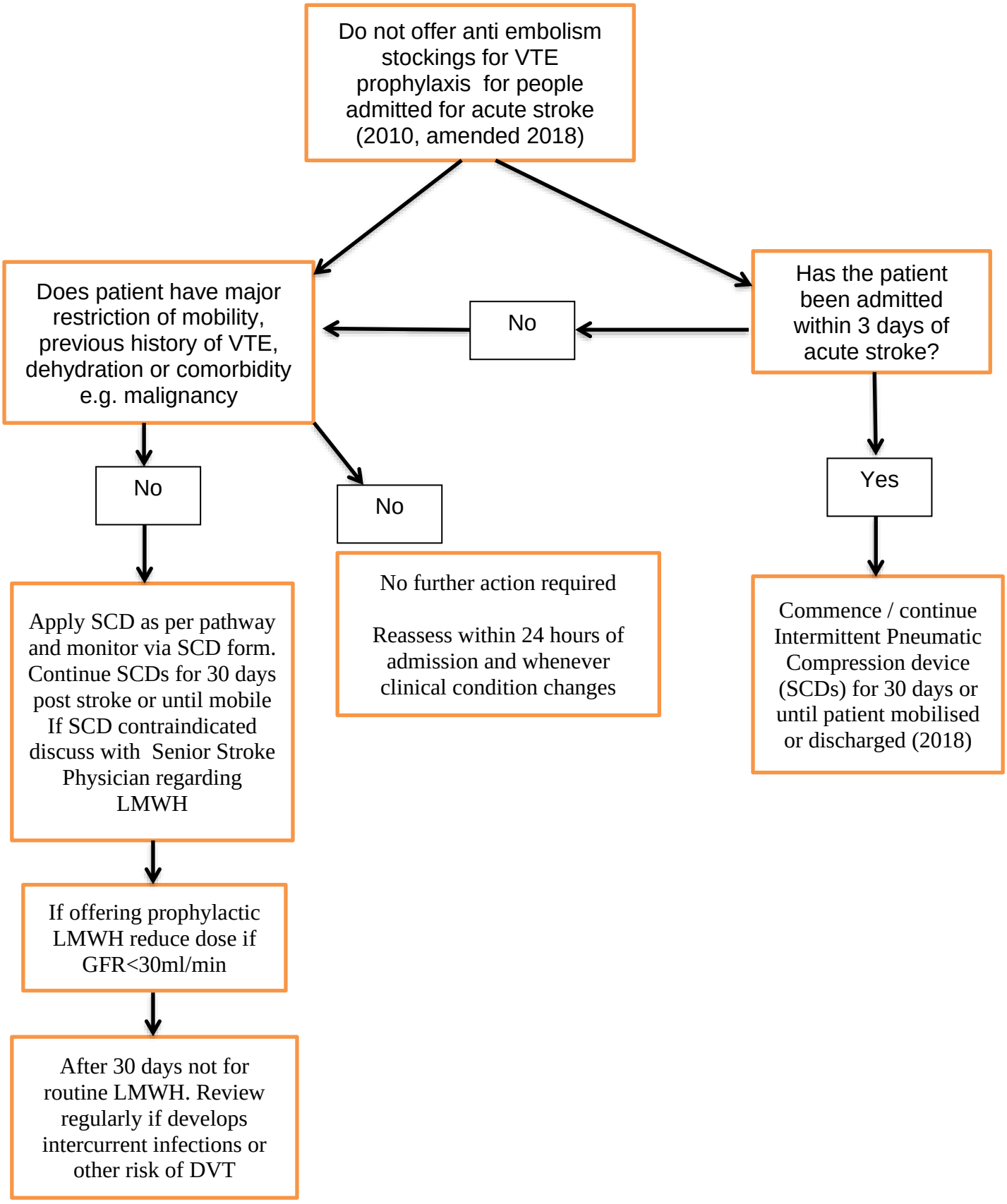
Balance the risk of VTE and bleeding before offering VTE prophylaxis

Continue pharmacological VTE prophylaxis with LMWH for people with lower limb immobilisation

Consider stopping prophylaxis if lower limb immobilisation continues beyond 42 days

Appendix 10

Stroke



Appendix 11

Palliative care

If the patient has potentially reversible acute pathology

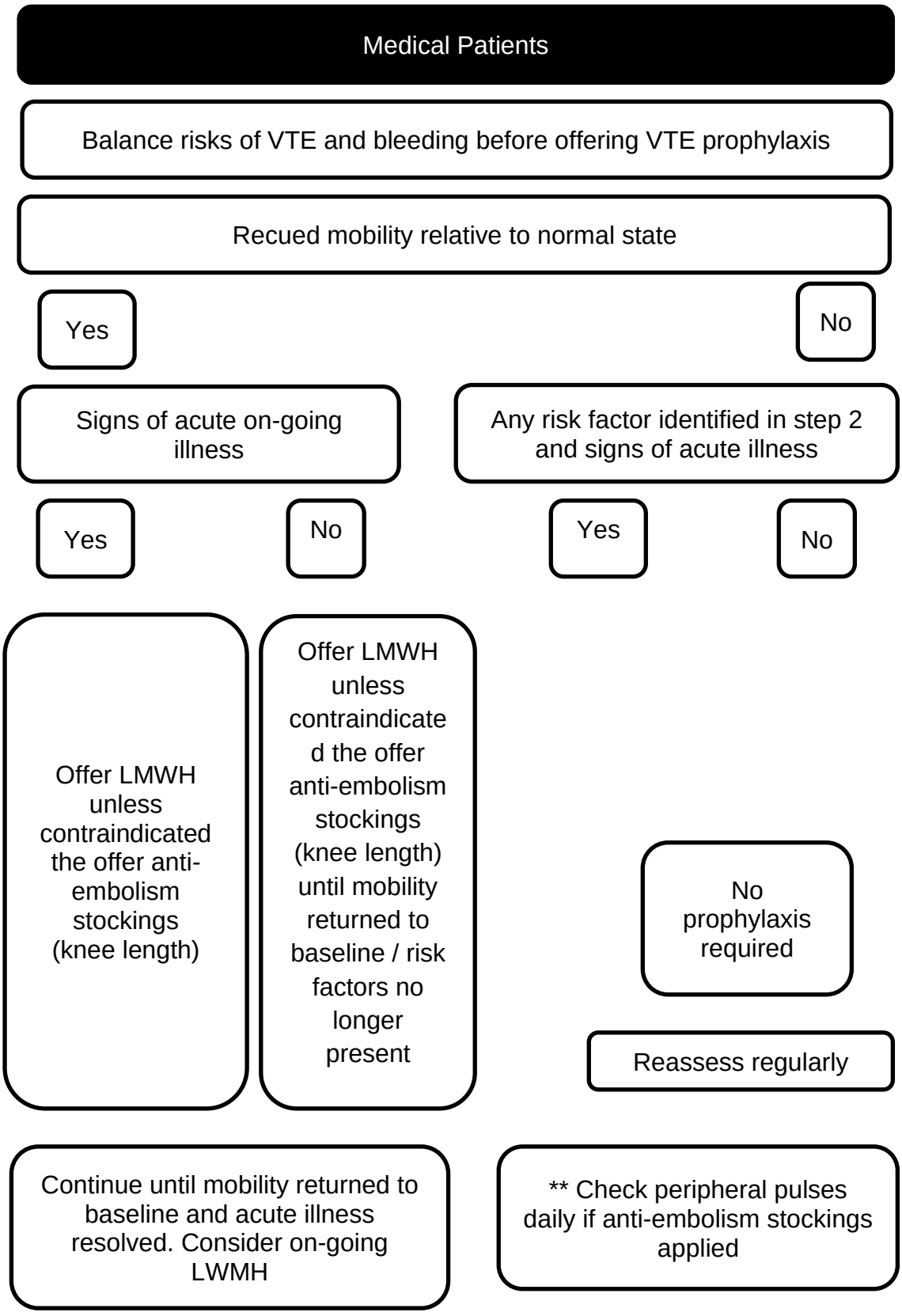
Last days of life

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 view of the person and their family members or carers (as appropriate)

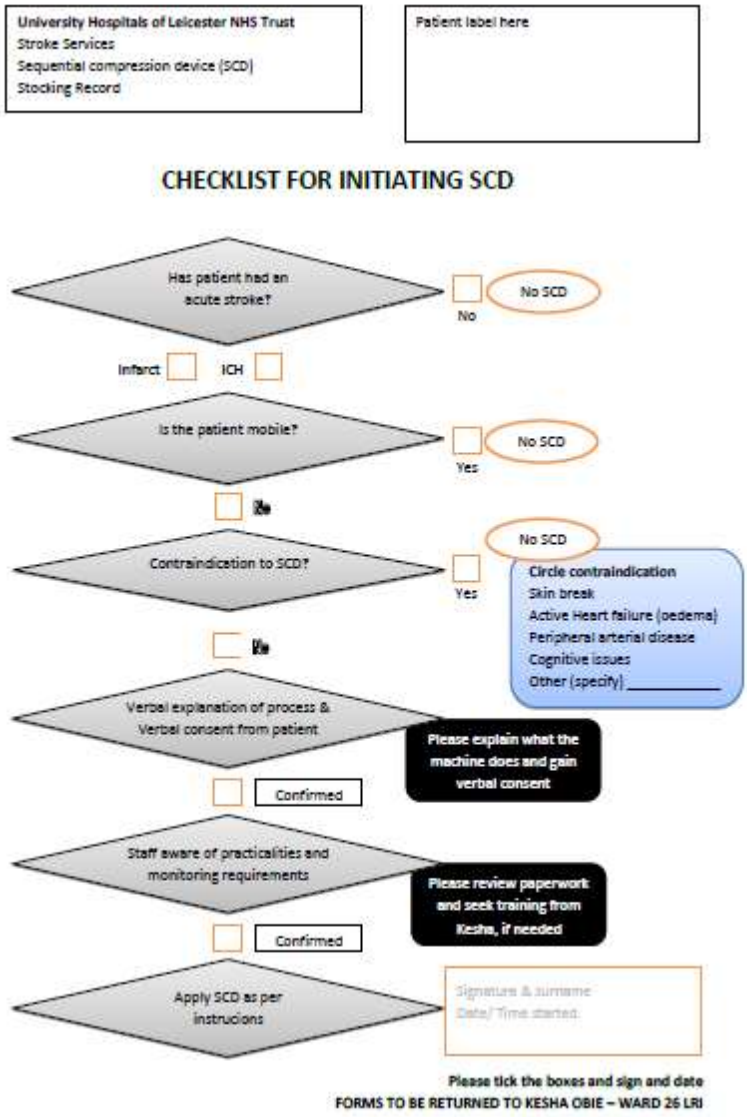
Do not offer VTE prophylaxis in the last days of life

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.

Appendix 12


Medical Patients
Balance risks of VTE and bleeding before offering VTE prophylaxis
Recued mobility relative to normal state
Yes
No
Signs of acute on-going illness
Any risk factor identified in step 2 and signs of acute illness
Yes
No
Yes
No
Offer LMWH unless contraindicated the offer anti-embolism stockings (knee length)
Offer LMWH unless contraindicate d the offer anti-embolism stockings (knee length) until mobility returned to baseline / risk factors no longer present
No prophylaxis required
Reassess regularly
Continue until mobility returned to baseline and acute illness resolved. Consider on-going LWMH
** Check peripheral pulses daily if anti-embolism stockings applied

Appendix 13


University Hospitals of Leicester NHS Trust
Stroke Services
Sequential compression device (SCD)
Stocking Record
Patient label here
CHECKLIST FOR INITIATING SCD
Has patient had an acute stroke?
No
No SCD
Infarct
ICH
Is the patient mobile?
Yes
No SCD
Contraindication to SCD?
Yes
No SCD
Circle contraindication
Skin break
Active Heart failure (oedema)
Peripheral arterial disease
Cognitive issues
Other (specify) _____
Verbal explanation of process & Verbal consent from patient
Please explain what the machine does and gain verbal consent
Confirmed
Staff aware of practicalities and monitoring requirements
Please review paperwork and seek training from Kesha, if needed
Confirmed
Apply SCD as per instructions
Signature & surname
Date/ Time started
Please tick the boxes and sign and date
FORMS TO BE RETURNED TO KESHA OBIE – WARD 26 LRI

KEY STEPS FOR SCD USE

1. **Measure** the widest part of the thigh before opening a pack.
2. Choose the **right size**
   (Extra small, small, medium, large)
3. **Keep plugged in** whilst in use
4. **Avoid disconnecting** unless needed (e.g. for W+D, toileting, therapy)
5. **IF** disconnecting
   a. turn machine off and
   b. pull connector off grasping the white connector ***(DO NOT tug at the tubing)***
6. The machines are for use in **Ward 25 and 26 only**.
7. If patient is transferred for rehab, **send the stocking** with the patient **NOT the machine**.

University Hospitals of Leicester NHS Trust
Stroke Services
Sequential compression device (SCD)
Stocking Record

Patient label here

Date	Morning	Afternoon	Evening	Night	

1. Tick √ to confirm patient has SCD on, and the machine is functioning
2. Please add comments if SCD not on, or with regards to ease of use
3. Please record any interruption of therapy overleaf

Sequential Compression Stocking Record of Use [Version 1] - A Mistri, K Obie
Feedback to Kesha Obie (kesha.s.obie@uhl-tr.nhs.uk) and/or Dr Mistri (amit.mistri@uhl-tr.nhs.uk)
FORMS TO BE RETURNED TO KESHA OBIE – WARD 26 LRI

University Hospitals of Leicester NHS Trust
Stroke Services
Sequential compression device (SCD)

Stocking Record

Date	Stop time	Restart time	Reason for stopping	Comments

Appendix 14

Patients suffering from Mental Health Illness

Assess all patients to identify their risk of VTE and bleeding.
Balance risks of VTE and bleeding before offering VTE prophylaxis.

Consider pharmacological VTE prophylaxis is with LMWH

Reassess all people admitted for risk of VTE and bleeding at the point of each consultant review or if the patients clinical condition changes

Continue VTE prophylaxis until the person is no longer at increased risk of VTE

Appendix 15 **Platelet Monitoring / Monitoring**

Recommendations for platelet monitoring (based on ACCP 2012 and BSCH 2012 recommendations)	
Secondary care should use this table to identify those patients requiring HIT monitoring. This is required on discharge, the secondary care team should ensure that the GP is notified accordingly	
Patient type	Platelet monitoring for HIT
LWMH only (prophylactic or therapeutic) and where : 1. the risk of HIT is more than 1% (see incidence table below) **AND** 2. patient does not fall into the other heparin categories	• Baseline platelet count - Subsequent monitoring not required I.e. HIT monitoring is not required all medical, obstetric and surgical patients (including orthopaedic). **Exception** cardiothoracic surgery (with incidence of HIT is 1-3%) and cancer patients undergoing surgery (where the risk of HIT is unclear but likely to be at least 1%)
LWMH and HIT incidence > 1% (see incidence table below)	• Baseline platelet count • Once between days 4-7 post starting LWMH • Once again between days 10-14 whilst on LMWH
UFH (unfractionated heparin) during the current in-patient episode and now on **LMWH**	• Baseline platelet count • Once between days 4-7 post starting UFH • Once again between days 10-14 whilst on LMWH
ANY type of heparin within the previous 100 days	• Baseline platelet count • Check at 24 hours • Thereafter as per other categories as appropriate

Incidence of HIT

Incidence of HIT according to patient population and type of heparin exposure (ACCP 2012)			
Patient population (min of 4 days exposure)	Incidence of HIT	Patient population (min of 4 days exposure)	Incidence of HIT
Post – operative patients		**Medical**	
Heparin prophylactic dose	1 -5%	Cancer	1%
Heparin therapeutic dose	1 - 5%	Heparin prophylactic or therapeutic dose	0.1 – 1%
Heparin flushes	0.1 – 1%	LMWH prophylactic or	0.6%

		therapeutic dose	
LMWH prophylactic or therapeutic dose	0.1 – 1%	ITU Patients	0.4%
Cardiac surgery patients	1 – 3%	Heparin flushes	<0.1%
		Obstetric patients	<0.1%

Appendix 16

Guide to Blood Parameter Monitoring for Drugs

Drug	Baseline	During therapy	Drug levels
Acetylcholinesterase inhibitors and Memantine	FBC (inc. iron, folate, B12, ESR), U+Es, LFTs, TFTs, serum glucose/HbA1c as per Leicestershire Dementia Medication Prescribing Guidelines[1] Galantamine is contraindicated in severe hepatic impairment (Child-Pugh score greater than 9) and in patients with creatinine clearance less		N/A
Agomelatine	LFTs Do not initiate if transaminases exceed 3 X ULN	LFTs three weeks, six weeks (end of acute phase), twelve weeks and twenty four weeks (end of maintenance phase) and thereafter when clinically indicated. Treatment should be discontinued if transaminases exceed three times ULN or if patients have symptoms or signs or suspected liver injury. When increasing the dosage, LFTs should again be performed at the same frequency as when initiating treatment.	N/A
Antipsychotics	LFTs FBC U+Es Blood lipids: total cholesterol, triglycerides, HDL, TC:HDL, LDL and non - HDL HbA1c Random blood glucose Please note that in the first instance a full lipid profile can now be measured on a non –fasting blood sample	LFTs (annually) FBC (annually) U+Es (annually) Blood lipids: total cholesterol, triglycerides, HDL, TC:HDL, LDL and non -HDL (at 3 months then annually thereafter) Random Blood glucose (only at 3 months) HbA1c (at 3 months then annually thereafter) Prolactin only indicated if symptoms of hyperprolactinaemia Clozapine as per ZTAS requirements CPK only if NMS suspected	N/A

Carbamazepine	FBC including platelets, reticulocytes & serum iron. Patients of Han Chinese &Thai origin should be	FBC including platelets, reticulocytes & serum iron 6 monthly Serum sodium levels should be measured after approximately two weeks and then at monthly	Routine monitoring not necessary. May be useful for assessing compliance, toxicity, or when concomitant medication is prescribed that may interact (CYP3A4)
Drug	Baseline	During therapy	Drug levels
	screened for HLA-B*1502 U+Es (including serum sodium) LFTS	intervals for the first three months during therapy, or according to clinical need. LFTs 6 monthly Some LFTs in patients receiving carbamazepine may be found to be abnormal, particularly gamma glutamyl transferase: probably due to hepatic enzyme induction. Enzyme induction may also produce modest elevations in alkaline phosphatase. These enhancements of hepatic metabolising capacity are not an indication for the withdrawal of carbamazepine. If the patient is on thyroid replacement therapy then thyroid function monitoring is necessary to adjust the dosage of thyroid replacement therapy. After 6 months on therapy: Calcium, inorganic phosphate, alkaline phosphatase, vitamin D. If replacement therapy of calcium & vitamin D is given then repeat these tests after 6 months	Sample immediately before first dose of the day (“trough”) 2 weeks after initiation or dose change BNF: 4-12mg/L (20-50 µmol/L) for optimum response relates to anticonvulsant activity. Maudsley: in affective illness levels of at least 7mg/ml may be required – although this is not a consistent finding; levels above 12 mg/ml are associated with a highr side effect burden

Lithium	U+Es (including Creatinine) Thyroid function (patients should be euthyroid before initiation of lithium). Calcium levels (corrected) Lithium register – please register/check patient is on the register 0116 256 3470 (Dr Madira) based at Glenfield Hospital. :	U+Es (including Creatinine) every 6 months (more often if there is evidence of deterioration, if the patient has other risk factors e.g. ACEi initiated, diuretics, renal impairment) TFT every 6 months (more often if there is evidence of impaired thyroid function or an increase in mood symptoms that might be related to impaired thyroid function Li levels: 4-7 days after initiation then every week until dosage has remained constant for 4 weeks and then every 3 months once stable (more often if other risk factors present e.g. pre-existing renal impairment, significant intercurrent disease, conditions leading to salt/water depletion (e.g. nausea, vomiting)) This should be repeated if brand/dose changed 6 monthly Calcium levels (corrected) NB More frequent testing should be undertaken if	Sample (“trough”): once daily dosing: take sample 12 hours post dose; twice daily dosing: 12 hours post last dose but before next dose. Target levels: **0.4-1.0 mmol/L lower end of the range for maintenance therapy and elderly 0.8-1.0mmol/L for acute episodes of mania and for patients who have previously relapsed or have sub-syndromal symptoms.** Important to determine optimum range for each patient dependent on clinical response and levels. Ideally aim for minimum effective dose. Toxic effects may be expected at about 1.5mmol/L and above - monitor patient for signs of toxicity e.g. ataxia, nystagmus – in such cases treatment should be stopped and prompt lithium levels should be done. Level in excess of 2.0mmol/L requires urgent

Drug	Baseline	During therapy	Drug levels
		there is evidence of clinical deterioration, abnormal results, a change in sodium intake, or symptoms suggesting abnormal renal or thyroid function (e.g. unexplained fatigue) or other risk factors (e.g. patient starting interacting medication). If urea and creatinine levels become elevated, initiate closer monitoring of dose and blood levels and assess the rate of renal function deterioration.	treatment as per Emergency Treatment of Poisoning policies.
Madopar (levodopa/ benserazide)		3 monthly. LFT, FBC with differential WBC, U&E and cardiovascular function Patients with diabetes should undergo frequent blood sugar tests and the dosage of antidiabetic agents should be adjusted to blood sugar levels.	
Mianserin	FBC	FBC every 4 weeks during first three months of treatment. Clinical monitoring should continue subsequently and treatment should be stopped and an FBC obtained if fever sore throat, stomatitis or other signs of infection develop.	N/A
Modafinil	U+Es LFTs		
Phenytoin	FBC LFTs U+E Patients of Han Chinese &Thai origin should be screened for HLA-B*1502	FBC every 3 months Serum folate concentrations every 6 months After 6 months on therapy: Calcium, inorganic phosphate, alkaline phosphatase, vitamin D. If replacement therapy of calcium and vitamin D is given then repeat these tests after 6 months.	Serum level determinations may be necessary for optimal dosage adjustments Clinically effective level is usually 10-20mg/l (40-80 micromoles/l) although some cases tonic-clonic seizures may be controlled with lower serum levels Seven to ten days required to achieve steady state serum levels. Sample immediately before next dose (“trough”) Changes in dosage should not be carried out at intervals shorter than seven to ten days

Valproate (Sodium valproate and Semi-sodium valproate)	LFTs (inc. platelet count, prothrombin time, bleeding time, coagulation tests) FBC (including platelets)	LFTs (inc. prothrombin time) at baseline and every 3 months in 1st 6 months especially in those who seem most at risk then annually thereafter. Hepatic impairment/active liver disease: avoid if possible (increased liver enzymes are common, particularly at the beginning of therapy (they are also transient) but	No clear correlation between daily dose, plasma concentration of valproate and therapeutic effect. Use in addition to clinical monitoring if poor efficacy or ADR suspected

Drug	Baseline	During therapy	Drug levels
		patients should be reassessed and liver function monitored until return to normal; FBC annually FBC (including platelet count), bleeding time, coagulation tests before surgery or if spontaneous bruising or bleeding. If N+V or acute abdominal pain - medical evaluation including serum amylase After 6 months on therapy: Calcium, inorganic phosphate, alkaline phosphatase, vitamin D. If replacement therapy of calcium & vitamin D is given then repeat these tests after 6 months Patients experiencing nausea, vomiting or acute abdominal pain should have a prompt medical evaluation (including measurement of serum amylase).	Sample at least 8 hours after the most recent dose (“trough”) 3 days after initiation or dose change Mania - generally agreed that plasma levels of 45 to 50µg/ml needed for efficacy
ACE inhibitors and ARBs	U+Es, eGFR	U+Es: One week after initiation then after each dose titration. Once target dose reached then repeat after one month. If stable then every 6 months or every 3 months if intercurrent illness, concomitant NSAIDs or potassium sparing diuretics. Stop ACEI/ARB therapy if serum potassium rises above 6.0mmol/L and other drugs known to promote hyperkalaemia have been discontinued If eGFR falls by 25% or more or plasma creatinine increases by 30% or more from baseline, stop the ACEI/ARB or reduce to a previously tolerated dose once potential alternative causes of renal impairment have been ruled out. If the changes indicating a decrease in renal function are less than described do	N/A

Drug	Baseline	During therapy	Drug levels
		not modify the dose but repeat the test in 1-2 weeks	
Amiodarone	Thyroid function (including free T3, free T4, TRH and ultrasensitive TSH) U+E in particular potassium LFTs (including transaminases) INR if on warfarin Digoxin level if on Digoxin	Thyroid function (including free T3, free T4, TRH and ultrasensitive TSH) at 6 monthly intervals, and for several months after discontinuation or where thyroid dysfunction suspected Serum TSH should also be measured when thyroid dysfunction is suspected. LFTs (including transaminases) every 6 months. At the beginning of therapy, elevation of serum transaminases which can be in isolation (1.5 to 3 times normal) may occur. These may return to normal with dose reduction, or sometimes spontaneously If on Warfarin then more frequent (3 monthly) monitoring of prothrombin time both during treatment and after discontinuation of Amiodarone treatment	N/A
Anticoagulants: Factor XA inhibitors: Apixaban, Dabigatran, Edoxaban, Rivaroxaban	Renal function (NB Renal function should be based on Cockcroft Gault calculation. Baseline clotting screen FBC LFTs Please refer to LMSG/UHL guidance for more specific information e.g. dosing	U+Es annually or more frequently as clinical circumstances dictate when it is suspected that the renal function could decline or deteriorate. (NB Renal function should be based on Cockcroft Gault calculation). LFTs annually Please refer to LMSG/UHL guidance for more specific information e.g. dosing	

Azathioprine	FBC (including platelets) U+Es, creatinine LFTs Thiopurine methyltransferase (TPMT)	FBC (including platelets) weekly for the first 8 weeks or more frequently if high dosage is used or if severe renal and/or hepatic disorder is present then monthly thereafter If dose and results are stable for 6 months then monitor FBC, LFTs and CRP every 3 months. U+Es every 6 months	N/A

Drug	Baseline	During therapy	Drug levels
		After a dose increase repeat LFTs and FBC after two weeks then monthly If dose and test results stable for 6 months consider reducing blood testing frequency to 3 monthly NB Local disease specific guidance e.g. rheumatology, dermatology may differ	
Calcium OR Vitamin D OR Calcium/ Vitamin D combinations	U+Es Bone profile' (serum calcium, alkaline phosphatase, albumin and inorganic phosphate)	If on treatment for 6 months or more then serum and urinary calcium and serum phosphate and U+Es should be monitored every 6 months In renal impairment calcium and phosphate every 3 months If there is a history of renal stones then 3 monthly urinary calcium excretion If patient has sarcoidosis then urine and serum calcium 6 monthly If there are any concerns over toxicity whilst on maintenance therapy of vitamin D it is recommended that the 'routine bone profile' (serum calcium, alkaline phosphatase, albumin and inorganic phosphate) is measured	N/A
Calcium resonium		U+Es: Potassium levels – stop if potassium falls below 5mmol/L Serum calcium levels should be estimated at weekly intervals to detect the early development of hypercalcaemia Dose of resin adjusted to levels at which hypercalcaemia and hypokalaemia are prevented	
Carbimazole	TFTs (free T4, T3 and TSH). LFT WBC	Dose should be titrated against 3 monthly TFTs until patient is euthyroid.	N/A

Drug	Baseline	During therapy	Drug levels
	NB if the person completing the blood request form states that the patient is on carbimazole then a free T4 will automatically be measured even if the relevant box isn't ticked on the form itself	WCC if patient reports sore throat, bruising or bleeding, mouth ulcers, fever or malaise or clinical signs of infection. LFTs if onset of any signs or symptoms of liver disorder. Stop treatment if abnormal signs of liver function. FBC 3 monthly if patient is confused or has poor memory If on anticoagulant treatment then additional monitoring of PT/INR should be considered especially prior to surgical procedures.	
Ciclosporin (systemic use)	LFT U+E (in particular potassium) - BNF recommends two measurements before starting treatment Serum magnesium Uric acid Blood lipids	Every 3 months: LFT, U+E (especially serum potassium, especially in renal dysfunction), serum magnesium. Measure blood lipids after the first month of treatment. Serum creatinine every 2 weeks for first 3 months then every month (NB guidance for rheumatology or transplant may differ)	Monitor whole blood ciclosporin concentration (trough level dependent on indication—consult local treatment protocol for details).
Cinacalcet	Serum calcium	In secondary hyperparathyroidism measure parathyroid hormone 1 to 4 weeks after initiation or dose adjustment then monthly for secondary hyperparathyroidism and every 2-3 months for primary hyperparathyroidism and parathyroid carcinoma. If patient has moderate to severe liver impairment then monitor LFTs monthly (if increasing dose then this may need to be done more frequently)	N/A
Dalteparin – prophylactic dose	Platelets Renal function/U+Es (including GFR)	Platelets 5 days after initiation and 3 monthly thereafter 3 monthly measurements of potassium if at risk of	N/A

Drug	Baseline	During therapy	Drug levels
	Anti-Xa Levels only those with renal failure, those who are very thin or morbidly obese, pregnant or at increased risk for bleeding or re-thrombosis	hyperkalaemia (diabetes mellitus, chronic renal failure, pre-existing metabolic acidosis, a raised plasma potassium or taking potassium sparing drugs)	
Dalteparin- treatment dose	Weight - this will determine dose. (NB use CURRENT weight) Platelets Renal function/U+Es (including GFR)Anti-Xa Levels only those with renal failure, those who are very thin or morbidly obese, pregnant or at increased risk for bleeding or rethrombosis	 Platelets 5 days after initiation and 3 monthly thereafter 3 monthly measurements of potassium if at risk of hyperkalaemia (diabetes mellitus, chronic renal failure, pre-existing metabolic acidosis, a raised plasma potassium or taking potassium sparing drugs)	N/A
Degarelix		The therapeutic effect of degarelix should be monitored by clinical parameters and prostate specific antigen (PSA) serum levels If patient has known or suspected hepatic disease 6 monthly LFTS	
Diuretics	Renal function/U+Es	Renal function/U+Es 6 monthly	
Digoxin	Renal function/ U+Es (in particular potassium) Magnesium Calcium	Take into account clinical state, potassium levels and thyroid function when assessing toxicity Appropriate electrolyte monitoring should be carried out in patients predisposed to hypokalaemia (e.g. on loop diuretics), and in patients with renal dysfunction and in elderly people	Individualise (early stages of treatment), detecting poor patient compliance, determine levels after a change in dose, for diagnosing toxicity. Routine monitoring during maintenance treatment not necessary unless Change in clinical state, concomitant use of drugs that may impact on toxicity, recognition of situations predisposing to toxicity, notably renal insufficiency. Sample for digoxin levels should be taken at 6 hours or more after the last dose. Steady state reached 7-10 days after change in dose (may take 21 days if renal

Drug	Baseline	During therapy	Drug levels
			insufficiency) No rigid guideline for range of serum concentrations but most patients will benefit, with little risk of toxic symptoms and signs developing, with digoxin concentrations from 0.8 nanogram/ml, ng/ml (1.02 nanomol/litre, nm/L) to 2.0ng/ml (2.56nm/L). Above this range toxic symptoms and signs become more frequent and levels above 3ng/ml (3.84nm/L) are quite likely to be toxic.
Eplerenone	U+Es including creatinine, potassium and eGFR Patients with a serum potassium of > 5.0 mmol/L should not be started on Eplerenone Patients with severe renal insufficiency (eGFR < 30 mL/min/1.73 m^2)	Potassium at 7 days, one month then 6 monthly thereafter or after dose adjustment. After initiation, the dose should be adjusted based on the serum potassium level	

Fibrates	TFTs LFTs U+Es Gemfibrozil: Lipids Blood counts	CK if muscle symptoms are experienced (muscle symptoms: pain, tenderness or weakness) LFTs every 3 months for the first year Additional requirements for specific drugs: Gemfibrozil Renal function before increase in dose 3 monthly serum lipids. Sometimes a paradoxical increase of (total and LDL) cholesterol can occur in patients with hypertriglyceridemia 3 monthly blood counts during first 12 months If concomitant hypoglycaemic agents then 3 monthly blood glucose If concomitant oral anticoagulant then careful monitoring of anticoagulant dosing	N/A

Drug	Baseline	During therapy	Drug levels
		Fenofibrate: U+Es (including creatinine) every 3 months Treatment should be interrupted in case of an increase in creatinine levels > 50% of (upper limit of normal)	
Hydroxycarbamide	FBC U+Es Uric acid LFTs UHL does all the initial monitoring FBC including Hb, leucocytes, platelets every two weeks for the first two months then every two months thereafter	Prescription should not be issued unless the patient has had an FBC within the last 3 months. (Contact the GP to check to that the patient is under a haematologist and what the patient specific recommendations were made regarding frequency of FBC checks as this may be different and should be followed. If there is any difficulty in obtaining this information from the GP then please contact the Oncology Pharmacy at UHL – O116 258 6649) U+Es, uric acid, LFTs 3 monthly	N/A
Hydroxychloroquine	U+Es LFTs FBC	Serum digoxin levels if patient is on concomitant digoxin FBC annually/periodic	Estimation of plasma Hydroxychloroquine levels should be undertaken in patients with severely compromised renal or hepatic function and dosage adjusted accordingly
Iron/ferrous salts/sodium feredetate	FBC including Hb NB if MCV raised then also check folate and B12 levels If MCV normal reticulocyte count If both MCV and MCH are low then measure Ferritin.	2-4 weeks after initiation FBC including Hb then if there is a response FBC every 3 months if this reveals no anaemia then Ferritin level if Ferritin is normal then stop supplements. NB it takes three months after Hb has been restored to correct Ferritin levels.	

Drug	Baseline	During therapy	Drug levels
Leflunomide	LFTs (in particular Alanine aminotransferase (ALT) (or serum glutamopyruvate transferase)) FBC including a differential white blood cell count and a platelet count,	LFTs (in particular Alanine aminotransferase (ALT) (or serum glutamopyruvate transferase)) For ALT (SGPT) elevations between 2- and 3-fold the upper limit of normal, dose reduction from 20 mg to 10 mg may be considered and monitoring must be performed weekly. If ALT (SGPT) elevations of more than 2-fold the upper limit of normal persist or if ALT elevations of more than 3-fold the upper limit of normal are present, leflunomide must be discontinued and wash-out procedures initiated as indicated in the manufacturers guidelines. FBC including a differential white blood cell count and a platelet count All of these tests must be carried out every two weeks during the first six months of treatment, and every 8 weeks thereafter It is recommended that monitoring of liver enzymes be maintained after discontinuation of leflunomide treatment, until liver enzyme levels have normalised	
Levothyroxine	TFTs	Individualise dose on the basis of clinical response and biochemical tests, and should be monitored every 6 months to avoid both under treatment and overtreatment Monitor 3months after any dose change to ensure required effect has been achieved.	N/A
Mercaptopurine	LFTs U+Es Thiopurine methyl transferase (TPMT) FBC	LFTs weekly during treatment. More frequent monitoring may be advisable in those with pre-existing liver disease or receiving other potentially hepatotoxic therapy. Blood and urine uric acid levels weekly. If on oral anticoagulants ensure INR monitored monthly	If on phenytoin or other antiepileptic then serum levels of these drugs monthly

Drug	Baseline	During therapy	Drug levels
		Full blood counts must be taken daily during remission induction and careful monitoring of haematological parameters should be conducted during maintenance therapy. The leucocyte and platelet counts continue to fall after treatment is stopped, so at the first sign of an abnormally large fall in the counts, treatment should be interrupted immediately	
Metformin	U+Es (including creatinine clearance)	U+Es (including creatinine clearance):- • at least annually in patients with normal renal function • at least 3 times a year in patients with creatinine clearance at the lower limit of normal and in elderly subjects or any other additional risk factors for renal impairment or if deterioration suspected	N/A
Mesalazine (oral)	Renal function including serum creatinine	Renal function (inc. serum creatinine/ U+E) every 3 months for the first year, then 6 monthly thereafter. More frequently if renal impairment exists	N/A

Methotrexate (oral)	U+Es (including creatinine) FBC LFTs	U+Es (including Creatinine), FBC, LFTs weekly until therapy stabilised then every 2-3 months. Renal function/U+Es, FBC, LFTs monitoring should continue after stopping methotrexate If hepatic function abnormalities develop, methotrexate dosing should be suspended for at least two weeks If reinstituting methotrexate after rest period then monitor as from baseline (Local guidance from rheumatology, dermatology or	The disappearance of methotrexate from plasma should be monitored, if possible - this is recommended in particular when high, or very high doses are administered in order to permit calculation of an adequate dose of leucovorin (folinic acid) rescue.

Drug	Baseline	During therapy	Drug levels
		gastroenterology may differ)	
Nitrofurantoin	U+E including eGFR NB Do not use if eGFR is < 45ml/min However, a short course (3-7 days) may be used with caution in **certain patients** with eGFR 30-44 ml/min.	On long-term therapy, monitor liver function and monitor	N/A
NSAIDs/ COX-2 Inhibitors	U+Es Avoid if eGFR less than 30 mL/minute/1.73 m2.	U+Es every 3 months in renal impairment in renal impairment monitor renal function; sodium and water retention may occur and renal function may deteriorate, possibly leading to renal failure.	N/A
Pioglitazone	LFTs - should not be initiated in patients with increased baseline liver enzyme levels (ALT> 2.5 x ULN) or with any other evidence of liver disease.	LFTs periodically based on clinical judgement If ALT levels are increased to 3 x ULN during pioglitazone therapy, liver enzyme levels should be reassessed as soon as possible. If ALT levels remain> 3 x the ULN, therapy should be discontinued. If any patient develops symptoms suggesting hepatic dysfunction, which may include unexplained nausea, vomiting, abdominal pain, fatigue, anorexia and/or dark urine, liver enzymes should be checked	N/A
Propylthiouracil	BNF: monitor for hepatotoxicity	In the event of a sore throat, fever, mouth ulcers, bruising, malaise, non-specific illness or other symptoms of infection immediately. A full blood count should be performed and treatment should be discontinued immediately if there is clinical or laboratory evidence of neutropenia. The prothrombin time should be monitored during therapy, especially prior to surgery, because propylthiouracil may cause thrombocytopenia BNF: monitor for hepatotoxicity	
Proton pump inhibitors	Consider magnesium level if prolonged	Consider magnesium level if prolonged treatment	

Drug	Baseline	During therapy	Drug levels
	treatment is anticipated especially when used with other drugs that cause hypomagnesaemia	especially when used with other drugs that cause hypomagnesaemia	
Rivaroxaban	U&Es, FBC, LFTs and coagulation screen Dosing will be dictated by creatinine clearance value Use the Cockcroft-Gault equation to estimate creatinine clearance. eGFR should NOT be used to estimate the dose as it will result in some patients being under or over dosed.	Renal function tests, FBC at least once a year. U+E, LFT and bleeding risk at 12 months or more frequently if clinically indicated. Use the Cockcroft-Gault equation to estimate creatinine clearance. eGFR should NOT be used to estimate the dose as it will result in some patients being under or over dosed.	
Spironolactone	U+Es (especially K^+ and Ca^{2+})	U+Es (especially K^+) – discontinue if hyperkalaemia occurs Severe heart failure – monitor U+Es (inc K^+ and Cr) one week after initiation and after any dose increase, monthly for first 3 months then every 3 months for 1 year then every 6 months Fluid and electrolyte status should be monitored every 6 months particularly in the elderly, in those with significant renal and hepatic impairment, and in patients receiving digoxin and drugs with pro-arrhythmic effects	N/A

Statins	Full lipid profile: (non-fasting) Total Cholesterol, triglycerides, HDL, non-HDL. HbA1c TSH (NB Hypothyroidism should be managed adequately before starting a statin) U+Es LFTs	Lipid profile Total cholesterol, HDL and non-HDL at 3 months if high intensity statin treatment* HbA1c at 3 months if at high risk of diabetes LFTs -within 3 months of starting and at 12 months -Or if patient has signs or symptoms suggestive of hepatotoxicity -Those with serum transaminases that are raised, but less than 3 times the upper limit of the reference range, should **not** be routinely excluded from statin therapy. Those with serum transaminases >3xULN	N/A

Drug	Baseline	During therapy	Drug levels
	CK levels if persistent, generalised, unexplained muscle pain (whether associated or not with previous lipid-regulating drugs); if the concentration is >5xULN, a repeat measurement should be taken after 7 days. If the repeat concentration remains >5xULN statin treatment should not be started; if concentrations are still raised but <5xULN, the statin should be started at a lower dose. Do not start statin ALT or AST >3x ULN statin treatment at a lower dose. If eGFR < 30ml/min/1.73m2 check appropriateness of dosing of statin with a renal specialist. Rosuvastatin is contra-indicated if creatinine clearance < 30 ml/min. Maximum 40mg/day if < 60ml/min	should discontinue statin therapy CK if muscle symptoms (pain, tenderness or weakness) experienced If CK levels are significantly elevated at baseline (> 5 x ULN), levels should be re- measured within 5 to 7 days later to confirm the results. For patients titrated to 40mg of rosuvastatin An assessment of renal function should be considered during routine follow-up For patients titrated to simvastatin 80mg LFTs should be performed Prior to titration, 3 months, 6 months and then at one year *high intensity statin is defined as atorvastatin ≥ 20mg daily, rosuvastatin ≥ 10mg daily, or simvastatin 80mg daily	
Sulfasalazine	FBC (including differential white cell, platelet, red cell), LFTs U+E/Renal function (including urinalysis)	FBC (including differential white cell, platelet, red cell) LFT and assessment of renal function (including urinalysis) monthly for the first 3 months Renal function at 3 months then annually, more frequently in renal impairment. Thereafter, monitoring should be performed as clinically indicated NB local rheumatology guidance may differ	

Tacrolimus (oral therapy only)	Fasting blood glucose U&Es (particularly potassium) LFT U+E FBC, Blood clotting/coagulation values Plasma protein NB No specific guidance was identified relating	During initial post-transplant period, monitoring of the following parameters should be undertaken on a routine basis Fasting blood glucose U&Es (particularly potassium) LFT U+E FBC,	Blood levels: Whole blood trough levels should be monitored periodically during maintenance therapy. Levels should be checked when any medication with possible interactions is prescribed, the dose or formulation is changed, or when there is unexplained graft dysfunction Blood trough levels should be drawn

Drug	Baseline	During therapy	Drug levels
	to the monitoring of patients receiving systemic tacrolimus for eczema however, please check local guidance on LMSG	Blood clotting/coagulation values Plasma protein NB No specific guidance was identified relating to the monitoring of patients receiving systemic tacrolimus for eczema however, please check local guidance on LMSG	approximately 12 hours post-dosing, just prior to the next dose. Please consult SPC and local guidance for frequency of monitoring.
Testosterone injection	Serum testosterone levels before and during initiation FBC LFTs PSA	Testosterone serum levels monthly Testosterone measurements should be performed at the end of an injection interval Serum PSA: annually and twice yearly in elderly patients and at risk patients (those with clinical or familial factors) 3 monthly FBC, LFTs, lipid profile	N/A

Theophylline		Xanthines can potentiate hypokalaemia resulting from beta-2-agonist therapy steroids, diuretics and hypoxia. Particular caution is advised in severe asthma. It is recommended that serum potassium levels are monitored in such situations.	Each patient should be titrated to a suitable dosage regimen by clinical assessment. It may also be necessary to measure plasma theophylline levels However plasma level provides a more accurate assessment of the patients' dosage need compared to clinical assessment, especially as significant variations in the rate of drug elimination can occur between individuals Sample level measured 4-8 hours after dosing (“trough”) and at least three days after any dosage adjustment It is advisable to recheck the plasma level after dose adjustment and every 6-12 months It is not possible to ensure bioequivalence

Drug	Baseline	During therapy	Drug levels
			between different sustained release theophylline products. Once titrated to an effective dose, patients should not be changed from sustained release preparation to another sustained release xanthine preparation without re-titration and clinical assessment Refer to manufactures information regarding dose adjustment and drug levels
Warfarin	LFTs including Prothrombin time, Activated partial thromboplastin time Platelet count Results of these are rarely needed immediately and this should not delay treatment	It is essential that the INR be determined daily or on alternate days in early days of treatment, then at longer intervals (depending on response) then up to every 12 weeks. The main adverse effect of all oral anticoagulants is haemorrhage. Checking the INR and omitting doses when appropriate is essential; if the anticoagulant is stopped but not reversed, the INR should be measured 2–3 days later to ensure that it is falling. The cause of an elevated INR should be investigated. The BNF documents further recommendations of the British Society for Haematology are based on the result of the INR and whether there is major or minor bleeding; the recommendations apply to patients taking warfarin: Change in a patient's clinical condition, particularly associated with liver disease, intercurrent illness, clindamycin therapy or drug administration, necessitates more frequent testing	N/A

1. Good practice guide to prescribing anti-dementia medication. July 2015. Leicestershire Partnership NHS Trust.

Appendix 17

Weight (kg)	eGFR <30 (Dalteparin dose)	eGFR > 30 (Dalteparin dose)
<40 kg	Seek haematology advice	Seek haematology advice
40-49 kg	Seek haematology advice	2500 units once daily
50-150 kg	2500 units once daily	5000 units once daily
>150 kg	5000 units once	10,000 units once

Body Weight Dosing:

Dalteparin dosage adults, non-pregnant, non-orthopaedic patients deemed to be at risk of thrombosis (medical/surgical).

Reference : Guidelines for Pharmacological and Mechanical Thromboprophylaxis for venous thromboembolism. University Hospitals of Leicester NHS Trust, v3 February 2016, review August 2022.

Appendix 18

Preventing blood clots when you are in hospital and at home
A patient's guide

This leaflet explains how the risk of developing Deep Vein Thrombosis (DVT) and pulmonary embolism (PE) can be reduced.

What is DVT?

DVT is a common medical condition that occurs when a thrombus (blood clot) forms in a deep vein, usually in the leg or pelvis, leading to either partially or completely blocked circulation. A DVT may cause no symptoms at all, or cause swelling or discolouration of the leg and pain. A DVT, in some cases, can cause a serious problem known as pulmonary embolus (PE) in the lungs.

What is a PE?

If the clot or DVT in the leg breaks off and travels to the lungs, it will cause PE.
PE may result in breathing difficulties and may be fatal.
Signs of PE are:

- Shortening of breath
- Chest pain
- Coughing (with blood streaked mucus)
- Collapse

DVT and PE are known under the collective terms of venous thromboembolism (VTE).

Why can a blood clot form?

There are 2 factors that may trigger a clot to form:

- Changes or damage to the blood vessels – If there is pressure on a vein a clot can form. This may be due to being immobile, surgery or long distance travel.
- Problems with the blood – This may be inherited (you are born with the condition), caused by some drugs or conditions such as pregnancy.

If you are dehydrated the blood can become more 'sticky' which can increase the risk of the blood forming a clot.

Who is mostly at risk?

There are several factors that increase the chance of developing a VTE.
These include:

- Having had a previous DVT or PE
- Major surgery, particularly orthopaedic operations such as a joint replacement
- Major trauma or injury to the lower limb
- Aged over the age of 60 years, family history of DVT or PE
- Advanced cancer and chemotherapy treatment for cancer
- Faulty blood clotting i.e. thrombophilia
- Recent medical illness (such as heart attack or lung disease, kidney failure or disease, recent heart attack, inflammatory conditions such as inflammatory bowel disease)
- Smoking
- Being obese (very overweight)
- Pregnancy and recent delivery
- Paralysis or immobility of the legs including staying in bed for a long time
- Some types of HRT or contraceptive pill
- If you are immobile or less likely to move due to your current physical or mental health
- Certain types of medications that are important for your wellbeing may also have an effect on the 'stickiness of your blood which could make you more prone to clots'

The risk of a blood clot forming after an operation ranges from 10% - 40% depending on the type of operation. Orthopaedic surgery carries the highest risk.

Is travelling a risk?
Because being immobile increases the risk of developing blood clots, if you travel for more than 3 hours at one time in the month before or after your surgery your risk of forming a blood clot will be higher.

If you have had major joint replacement surgery the risk is present for up to 3 months, particularly if you have had a long haul flight for over 4 hours.

How is VTE prevented in hospital?
Not all VTE can be prevented but the risk of developing a clot can be significantly reduced.

Your risk will be assessed when you are admitted to hospital and reassessed at different intervals during your hospital stay.

If you are considered to be at risk of VTE a blood thinning medication may be prescribed. For some people this is an injection. This is called a subcutaneous injection and it uses a short needle to inject the drug under the skin of your abdomen. This type of medication is absorbed more slowly.

The injection is given once a day.
Alternatively, you may be given blood thinning tablets.

If you are unable to have the injections (because of a medical condition or the type of surgery you are having) you may be asked to wear compression stockings or use some other form of prevention.
Compression stockings (also known as 'TED's' or thrombo-embolic deterrent stockings) help maintain circulation and reduce the risk of blood clots forming in the veins of your legs.
They are available in several sizes and lengths. Your nurse will measure your legs and recommend the correct stockings for you.

What can I do to help myself?
Whilst the doctors can do something to reduce your risk, there are some very important and simple things that you can help to reduce your risk:

- Make sure that you get up and about as soon as possible
- Exercise your legs whilst in bed
- Make sure you drink plenty – water is particularly good for you
- Stop smoking
- Consider stopping contraceptive or hormone replacement therapy and talk to your doctor
- Lose weight

What happens when I go home?
You may need to wear compression stockings after you go home. Your nurse will show you how to put the stockings on and provide advice about washing and taking care of your stockings. Your nurse will tell you how long you need to wear the stockings for.
You may need to continue blood thinning treatment at home. Your nurse will teach you how to inject the blood thinning medication. You should use a different area of your abdomen, approximately 1 inch apart, for each injection.
The injection may cause bruising around the injection site, which is normal. If you notice any other bruising or bleeding, from your surgical site or elsewhere please contact the hospital immediately.
You will be given a supply of medication and a sharps bin for safe disposal of used syringes. Please return the sharps bin to your GP surgery for safe disposal.

If you develop any signs or symptoms of a clot when you are at home seek medical advice immediately

Appendix 19
Two level wells score tables
Table 1 – Deep Vein Thrombosis
Table 2 – Pulmonary Embolism

Table 1 Two-level DVT Wells score[a]

Clinical feature	*Points*
Active cancer (treatment ongoing, within 6 months, or palliative)	1
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1
Localised tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling at least 3 cm larger than asymptomatic side	1
Pitting oedema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Previously documented DVT	1
An alternative diagnosis is at least as likely as DVT	−2
Clinical probability simplified score	
DVT likely	**2 points or more**
DVT unlikely	**1 point or less**

[a] Adapted with permission from Wells PS et al. (2003) Evaluation of D-dimer in the diagnosis of suspected deep-vein thrombosis.

Pulmonary embolism (PE)

Table 2 Two-level PE Wells score[a]

Clinical feature	*Points*
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3
An alternative diagnosis is less likely than PE	3
Heart rate > 100 beats per minute	1.5
Immobilisation for more than 3 days or surgery in the previous 4 weeks	1.5
Previous DVT/PE	1.5
Haemoptysis	1
Malignancy (on treatment, treated in the last 6 months, or palliative)	1
Clinical probability simplified score	
PE likely	**More than 4 points**
PE unlikely	**4 points or less**

[a] Adapted with permission from Wells PS et al. (2000) Derivation of a simple clinical model to categorize patients' probability of pulmonary embolism: increasing the model's utility with the SimpliRED D-dimer. Thrombosis and Haemostasis 83: 416–20

Appendix 20

DATA PRIVACY IMPACT ASSESSMENT SCREENING

Data Privacy impact assessment (DPIAs) are a tool which can help organisations identify the most effective way to comply with their data protection obligations and meet Individual's expectations of privacy.
The following screening questions will help the Trust determine if there are any privacy issues associated with the implementation of the Policy. Answering 'yes' to any of these questions is an indication that a DPIA may be a useful exercise. An explanation for the answers will assist with the determination as to whether a full DPIA is required which will require senior management support, at this stage the Head of Data Privacy must be involved.

Name of Document:	**VTE Policy**	
Completed by:	**Jonathan Dexter**	
Job title	**Consultant Nurse**	**Date 07.07.2020**

Screening Questions	**Yes / No**	**Explanatory Note**
1. Will the process described in the document involve the collection of new information about individuals? This is information in excess of what is required to carry out the process described within the document.	**No**	
2. Will the process described in the document compel individuals to provide information about them? This is information in excess of what is required to carry out the process described within the document.	**No**	
3. Will information about individuals be disclosed to organisations or people who have not previously had routine access to the information as part of the process described in this document?	**No**	
4. Are you using information about individuals for a purpose it is not currently used for, or in a way it is not currently used?	**No**	
5. Does the process outlined in this document involve the use of new technology which might be perceived as being privacy intrusive? For example, the use of biometrics.	**No**	
6. Will the process outlined in this document result in decisions being made or action taken against individuals in ways which can have a significant impact on them?	**No**	
7. As part of the process outlined in this document, is the information about individuals of a kind particularly likely to raise privacy concerns or expectations? For examples, health records, criminal records or other information that people would consider to be particularly private.	**No**	
8. Will the process require you to contact individuals in ways which they may find intrusive?	**No**	

If the answer to any of these questions is 'Yes' please contact the Data Privacy Team via Lpt-dataprivacy@leicspart.secure.nhs.uk
In this case, ratification of a procedural document will not take place until review by the Head of Data Privacy.

Data Privacy approval name:	
Date of approval	