



# INVESTIGATION AND MANAGEMENT OF PULMONARY EMBOLISM

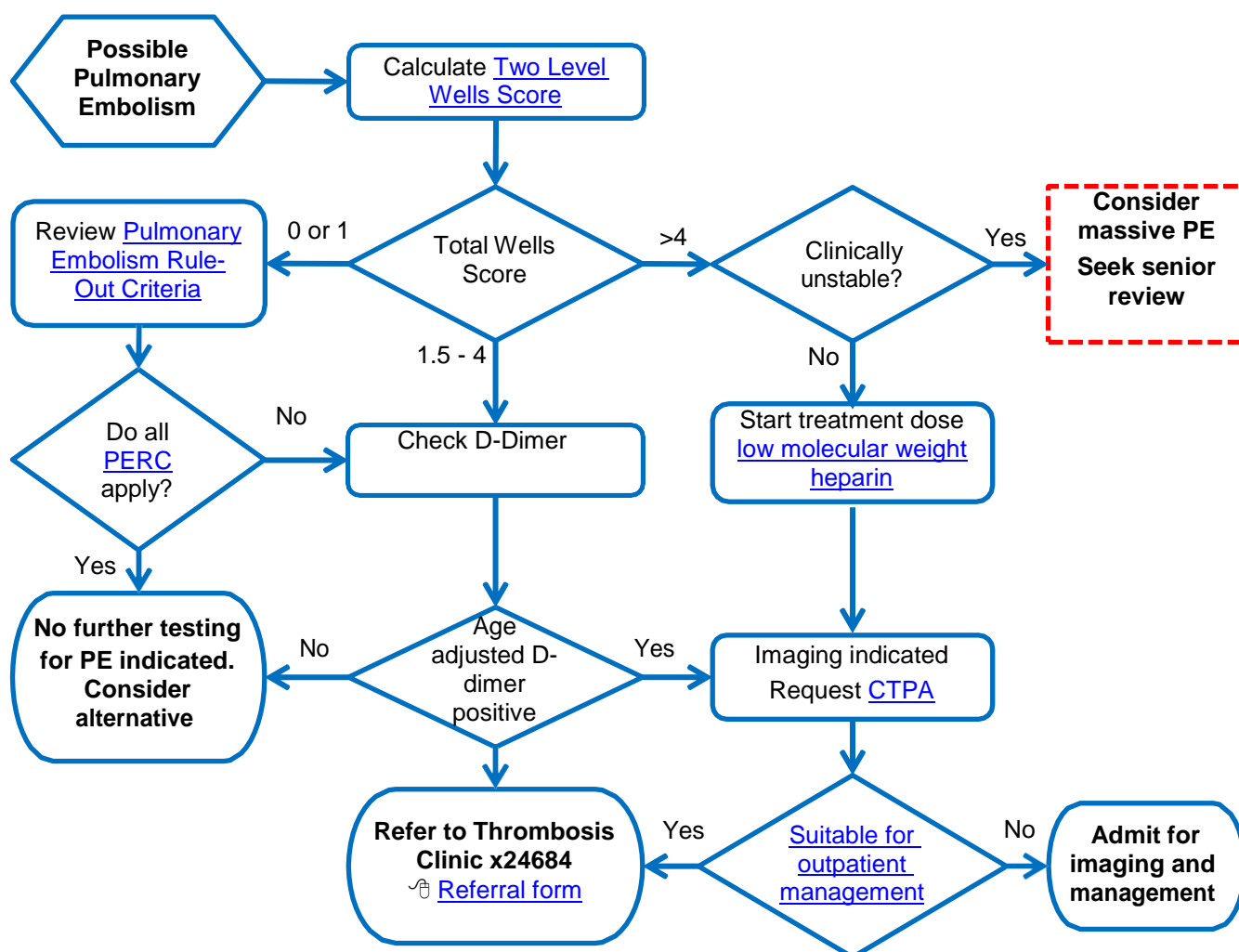
SETTING	Trust-wide
FOR STAFF	Medical and nursing staff
PATIENTS	Adult patients with suspected or confirmed pulmonary embolism Excludes pregnancy and puerperium (see <a href="http://www.avon.nhs.uk/dms/download.aspx?did=11244">http://www.avon.nhs.uk/dms/download.aspx?did=11244</a> )

This guideline consists of three sections: [Investigations for suspected PE](#); [immediate management of confirmed PE](#); [continuing management of confirmed PE](#).

Clinical judgement should always be used when deciding on management for individual patients.

## 1. Investigations for suspected PE

(Underlined text links to explanatory paragraphs below)



## Two Level Wells Score

Criterion	Score
Clinical signs of deep vein thrombosis (leg swelling or pain on palpation)	3
Pulmonary embolism is more likely than alternative diagnoses	3
Heart rate > 100 beats per minute	1.5
Immobilisation for more than 3 days or surgery in the previous 30 days	1.5
Previous deep vein thrombosis or pulmonary embolism	1.5
Haemoptysis	1
Malignancy (on treatment, treated within the last 6 months)	1

Interpretation of Two Level Wells Score:

Total score	Probability of PE	Interpretation
≤ 4.0	3%	PE unlikely (if score 0 or 1.0 see below for rule out criteria)
>4.0	28%	PE likely

## Pulmonary Embolism Rule Out Criteria (PERC)

If Wells score is 0 or 1.0 and all of the following apply the patient is at ultra-low risk of pulmonary embolism:

- Age < 50 year old
- Heart rate < 100 beats/min
- SpO<sub>2</sub> > 94%
- No unilateral leg swelling
- No haemoptysis
- No surgery or trauma within last 4 weeks
- No previous deep vein thrombosis or pulmonary embolism
- No current oral hormone use

No further investigations (including D-dimer) are indicated. Consider an alternative diagnosis to PE.

## Outpatient management not suitable if any of the following:

- Haemodynamic instability: HR >110, systolic BP <100mmHg, requirement for inotropes, critical care, thrombolysis or embolectomy
- Sats <94% or need for supplementary oxygen
- Active bleeding or risk of major bleeding (e.g. recent GI bleed or surgery, previous intracranial bleeding, uncontrolled hypertension)
- On anticoagulation at the time of the PE
- Severe pain (e.g. requiring opiates)
- Other medical co-morbidities requiring hospital admission
- Chronic kidney disease (CKD) stages 4 or 5 (eGFR<30ml/min) or severe liver disease
- Heparin induced thrombocytopenia (HIT) previously (if LMWH is to be used as the out-patient treatment)
- Social reasons which may include inability to return home, inadequate care at home, lack of telephone communication, concerns over compliance, etc.
- New or unexplained troponin > 14ng/l
- ECG showing right heart strain

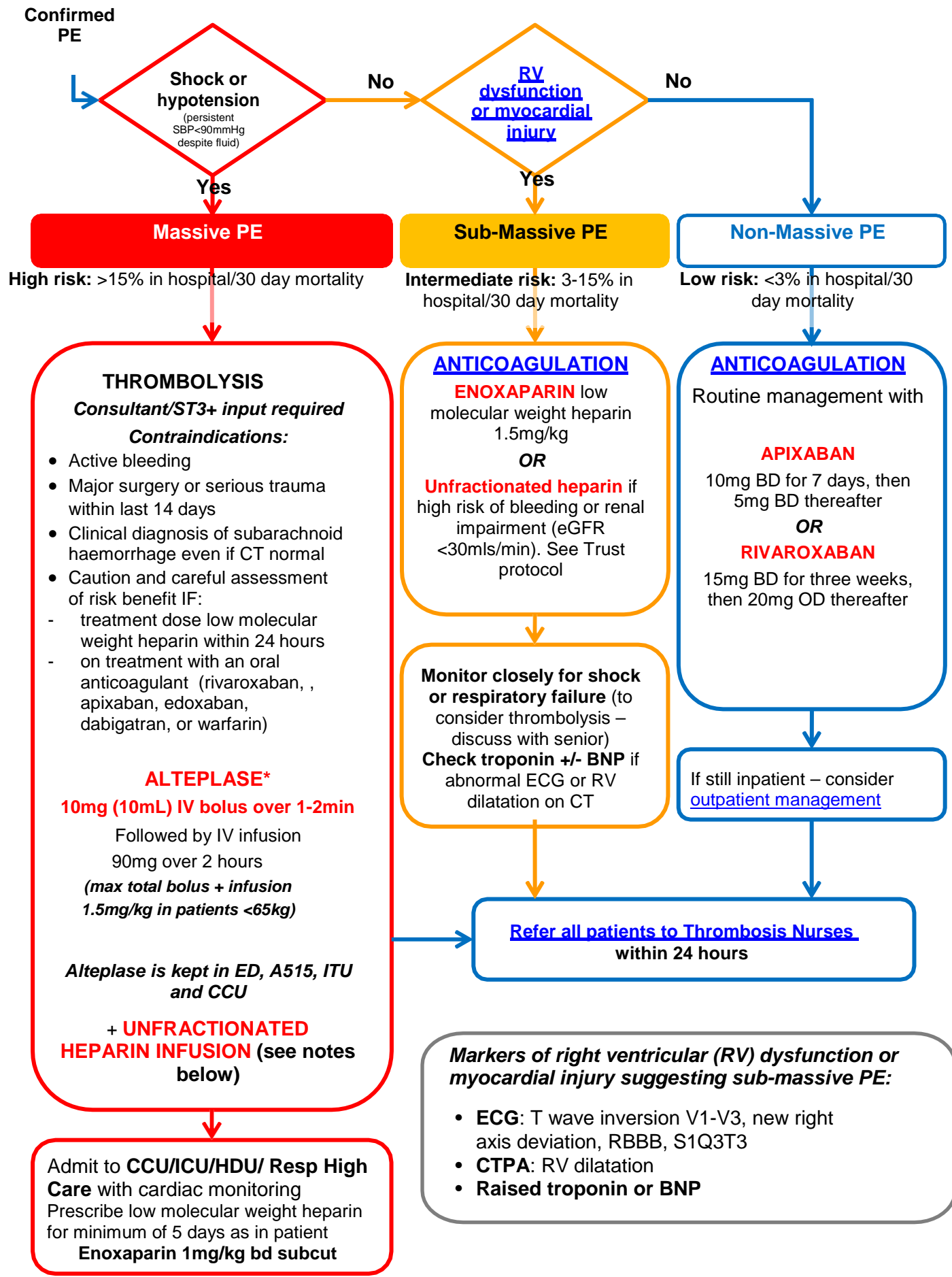
**Patients with a confirmed diagnosis of pulmonary embolism who are thought suitable to be discharged should be assessed by a senior clinician (ST3 or above) prior to discharge. They should be given clear instructions on what to do if their condition deteriorates.**

## Imaging

- Clinical probability +/- D-dimer result required on scan request
- CTPA first line investigation
- V/Q scan recommended for women of childbearing age but do not delay scanning if unavailable
  - If leg symptoms present can request Doppler ultrasound to make diagnosis, if leg scan positive for VTE chest imaging not indicated
- All women of childbearing potential require a pregnancy test
- If delay in imaging and PE likely by Wells score will need treatment dose anticoagulation

## 2 Immediate management of confirmed PE

(Underlined text links to explanatory paragraphs below)



### 3. Thrombolysis of massive PE

Thrombolysis is indicated for acute PE with cardiogenic shock, i.e. BP <90mmHg despite fluid resuscitation and/or evidence of compromised organ perfusion, or in cardiac arrest.

Alteplase comes in 50mg vials with 50ml sterile water diluent; 2 full bottles (100mg) will be required unless the patient weighs <65kg, in which case the total dose (bolus dose + infusion dose) will be 1.5mg/kg.

10mg (10ml) is administered as a bolus dose IV over 1-2minutes, followed by a 2 hour infusion of the remaining 90mg (90ml) alteplase via a syringe pump (or the remainder of the dose if the patient is <65kg).

#### Heparin infusion

After completion of the alteplase infusion:

1. Check APTT level immediately after completion of the alteplase infusion
2. Initiate unfractionated heparin infusion as per UH Bristol IV heparin guidelines 3 hours after administration of alteplase, **providing APTT levels are less than 64 sec** (twice the upper limit of normal). A bolus dose should be given if heparin is being initiated.
3. Once the patient is stabilized consider alternative anticoagulation therapy

Patients who have been thrombolysed should be nursed on CCU or other high-dependency area (ITU).

## 4. Continuing management of confirmed PE

### Refer to Thrombosis Specialist Nurses within 24h of diagnosis

- Provide counselling for anticoagulation decisions
- Facilitate discharge and provide initial follow up

Phone extension 24684: Mon-Fri 9am- 5pm & Sat-Sun 9am-12pm

Complete referral from on <http://nww.avon.nhs.uk/dms/download.aspx?did=12441>

### Anticoagulant Choice

**Apixaban** 10mg BD PO for 7 days, then 5mg BD thereafter

OR

**Rivaroxaban** 15mg BD PO for 21 days, then 20mg OD thereafter

OR

**Enoxaparin** 1mg/kg BD SC for a minimum of 5 days with conversion to **Warfarin**

**NB if using Enoxaparin recommended dose in symptomatic PE or where there are risk factors (e.g. malignancy) is now 1mg/kg BD initially**

### Duration of anticoagulation

- Provoked PE (i.e. secondary to **major** temporary risk factor): 3 months
- Unprovoked PE: minimum 3 months but consider long-term
- Pulmonary hypertension at 3 months: long-term anticoagulation

Special circumstances:

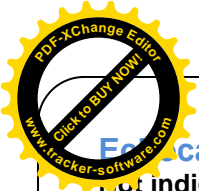
- IVDUs – Rivaroxaban is a good choice
- Pregnancy – Enoxaparin 1.0mg/kg SC BD
- Known active malignancy – Enoxaparin 1mg/kg SC BD initially with potential to reduce to 1.5mg/kg if symptoms improve
  - Initial period of anticoagulation 3-6 months; reassess need for further anticoagulation at 6mo
  - Check platelet count at 7-10 days

### Investigation for underlying malignancy (to be arranged by the admitting medical team)

In up to 5% of patients presenting with an apparently unprovoked pulmonary embolism occult malignancy is found

- Thorough history and physical examination (incl. rectal and breast exam)
- FBC, LFTs, Calcium, PSA
- Urinalysis
- Consider CT abdomen/pelvis and mammogram especially in patients over 40 where there is clinical suspicion based on history clinical examination and abnormal blood tests:

**Choice of investigation should be guided by clinical presentation**



## Echocardiogram

**CT not indicated in the acute setting** unless suspected massive PE and CTPA inappropriate or contraindicated.  
Even if CT suggests right heart strain, an ECHO at this stage does not change management  
If persistent dyspnoea at 3 months: → consider transthoracic echocardiogram  
→ refer to respiratory: type 'goto/chest' into the intranet / bleep 6059

## Discharge Planning

Patients requiring hospital admission – recommended admission minimum 48hrs

- **Prior to discharge they should be reviewed by a senior clinician (ST3 or above)**

Consider the following parameters to be safe for discharge (taking into consideration their pre-morbid condition):

- RR ≤ 20
- BP > 100 systolic
- HR < 100
- SaO<sub>2</sub> ≥ 94% on air (i.e. not requiring oxygen)
- No undue dyspnoea on walking

**The patient should be counselled regarding what to expect (i.e. that recovery may take some weeks) and that they should seek medical advice if still breathless at 3 months.**

**A patient information leaflet for patients has been written; a copy of the text is appended to this guideline.**

## Follow up

**Haematology clinic** → unprovoked PE in patients who are otherwise well at discharge

Primarily for discussion of longterm anticoagulation

Also consider for young patients with >1 first degree relative with VTE and

Post-partum follow up of all patients with PE during pregnancy

**Respiratory clinic** → patients with sub-massive PE, evidence of pulmonary hypertension, abnormal echo, or underlying lung disease

**GP follow up only** → provoked PE in patients who are otherwise well. The GP needs to assess for ongoing breathlessness at 3mo (and subsequent respiratory referral); this must be made clear in the discharge paperwork.

- 
- REFERENCES**
1. British Thoracic Society Guideline for the initial outpatient management of pulmonary embolism. Thorax, 2018 73:S2
  2. Venous thromboembolic diseases: the management of venous thromboembolic diseases and the role of thrombophilia testing NICE Clinical guideline 144 2012
  3. Pulmonary Embolism: NICE clinical knowledge summary.  
<https://cks.nice.org.uk/pulmonary-embolism#!topicSummary>

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**QUERIES**      Thrombosis Nurses (ext 24684)

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## Discharge advice after a pulmonary embolism

After being diagnosed with a pulmonary embolism (PE) – a blood clot in the lungs – you will be discharged when appropriate with anti-coagulant medication (medicine to thin your blood).

This can be in the form of tablets or injections, and may be for a short defined period or for long-term use – all depending on what is the best option in your case.

This leaflet provides you with information on what to expect and what to watch out for once you are home.

### Treatment for pulmonary embolism

Treatment for PE aims to stop new clots from forming, and to prevent long-term complications from the clot. Blood thinners do not dissolve the clots themselves, but prevent the clots from getting any bigger while the body breaks the clots down by itself.

To ensure that you get better it is very important that you:

- **Take your medication regularly as prescribed – don't skip any doses**
- Get up and move around as your condition allows – it is important not to sit or lie still for long periods of time

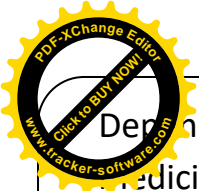
Other things that you can do to prevent problems in the future include:

- Stopping smoking
- Staying at a healthy weight
- Exercising regularly as you are able

### What to expect

When you are discharged from hospital, the team looking after you will have told you what follow-up arrangements are needed in your case, and how long you should take your blood thinning medicine for. **If you have any questions regarding this, please ask us before going home.**





Depending on how large your clot is, you may need to be seen by the respiratory medicine team after going home. This is to check that larger clots have dissolved fully, and have not caused any longer-term problems.

You may also need to see the haematology (blood) team. This will be to decide if your blood thinning treatment needs to continue longer term.

Some patients also require further scans after going home, either to look for causes of the clot, or to look at how well the heart is working with the clot. Your team will tell you about these scans if they are necessary in your case.

### **Things to watch out for:**

#### **1. Bleeding**

All blood thinners are associated with a small risk of bleeding. You may notice that you bleed for longer than usual when you cut yourself, so take care when shaving and using sharp instruments. Do not play any contact sports.

Watch for bleeding and bruising whilst taking these medicines, for example bleeding gums or blood in the urine or bowel movements. If your bowel movements become black and tarry this can be a sign of bleeding. You should seek medical advice if you experience bleeding like this.

If you need any procedures at the dentist, or any other operation, you should tell the healthcare staff treating you that you are on blood thinners. You should also tell anyone who is prescribing you a new medicine that you are on blood thinners, in case it interacts with them.

#### **2. If things aren't getting better**

Because the body breaks down the clots by itself, it can take some time (several weeks) for all of your symptoms to clear and for you to feel completely better again – this is normal.

However, sometimes blood thinning treatment doesn't work, and the clot doesn't fully dissolve. This puts extra strain on the heart, which can cause long-term problems if it isn't spotted.

**If you still feel breathless after 3 months of treatment it is very important that you seek medical advice.** If this is the case, either your GP or your treating doctor can organise a heart scan and an appointment to be seen in our respiratory (chest) clinic.



### **3. If you feel worse**

If your symptoms are getting worse rather than better, or if the symptoms of a clot come back again after going away, you should seek urgent medical advice.

### **If you have questions**

If you have questions about your condition or treatment, you can obtain advice from either:

- Your GP
- Your local pharmacist
- The thrombosis team at Bristol Royal Infirmary
- The team who treated you when you were admitted

The telephone number for Bristol Royal Infirmary is 0117 923 0000, where you can ask to be put through to the appropriate team.





## Venous Thromboembolism Prevention Policy

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### What is in this Policy?

The House of Commons Health Committee<sup>1</sup> reported in 2005 that an estimated 25,000 people in the UK die from preventable hospital-acquired venous thromboembolism (VTE) every year. This includes patients admitted to hospital for medical care and surgery.

This policy sets out University Hospitals Bristol NHS Foundation Trust's (the Trust's) requirements for preventing and managing VTE and includes:

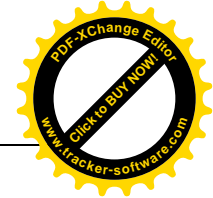
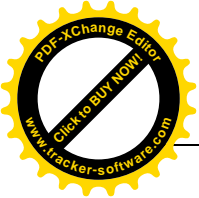
- Risk assessment;
- Prescribing appropriate thrombo-prophylaxis;
- Process for managing suspected VTE;
- Process for managing confirmed VTE;
- Process for investigating and learning from hospital associated thrombosis.

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<sup>1</sup> House of Commons Health Committee (2005) The prevention of venous thromboembolism in hospitalised patients. London: The Stationery Office.

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Document Change Control				
Date of Version	Version Number	Lead for Revisions	Type of Revision	Description of Revision
2010	1			New Policy in accordance with NICE guidelines
March 2011	2	Amanda Clark, Consultant Haematologist	Major	Update for NHSLA requirements and to reflect changes in local practice
July 2013	3	Amanda Clark, Consultant Haematologist	Major	Update to reflect changes in practice and process for investigating hospital associated thrombosis
Aug 2018	4	Charlotte Bradbury Consultant Haematologist	Major	Update to reflect various changes including the fact that the Trust no longer employs a VTE nurse and to incorporate new VTE prevention NICE guidance 2018

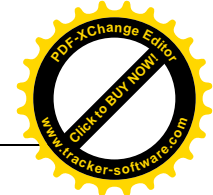
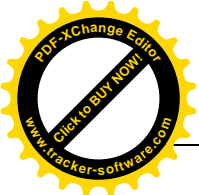
Sign off Process and Dates	
Groups consulted	Date agreed
VTE and anticoagulation committee	01/10/2018
Steering Group Title	Click here to enter a date.
Other Groups Consulted	Click here to enter a date.
Other Groups Consulted	Click here to enter a date.
Policy Assurance Group	21/01/2019
Clinical Quality Group	07/02/2019

- **Stakeholder Group** can include any group that has been consulted over the content or requirement for this policy.
- **Steering Group** can include any meeting of professionals who has been involved in agreeing specific content relating to this policy.
- **Other Groups** include any meetings consulted over this policy.
- **Policy Assurance Group** must agree this document before it is sent to the **Approval Authority** for final sign off before upload to the DMS.

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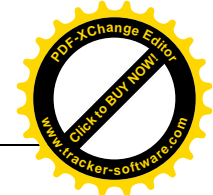
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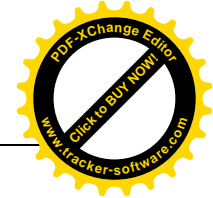
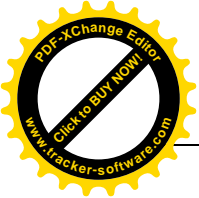
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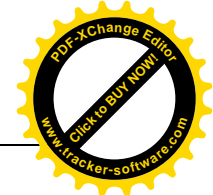
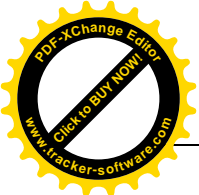
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## 1. Do I need to read this Policy?

All Clinical Staff

Must read all sections and appendix A,B,C,D,E



## 2. Introduction

This policy applies to all clinical staff caring for adult patients. The aim of this policy is to outline the processes that are in place to ensure that adult patients admitted to the Trust are assessed for their venous thrombotic risk and offered appropriate thrombo-prophylaxis. On admission, patients must be given information and advice on venous thromboembolism prevention; this should cover their inpatient stay and the post discharge period. The policy also outlines how adult patients who have a suspected venous thrombosis should be managed.

For more detailed recommendations on VTE prevention please see NICE VTE prevention guidelines 2018 <https://www.nice.org.uk/guidance/ng89/chapter/Recommendations>

The NICE guideline pathway can be found using this link <https://pathways.nice.org.uk/pathways/venous-thromboembolism#path=view%3A/pathways/venous-thromboembolism/reducing-venous-thromboembolism-risk-in-hospital-patients.xml&content=view-index>

## 3. Purpose

The first part of this policy will enable staff caring for adult patients to understand the risk of venous thromboembolism associated with hospital admission. The policy outlines the appropriate steps required to take to reduce the risk.

The second part of the policy is to enable staff caring for adult patients to manage patients with suspected venous thromboembolism and the investigation and learning from incidents of hospital associated thrombosis.

## 4. Scope

This policy relates to all permanent and temporary employees, volunteers, agencies and agency staff working for and on behalf of the Trust.

## 5. Definitions

### 5.1 Venous Thromboembolism

Venous thromboembolism (VTE) is used to describe a condition in which a blood clot forms in a vein. It most commonly occurs in the deep veins of the legs – Deep Vein Thrombosis (DVT) but may also dislodge from its site of origin to travel to in the blood to the lungs – Pulmonary embolism (PE).

### 5.2 Thrombo-prophylaxis

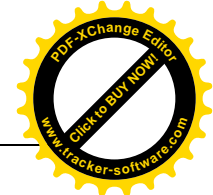
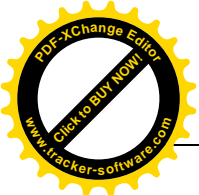
Thrombo-prophylaxis refers to the method of preventative treatment that a patient should receive after a VTE risk assessment.

- (a) 'Mechanical thrombo-prophylaxis' refers to anti-embolic hosiery and sequential compression devices.
- (b) 'Pharmacological thrombo-prophylaxis' refers anticoagulant medications including low molecular weight heparin and unfractionated heparin. (Anti-platelet agents including aspirin, clopidogrel, prasugrel, dipyridamole are not classified as standard thromboprophylaxis).

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### 5.3 *Significantly reduced mobility*

Significantly reduced mobility refers to anyone who may be bedbound, unable to walk unaided or who is likely to spend a substantial proportion of the day in bed or in the chair – when they are normally more active/mobile.

### 5.4 *Hospital-associated thrombosis*

A hospital-associated thrombosis is defined as a venous thrombosis occurring within 90 days of a hospital admission (patients who are admitted from the community with no prior admission whose symptoms on admission are subsequently found to be due to VTE are excluded).

## 6. Duties, Roles and Responsibilities

### 6.1 *Consultants*

- (a) The ultimate responsibility for completion and documentation of a VTE risk assessment within 24 hours of admission and prescription of appropriate thrombo-prophylaxis lies with the consultant, and is ideally checked on the post-take ward round.
- (b) Consultants are responsible for ensuring the procedure for suspected VTE as set out in Appendix C is followed for patients under their care.
- (c) Consultants are responsible for ensuring that incidents of hospital associated thrombosis relating to their patients are investigated within four weeks of identification using the [VTE checklist](#) (modified root cause analysis). If the incident has led to severe harm or a catastrophic outcome a full root cause analysis must be undertaken in line with the Trust Policy for the Management of Incidents and Serious Incident policy.

### 6.2 *Doctors/non-medical prescribers*

Doctors and non-medical prescribers will:

- (a) Document a full VTE risk assessment on all adult patients as soon as possible after admission to hospital or by the time of the first consultant review (and within 24h of admission). This will include identification of all risk factors for thrombosis and bleeding
- (b) Where indicated prescribe appropriate thrombo-prophylaxis (mechanical and/or pharmacological), and start it as soon as possible and within 14 hours of admission.
- (c) Duration of thrombo-prophylaxis should follow NICE 2018 recommendations for individual patient populations (<https://www.nice.org.uk/guidance/ng89/chapter/Recommendations>).
- (d) Check that VTE risk assessment has been undertaken whilst on the ward round.
- (e) Re-assess patients for VTE and bleeding risk at the point of consultant review or if their clinical condition changes.
- (f) Ensure that prescribed medication has been administered.
- (g) Where patients require post discharge/extended thrombo-prophylaxis they will prescribe this, ensure that patients and their relatives/carers understand why it is required and ensure that this is communicated to the GP on discharge.

### 6.3 *Nurses*

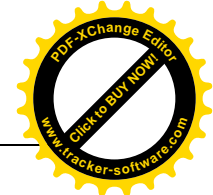
- (a) Registered nurses in pre-operative assessment clinic (POAC) will risk-assess patients and request an accredited prescriber to complete the prescription chart.

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- (b) Registered nurses in clinical areas will routinely check that the VTE risk assessment is complete and apply anti-embolic hosiery where prescribed and continue to follow the NICE 2018 recommendations until compression stockings are no longer required (Appendix A).
- (c) Nurses will ensure that prescribed pharmacological thrombo-prophylaxis is administered as prescribed, unless there is a valid reason not to e.g. haemorrhage, in which case this will be promptly referred to a doctor for review.
- (d) Where patients require post discharge/extended thrombo-prophylaxis they will ensure that patients and their relatives/carers understand why it is required and teach the patient/carer to administer the medication. Where this is not possible they will liaise with the district nurse.

#### **6.4 Ward Managers**

- (a) Ward managers will ensure that when patients are discharged from the ward the VTE risk assessment data is captured in the Trust's patient administration system (PAS, Medway).

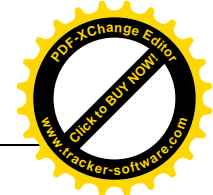
#### **6.5 Pharmacists**

- (a) Registered pharmacists in pre-operative assessment clinic will risk assess patients and if suitably trained will complete the prescription chart, or request an accredited prescriber complete the prescription chart.
- (b) Pharmacists are to support nurses in prompting doctors to complete risk assessments as soon as possible after admission.
- (c) Pharmacists will review prescriptions and ensure proper corrections have been made to prescribed pharmacological thrombo-prophylaxis especially in extremes of body weight and patients with reduced renal function.
- (d) Where patients require post-discharge/extended thrombo-prophylaxis they will help to ensure that patients have been educated in why the treatment is needed and how to administer it.
- (e) Ward pharmacists will conduct a monthly audit aiming for five patients per ward per week to assess compliance with appropriate thrombo-prophylaxis prescribing.

#### **6.6 Thrombosis and anticoagulation Group and Chair**

The Thrombosis and Anticoagulation Group will:

- (a) Ensure national guidance is included in risk assessment tools and will co-ordinate audit activity to monitor effectiveness.
- (b) Advise on the form of training required for various staff groups so that VTE risk is included in the essential training plan.
- (c) Receive a quarterly report of themes and learning arising from root cause analysis incidents of hospital-associated thrombosis and ensure an action plan to implement risk reduction measures is in place and monitor the implementation any action plan.
- (d) Receive monitoring reports as set out in Appendix D auditing compliance with the procedure to be followed if VTE is suspected.
- (e) Agree and implement any changes in practice for the management of VTE which are required in response to new national guidance, audit or research activity.



## 6.7 Divisional Boards

Divisional Boards will:

- a) Review metrics on VTE risk assessment compliance, appropriate thrombo-prophylaxis and hospital-associated thrombosis incidents at their Divisional Board meetings and identify if any further local actions need to be taken in response to this information.
- b) Ensure modified root cause analysis for hospital associated VTE is completed within 28 days of submission of clinical incident.

## 6.8 Trust Board of Directors

- (a) Receives monthly information regarding compliance with VTE risk assessments and appropriate thrombo-prophylaxis via its quality dashboard and, by exception, actions to rectify any deterioration in performance.

## 6.9 Medical Director

- (a) The medical director is the lead executive for patient safety and provides support to Thrombosis Group Chair in relation to Trust expectations surrounding VTE.

# 7. VTE Risk Assessment

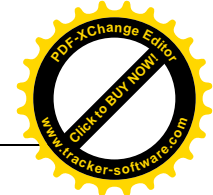
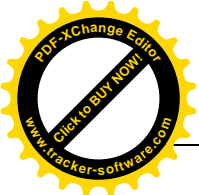
## 7.1 Risk Assessment

- (a) VTE risk assessment must be completed and documented on the risk assessment form on admission (within 24 hours of admission to allow for discussion of difficult cases with senior members of the team and where necessary for relevant blood tests to be reviewed e.g. renal function and platelet count). Wards using EPMA for prescribing will document VTE risk assessment within midway.
- (b) Reassessment should be undertaken regularly thereafter, at the point of consultant review, when there is a change in the patient's condition or if the patient is transferred to a new ward. This is to ensure that the patient continues to receive appropriate thrombo-prophylaxis should any risk factors or contraindications resolve or develop. This will be a clinical judgement. Reassessments should be clearly documented in the relevant section of the adult prescription chart.
- (c) All patients aged 18 or above on the day of admission will be fully risk assessed using the Trust's risk assessment forms either on the paper drug chart or within Medway for wards using EPMA. These are all fully compliant with the Department of Health risk assessment tool. The risk assessment tool is integrated within the adult prescription chart and will be used in all areas except obstetrics, and day surgery, and for assessing lower limb trauma patients (see Appendix A).
- (d) Surgical patients having elective surgery will be risk assessed at their POAC visit. The risk assessment within the drug chart is used for all patients who will be admitted.
- (e) **Day surgery cases:** will be risk assessed according to the Day Surgery form. Appropriate thrombo-prophylaxis will be prescribed and any additional care management needs will be included in the medical management plan.
- (f) **Day Case Exclusions:** There are nationally and locally agreed cohorts of patients that are excluded from being risk assessed. This is because the procedure/activity that they are undergoing has been classified as low risk regardless of patient factors (see Appendix B).

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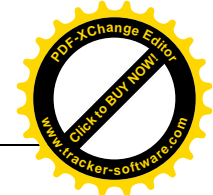
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- (g) All the Trust VTE risk assessment forms provide guidance on how to manage patients at risk of VTE.
- (h) The WHO Surgical Safety Checklist will be used as a checking process for patients who are taken to Theatre.
- (i) **Stroke patients:**
  - (i) On admission both low molecular weight heparin (LMWH) and anti-embolic stockings are contraindicated.
  - (ii) All stroke patients (including haemorrhagic) will be assessed on day 1 and regularly thereafter.
  - (iii) Stroke patients who are admitted with significant immobility will be eligible for sequential compression devices which will be made available on the stroke ward.
  - (iv) At day 14 a stroke consultant should decide whether LMWH is advised and any ischaemic stroke patient with significant on-going leg weakness and significantly reduced mobility must be considered for treatment with LMWH.
  - (v) Some patients will be assessed by the stroke consultant to be at significantly increased risk of VTE and will commence LMMH before day 14.
- (j) **Children:** (aged 17 and under) are not required to be routinely risk assessed for VTE. It is now standard practice within the Bristol Royal Hospital for Children for any children weighing greater than 40kg to be risk assessed for VTE and fitted with anti-embolic stockings if appropriate.

## 7.2 Prophylactic treatment regime

- (a) Pharmacological thrombo-prophylaxis usually in the form of LMWH must be prescribed if the risk of venous thrombosis outweighs the risk of bleeding, and there are no other contraindications to anticoagulant therapy.
- (b) Renal function must be taken into consideration when prescribing; it is acceptable to use the estimated Glomerular Filtration Rate (eGFR) as a guide (see section 6.4).
- (c) Extremes of body weight should also be taken into consideration when prescribing LMWHs (see section 6.4).
- (d) Anti-embolic hosiery must be prescribed if appropriate and there are no contraindications. Hosiery must be measured and fitted by staff who have been appropriately trained.
- (e) Intermittent pneumatic compression devices (Sequential compression devices) are to be used for high risk patients undergoing high risk surgical procedures during the peri-operative period. They may also be used if pharmacological thrombo-prophylaxis is contraindicated e.g. lower limb trauma patients and stroke patients who are immobile.
- (f) For guidance on thrombo-prophylaxis in pregnancy, labour and the postnatal period see the guideline for [Dalteparin](#) or [Enoxoparin](#).



### 7.3 *Choice of thrombo-prophylaxis for patients at risk of VTE*

	<b>Risk factors for VTE present</b>	<b>Risk factors for bleeding also present</b>
<b>Medical Patients who are not fully mobile</b>	Enoxaparin	If bleeding risk is too high for anticoagulants and VTE risk very high consider anti-embolic stockings or sequential compression devices in stroke patients (if no contraindications).
<b>Surgical Patients</b>	Anti-embolic stockings +/- enoxaparin	Omit enoxaparin until bleeding risk allows; Anti-embolic stockings; Consider sequential compression devices.

### 7.4 *Thrombo-prophylaxis dosing:*

It is Trust policy to administer pharmacological thromboprophylaxis at 6pm to avoid any delays to procedures/surgery planned the following day.

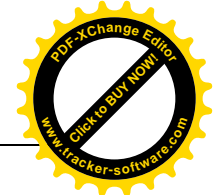
- (a) Standard dose of enoxaparin 40mg once daily.
- (b) Body weight <50kg enoxaparin 20mg once daily.  
Body weight >100Kg enoxaparin 40mg twice daily.
- (c) Renal function based on glomerular filtration rate (GFR):  
(eGFR may be used as a guide)  
GFR 20 – 30mls/min enoxaparin 20mg once daily.  
GFR <20mls/min unfractionated heparin 5000 international units twice daily.

### 7.5 *Other measures to reduce the risk of thrombosis in patients admitted to hospital*

- (a) Patients must be encouraged to mobilise as soon as possible, and should be encouraged to perform active limb movements whilst on bed rest.
- (b) An accurate fluid balance must be maintained to avoid dehydration.
- (c) All patients must be given the Trust patient information leaflet on admission about preventing [hospital associated thrombosis](#).

## 8. *Post discharge considerations and extended thrombo-prophylaxis*

- (a) All patients should receive written and verbal information outlining their risks for VTE ([Hospital Associated Thrombosis leaflet](#)).
- (b) Patients who do not require pharmacological thrombo-prophylaxis should be encouraged to be as mobile as possible post discharge.
- (c) Certain groups of patients benefit from continued pharmacological prophylaxis post discharge. Currently the Trust offers continuing treatment in the following groups of patients:
  - (i) [Patients undergoing colorectal cancer surgery](#) (28 days in total).
  - (ii) Post partum women at risk (ten days or six weeks)
  - (iii) [Lower limb trauma discharged from the Emergency Department](#)



- (iv) [Post hip fracture patients](#)
- (v) Other individual patient groups may be eligible for extended thromboprophylaxis according to NICE 2018 guidance  
<https://www.nice.org.uk/guidance/ng89/chapter/Recommendations>

## 9. Management of suspected Venous Thromboembolism

If VTE is suspected in a patient already admitted to hospital or in a patient attending with symptoms suggestive of VTE, a prompt clinical assessment should be made followed by relevant tests to make a formal diagnosis. The following tests are recommended:

- (a) Clinical probability score:
  - (i) Suspected DVT: Wells score;
  - (ii) Suspected PE: Two level Wells score.
- (b) If the clinical probability is high proceed directly to imaging.
- (c) If the clinical probability is low:
  - (i) D-Dimer testing is indicated in order to potentially reduce the number of diagnostic imaging requests. D-dimer has a high negative predictive value and if negative in combination with a low clinical probability then diagnostic imaging is not required.

N.B. D-dimer testing is less valuable in patients who are post-op, have a known malignancy, have infection or are pregnant, all these states independently cause an elevation in D-dimer.

- (d) If DVT is suspected:
  - (i) Doppler scan of the suspected limb.
- (e) If PE is suspected:
  - (i) CTPA (Computerised Tomography pulmonary angiography) or V/Q (ventilation perfusion) scan (consider V/Q scan in pregnant women or women of childbearing age).

Ideally scans should be performed on the same day, however if this is not possible and the clinical probability is felt to be high the patient may be commenced on therapeutic anticoagulation with LMWH or rivaroxaban prior to completion of diagnostic investigations.

This is set out in a flow chart in Appendix C.

### 9.2 Management of confirmed embolism

This is set out in a flow diagram in Appendix D.

If VTE is confirmed, all test results must be documented in the patient's notes and appropriate treatment should be prescribed. Identification of this diagnosis must also be included in the patient's discharge summary.

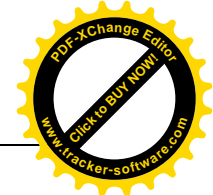
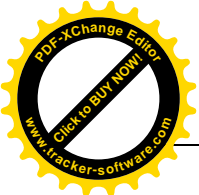
### 9.3 Investigation of possible Hospital-Associated Thrombosis (HAT)

- (a) All episodes of VTE should be reported as a patient safety incident via the online system under one of the following headings:
  - (i) DVT or PE during hospital stay (HAT);
  - (ii) DVT or PE on admission (may not be HAT);

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- (iii) DVT or PE within 90 days of discharge (HAT to be investigated at the Trust);
- (iv) DVT or PE within 90 days of discharge from another Trust (HAT to be referred to the relevant care provider).
- (b) In addition direct information from radiology giving information on all positive Doppler ultrasounds, CTPAs and V/Q scans will also be used and cross-referenced with information on admissions to identify episodes of hospital associated thrombosis.
- (c) The process for identifying and investigating any hospital associated thrombosis is set out in Appendix E.
- (d) A checklist (modified RCA) must be completed within four weeks of the incident being identified and for incidents which have led to severe harm or a catastrophic outcome a full root cause analysis must be undertaken in line with the Trust Policy for the Management of Incidents and Serious Incident policy.
- (e) All completed investigations should be attached to the relevant incident in the Datix.
- (f) The outcomes of the investigations will be reviewed by the Thrombosis and Anticoagulation Group on a quarterly basis and actions to implement risk reduction measures identified.

## 9.4 Training

- (a) VTE Risk Assessment is included in the Patient Safety Training and methods of delivery are described in the Risk Management Training Needs Analysis.
- (b) VTE risk assessment training is included at induction.

# 10. Standards and Key Performance Indicators

## 10.1 Applicable Standards

- (a) On-going monitoring of monthly census data for VTE risk assessment is fed back to ward areas, divisional boards and compliance is reported to the Board.
- (b) Monthly audits of five patients per clinical area per week are audited by pharmacists for prescribing of appropriate thrombo-prophylaxis.
- (c) RCA data on all episodes of hospital associated thrombosis.

## 10.2 Measurement and Key Performance Indicators

Proportion of patients VTE risk assessed on admission (target >95%) and prescribed appropriate thromboprophylaxis (target >90%). Rates of hospital associated thrombosis, particularly those considered avoidable.

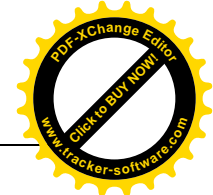
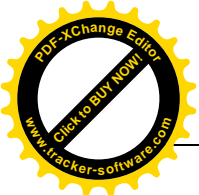
# 11. References

Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism NICE guideline Published: 21 March 2018 nice.org.uk/guidance/ng89

<https://www.nice.org.uk/guidance/ng89/chapter/Recommendations>

Venous Thromboembolism during Pregnancy and the Puerperium. Green-top Guideline No. 37a April 2015

<https://www.rcog.org.uk/globalassets/documents/guidelines/gtg-37a.pdf>



## 12. Associated Internal Documentation

[Patients undergoing colorectal cancer surgery](#) (28 days in total).

Post partum women at risk (ten days or six weeks)

[Lower limb trauma discharged from the Emergency Department](#)

[Post hip fracture patients](#)

[Hospital Associated Thrombosis](#)

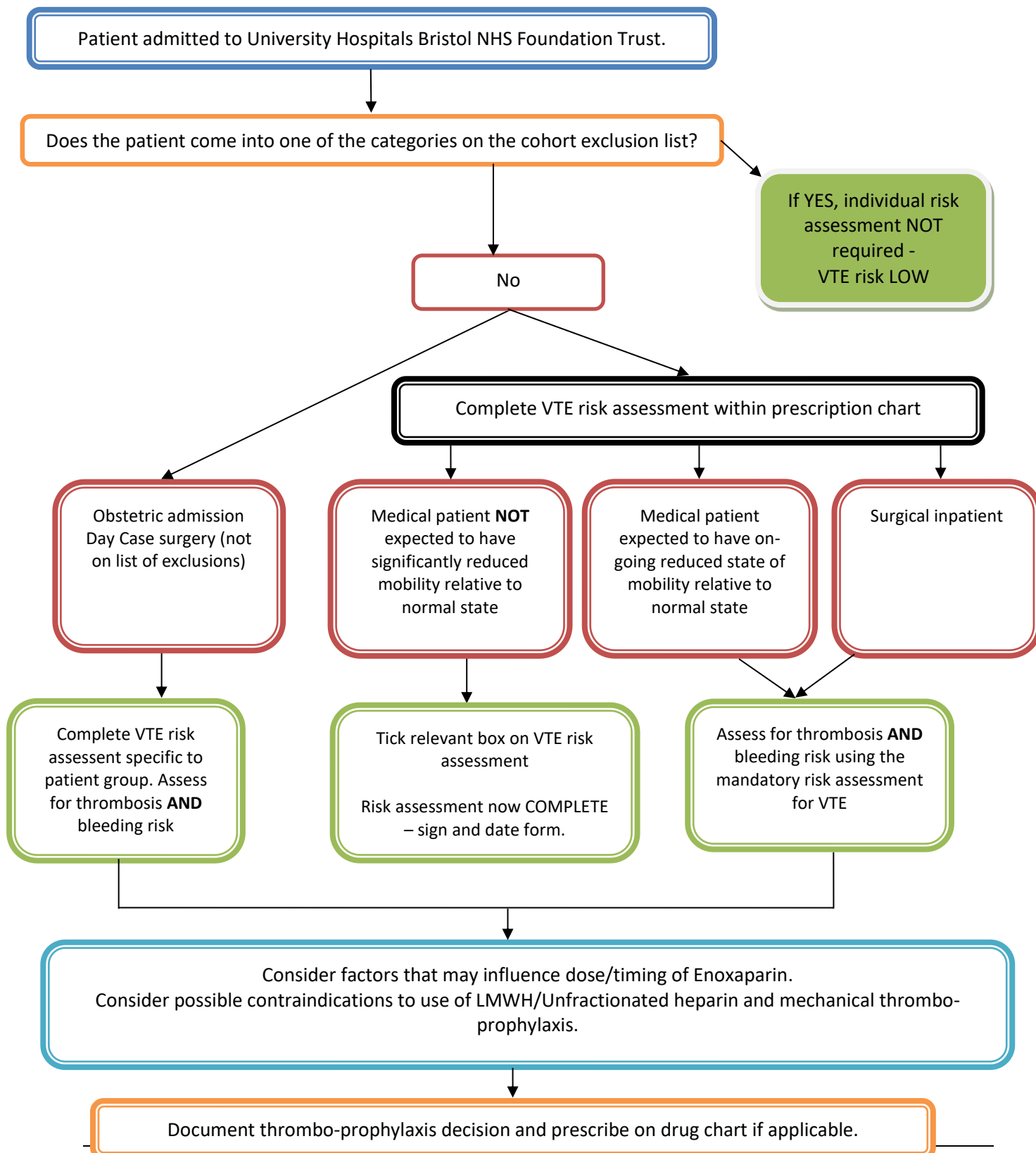
Incident Management Policy

Serious incident Management Policy



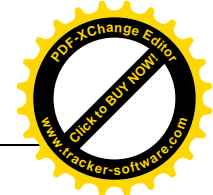
## 13. Appendix A – VTE Risk Assessment

### Guidance for completing a VTE risk assessment (ALL Adult admissions aged 18 years and above)



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## 14. Appendix B – List of agreed exclusions for individual VTE risk assessment

### DAY CASE PATIENTS IDENTIFIED AS LOW RISK FOR THE DEVELOPMENT OF VENOUS THROMBOEMBOLISM AND EXCLUDED AS A COHORT FROM VTE RISK ASSESSMENT

#### 14.1 Day cases:

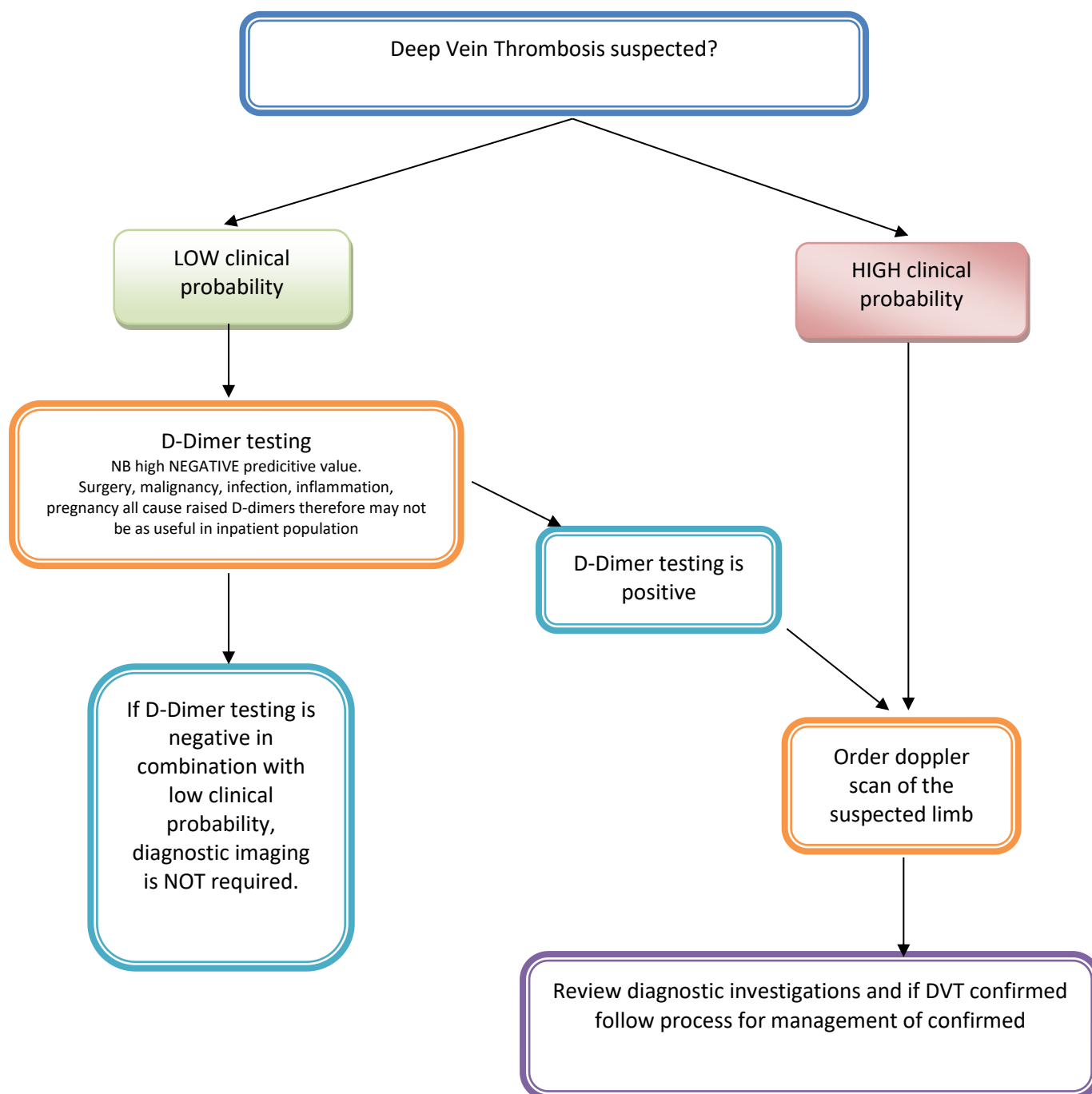
- (a) Endoscopy (OGD/ colonoscopy/ sigmoidoscopy/ bronchoscopy).
- (b) Minor procedures lasting less than 90 minutes, performed under local or regional anaesthetic or sedation.
- (c) Non-cancer ENT surgery lasting less than 90 minutes with local anaesthetic/ regional/ sedation and not full general anaesthetic.
- (d) Non-cancer plastic surgery lasting less than 90 minutes with local or regional anaesthetic or sedation and not full general anaesthetic.
- (e) Ophthalmological procedures with local and regional anaesthetic or sedation and not full general anaesthetic.
- (f) Non-cancer dental and maxillo-facial surgery lasting less than 90 minutes with local or regional anaesthetic or sedation and not full general anaesthetic.
- (g) Flexible cystoscopy.
- (h) Haematology Day Cases including chemotherapy.
- (i) Oncology Day Cases including chemotherapy.
- (j) Day Case Cardiology.
- (k) Pathology Day Cases.
- (l) Dermatology Day Cases
- (m) Regional anaesthetic/spinal injections (Pain clinic).
- (n) Medical termination of pregnancy.
- (o) Foetal Medicine Unit.
- (p) Maternity Day Assessment Unit.
- (q) Sleep Unit.
- (r) Intra-vaginal brachytherapy Day Cases.
- (s) Non-cancer Day cases receiving radioactive substances
- (t) Non elective patients who are admitted onto the system, but subsequently assessed and discharged by the 'admitting' doctor/nurse/midwife (includes Central Delivery Suite short-stay).

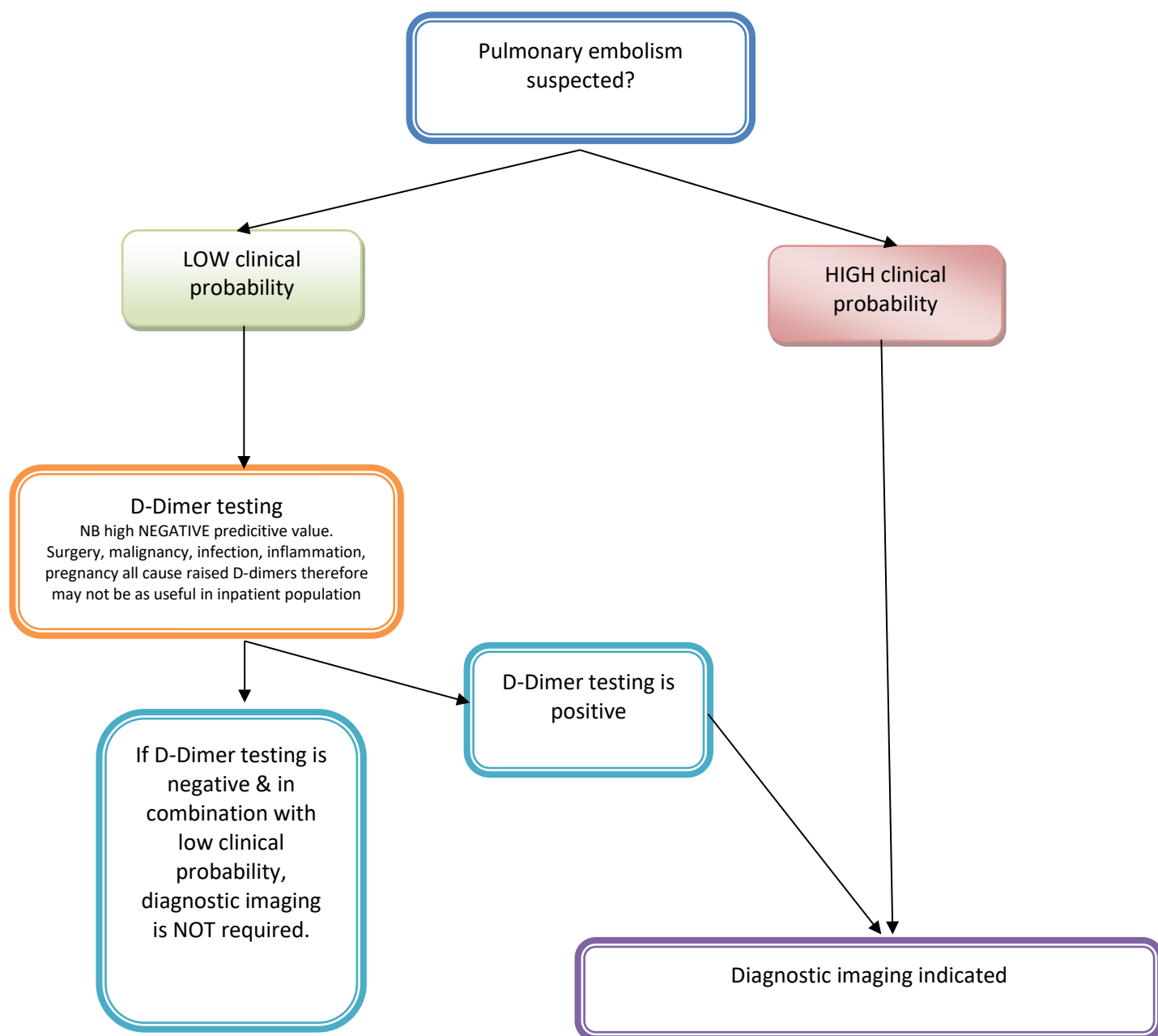
- 14.2 Women admitted in labour or for induction of labour will not be risk assessed until post delivery i.e. not necessarily on admission.

NB: Where a *significant* period of immobility is anticipated following any procedure which would otherwise be excluded from risk assessment, an individual risk assessment *should* be performed, documented and thrombo-prophylaxis considered.

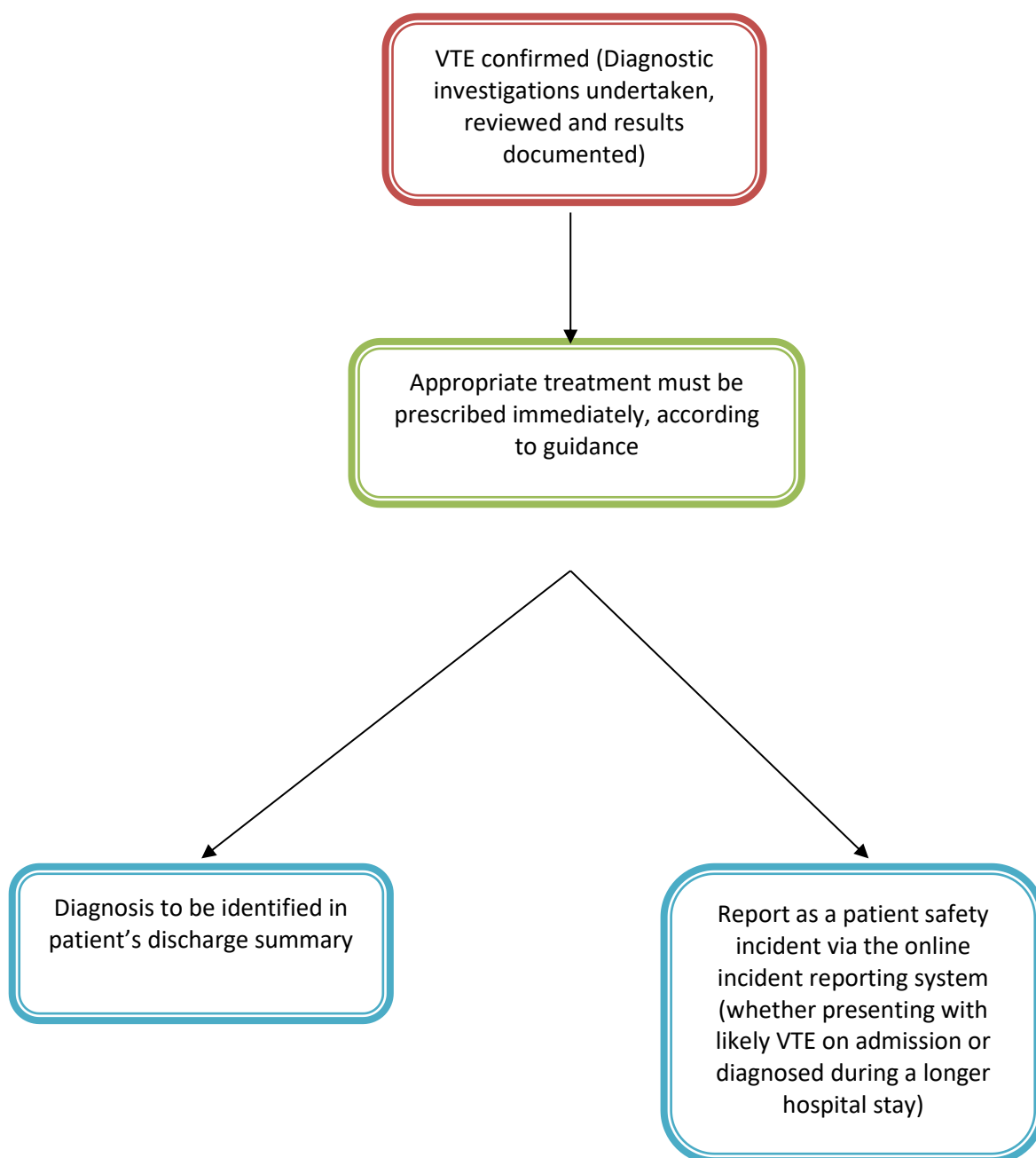
## 15. Appendix C – Process to follow if VTE is suspected during inpatient stay

If clinical probability is high, the patient should be commenced on therapeutic anticoagulation with LMWH or a direct acting oral anticoagulant prior to completion of diagnostic investigations.



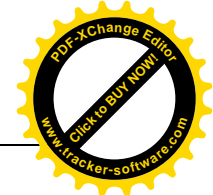
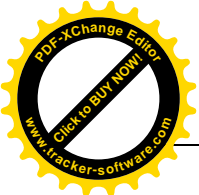


## 16. Appendix D - Process to follow for the management of confirmed VTE during in-patient stay



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## 17. Appendix E-Process for investigating and learning from hospital associated VTE

All hospital associated thrombosis will be subject to a modified RCA investigation using the VTE checklist (modified RCA) If the incident results in severe harm or a catastrophic outcome a full RCA must be conducted.

Data analysts cross reference 'VTE positive event' comment on radiology reports with Medway admissions and produce a list of patients who may have had VTE associated with an admission to UHBristol.

Medical Director for patient safety checks list clarification that VTE is hospital associated ie occurred during a hospital admission or within 90days of discharge (not on admission with not prior episode of care at UHB) and distributes a final list to patient safety managers (PSM).

PSM will report as clinical incident on Datix and put responsible consultant as a handler on Datix.

PSM emails the consultant with the patients details alerting to them to the need to request the patient's notes and complete the VTE modified RCA on Datix\* within 28 days of notification.

If consultant identifies that this patient was not under their care during the episode in question they should:  
Forward notes to correct consultant  
Change the handler on Datix to correct consultant (PSM can advise regarding this process if uncertain)

If there is severe or catastrophic harm the incident should be escalated to a full root cause analysis.  
If the outcome of the investigation is that this event was preventable this remains moderate harm and under duty of candour the report should be discussed with the patient and/or relatives.  
If the outcome of the investigation is that all procedure were followed appropriately and the event was unpreventable the incident PSM will downgrade to negligible harm.

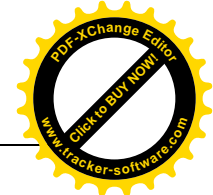
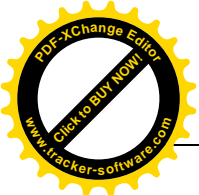
All modified RCAs where it is identified that the VTE was preventable or where they have not been completed within 28 days should be reviewed at Divisional Governance.

All preventable events will be reviewed quarterly at Thrombosis and Anticoagulation Committee.

\*To log in to Datix use UH Bristol login details. If unable to view/manage the incident contact [Datix.support@UHBristol.nhs.uk](mailto:Datix.support@UHBristol.nhs.uk) or ext 23961.

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## 18. Appendix F – Monitoring table for this policy

The following table sets out the monitoring provisions associated with this policy. Please ensure any possible means of monitoring this policy to ensure all parts are fulfilled are included in this table.

Objective	Evidence	Method	Frequency	Responsible	Committee
How patients are assessed for their risk of developing VTE	Continuous monitoring via census methodology reported to the Board in the monthly quality report	Monthly quality report	Monthly	VTE Lead (Consultant Haematologist)	Thrombosis and anti-coagulation Group
Procedure to be followed if VTE is suspected	Six-monthly case note audits of a sample of patients admitted with suspected VTE reported to the Thrombosis and Anti-coagulation Group	Case note audit outcomes	Six-Monthly	VTE Lead (Consultant Haematologist)	Thrombosis and anti-coagulation Group

## 19. Appendix G – Dissemination, Implementation and Training Plan

The following table sets out the dissemination, implementation and training provisions associated with this Policy.

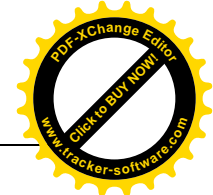
Plan Elements	Plan Details
The Dissemination Lead is:	Consultant Haematologist
This document replaces existing documentation:	Yes
Existing documentation will be replaced by:	This current version
This document is to be disseminated to:	All doctors, pharmacists, registered nurses,
Training is required:	Yes but is included in induction training
The Training Lead is:	[DITP - Training Lead Title]

Additional Comments	Training on VTE risk assessment is included on
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Plan Elements	Plan Details
	induction for all clinical staff
[DITP - Additional Comments]	

## 20. Appendix H – Equality Impact Assessment (EIA) Screening Tool

Further information and guidance about Equality Impact Assessments is available here:

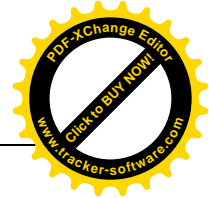
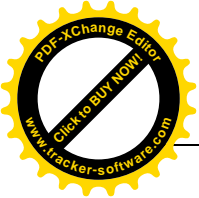
<http://nww.avon.nhs.uk/dms/download.aspx?did=17833>

Query	Response
What is the <b>main purpose</b> of the document?	Prevention of hospital associated VTE
Who is the target audience of the document?	Add <input checked="" type="checkbox"/> or <input checked="" type="checkbox"/>
Who is it likely to impact on? (Please tick all that apply.)	Staff <input checked="" type="checkbox"/> Patients <input type="checkbox"/> Visitors <input type="checkbox"/> Carers <input type="checkbox"/> Others <input type="checkbox"/>

Could the document have a significant <b>negative</b> impact on equality in relation to each of these characteristics?	YES	NO	Please explain why, and what evidence supports this assessment in relation to your response.
<b>Age</b> (including younger and older people)		<input checked="" type="checkbox"/>	
<b>Disability</b> (including physical and sensory impairments, learning disabilities, mental health)		<input checked="" type="checkbox"/>	
<b>Gender reassignment</b>		<input checked="" type="checkbox"/>	
<b>Pregnancy and maternity</b>		<input checked="" type="checkbox"/>	
<b>Race</b> (includes ethnicity as well as gypsy travelers)		<input checked="" type="checkbox"/>	
<b>Religion and belief</b> (includes non-belief)		<input checked="" type="checkbox"/>	
<b>Sex</b> (male and female)		<input checked="" type="checkbox"/>	
<b>Sexual Orientation</b> (lesbian, gay, bisexual, other)		<input checked="" type="checkbox"/>	
<b>Groups at risk of stigma</b> or social exclusion (e.g. offenders, homeless people)		<input checked="" type="checkbox"/>	
<b>Human Rights</b> (particularly rights to privacy, dignity, liberty and non-degrading)		<input checked="" type="checkbox"/>	

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treatment)			
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Will the document create any problems or barriers to any community or group? NO

Will any group be excluded because of this document? NO

Will the document result in discrimination against any group? NO

If the answer to any of these questions is YES, you must complete a full Equality Impact Assessment.

Could the document have a significant positive impact on inclusion by reducing inequalities?	YES	NO	If yes, please explain why, and what evidence supports this assessment.
Will it promote equal opportunities for people from all groups?	<input checked="" type="checkbox"/>		Policy applies to all patients
Will it help to get rid of discrimination?			Not applicable
Will it help to get rid of harassment?			Not applicable
Will it promote good relations between people from all groups?			Not applicable
Will it promote and protect human rights?			Not applicable

On the basis of the information/evidence so far, do you believe that the document will have a positive or negative impact on equality? (Please rate by circling the level of impact, below.)

Positive impact				Negative Impact		
Significant	<u>Some</u>	Very Little	NONE	Very Little	Some	Significant

Is a full equality impact assessment required? NO

Date assessment completed:28.1.19

Person completing the assessment:28.1.19

Status: Approved

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