Policy Document Control Sheet

County Durham and Darlington NHS Foundation Trust

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Name of Document Owner	Steve Cowie, Chair of VTE Task & Finish Group					
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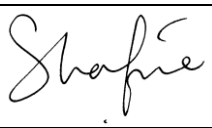
Executive Sponsor's Signature	
Name & Job title of Executive Sponsor	Shafie Kamaruddin, Chair, CSTC
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Version Control Table

Date Ratified	Version Number	Status
June 2011	1.0	Superseded
September 2011	1.1	Superseded
October 2011	2.0	Superseded
January 2012	2.1	Superseded
February 2012	2.2	Superseded
August 2013	3.0	Superseded
February 2016	3.1	Superseded
December 2018	4.0	Approved

Table of Revisions

Date	Section	Revision	Author
September 2011	Various Sections	Revision of versions 1.0 –working draft documents taking into account peer comments	Helen Rutter – Clinical Effectiveness Lead
October 2011	Various Sections	Revision of versions 1.1 –working draft documents taking into account peer comments	Helen Rutter – Clinical Effectiveness Lead
January 2012	11	Added to incorporate the Root Cause Analysis process for VTE episodes	Helen Rutter - Clinical Effectiveness Lead
February 2012	Monitoring	Monitoring mechanisms made more specific.	Helen Rutter - Clinical Effectiveness Lead
August 2013	Full Review	Up-date in line with NICE guidance. Make specific for in-patients only. Change from guideline to guideline following discussion at Clinical Standards and Therapeutics Committee 07/08/2013	Helen Rutter – Clinical Effectiveness Lead Dr S Cowie – Consultant physician Dr A Foden - Consultant physician Members of VTE Group
February 2016	Appendices	Appendix 3 DVT Treatment proformas for Urgent Care/ GP has been added to the document	David Gibson, Pharmacist
October 2018	Full Review	Full review of the content by the VTE Task and Finish Group	VTE Task & Finish Group

This Policy/Procedure/Guideline has been reviewed and updated to comply with the General Data Protection Regulations (May 2018)

Contents

1 Introduction

Venous thromboembolism (VTE), in either the form of deep vein thrombosis (DVT) or pulmonary embolism (PE) has been identified as being one of the main causes of morbidity and mortality in medical and surgical patients. Both present with a large range of clinical symptoms ranging from asymptomatic DVT to life threatening, acute PE.

VTE has a high mortality when untreated but treatment also carries risks, principally haemorrhage. Therefore, accurate confirmation of diagnosis is essential in all patients, usually by imaging. In addition, the duration of treatment with antithrombotics requires individual and careful consideration of the balance of benefits (reduced risk of long term complications and recurrent thrombosis) and risks (principally haemorrhage).

2 Purpose

To ensure safe, standardised, evidence based approach to the diagnosis and treatment of patients who are either admitted with or develop symptoms of either DVT, PE or SVT whilst an in-patient within the County Durham and Darlington NHS Foundation Trust.

3 Scope

This guideline applies to adult patients who are either admitted with or develop symptoms of either DVT or PE whilst an in-patient within the Trust.

The recommendations in this guideline must be implemented taking into account the patient's individual clinical situation and the clinical judgement of the clinician in charge of their care.

Obstetric patients will be treated in line with guideline GUID/MAT/1316 'Management of DVT and pulmonary embolism during pregnancy and the puerperium' and GUID/MAT/1015 'Management of massive PE' Guidance.

Assessment and prophylaxis guidance is in POL/N&G/0013 Guideline for Venous Thromboembolism (VTE) risk assessment and prophylaxis in adult patients admitted to hospital.

Guideline for VTE prevention following an acute stroke – is available on the intranet site see links to the document. Stroke Guideline

The guideline for the Diagnosis and Treatment of Suspected High Risk Pulmonary Embolus (PE) in Adults (non-pregnant*) aged over 18 years is available at Appendix 7

4 Definitions

For the purpose of this guideline the following definitions stand.

Venous thromboembolism: Venous thrombosis is a condition in which a blood clot (thrombus) forms in a vein. Blood flow through the affected vein can be limited by the clot, causing swelling and pain. Venous thrombosis most commonly occurs in the 'deep veins' in the legs, thighs, or pelvis. This is known as a deep vein thrombosis. An embolism is created if a part or all of the blood clot in the deep vein breaks off from the site where it is created and travels through the venous system. If the clot lodges in the lung a very serious condition, pulmonary embolism (PE), arises. Venous thrombosis can form in any part of the venous system. However, deep vein thrombosis (DVT) and PE are the most common manifestations of venous thrombosis. DVT and PE are known as venous thromboembolism (VTE).

5 Duties

Medical Director - the Medical Director has overall clinical responsibility for this guideline.

Clinical Directors – all Clinical Directors are responsible for implementation within Care Group.

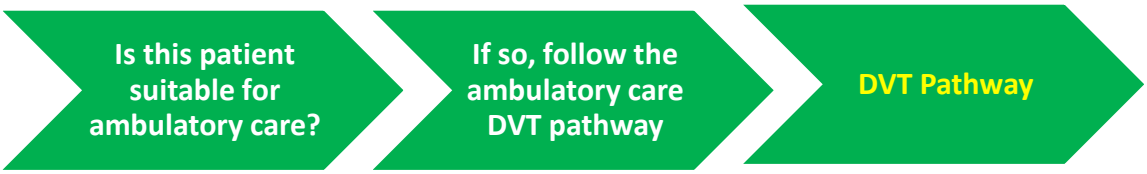
Medical staff - Medical staff are responsible for carrying out appropriate diagnostics and prescribing appropriate treatment.

Nursing staff - Ward nursing staff are responsible for delivering treatment, medication and care as prescribed by medical staff.

Care Groups – the Care Groups are responsible for ensuring a clinical review (RCA) is carried out per patient on any episode of VTE within 90 days of discharge following an inpatient stay of at least twenty four hours, or following a surgical procedure under general or regional anaesthetic.

Radiology - Radiology will identify all VTE events monthly and send the data to each Care Group for a review to take place. The findings from the review should be sent to Patient Safety Team so a quarterly report can be completed.

6 Diagnostic Investigations for Deep Vein Thrombosis



If GP/Urgent Care → **See Appendix 3**

If not, following the information below and Appendix 1 for further details.

Assessment

- **If a patient presents with signs or symptoms of deep vein thrombosis (DVT), carry out an assessment of their general medical history and a physical examination to exclude other causes.**

Two-Level DVT Wells Score

- **If DVT is suspected, use the two-level DVT Wells score (see table 1 below) to estimate the clinical probability of DVT and record the likelihood in patient notes.**

Table 1

Clinical feature	**Points**
Active cancer (treatment on-going, 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
Adapted with permission from Wells PS et al. (2003) Evaluation of D-dimer in the diagnosis of suspected deep-vein thrombosis. New England Journal of Medicine 349: 1227–35	

Offer patients in whom DVT is suspected and with a ***likely*** two-level DVT Wells score (see table 1):

- Appropriate anticoagulation and a leg vein ultrasound scan and, if the result is negative, a D-dimer test (see Appendix 6 for details of D-dimer)

  OR
- a D-dimer test and an interim 24-hour dose of appropriate anticoagulant (if a leg vein ultrasound scan cannot be carried out within 4 hours) and a leg vein ultrasound scan carried out within 24 hours of being requested.

Consider repeating the leg vein ultrasound scan 6–8 days later in patients with a positive D-dimer test and a negative leg vein ultrasound scan if clinically indicated. If the patient has discharged, make reference in the discharge letter for the GP.

Offer patients in whom DVT is suspected and with an ***unlikely*** two-level DVT Wells score (see table 1 above) a D-dimer test (see appendix 6 for details of D-dimer) and if the result is positive offer:

- appropriate anticoagulation and a leg vein ultrasound scan

  OR
- an interim 24-hour dose of an appropriate anticoagulant (if a leg vein ultrasound scan cannot be carried out within 4 hours) and a leg vein ultrasound scan carried out within 24 hours of being requested

Take into consideration alternative diagnosis in patients with:

- **an unlikely two-level DVT Wells score** (see table 1) and
  - a negative D-dimer test (see Appendix 6 for more detail),

    OR
  - a positive D-dimer test and a negative leg vein ultrasound scan.

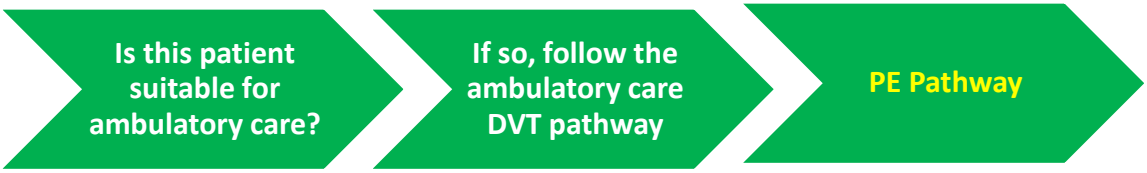
- **a likely two-level DVT Wells score (see table 1)** and
  - a negative leg vein ultrasound scan and a negative D-dimer test (see Appendix 6 for more detail),

    OR
  - a repeat negative leg vein ultrasound scan.

Advise patients in these two groups that it is not likely they have DVT, and discuss with them the signs and symptoms of DVT, provide with information leaflet and when and where to seek further medical help.

If SVT is suspected → **See Appendix 5**

7 Diagnostic Investigations for Pulmonary Embolism



If not, following the information below and Appendix 2 for further details.

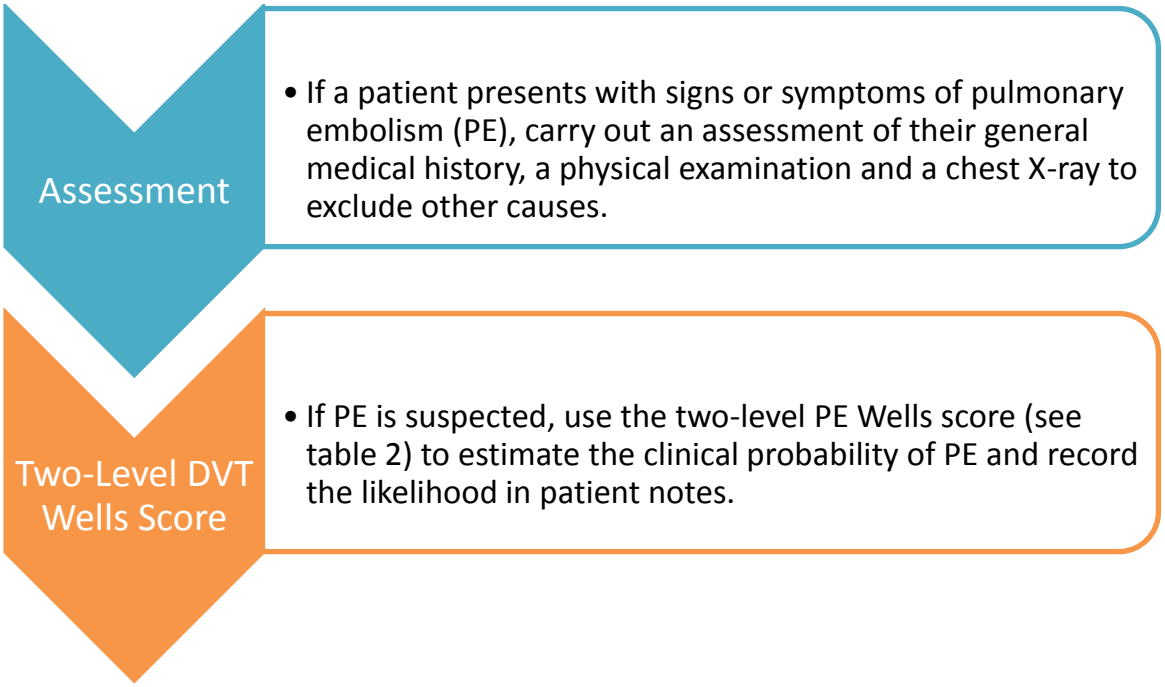


Table 2

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)	1
Clinical probability simplified score	
PE *likely*	More than 4 points
PE *unlikely*	4 points or less
Adapted with permission from Wells PS et al. (2000) Derivation of a simple model to categorize patients' probability of pulmonary embolism: increasing the model's utility with the SimpliRED D-dimer. Thrombosis and Haemostasis 83: 416-20	

Offer patients in whom PE is suspected and with a ***likely*** two-level PE Wells score (see table 2):

- immediate interim appropriate anticoagulant therapy followed by a CTPA or VQ SPECT scan,

  OR
- immediate interim appropriate anticoagulant therapy followed by a CTPA or VQ SPECT within 24 hours (NICE), if imaging cannot be carried out immediately.

Consider a leg vein ultrasound scan if the imaging is negative and DVT is suspected

Offer patients in whom PE is suspected and with an ***unlikely*** two-level PE Wells score (see table 2) a D-dimer test (see appendix 5 for details on D-dimer)and if the result is positive offer:

- an immediate CTPA or VQ SPECT scan,

  OR
- immediate interim parenteral anticoagulant therapy followed by a CTPA or VQ SPECT scan

All patients are suitable for VQ SPECT. However, patients with substantial abnormalities on the chest x-ray or have severe COPD are more likely to have significant ventilation abnormalities which may make interpretation difficult. Patients who should be preferentially referred for VQ SPECT include:

- Patients < 60 years, particularly younger women
- Pregnant patients
- Lactating mothers
- Patients who have allergies to contrast
- Patients who have poor renal function eGFR 30 or less

Take into consideration alternative diagnoses in the following two groups of patients:

- Patients with an ***unlikely*** two-level PE Wells score (see table 2) and either:
  - a negative D-dimer test,

    OR
  - a positive D-dimer test and negative imaging.

- Patients with a ***likely*** two-level PE Wells score (see table 2) and both:
  - negative imaging **and**
  - no suspected DVT

Advise these patients that it is not likely they have PE and discuss with them the signs and symptoms of PE, provide an information leaflet (available via the staff

intranet/policies and procedures under VTE) and when/where to seek further medical help.

8 Patients With Signs and Symptoms of Both Deep Vein Thrombosis and Pulmonary Embolism

If there is obvious evidence of DVT (eg red, swollen leg), ultrasound of legs would be performed instead of CTPA, if proximal DVT present no further imaging required as PE is therefore assumed to exist. **If calf vein only proceed to CTPA, as will determine duration of Rx.**

9 Prognosis

The confirmation of pulmonary embolism should trigger an assessment of the risk of complications.

We suggest using the Simplified Pulmonary Embolism Severity (sPESI) Index as a primary tool for early stratification. See the attached table for details.

An sPESI score "0" indicates low risk of complications and may be used as guidance for early discharge or ambulatory treatment during the initial presentation.

All patients presenting sPESI greater than (>)= 1 have at least intermediate risk of adverse events. The stratification may be further enhanced by adding information on increased RV ventricular strain. This parameter can be derived from imaging or laboratory tests. An RV/LV ratio above 0.9 on echocardiographic or CT examination and/or proven myocardial injury or increased RV strain (troponin is above normal limit or elevated BNP) identify patients with higher mortality. It is reasonable to consider the High Dependency Unit as a hospitalization base for this group of patients.

High-risk patients are identified on the ground of hemodynamic compromise, which for practical reasons is defined as sustained systolic blood pressure less than (<)90 mmHg or BP drop by greater than or equal to (≥)40 mm Hg, for greater than (>)15 minutes, if not caused by new-onset arrhythmia, hypovolaemia, or sepsis. This presentation requires an immediate response which may need fluid resuscitation, inotropic support or thrombolytic treatment (See section 10.2 thrombolytic treatment). The High Dependency Unit should be a default destination for this group of patients.

sPESI	
Age Male sex	1 point (if age >80 years)
Chronic heart failure	1 point
Chronic pulmonary disease	1 point
Pulse rate ≥110 b.p.m.	1 point
Systolic blood pressure <100 mm Hg	1 point
Arterial oxygen saturation <90%	1 point
sPESI score	

sPESI – score system

Low risk
0 points = 30-day mortality risk 1.0% (95% CI 0.0%-2.1%)
Intermediate/high risk
Greater than or equal to (≥1) point(s) = 30-day mortality risk 10.9% (95% CI 8.5%-13.2%)

10 Treatment

10.1 Pharmacological interventions – Deep vein thrombosis or pulmonary embolism

Initial treatment of VTE

- Prescribe Enoxaparin with confirmed proximal DVT or PE at a dose of 1mg/kg bd (twice daily) for complicated patients at high risk of VTE recurrance (eg symptomatic PE, cancer, recurrent VTE or proximal thrombosis) or 1.5mg/kg od (once daily) for uncomplicated patients with a low risk of VTE recurrence. Risk assessment needs to take into account a patients thromboembolic risk and the individual risk of bleeding.

- If diagnosis is likely to be delayed by more than one hour consider administering a dose of Enoxaparin before diagnosis is confirmed.

- For patients with PE and haemodynamic instability, offer UFH and consider thrombolytic therapy (see section 10.2).

Renal

- For patients with severe renal impairment or established renal failure (Creatinine Clearance less than 30ml/min) offer enoxaparin at 1mg/kg od or unfractionated heparin (UFH) with dose adjusted based on the APTT (activated partial thromboplastin time).

- For patients with a CrCl of less than 15ml/min UFH should be the first choice for treatment.

Ongoing management

- Choice of anticoagulant will depend upon a patients individual condition and personal preference. Choice of oral anticoagulantion should be:

    - Either a Vitamin K Antagonist (VKA) e.g. Warfarin to patients with confirmed DVT or PE within 24 hours of diagnosis and continue the VKA for at least 3 months. Treatment duration should be extended beyond 3 months dependent upon a patients individual risk of VTE recurance. Continue LMWH until INR is within desired therapeutic range for at least 24 hours. Advice on initiation and on-going monitoring of VKA can be found in the trust Anticogulation policy. Please ensure that referral to the anti-coagulation service and duration of

therapy documented. A clinical review of all patients with diagnosed DVT/PE is needed.

- Or DOACs (Direct Oral Anticoagulants) should be considered as an option for treating patients with either DVT or PE. For advice about indivudal agents see BNF.

- Offer oral anticoagulant of choice beyond 3 months to patients with an unprovoked PE, taking into account the patient's risk of VTE recurrence and whether they are at increased risk of bleeding. Discuss with the patient the benefits and risks of extending their anticoagulant treatment.

- For advice about indication and monitoring of VKA and UFH consult the CDDFT Oral anticoagulation guidelines (PROC/MM/0015).

Ambulatory patients

- Ambulatory patients should be offered a choice of anticoagulation as per pathways: Ambulatory, UCC/GP.

Special patient groups

- **Cancer**- Offer LMWH to patients with active cancer and confirmed DVT or PE, and continue the LMWH for 6 months. At 6 months, assess the risk and benefits of continuing anticoagulation.

- **Alcohol and substance misuse** patients diagnosed with VTE should be offered LMWH for at least 6 weeks as a minimum but idealy complete the full course the preferred anticoagulant.

10.2 Thrombolytic therapy (see local guidelines)

10.2.1 Extensive deep vein thrombosis

Consider catheter-directed thrombolytic therapy for patients with symptomatic iliofemoral DVT who have:

- symptoms of less than 14 days' duration **and**
- good functional status **and**
- a life expectancy of 1 year or more **and**
- a low risk of bleeding

Thrombolytic therapy for this group is not performed on site. For possible transfer to the Regional Unit

Contact Point: Vascular Consultant or Registrar On Call – UHND Bleep 32249

10.3 Mechanical interventions – deep vein thrombosis or pulmonary embolism

10.3.1 **Do not offer elastic graduated compression stockings to prevent post-thrombotic syndrome or VTE recurrence after DVT.** Consider elastic stockings for the management of leg symptoms after DVT (NICE CG144, 2015).

10.3.2 Offer inferior vena caval filters to patients with acute PE or ileofemoral DVT when:

- Contraindication to anticoagulation eg life threatening bleeding, 2 weeks of delivery
- Severe complication of anticoagulation
- Failure of anticoagulation therapy eg increased INR 3-4 targets/switch to LMWH
- Essential surgery within one month of thrombosis

Establish baseline bloods FBC, U&E, INR, APTT then discuss with haematologist. Agree on removable or permanent filter.

Discuss with interventional radiologist placing of IVC filter. A target date for the extraction of removable IVC filter is to be documented.

Contact Point: **On Call Haematologist via switchboard**
On Call Radiologist via switchboard to discuss request for interventional radiologist placement of IVC filter

If not possible to offer this service at CDDFT, contact South Tees NHS Foundation Trust or Newcastle upon Tyne Hospitals NHS Foundation Trust

10.3.3 At the earliest opportunity, the removable IVC filter will be extracted.

- The interventional radiologist will document and plan the IVC removal
- All patients following removal of an IVC filter must be reviewed. Consultant Haematologist advice can be requested.

11 Patient Information

Give patients having anticoagulation treatment verbal and written information about:

- how to use anticoagulants
- duration of anticoagulation treatment
- possible side effects of anticoagulant treatment and what to do if these occur
- the effects of other medications, foods and alcohol on oral anticoagulation treatment
- monitoring their anticoagulant treatment
- taking anticoagulants if they are planning pregnancy or become pregnant
- how anticoagulants may affect activities such as sports and travel

- when and how to seek medical help.

Provide patients who are having anticoagulation treatment with an 'anticoagulant alert card' and advise them to carry this at all times.

Be aware that heparins are of animal origin and this may be of concern to some patients. For patients who have concerns about using animal products, consider offering synthetic alternatives based on clinical judgment after discussing their suitability, advantages and disadvantages with the patient.

Advise patients about the correct application and use of below-knee graduated compression stockings, how long they should be worn and when they should be replaced.

12 Self-Management and Self-Monitoring for Patients Treated with Vitamin K Antagonist (VKA)

Do not routinely offer self-management or self-monitoring of INR to patients who have had DVT or PE and are having treatment with a VKA.

13 Referral to Haematology Thrombolysis Clinic

Patients with **unprovoked** - on minimally provoked (eg long haul travel or minor surgery) VTE

Patient with **recurrent** VTE

Patients who develop **VTE while on adequate anticoagulation**

Patients with **VTE at unusual sites** eg mesenteric / portal vien thrombosis, intracranial sinus thrombosis.

Patients with **provoked VTE, only if the attending clinician suspects on going risk factor** eg family history of VTE.

14 Post PE Management Following Discharge

All patients must have follow up within 3 months of diagnosis and investigations for possible cancer.

It is the clinicians responsibility to ensure management of these patients.

15 Investigation for Cancer

Offer all patients diagnosed with unprovoked DVT or PE who are not already known to have cancer the following investigations:

- a physical examination (guided by the patient's full history) **and**
- a chest X-ray (not needed if CTPA completed) **and**
- blood tests (full blood count, serum calcium and liver function tests) **and** urinalysis **and**
- Prostate examination in men older than 40 (+/- PSA) **and/or**
- Breast examination in women older than 50 **and**
- In discharge letter please highlight to GP to check mammography and cervical screening up to date.

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT or PE who do not have signs or symptoms of cancer based on initial investigation.

16 Thrombophilia Testing

- **Do not** routinely offer thrombophilia testing to patients who are continuing anticoagulation treatment.

- Consider testing for antiphospholipid antibodies and where anticoagulation is to be stopped.

- Consider repeat D-dimer test 4 weeks after stopping anticoagulation in patients with **unprovoked – minimally provoked – VTE** where no persistant risk factor is identified, and where anticoagulation is to be stopped. A raised D-dimer 4 weeks after stopping anticoagulation identifies a group of patients at high risk of recurrence. The risk/benefit of continuing anticoagulation should be discussed with the patient.

- **Do not** routinely offer thrombophilia testing to patients who have had provoked DVT or PE.

- **Do not** routinely offer thrombophilia testing to first-degree relatives of people with a history of DVT or PE and thrombophilia.

17 Root Cause Analysis

The purpose of the Root Cause Analysis (RCA) is to determine the facts of a case, identify the root causes and make recommendations to prevent reoccurrence.

Following all confirmed VTE incidents, when the trust has provided care within 90 days of a VTE incident being identified, an RCA must be undertaken using the short VTE RCA template.

Consultants and teams have the responsibility to complete this work within 30 working days of the VTE event being recognised.

18 Monitoring

18.1 Compliance and Effectiveness Monitoring

Compliance with this policy will be monitored as outlined in the table below.

18.2 Compliance and Effectiveness Monitoring Table

Monitoring Criterion	Response
Who will perform the monitoring?	Information Department by producing compliance with assessment figures. Care Groups will review compliance with assessment figures and carry out monitoring of prophylaxis via monthly ward performance framework.
What are you monitoring?	The number of patients who have appropriate risk assessment for VTE and appropriate prophylaxis in line with trust guideline.
When will the monitoring be performed?	Weekly compliance figures.
How are you going to monitor?	Figures are produced on a weekly basis showing levels of compliance on all adult in-patients and day-cases (with the exception of patients within the exclusion criterion) – these feed into the weekly monitoring and annual monitoring for CQUIN.
What will happen if any shortfalls are identified?	Information disseminated to Care Groups who will be responsible for actioning specific issues.
Where will the results of the monitoring be reported?	Care Group Performance Reviews
How will the resulting action plan be progressed and monitored?	Action plans should not be required as picked up as part of performance reviews.
How will learning take place?	Information sharing from the Anticoagulation Group

19 Glossary of Terms

VTE: Venous thromboembolism
PE: Pulmonary embolism
DVT: Deep vein thrombosis
SVT: Superficial venous thrombosis
LMWH: Low molecular weight heparin
CTPA: Computed tomographic pulmonary angiography
CXR: Chest x-ray
VKA: Vitamin K antagonist

20 Associated Documentation

Policy for the Development and Management of Guideline and Guidance Documents
Policy for Venous Thromboembolism (VTE) risk assessment and prophylaxis in adult patients admitted to hospital
Incident Management policy
Management of DVT and pulmonary embolism during pregnancy and the puerperium
Management of Massive PE (Maternity Policy)
Ambulatory VTE Pathway
Guidelines for VTE prevention following an acute stroke
Major Haemorrhage Policy

National Institute for Health and Care Excellence (2015) CG 144: Venous thromboembolic diseases: diagnosis, management and thrombophilia testing.

National Institute for Health and Care Excellence (2015) CG92: Venous thromboembolism: reducing the risk for patients in hospital

National Institute for Health and Care Excellence (2016) QS29: Venous Thromboembolism in adults diagnosis and management

National Institute for Health and Care Excellence (2018) QS3: Venous thromboembolism in adults: reducing the risk in hospital

National Institute for Health and Care Excellence (2018) NG89: Venous thromboembolism in over 16s: reducing the risk of hospital-acquired Deep vein thrombosis or pulmonary embolism

SIGN (Scottish Intercollegiate Guidelines Network) (2010) Prevention and management of venous thromboembolism.

21 Appendices

Appendix 1 - Equality Impact Assessment

Appendix 2 – Patient with Signs or Symptoms of DVT

Appendix 3 – Patient with Signs or Symptoms of PE

Appendix 4 – DVT Treatment Proformas for Urgent Care/GP

Appendix 5 – Management of Superficial Venous Thrombosis

Appendix 6 – A Guideline on the Value of D-dimer Test in Diagnosis of VTE

Appendix 7 – The guideline for the Diagnosis and Treatment of Suspected High Risk Pulmonary Embolus (PE) in Adults (non-pregnant*) aged over 18 years