Ambulatory Care Pulmonary embolism pathway

2019/2020

Suspected PE in Non cancer and Non pregnant patients

Emergency Department or Medical team Initial Assessment:
FBC, U&E. LFT, Coagulation screening, CRP, ECG, Chest X-Ray

Patient stable?

No → Consider urgent CTPA/Echo and thrombolysis if: systolic BP<90 Marked hypoxemia

Yes

Assess clinical probability using TWO-LEVEL PE WELLS scoring
1. Is another diagnosis unlikely (chest radiograph and ECG are helpful)?
   Score: 4 or less – PE unlikely
2. Is there a major risk factor? - see PE Wells list
   Score: more than 4 points – PE likely

Two-Level PE score (see next sheet for scoring)
Clinical S&S of DVT
An alternative diagnosis is less **likely**
Heart rate >100 beats per min
Immobilisation for more than 3 days or surgery in previous 4wks
Previous DVT/PE
Haemoptysis
Malignancy
PE Likely – more than 4 points
PE **unlikely** 4 points or less

NOT TO BE USED IN PREGNANT PATIENTS

Well's> 4 → High: No D-Dimer

Well's ≤ 4 → Intermediate/low:
Test D-Dimer and take any other diagnostics check blood results taken on admission

Positive D-dimer age adjusted

Negative D-dimer age adjusted → Consider alternative diagnosis

Investigations: book CTPA/VQ immediately **via ACC**
N.B Radiologist can make decision as to CTPA/ VQ based on assessment
If female – **assess pregnancy status** (Last normal menstrual period/Urine Dip) and order investigations accordingly

Table 4 Simplified Pulmonary Embolism Severity Index

Parameter	Score	Risk class	Total points
Age >80 years	1	Low	0
Cancer*	1	High	≥ 1
Chronic cardiopulmonary disease	1		
Pulse ≥110 bpm	1		
Systolic blood pressure < 100 mm Hg	1		
Arterial blood oxygen saturation < 90%†	1		

*Defined as active cancer (diagnosed within last 12 months or undergoing

NOT TO BE USED IN PREGNANT PATIENTS

Assess management in OPD setting against sPESI score In non pregnant patients

sPESI ≥ 1 → Not suitable for Outpatient Management

sPESI 0

Consider further investigations for cancer with an abdo-pelvic CT scan (and a mammogram for women) in all patients aged over 40yrs with a 1st unprovoked DVT or PE who do not have signs/symptoms of cancer based on initial investigation

Start Tinzaparin according to dosing table if immediate CTPA not available. ***Prescription record sheet signed essential for teams giving tinzaparin***

Relative or patients able to administer Tinzaparin?

No → Community administration service available? Patient **must** be housebound

No → Arrange for pt to return to Ambulatory care for daily injections OR refer to H@H

Yes → Instruct patient or relative on giving tinzaparin, provide sharp box

Yes → Make referral to Rapid Response or Community Nurses

CTPA Results

If CTPA positive for PE refer to ANTICOAGULATION CLINIC

If CTPA negative, consider a proximal leg vein scan if DVT is suspected.
If negative and no other concerns discharge;
if positive move to DVT pathway

ALL patients referred from ED MUST be seen in ACC for medical review prior to anticoagulation clinic referral

SOURCE: Adapted from an example from NHS Institute for Innovation and Improvement website (www.institute.nhs.uk) and Kaiser Permanente Guidelines

TWO-LEVEL Pulmonary Embolism PE WELLS SCORE
(NOT VALIDATED IN PREGNANCY)

Clinical Feature	Points
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpitation 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 past 4 weeks	1.5
Previous DVT/PE	1.5
Haemoptysis	1
Malignancy (on treatment, treated in last 6 months or palliative)	1
Clinical probability simplified scores	
PE Likely	**More than 4 points**
PE unlikely	**4 points or less**
Adapted with permission from Wells PS et al. (2000)	

***VQ Scan indications (available Monday and Thursdays only)**

- **Pregnant/ Breastfeeding**
- **Young patient**
- **Normal CXR**
- **Deranged Renal function**

Assessment of suitability for ACC Management using Pulmonary Embolism Severity Index (PESI) and Simplified Pulmonary Embolism Index (sPESI)

(NOT VALIDATED IN PREGNANCY)

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*Defined as active cancer (diagnosed within last 12 months or undergoing treatment, personal communication from Prof David Jimenez).

Pulmonary Embolism Severity Index (PESI)
The PESI is a validated, accurate, easy-to-use tool that can be used at no cost. It can be accessed at http://www.mdcalc.com/pulmonary-embolism-severity-index-pesi/

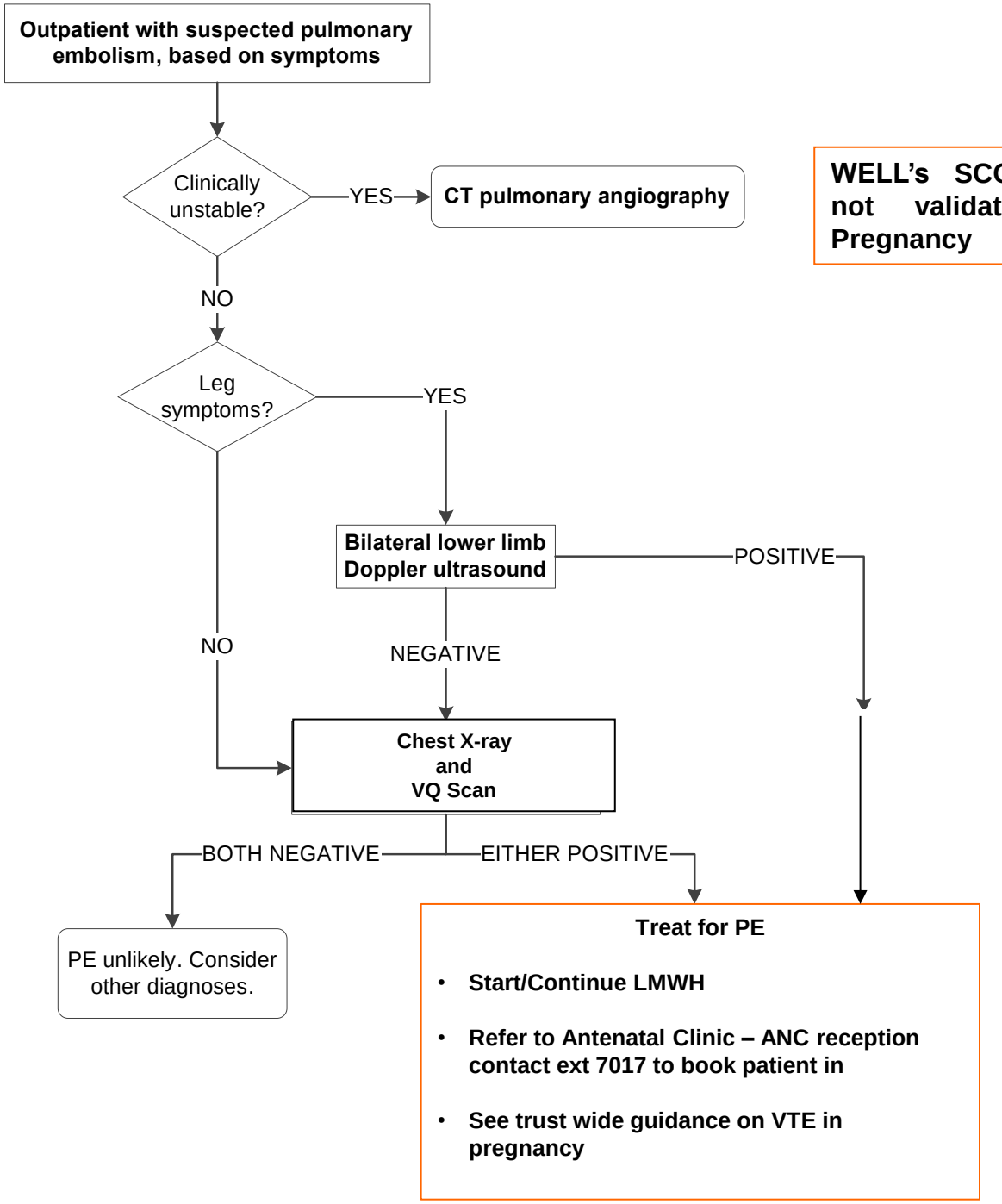
Predictor	Points
Age	+1 per year
Male sex	+10
Heart failure	+10
Chronic lung disease	+10
Arterial oxygen saturation < 90%	+20
Pulse ≥ 110 beats per minute	+20
Respiratory rate ≥ 30 breaths per minute	+20
Temperature < 36° C/96.8° F	+20
Cancer	+30
Systolic blood pressure < 100 mm Hg	+30
Altered mental status	+60

Risk classification based on PESI score

Risk	PESI score	30-day mortality	Recommendation
Class I: Very low risk Class II: Low risk	< 65 66–85	0.1 to 1.6% 1.7 to 3.5%	Offer outpatient treatment to patients in Classes I and II. Discuss the benefits and risks of outpatient treatment.
Class III: Intermediate risk Class IV: High risk Class V: Very high risk	86–105 106–125 > 125	3.2 to 7.1% 4.0 to 11.4% 10.0 to 24.5%	Provide inpatient treatment for patients in Classes III–V.

SOURCE: Adapted from an example from NHS Institute for Innovation and Improvement website (www.institute.nhs.uk) and Kaiser Permanente Guidelines 2017

Suspected PE evaluation and diagnosis in Pregnant Woman

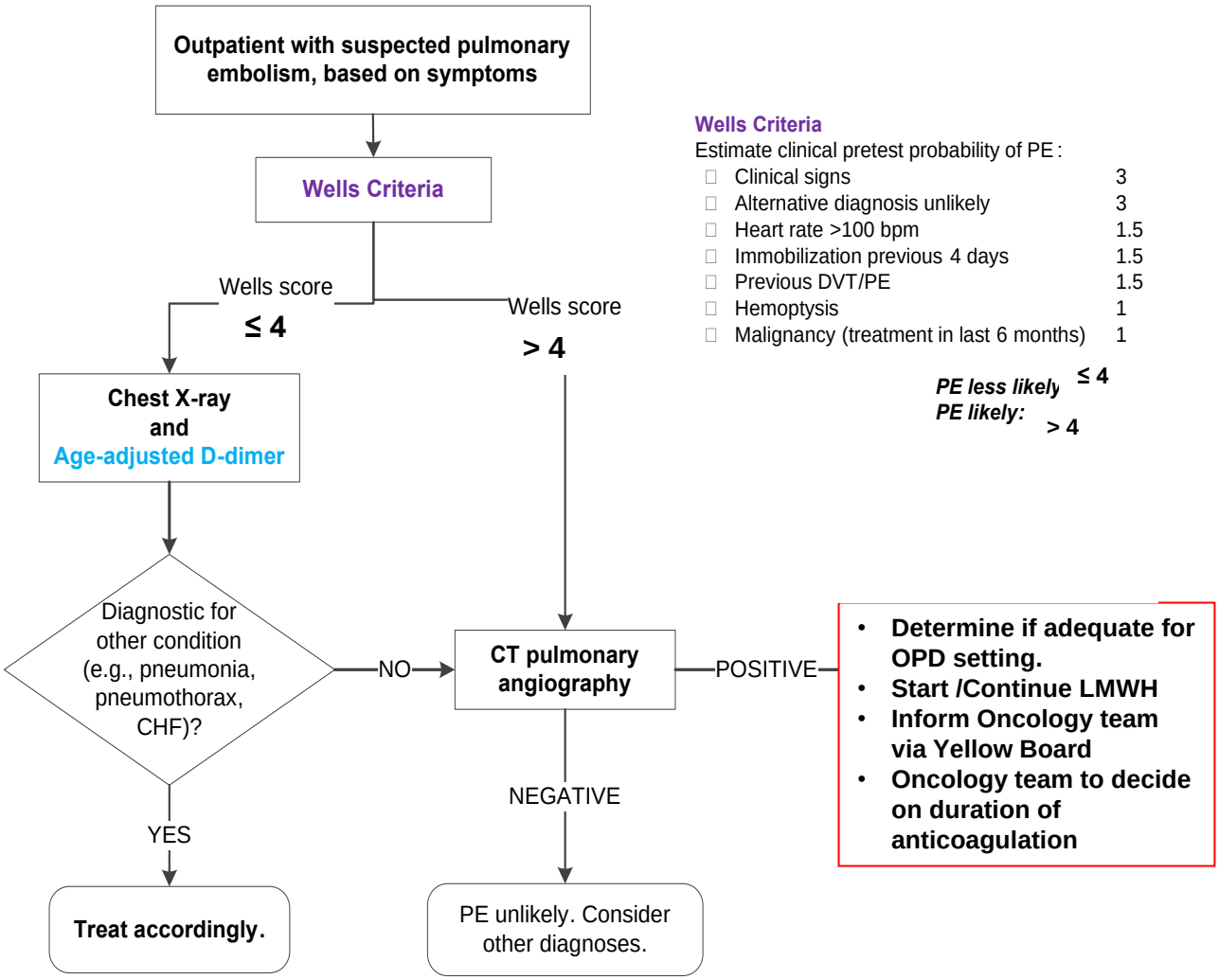


WELL's SCORE is not validated in Pregnancy

Adapted from Leong 2012 and Kaiser Permanente Guidelines 2017

Suspected PE evaluation and diagnosis in Adults with cancer

This algorithm is based on NCCN 2016.



Wells Criteria

Estimate clinical pretest probability of PE :

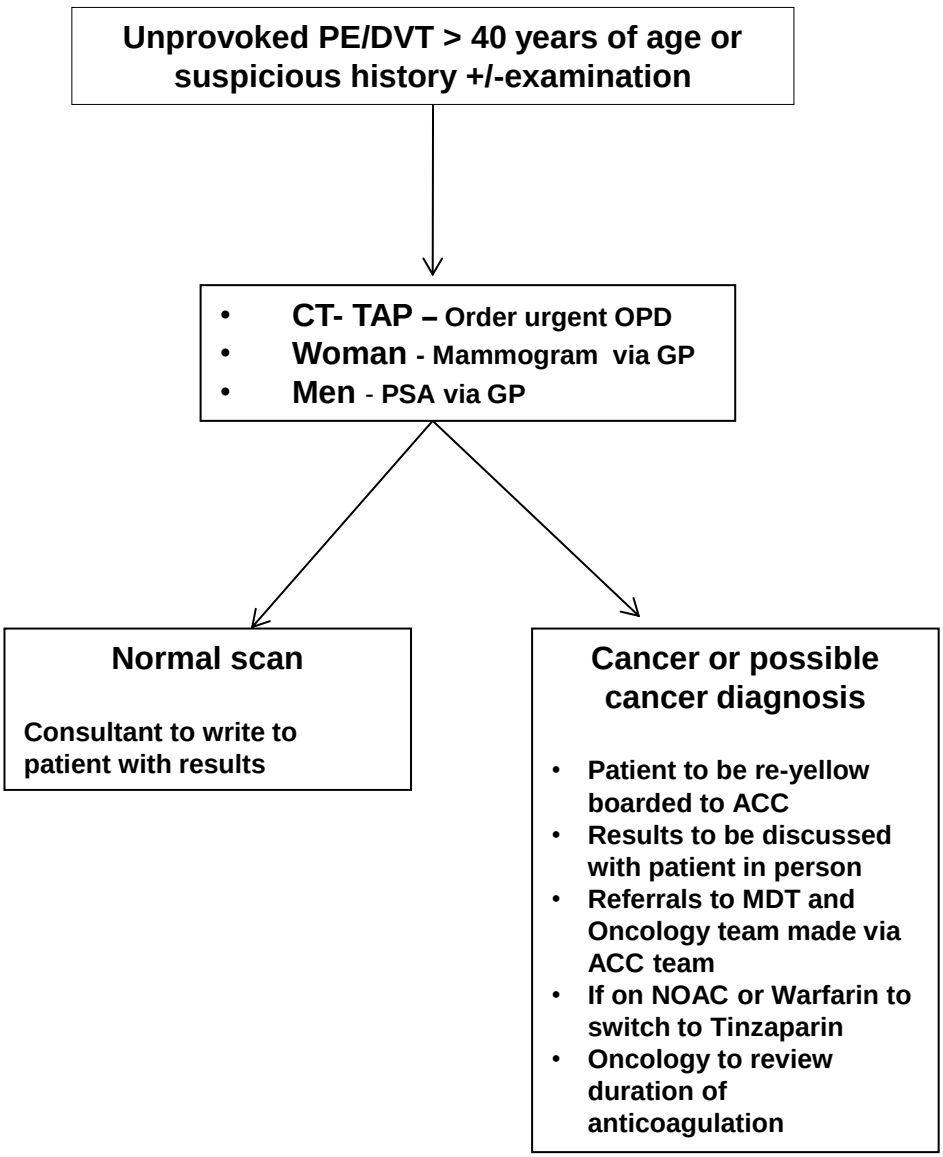
Clinical signs	3
Alternative diagnosis unlikely	3
Heart rate >100 bpm	1.5
Immobilization previous 4 days	1.5
Previous DVT/PE	1.5
Hemoptysis	1
Malignancy (treatment in last 6 months)	1

PE less likely **≤ 4**

PE likely: **> 4**

Adapted from Kaiser Permanente Guidelines 2017

Investigation for cancer in unprovoked DVT/PE



Tinzaparin Dosage Calculation tool for the treatment of DVT and PE

Subcutaneous Low Molecular Weight Heparin (LMWH)

- The patient **MUST** be weighed before prescribing tinzaparin.
- The weight MUST also be documented on the patient's inpatient prescription chart.
- The treatment dose of tinzaparin given subcutaneously is 175 units/kg ONCE a day
- Doses must be rounded to the nearest 1000 units (0.05ml) so that the dose is measurable.
- The patient's actual weight should be rounded to the nearest 5kg.

	Weight (kg)	Injection volume (ml)	Tinzaparin dose (units)
Use multidose vial	130	1.15	23,000
	125	1.10	22,000
	120	1.05	21,000
	115	1.00	20,000
	110	0.95	19,000
Use 0.9ml syringe	105	0.90	18,000
	100	0.90	18,000
	95	0.85	17,000
	90	0.80	16,000
	85	0.75	15,000
Use 0.7ml syringe	80	0.70	14,000
	75	0.65	13,000
	70	0.60	12,000
	65	0.55	11,000
	60	0.55	11,000
Use 0.5ml syringe	55	0.50	10,000
	50	0.45	9,000
	45	0.40	8,000
	40	0.35	7,000

For further information please contact Medicines Information (MI) on extension 7114

NOTES:

- **For patients that weigh more than 130kg actual body weight should still be used to calculate the dose. For such patients monitoring of anti-factor Xa should be considered.**
- **Monitoring of anti-factor Xa activity should be considered in patients with severe renal impairment (creatinine clearance (CrCl) < 30 ml/min)[1]**
- **For patients with a CrCl of <20ml/min use an alternative treatment (e.g. enoxaparin 1mg/kg OD[2]). Please seek further advice from the ward pharmacist or Medicines Information.**
- **Each pre-filled syringe and multidose vial contain tinzaparin at a concentration of 20,000units/ml.**

1.Summary of Product Characteristics (SPC) for Innohep (tinzaparin) last updated on the eMC: 02/12/2010
2.The Renal Drug Handbook, 3rd Edition, 2009

**Adapted from a document from Imperial College NHS Trust by Nadine Hall on behalf of the Department of Pharmacy Luton and Dunstable Hospital.
Approved by The Drug & Therapeutics Committee September 2011. Review date September 2013**

PULMONARY EMBOLISM AMBULATORY CARE - EAU / IMAGING PATHWAY

A&E/ EAU decides patient meets criteria for Ambulatory care and CTPA/VQ* required

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- **Dr requests CTPA/VQ *on ICE**
- **Dr sends yellow board to ACC**

- **Location "ambulatory care" will trigger apt within 48hrs Mon – Fri**
- **Ensure patient's contact number is on request**
- **If female – assess pregnancy status- (LNMP/Urine dipstix)**

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- **ACC team receives referral**
- **ACC team rings Radiology for date & time of scan**
- **ACC team to inform patient of time and date of scan telephonically**

IF REQUESTS are MADE BETWEEN 4.30PM FRIDAY, SATURDAY,SUNDAY AND BANKHOLIDAYS (until further notice)
ACC team will ring Radiology the next working day

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- **Patient arrives 30 minutes before scan appointment**
- **ACC team- inserts IVI cannula**
- **Patient returns to ACC after imaging to be seen by doctor for results**

REFERRAL TO ANTICOAGULATION SERVICE

PE confirmed

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Continue Tinzaparin

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Refer to Anticoagulation service for discussion of ongoing anticoagulation

Ambulatory Care to Anticoagulation clinic staff referrals roles

Doctor roles

*Complete written clinic notes
*Check baseline bloods
*Complete Inpatient prescription sheet for S/C LMWH
*Refer on ICE (or FAX 7568 as contingency plan)
The anticoagulation nurse led clinic cannot see a patient if this pathway has not been completed.

Ward/clinic clerk roles

*Phone the anticoagulant clinic (ext 7537) between 9am-3pm for an appointment date and time
*Confirm the patient can attend clinic, book Transport if necessary
*Provide patient with Patient transfer information letter from Ambulatory Care to Anticoagulation clinic with written appointment details completed if known
*Place completed notes in Anticoagulation tray in Emergency Assessment Unit clerk office; these will be collected by the anticoagulation admin staff by 9am the next working day.
*On Bank Holidays and Weekends the patient will need to attend Ambulatory care for ongoing treatment.

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Patient Transfer Information from Ambulatory Care to Anticoagulation clinic

Anticoagulation Clinic Service Hours are Monday to Friday 9.30am – 12 noon we are not open at weekends or bank holidays.

Dear Patient

You have been referred to the Anticoagulant clinic for treatment of
Venous Thromboembolism
E.g. Deep vein thrombosis (blood clot in your leg).
Or Pulmonary Embolism (blood clot in your lung).

Your clinic appointment details are

DATE…… **TIME**…….

If you have not been given an appointment, the anticoagulation clinic will contact you the next working day.
If you have not been contacted by 09.30am. Please phone the anticoagulation clinic on 01582 497537 as soon as possible

The anticoagulation clinic is located on the first floor of the main hospital building,
In Zone B in the out patients department.

If you require hospital transport please discuss with the discharging ward.

Please bring your current medication to the appointment, including any self-prescribed medicine.

Please inform the clinic nurse of any allergies.

Thank you

References

- British Thoracic Society Guideline for the initial outpatient management of pulmonary embolism (PE) - 2018 Luke S G E Howard,1 Steven Barden,2 Robin Condliffe,3 Vincent Connolly,4 Christopher W H Davies,5 James Donaldson,6 Bernard Everett,7 Catherine Free,8 Daniel Horner,9,10 Laura Hunter,11 Jasvinder Kaler,12 Catherine Nelson-Piercy,13 Emma O'Dowd,14 Raj Patel,15 Wendy Preston,16 Karen Sheares,17 Campbell Tait18

- Leung AN, Bull TM, Jaeschke R, et al; ATS/STR Committee on Pulmonary Embolism in Pregnancy. American Thoracic Society documents: an official American Thoracic Society/Society of Thoracic Radiology Clinical Practice Guideline—Evaluation of Suspected Pulmonary Embolism in Pregnancy. *Radiology*. 2012 Feb; 262(2):635-646.

- Kaiser Permanente Guidelines on Pulmonary embolism diagnosis and treatment – October 2017

- NICE Clinical Guideline [CG144] Venous thromboembolic diseases: diagnosis, management and thrombophilia testingPublished date: June 2012 Last updated: November 2015