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Related Trust Policies (to be read in conjunction with)	04071 Standard Infection Prevention 04072 Hand Hygiene 06036 Maternity Record Keeping including Documentation in Handheld Records 08033 Thromboprophylaxis and treatment during labour and delivery including caesarean section 12007 Management of women with venous thromboembolism (VTE), deep vein thrombosis (DVT) or pulmonary embolism (PE) during antenatal and postnatal period 05092 Pregnant patient with raised body mass index (BMI) 08079 Clinical audit strategy and policy

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3.1		Equality and diversity; audit and monitoring update; Update 6.0, 5.4	December 2010
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4.1	Sarah Moon	Clarification to Appendix F	December 2012
5.0	Dr Richard Haines		7 June 2016
5.1	Sarah Moon	Clarification to tables 5.6 and 6.5	12 May 2017
6.0	Anita Dutta	Full Review	22nd August 2019

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1.0 Purpose

1.1 This guideline is designed to help maternity staff to identify, counsel and put the women who need antenatal and postpartum thromboprophylaxis on the correct pathway of care. (Refer to the guideline entitled 'Thromboprophylaxis and treatment during labour and delivery including caesarean section'; register number 08033 and 'Management of Venous Thrombolembolism (VTE), deep vein thrombosis (DVT) and pulmonary embolism (PE) during antenatal and postnatal period'; register number 12007)

2.0 Equality Impact Assessment

2.1 Mid Essex Hospital Services NHS Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.
(Refer to Appendix H)

3.0 Background

3.1 A significant fall in maternal death due to VTE followed the publication of the RCOG guideline 'Thromboprophylaxis' in 2004. It is likely that the fall in deaths is the result of better recognition of at-risk women and widespread thromboprophylaxis.

3.2 The overall incidence of VTE in pregnancy and the puerperium was 1–2/ 1000. The case fatality rate of pulmonary embolism was 3.5%. According to the UK Obstetric Surveillance System cohort, 70 % (no 143) of fatal and nonfatal antenatal pulmonary embolisms also had identifiable risk factors.

3.3 Many antenatal VTE events occur in the first trimester and therefore, if a decision is made to initiate antenatal thromboprophylaxis, this should begin as early in pregnancy as practical.

3.4 The postpartum period is the highest risk period for VTE, and five times higher in postpartum compared with pregnancy.

3.5 The Trust wide audit of VTE prophylaxis is mandatory. This is part of Commissioning for Quality and Innovation (CQUIN) target contract 2010; which states that 90% of patients admitted have to be risk assessed on admission and within 24 hours and of patients assessed as being high risk, 100% have to receive appropriate thromboprophylaxis.

4.0 Recommendations

4.1 All women should undergo a documented assessment of risk factors for VTE in early pregnancy or before pregnancy. All pregnant women should have a documented VTE risk assessment at the booking appointment whilst the comprehensive history is being taken.
(Refer to Appendix F)

4.2 Repeat VTE risk assessment if a patient is **admitted to the hospital** for any reason or develops other inter-current problems during pregnancy and postpartum period.

4.3 All women require VTE risk assessment **following delivery** and before discharge; and arrangements made for subcutaneous low molecular weight heparin (LMWH) prescription and administration (usually by the woman herself) in the community where necessary.

4.4 Midwives and doctors should be alert to changes in the woman's situation and be aware that her risk status may change several times during the course of the pregnancy and the postnatal period.

4.5 Body mass index must be calculated at booking visit and documented in the Antenatal Care Record. Obesity remains the most important risk factor for VTE. The revised RCOG guideline (2015) advises weight specific dosage on thromboprophylaxis.
(Refer to Appendix B)

4.6 Obese women with a body mass index (BMI) of 35 or more are unsuitable for midwife-led care, and should be seen in pregnancy by a consultant obstetrician.
(Refer to the guideline entitled 'Pregnant patient with a raised body mass index (BMI)'; register number 05092)

4.7 Vulnerable women, such as those with mental illness or learning disability and may not be able to follow advice or self inject, and so require particular care. Antipsychotic medication may be associated with weight gain, which may put the woman at increased risk of thromboembolism.

4.8 Women are at risk of thromboembolism from very early pregnancy until the end of the puerperium, and all health professionals must be aware of this. Early pregnancy units and gynaecology wards must carry out risk assessment appropriate for pregnant women.

4.9 Women with a high or very high risk of VTE should be seen by consultant obstetrician or discussed with consultant obstetrician.

4.10 Women who require thromboprophylaxis need an individual management plan at all stages of pregnancy. The patient's healthcare records must clearly document dose and duration of treatment.

4.11 Women who are on pharmacological antenatal thromboprophylaxis require anaesthetic referral to discuss individual plans for intrapartum and delivery analgesic options.

4.12 Women who fall into the 'very high risk group' require management by a specialist multidisciplinary team including haematologist, obstetrician, midwife and anaesthetist.

4.13 Women at high risk of VTE in pregnancy, such as those with previous VTE, should be offered pre-pregnancy counselling and a prospective management plan for thromboprophylaxis in pregnancy.

4.14 Women who become pregnant before receiving such counselling should be referred to a consultant obstetrician or trust-nominated expert in thrombosis in pregnancy early in pregnancy.

4.15 Women with a previous non-oestrogen-related VTE provoked by a minor risk factor should undergo testing for thrombophilia, as this will influence management and decisions regarding thromboprophylaxis antenatally.

4.16 Low molecular weight heparins (LMWH) are the agents of choice for antenatal thromboprophylaxis. All pregnant women, at risk of VTE, should be offered Clexane, unless contraindicated. These are at least as effective as and safer than unfractionated heparin.

4.17 The use of aspirin is not recommended for VTE prophylaxis in any patient group.

4.18 Regardless of their risk of VTE, all women should be encouraged to mobilise during labour and postpartum. Dehydration should be avoided.

4.19 Elective induction of labour may be indicated in some women (particularly those on high-dose prophylactic or treatment doses of Clexane) to help plan Thromboprophylaxis around delivery.

4.20 Women receiving LMWH antenatally should usually continue prophylactic doses of LMWH until 6 weeks postpartum but a postnatal risk assessment should be made.

4.21 If they are receiving long-term anticoagulation with warfarin, this can be started when the risk of haemorrhage is low.

4.22 Both warfarin and LMWH are safe when breastfeeding. Women should be repeatedly assessed for risk factors for VTE if they develop intercurrent problems or require surgery or readmission in the puerperium.

5.0 Antenatal VTE Risk Assessment and Management

5.1 All women should have a documented VTE risk assessment as stated in section 4. Those identified at risk should be offered thromboprophylaxis, according to their level of risk as defined in this section and the appropriate appendices. Women who commence LMWH should start as soon as possible and within 14 hours of the risk assessment being completed.

5.2 For risk assessment, see flow-chart of risk assessment Appendix F.

Please note obstetric thromboprophylaxis risk assessment and management has been updated in accordance with RCOG Green-Top Guideline 37a April 2015 and the following new information and guidance reflects this.

5.3 **Very High Risk**

One of the following risk factors: Requires higher-dose LMWH Prophylaxis dose 12 hourly or weight adjusted 75% of treatment dose (Refer to Appendix B) Continue for 6 weeks postpartum or until converted back to Warfarin Seeks obstetric and haematology consultant opinion
Previous recurrent VTE with antithrombin deficiency
Previous recurrent VTE with antiphospholipid antibody syndrome (APS)

5.4 High Risk

One of the following risk factors: Requires antenatal LMWH prophylaxis Refer to trust-nominated thrombosis in pregnancy expert/team Haematology advice Requires postpartum LMWH for 6 weeks
ANY previous VTE except a single event related to major surgery

5.5 Intermediate risk

One of the following risk factors: Consider antenatal LMWH prophylaxis (discuss with consultant) Requires postpartum LMWH after risk assessment
Hospital admission
Single previous VTE related to major surgery
High-risk thrombophilia but no VTE • Antithrombin deficiency • Antiphospholipid syndrome • Homozygous Factor V Leiden • Protein C deficiency • Protein S deficiency
Medical comorbidity • Cancer • Heart failure • Active SLE • Inflammatory bowel disease • Inflammatory polyarthropathy • Nephrotic syndrome • Type 1 diabetes with nephropathy • Sickle cell disease • Current intravenous drug users
Any surgical procedure e.g. appendicectomy
Ovarian Hyperstimulation Syndrome

5.6 Generic Risk factors to stratify change in risk

Age > 35 years
Obesity BMI > 30
Low-risk thrombophilia e.g. Prothrombin gene mutation, hetero Factor V Leiden
Family history of unprovoked or estrogen-provoked VTE in first degree relative
Parity ≥ 3 (a woman becomes para 3 after her third delivery)
Smoker
Gross varicose veins
Admission or Immobility e.g. Paraplegia, SPD
Current pre-eclampsia
Multiple pregnancy
Assisted reproduction techniques

1 OR 2 RISK FACTORS	LOW RISK	Mobilisation Avoidance of dehydration
3 RISK FACTORS	BECOMES INTERMEDIATE RISK	LMWH prophylaxis from 28 weeks gestation
4 OR MORE RISK FACTORS	BECOMES INTERMEDIATE RISK	LMWH prophylaxis from first trimester

5.7 Any woman with 3 current risk factors as above should be considered for prophylactic LMWH from 28 weeks gestation and will usually require prophylactic LMWH for 6 weeks postnatally but a postnatal risk assessment should be undertaken by the midwife/ obstetrician.

5.8 Any woman with 4 or more current risk factors as above should be treated as intermediate risk and should be considered for prophylactic LMWH from the first trimester and will usually require prophylactic LMWH for 6 weeks postnatally but a postnatal risk assessment should be undertaken by the midwife/ obstetrician.

5.9 Women with previous VTE should be offered pre-pregnancy counselling and a prospective management plan for thromboprophylaxis in pregnancy. Those who become pregnant before receiving such counselling should be referred at the earliest opportunity in pregnancy to a clinician with expertise in thrombosis in pregnancy. Women with previous VTE associated with antithrombin deficiency should be offered thromboprophylaxis with higher dose LMWH and for 6 weeks postnatally or until returned to oral anticoagulant therapy after delivery. Management should be undertaken in collaboration with a haematologist with expertise in thrombosis in pregnancy and consideration given to antenatal anti-Xa monitoring and the potential for antithrombin replacement at initiation of labour or prior to caesarean section.

5.10 **If objective documentation of previous VTE is not available**, the previous history of VTE can be assumed:

- When the woman gives a good history and
- She received prolonged therapeutic anticoagulation (more than 6 weeks).

5.11 **Methods for antenatal thromboprophylaxis**

Low-molecular-weight heparin

- LMWH's are the agents of choice for antenatal thromboprophylaxis. They are at least as effective as and safer than unfractionated heparin.

Unfractionated heparin

- Unfractionated heparin has a shorter half-life than LMWH and there is more complete reversal of its activity by protamine sulphate.

It may be used in following conditions:

- Around the time of delivery in women at very high risk of thrombosis;
- In women at increased risk of haemorrhage;
- In women with renal failure.

Low-dose aspirin

- The use of aspirin is not recommended for VTE prophylaxis in any patient group.
- Aspirin is recommended for all women with antiphospholipid syndrome to improve fetal outcomes. There were no adverse fetal outcomes reported in the trials of low-dose aspirin for prevention of pre-eclampsia in pregnancy.

Graduated elastic compression stockings

- Use of properly applied thigh-length stockings are recommended in pregnancy and puerperium but knee-length stockings should be considered if (as is often the case) full-length stockings are ill fitting or compliance is poor.

5.12 **Testing of thrombophilia in women with prior VTE**

- The test should be offered if previous VTE was provoked by a temporary minor risk factor (e.g. long distance travel);
- The test is not required for women with a prior unprovoked or estrogen provoked VTE, because obviously, these women should be considered for thromboprophylaxis. The test result would not alter the proposed management.
- It is important to be aware of the effects of pregnancy on the results of thrombophilia tests. In particular, protein S levels are reduced by pregnancy.

6.0 Postpartum VTE Risk Assessment and Thromboprophylaxis

6.1 All women require VTE risk assessment **following delivery** and before discharge; and arrangements made for LMWH prescription and administration (usually by the woman herself) in the community where necessary.

6.2. For risk assessment, see flow-chart of risk assessment Appendix F.

Please note obstetric thromboprophylaxis risk assessment and management has been updated in accordance with RCOG Green-Top Guideline 37a April 2015 and the following new information and guidance reflects this

6.3 **High risk**

One of the following risk factors: Requires at least 6 weeks postnatal prophylactic LMWH
Any previous VTE
Anyone requiring antenatal LMWH
High-risk thrombophilia
Low-risk thrombophilia + Family History of VTE

6.4 Intermediate risk

One of the following risk factors: Requires at least 10 days postnatal prophylactic LMWH If persisting or >3 risk factors consider extending course
Caesarean section in labour
BMI > 40 kg/m2
Re-admission or prolonged hospital admission > 3days in the puerperium
Any surgical procedure in the puerperium except immediate repair of perineum
Medical co-morbidity • Cancer • Heart failure • Active SLE • Inflammatory bowel disease • Inflammatory polyarthropathy • Nephrotic syndrome • Type 1 diabetes with nephropathy • Sickle cell disease • Current intravenous drug users

6.5 Generic risk factors to stratify change in risk

Age > 35 years
Obesity (BMI > 30kg/m2)
Family history of VTE
Parity ≥ 3 (a woman becomes para 3 after her third delivery)
Smoker
Elective caesarean section
Pre-term delivery in this pregnancy (<37 weeks)
Stillbirth in this pregnancy
Low-risk thrombophilia
Gross varicose veins
Current systemic infection
Immobility, e.g. paraplegia, SPD, long distance travel
Current pre-eclampsia
Multiple pregnancy
Mid-cavity rotational or operative delivery
Prolonged labour (> 24 hours)
PPH > 1 litre or blood transfusion

1 RISK FACTOR	LOW RISK	Mobilisation Avoidance of dehydration
2 OR MORE RISK FACTORS	BECOMES INTERMEDIATE RISK	At least **10 days** postnatal prophylactic LMWH If persisting or >3 risk factors, consider extending course

6.6 Any woman with 2 current risk factors as above should be given prophylactic LMWH for at least 10 days postpartum, to commence as soon as possible and within 14 hours of the assessment. (NICE 2018).

6.7 All women who have had caesarean sections should be considered for thromboprophylaxis with LMWH for 10 days after delivery apart from those having an elective caesarean section who should be considered for thromboprophylaxis with LMWH for 10 days after delivery only if they have additional risk factors.

6.8 The first thromboprophylactic dose of LMWH should be given as soon as possible after delivery provided that there is no postpartum haemorrhage (but see precautions after use of regional anaesthesia).

6.9 If there has been regional analgesia, in which case LMWH should be given by 4 hours after delivery or 4 hours after removal of the epidural catheter, if it is removed immediately or shortly after delivery.

6.10 If the epidural catheter is left in place after delivery for the purpose of postpartum analgesia, it should be removed 12 hours after a dose and 4 hours before the next dose of LMWH.

6.11 In women who have additional persistent (lasting more than 7 days postpartum) risk factors, such as prolonged admission or wound infection, extend the 7-day period of thromboprophylaxis for up to 6 weeks or until the additional risk factors are no longer present.

6.12 **Methods for postpartum thromboprophylaxis:**

- LMWH is appropriate for postpartum thromboprophylaxis.
- Both warfarin and LMWH are safe when breast feeding.
- If women are receiving long term anticoagulation, warfarin may be preferable, Conversion from LMWH to warfarin should be delayed for at least 5–7 days after delivery to minimise the risk of haemorrhage during the period of overlap of LMWH and warfarin treatment.
  (Refer to Management of Women with Venous Thromboembolism (VTE), Deep Vein Thrombosis (DVT) or Pulmonary Embolism (PE) During Antenatal and Postnatal Period; register number 12007)

7.0 Staff and Training

7.1 All qualified midwifery and obstetric staff are fully trained to perform an initial assessment antenatally and to inform the appropriate multidisciplinary members as necessary. Qualified staff should assist midwifery and medical trainees to learn how to assess and identify women who may require thrombophrophylaxis as part of their education and skills where appropriate to ensure safe competent practitioner.

7.2 All midwifery and obstetric staff must attend yearly mandatory training which includes skills and drills training.

7.3 All midwifery and obstetric staff are to ensure that their knowledge and skills are up-to date in order to complete their portfolio for appraisal.

8.0 Professional Midwifery Advocates

8.1 Professional Midwifery Advocates provide a mechanism of support and guidance to women and midwives. Professional Midwifery Advocates are experienced practising midwives who have undertaken further education in order to supervise midwifery services and to advise and support midwives and women in their care choices.

9.0 Infection Prevention

9.1 All staff should follow Trust guidelines on infection prevention by ensuring that they effectively 'decontaminate their hands' before and after each procedure and when taking bloods samples to use the Aseptic Non –Touch Technique (ANTT).
(Hand hygiene; register number 04072)

10.0 Audit and Monitoring

10.1 Topics for formal audit are selected on an annual basis in accordance with the requirements the Clinical Audit Strategy and Policy (register number 08076), the Corporate Clinical Audit and Quality Improvement Project Plan and the Maternity Annual Audit Work Plan.

10.2 Audit of compliance with this guideline will be considered based on national and local audit findings and clinical governance data identifying themes suggesting care delivery is suboptimal. If audit of this guideline is identified as a priority, the Women's and Children's Clinical Audit Group will identify a lead for the audit.

10.3 The findings of the audit will be reported to and approved by the Women's and Children's Clinical Audit Group and an action plan with named leads and timescales will be developed to address any identified deficiencies. Performance against the action plan will be monitored by this group at subsequent meetings.

10.4 Any significant concerns relating to compliance with the requirements of this guideline will be entered on the local Risk Assurance Framework.

10.5 Key findings and learning points from the audit will be submitted to the Clinical Governance Group within the quarterly Women's and Children's Directorate Governance report.

10.6 Key findings and learning points will be disseminated to relevant staff.

11.0 Guideline Management

11.1 As an integral part of the knowledge, skills framework, staff are appraised annually to ensure competency in computer skills and the ability to access the current approved guidelines via the Trust's intranet site.

11.2 Quarterly memos are sent to line managers to disseminate to their staff the most currently approved guidelines available via the intranet and clinical guideline folders, located in each designated clinical area.

12.0 Communication

12.1 A quarterly 'maternity newsletter' is issued and available to all staff including an update on the latest 'guidelines' information such as a list of newly approved guidelines for staff to acknowledge and familiarise themselves with and practice accordingly.

12.2 Approved guidelines are published monthly in the Trust's newsletter that is sent via email to all staff.

13.0 References

Royal College of Obstetricians and Gynaecologists (2015); Reducing the risk of Venous Thromboembolism during Pregnancy and the Puerperium; Green-top Guideline No. 37a; April. London: RCOG https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg37a/

National Institute of Clinical for Health and Excellence (2012) Venous thromboembolic diseases: NICE clinical guideline (CG 144), June 2012 London: NICE https://www.nice.org.uk/guidance/cg144

National Institute for Health and Care Excellence (2018) Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism. NICE Guideline (NG 89) London: NICE https://www.nice.org.uk/guidance/ng89

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Knight M, Bunch K, Tuffnell D, Jayakody H, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2014-16. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2018

Appendix A

Low Molecular Weight Heparin

A.1 LMWHs are the agents of choice for antenatal thromboprophylaxis. They are at least as effective as and safer than unfractionated heparin.

A.2 Doses of LMWH for thromboprophylaxis are based on booking weight.

A.3 Monitoring of anti-Xa levels is not required when LMWH is used for thromboprophylaxis, provided that the woman has normal renal function.

A.4 Lower doses of enoxaparin and dalteparin should be employed if the creatinine clearance is less than 30 ml/minute. This would equate to a serum creatinine of about 200 µmol/ l for a 30-year-old woman weighing 70 kg.

A.5 A higher prophylactic doses or therapeutic doses of LMWH may be appropriate, in antithrombin deficiency, higher doses of LMWH (weight-adjusted: either 75% or 100% of treatment dose) may be necessary, as judged by anti-Xa levels and monitoring should be by a haemostasis expert

A.6 Antenatal period the therapeutic dose should be LMWH- 1mg/kg12 hourly(as documented by RCOG), Daltaparin 100iu/kg12 hourly or Tinzaparin 175iu/kgdaily. (page 21.p 8.1 GTguideline 37a)

Contraindications to LMWH

LMWH should be avoided, discontinued or postponed in women who are risk of bleeding after careful consideration of the balance of risks of bleeding and clotting. Risk factors for bleeding are:

- Women with active antenatal or postpartum bleeding;
- Women considered at increased risk of major haemorrhage (such as placenta praevia);
- Women with a bleeding diathesis, such as von Willebrand’s disease, haemophilia or acquired coagulopathy;
- Women with thrombocytopenia (platelet count less than 75 x 109);
- Acute stroke in the last 4 weeks (ischaemic or haemorrhagic);
- Severe renal disease (glomerular filtration rate less than 30 ml/minute/1.73 m2);
- Severe liver disease (prothrombin time above normal range or known varices);
- Uncontrolled hypertension (blood pressure greater than 200 mmHg systolic or greater than 120 mmHg diastolic).

Appendix B

Antenatal and Postnatal Prophylactic Dose of LMWH

Weight	Enoxaparin	Dalteparin	Tinzaparin	
< 50 kg	20 mg	2500 units	3500 units	daily
50–90 kg	40 mg	5000 units	4500 units	daily
91–130 kg	60 mg *	7500 unit *	7000 unit *	daily
131–170 kg	80 mg *	10000 unit *	9000 unit *	daily
> 170 kg	0.6 mg/kg/day *	75 units/kg/day *	75 units/kg/day *	

High prophylactic (intermediate) dose for very high risk group (for women weighing 50-90 Kg)

- 40 mg enoxaparin 12-hourly or
- 5000 iu dalteparin 12-hourly, or
- tinzaparin 4500 iu 12-hourly.

Therapeutic dose subcutaneous LMWH (antenatal):

- 1 mg/kg enoxaparin 12-hourly or
- 100 iu/kg dalteparin 12-hourly or
- tinzaparin 175 iu/kg daily.

Therapeutic dose subcutaneous LMWH (postnatal):

- 1.5 mg/kg enoxaparin daily or
- 200 u/kg dalteparin daily or
- tinzaparin 175 u/kg daily.

***may be given in two divided doses**

Appendix C

Unfractionated Heparin

Unfractionated heparin has a shorter half-life than LMWH and there is more complete reversal of its activity by protamine sulphate.

It may be used in following conditions:

- Around the time of delivery in women at very high risk of thrombosis (when there may be reluctance to use LMWH in case regional anaesthetic techniques are required;
- In women at increased risk of haemorrhage;
- In women with renal failure.

A prophylactic dose of 5000 iu subcutaneously of unfractionated heparin could be used and repeated every 12 hours until LMWH can be resumed after delivery.

The required interval between a prophylactic dose of unfractionated heparin and regional analgesia or anaesthesia is less (4 hours) than with LMWH (12 hours).

There is less concern regarding neuraxial haematomas with unfractionated heparin.

Any exposure to unfractionated heparin is associated with an increased risk of heparin induced thrombocytopenia.

Appendix D

Graduated Elastic Compression Stockings

Use of properly applied thigh-length stockings are recommended in pregnancy and puerperium but knee-length stockings should be considered if (as is often the case) full-length stockings are ill fitting or compliance is poor.

Indications for anti-embolism stockings in pregnancy and the puerperium

- Those who are hospitalised and have a contraindication to LMWH;
- Those who are hospitalised post-caesarean section (combined with LMWH) and considered to be at particularly high risk of VTE (such as previous VTE, more than three3 risk factors);
- Outpatients with prior VTE (usually combined with LMWH);
- Travelling long distance for more than 4 hours;
- Symptomatic DVT, patients should wear a tighter-fitted stocking during the day, with an ankle pressure gradient of 30–40 mmHg for 2 years to prevent the post-thrombotic; syndrome (and continue for longer if post-thrombotic symptoms are present).

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

- Suspected or proven peripheral arterial disease;
- Peripheral arterial bypass grafting;
- Peripheral neuropathy or other causes of sensory impairment;
- Any local conditions in which stockings may cause damage, for example fragile ‘tissue paper’ skin, dermatitis, gangrene or recent skin graft;
- Known allergy to material of manufacture;
- Cardiac failure;
- Severe leg oedema or pulmonary oedema from congestive heart failure;
- Unusual leg size or shape;
- Major limb deformity preventing correct fit.

Use caution and clinical judgement when applying anti-embolism stockings over venous ulcers or wounds.

Ensure that patients who develop oedema or postoperative swelling have their legs re-measured and anti-embolism stockings refitted. Use anti-embolism stockings that provide graduated compression and produce a calf pressure of 14–15 mmHg.

Encourage patients to wear their anti-embolism stockings day and night until they no longer have significantly reduced mobility.

Remove anti-embolism stockings daily for hygiene purposes and to inspect skin condition. In patients with a significant reduction in mobility, poor skin integrity or any sensory loss, inspect the skin two or three times per day, particularly over the heels and bony prominences.

Discontinue the use of anti-embolism stockings if there is marking, blistering or discolouration of the skin, particularly over the heels and bony prominences, or if the patient experiences pain or discomfort. If suitable, offer a foot impulse or intermittent pneumatic compression device as an alternative.

Appendix E

Assessment of Bleeding Risk

Assess all patients for risk of bleeding before offering pharmacological VTE prophylaxis.

Do not offer pharmacological VTE prophylaxis to patients with any of the risk factors for bleeding shown below, unless the risk of VTE outweighs the risk of bleeding**.**

Women at high risk of haemorrhage may be more conveniently managed with unfractionated heparin or graduated compression stockings.

If a woman develops a haemorrhagic problem while on LMWH, the treatment should be stopped and expert haematological advice sought.

It should be remembered that excess blood loss and blood transfusion is a risk factor for VTE, so thromboprophylaxis should be begun or reinstituted as soon as the immediate risk of haemorrhage is reduced.

For women with an identified bleeding risk, the balance of risks of bleeding and clotting should be discussed in consultation with a haematologist with experience of thrombosis and bleeding in pregnancy.

Risk factors of bleeding
Haemophilia or other known bleeding disorder (e.g. von Willebrand's disease or acquired coagulopathy)
Active antenatal or postpartum bleeding
Women considered at increased risk of major haemorrhage (e.g. placenta praevia)
Thrombocytopenia (platelet count < 75 ×109)
Acute stroke in previous 4 weeks (haemorrhagic or ischaemic)
Severe renal disease (glomerular filtration rate < 30 ml/minute/1.73 m2)
Severe liver disease (prothrombin time above normal range or known varices)
Uncontrolled hypertension (blood pressure > 200 mmHg systolic or > 120 mmHg diastolic)
Concurrent use of anticoagulants (such as warfarin with INR higher than 2)

Appendix F

Appendix I: Obstetric thromboprophylaxis risk assessment and management

Antenatal assessment and management (to be assessed at booking and repeated if admitted)

- Any previous VTE except a single event related to major surgery → **HIGH RISK**: Requires antenatal prophylaxis with LMWH; Refer to trust-nominated thrombosis in pregnancy expert/team
- Hospital admission
- Single previous VTE related to major surgery
- High-risk thrombophilia + no VTE
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy, nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU
- Any surgical procedure e.g. appendicectomy
- OHSS (first trimester only) → **INTERMEDIATE RISK**: Consider antenatal prophylaxis with LMWH
- Obesity (BMI > 30 kg/m²)
- Age > 35
- Parity ≥ 3
- Smoker
- Gross varicose veins
- Current pre-eclampsia
- Immobility, e.g. paraplegia, PGP
- Family history of unprovoked or estrogen-provoked VTE in first-degree relative
- Low-risk thrombophilia
- Multiple pregnancy
- IVF/ART → **Four or more risk factors**: prophylaxis from first trimester; **Three risk factors**: prophylaxis from 28 weeks
- Transient risk factors: Dehydration/hyperemesis; current systemic infection; long-distance travel

Fewer than three risk factors → **LOWER RISK**: Mobilisation and avoidance of dehydration

APL = antiphospholipid antibodies (lupus anticoagulant, anticardiolipin antibodies, β_2-glycoprotein 1 antibodies); ART = assisted reproductive technology; BMI based on booking weight; DM = diabetes mellitus; FHx = family history; gross varicose veins = symptomatic, above knee or associated with phlebitis/oedema/skin changes; high-risk thrombophilia = antithrombin deficiency, protein C or S deficiency, compound or homozygous for low-risk thrombophilias; IBD = inflammatory bowel disease; immobility = ≥ 3 days; IVDU = intravenous drug user; IVF = in vitro fertilisation; LMWH = low-molecular-weight heparin; long-distance travel = > 4 hours; low-risk thrombophilia = heterozygous for factor V Leiden or prothrombin G20210A mutations; OHSS = ovarian hyperstimulation syndrome; PGP = pelvic girdle pain with reduced mobility; PPH = postpartum haemorrhage; thrombophilia = inherited or acquired; VTE = venous thromboembolism.

Postnatal assessment and management (to be assessed on delivery suite)

- Any previous VTE
- Anyone requiring antenatal LMWH
- High-risk thrombophilia
- Low-risk thrombophilia + FHx → **HIGH RISK**: At least 6 weeks' postnatal prophylactic LMWH
- Caesarean section in labour
- BMI ≥ 40 kg/m²
- Readmission or prolonged admission (≥ 3 days) in the puerperium
- Any surgical procedure in the puerperium except immediate repair of the perineum
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU → **INTERMEDIATE RISK**: At least 10 days' postnatal prophylactic LMWH; NB If persisting or > 3 risk factors consider extending thromboprophylaxis with LMWH
- Age > 35 years
- Obesity (BMI ≥ 30 kg/m²)
- Parity ≥ 3
- Smoker
- Elective caesarean section
- Family history of VTE
- Low-risk thrombophilia
- Gross varicose veins
- Current systemic infection
- Immobility, e.g. paraplegia, PGP, long-distance travel
- Current pre-eclampsia
- Multiple pregnancy
- Preterm delivery in this pregnancy (< 37+0 weeks)
- Stillbirth in this pregnancy
- Mid-cavity rotational or operative delivery
- Prolonged labour (> 24 hours)
- PPH > 1 litre or blood transfusion

Two or more risk factors → **INTERMEDIATE RISK** (see above)

Fewer than two risk factors → **LOWER RISK**: Early mobilisation and avoidance of dehydration

Antenatal and postnatal prophylactic dose of LMWH

Weight < 50 kg = 20 mg enoxaparin/2500 units dalteparin/3500 units tinzaparin daily
Weight 50–90 kg = 40 mg enoxaparin/5000 units dalteparin/4500 units tinzaparin daily
Weight 91–130 kg = 60 mg enoxaparin/7500 units dalteparin/7000 units tinzaparin daily
Weight 131–170 kg = 80 mg enoxaparin/10 000 units dalteparin/9000 units tinzaparin daily
Weight > 170 kg = 0.6 mg/kg/day enoxaparin/ 75 u/kg/day dalteparin/ 75 u/kg/day tinzaparin

Appendix G

Obstetric thromboprophylaxis risk assessment and management (including early pregnancy complication in Gynaecological ward)

Mid EssexHospital Services NHS Trust

- Above and the following tables are for guidance only and not exhaustive lists
- Thromboprophylaxis assessment and management in details – in the guideline 08014, Appendix A and Appendix B
- Ensure good hydration and mobilisation for all antenatal, intra partum and postnatal women

Key
ART = assisted reproductive therapy
BMI = bases on booking weight
Gross varicose vein = symptomatic, above knee, associated with phlebitis, oedema, skin changes,
LMWH + low molecular weight heparin
OHSS =ovarian hyperstimutation syndrome
SPD = symphysis pubis dysfunction

Note: to assess risk of bleeding before prescribing LMWH

Risk factors for bleeding

- Haemophilia or other known bleeding disorder (e.g. von Willebrand's disease or acquired coagulopathy)
- Active antenatal or postpartum bleeding
- Women considered at increased risk of major haemorrhage (e.g. placenta praevia)
- Thrombocytopenia (platelet count < 75 ×109)
- Acute stroke in previous 4 weeks (haemorrhagic or ischaemic)
- Severe renal disease (glomerular filtration rate < 30 ml/minute/1.73 m2)
- Severe liver disease (prothrombin time above normal range or known varices)
- Uncontrolled hypertension (blood pressure > 200 mmHg systolic or > 120 mmHg diastolic)
- Concurrent use of anticoagulants (such as warfarin with INR higher than 2)

Anti-embolism stocking

Indications for anti-embolism stockings in pregnancy and the puerperium

- who are hospitalised and have a contraindication to LMWH
- who are hospitalised post-caesarean section (combined with LMWH)
- who arerisk of VTE (such as previous VTE, more than three3 risk factors)
- outpatients with prior VTE (usually combined with LMWH)
- travelling long distance for more than 4 hours.
- symptomatic DVT, patients should wear a tighter-fitted stocking during the day, with an ankle pressure gradient of 30–40 mmHg for 2 years to prevent the post-thrombotic syndrome (and continue for longer if post-thrombotic symptoms are present).

Do not offer anti-embolism stockings to women who have

- suspected or proven peripheral arterial disease
- peripheral arterial bypass grafting
- peripheral neuropathy or other causes of sensory impairment
- any local conditions in which stockings may cause damage, for example fragile 'tissue paper' skin, dermatitis, gangrene or recent skin graft
- known allergy to material of manufacture
- cardiac failure
- severe leg oedema or pulmonary oedema from congestive heart failure
- unusual leg size or shape
- major limb deformity preventing correct fit

Appendix H: Preliminary Equality Analysis

This assessment relates to: Venousthromboembolism (VTE) Risk Assessment and Thromboprophylaxis in Maternity/ 08014B

A change in a service to patients		A change to an existing policy	**X**	A change to the way staff work	
A new policy		Something else (please give details)			

Questions	Answers
1. What are you proposing to change?	Full Review
2. Why are you making this change? (What will the change achieve?)	3 year review
3. Who benefits from this change and how?	Patients and clinicians
4. **Is anyone likely to suffer any negative impact as a result of this change?** If **no**, please record reasons here and sign and date this assessment. If **yes**, please complete a full EIA.	No
5. a) Will you be undertaking any consultation as part of this change? **b) If so, with whom?**	Refer to pages 1 and 2

Preliminary analysis completed by:

Name	Anita Dutta	**Job Title**	Consultant Obstetrician	**Date**	June 2019