BEST PRACTICE GUIDELINE

East Lancashire Health Economy

Use of Low Molecular Weight Heparins (LMWH) (e.g. Dalteparin / Tinzaparin)

Purpose & Scope

This guideline aims to provide sufficient information to ensure LMWHs are used safely and appropriately. It is aimed at all healthcare professionals involved in the prescribing, dispensing or administration of LMWHs. It aims to cover all indications (licensed and unlicensed) for the prevention or treatment of venous thromboembolism. It is applicable to all patients who are to receive a LMWH and have been discharged from hospital, are still under the routine care of a hospital specialist through outpatient follow up, or who are being managed purely by a primary care clinician. It is not intended to guide management of inpatients in hospital or in a community hospital; the relevant Trust policies should be consulted in this instance.

Introduction & Background

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 in the affected limb or area. 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, which can be life threatening. 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).

Low Molecular Weight Heparins (LMWHs)

LMWHs are used in the '**prevention**' of VTE (prophylaxis) in patients at moderate to high risk, and are given in a low dose.

LMWHs are also used in the '**treatment**' of VTE in patients who develop a DVT or PE and are given in a higher dose.

As LMWHs work very quickly, they are used concurrently with warfarin in the first few days of treatment for patients with VTE and are continued until the INR is in the target range. Once the INR is in the target range for 24 hours (showing that the warfarin is working sufficiently) then the LMWH is stopped. However, not all patients can take warfarin and therefore LMWHs are sometimes used for longer periods of time instead of warfarin.
When used for prevention of VTE, LMWHs are given for as long as the patient is deemed to be at high risk, and then they are stopped. **Wider context**: Direct Oral Anticoagulants (DOAC's) are now used in many VTE management plans and have a rapid onset of action that does not require LMWH during initiation.

East Lancashire Health Economy Choices of LMWH

There are a number of LMWHs licensed for both prevention and treatment of DVT/PE in the UK. In East Lancashire Hospitals for medical, surgical and obstetric patients, the LMWH agreed for prophylaxis of VTE is Dalteparin (Fragmin™) and for treatment of VTE is Tinzaparin.

For prophylaxis of PE/VTE use DALTEPARIN Syringes
A dose of 5000 units once daily is recommended for most adult medical and surgical patients, with dose adjustments for extremes of body weight. Dalteparin syringes are available as 2500 unit/0.2mL, 5000 unit/0.2mL and 7500 unit/0.3mL.

For treatment of PE/VTE use TINZAPARIN syringes. It is vital that patients are weighed using appropriate equipment, that their weight is accurately recorded, and that the dose of tinzaparin is accurately calculated based on their weight.
For treatment dosing with tinzaparin the higher strength 20,000 units/mL range of injections should be used. The dose to be given, and the syringe to be prescribed should only be calculated by weighing the patient and using the charts inside.

In addition, Enoxaparin is used in acute coronary syndrome as per SPC if fondaparinux is contra-indicated due to reduced renal function, and ELHT vascular services use a high dose Dalteparin regimen following embolectomy (Both indications RED traffic light).

How to use this guideline

Secondary Care Specialists Read the introduction above. Pages 2, 3 and 4 contain guidance for specific indications. Check whether prescribing for the whole course is your responsibility (i.e. via outpatient prescriptions) or whether the GP can be asked to prescribe. For treatment of VTE ensure the patient has been accurately weighed to calculate the correct rounded-up dose and if self-administering that the patient is trained. Communication to GP/primary care (discharge letter) must include the indication, dose, strength and volume of syringe (mL & units), monitoring requirements, renal status, patient weight and treatment duration. Where referral to district nurse / treatment room is required refer to page 6. Patients must be supplied with written information about their treatment that is understood.

Primary Care Prescribers Read the introduction above. Go to the central page relevant to the indication you have been asked to prescribe for. Check whether you should prescribe the remainder of the course, or whether the specialist should do so. Follow this advice. If a RED indication, refer back to the specialist. If an AMBER indication, prescribe including the indication, strength of syringe, dose, weight of patient (treatment dosing only) on the FP10. The weight and indication will need to be added by hand, but are essential. Ensure the patient can self administer. Where district nursing (housebound pts) or treatment room referral required, refer to last page. Ensure patient written information in a suitable format has been supplied, and they understand how to manage their regimen.

Nursing or Pharmacy Staff involved in Dispensing or Administration Nursing and Community pharmacy staff should follow the guidance on the last page to facilitate the checking, dispensing and administration of dalteparin and tinzaparin prescriptions in primary care.

Authorship & Governance – Version 7.1
This best practice guideline was originally developed with a multi-disciplinary input from across a variety of specialities, with representation from primary and secondary care including CCG and provider services across East Lancashire Health Economy. It should be read in conjunction with the Summary of Product Characteristics for the relevant products which gives advice regarding the licensed uses.
This version of the best practice guideline was updated & approved by the East Lancashire Medicines Management Board and can be found online at **www.elmmb.nhs.uk**, click on Shared Care.
Date: June 2023: Review June 2026.

PREVENTION of DVT/PE in MEDICAL & SURGICAL PATIENTS

Prevention of VTE in patients at moderate to high risk

PLEASE NOTE THE DOSES USED IN ELHT FOR PROPHYLAXIS DIFFER FROM THE USUAL LICENSED DOSES

Patients on oral anticoagulation do not require dalteparin or may be bridged with tinzaparin for surgical procedures – **see *The Peri-Procedural Management of Patients on Oral Anticoagulants and Antiplatelet medicines*** guidance.

Speciality	Indication	Licensed	Duration	Traffic Light
AMBER Traffic Light - For initiation by or on the recommendation of a specialist, and continuation by a primary care prescriber with the relevant competencies to do so. Nursing staff may still administer with written authorisation.				
General Surgery or Medicine	Immobile patients or those deemed to be at particularly high risk of DVT at home or in care situation.	No	For as long as patient is immobile and/or at higher risk of DVT/PE	AMBER
Haematology	Very High Risk Patient. Pre-flight DVT/PE prophylaxis. Haematology advice only	No	Single dose 2-3 hours pre-flight outward and return (Ref: NHS CKS [Prodigy] Guideline)	AMBER
Assessment of risk should be made on an individual basis but it is likely that recent major surgery (within 1 month), active malignancy, previous unprovoked VTE, previous travel-related VTE with no associated temporary risk factor or presence of more than one risk factor identifies those travellers at highest thrombosis risk. Travellers at the highest risk of travel-related thrombosis undertaking journeys of >3 hours should wear well fitted below knee compression hosiery. In unusual circumstances where the patient is deemed to be at an additionally high risk, consultant haematologist advice is necessary to discern when pharmacological prophylaxis is considered appropriate using LMWH. Arrange for self-administration or district nurse (housebound patients) or treatment room nurse, and consider need for compression hosiery. The person should be advised on the safe storage and disposal of 'sharps', and should be given a letter for security, immigration, and customs officials that explains why it is medically necessary for them to carry needles and syringes when travelling. **Ref. British Journal of Haematology, 152, 31–34**				
RED Traffic Light - Not for GP prescribing. Whole course supplied by hospital. Nursing staff may still administer with written authorisation. Prescribers should ensure adequate supplies for patients are prescribed as they will not be able to obtain via GP				
Vascular Surgery	High Risk Patient: Preoperatively	Yes	Started the day prior to surgery	RED
Orthopaedics	Postoperatively: Hip Fracture/Replacement	Yes	Emergency surgery: 28 days following surgery Elective surgery: 10 days LMWH followed by 28 days aspirin * (*see ELHT guidance CP17a for full details)	RED
Orthopaedics	Postoperatively: Knee Replacement	Yes	14 days in total following surgery	RED
Orthopaedics	Lower limb cast immobilisation	Yes	Until cast removal/full mobility restored - review in Fracture Clinic	RED
All Surgical Specialities	Cancer: Abdominal Solid Tumour Patient Postoperatively	Yes	28 days in total after operation then stop	RED
All Surgical Specialities	High Risk Patient: Postoperatively	Yes	As directed by the surgeon Up to 28 days maximum	RED
Gynaecology	High Risk Patients: Postoperatively	Yes	7 days postoperatively	RED
Haematology	High Risk Patient: Treated with VTE inducing medicine such as lenalidomide	No	As long as receiving lenalidomide or equivalent	RED

Dalteparin (Fragmin™) Dosing in VTE Prophylaxis for Surgical and Medical patients#

Medical and Surgical patients at high risk for VTE as per VTE risk assessment (Actual body weight)	**STANDARD subcutaneous DOSE**	**Patients with Kidney Disease/Renal Impairment** (Creatinine clearance <30mL/min)
Patients weight <50kg	**Dalteparin 2500 units Once daily***	There is no dose adjustment required for prophylactic Dalteparin in renal impairment. Monitoring of anti-Xa levels can be considered in patients with renal impairment and in patients thought to be at risk of major bleeding, however the benefit of monitoring is uncertain and accumulation of prophylactic dose dalteparin in renal impairment has not been reported
Patient weight 50 to 100kg	**Dalteparin 5000 units Once daily**	
Patients weight >100 to 150kg	**Dalteparin 5000 units Twice daily***	
Patients weight >150kg	**Dalteparin 7500 units Twice daily***	

#Dosing in Covid-19: Dosing is as per standard weight-based dosing, duration as per ELHT guidance CP17a. Consider treatment dosing with tinzaparin for high-risk patients.

***** These are unlicensed doses taken from 'What doses of thromboprophylaxis are appropriate for adult patients at extremes of body weight? UKCPA, ~Medicine Q&A362.2, June 2015

DALTEPARIN (Fragmin™) Syringe colour identification

2500 units /0.2mL Blue

5000 units /0.2mL Orange

7500 units /0.3mL Green

PREVENTION of DVT/PE during PREGNANCY and following delivery

Prevention of DVT/PE in pregnant patients at moderate to very high risk

PLEASE NOTE THE DOSES USED IN PREGNANCY FOR PROPHYLAXIS DIFFER FROM THE USUAL LICENSED DOSES

DALTEPARIN syringes - 2500 units/0.2mL; 5000 units/0.2mL; 7500 units/0.3mL (Dalteparin™ brand)

This guidance below summarises the East Lancashire Hospitals Trust guidelines which are based upon the Royal College of Obstetrics & Gynaecology Guidelines for Thromboprophylaxis during pregnancy, labour and after vaginal delivery (April 2015, Green Top Guideline no. 37a). It does not address prophylaxis following caesarean section or the acute management of VTE in pregnancy, which is covered further on.

MODERATE TO HIGH RISK PATIENTS: NOT ON WARFARIN PRIOR TO PREGNANCY

Note: The table below is an abridged version of the full ELHT guideline which should be referred to for definitive guidance. This table is to give a quick reference guide to this complex area.

RED Traffic Light - Not for GP prescribing. Whole course supplied by hospital. Nursing staff may still administer with written authorisation. Prescribers should ensure adequate supplies for patients are prescribed as they will not be able to obtain via GP

Indication		Licensed	Duration	Traffic Light
Very high	Previous VTE on long-term warfarin Antithrombin deficiency Antiphospholipid syndrome with previous VTE	No	Recommend antenatal high-dose LMWH and at least 6 weeks postnatal LMWH/warfarin Requires specialist management by experts in haemostasis and pregnancy	RED
High	Previous recurrent or unprovoked VTE Previous estrogen-provoked (pill or pregnancy) VTE Previous VTE + thrombophilia Previous VTE + family history of VTE Asymptomatic thrombophilia (combined defects, homozygous factor V Leiden)	No	Recommend antenatal and 6 weeks postnatal prophylactic LMWH.	RED
Intermediate	Single previous VTE associated with transient risk factor no longer present without thrombophilia, family history or other risk factor Asymptomatic thrombophilia (except antithrombin deficiency, combined defects, homozygous factor V Leiden)	No	Consider antenatal LMWH (but not routinely recommended) Recommend 6 weeks postnatal prophylactic LMWH Recommend 10 days (or 6 weeks if family history or other risk factors) postnatal prophylactic LMWH	RED

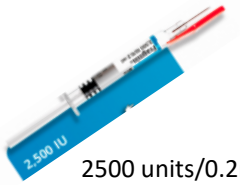
Weight: Use pre-pregnancy or booking weight at approximately 16 weeks, NOT the current weight.

Dosing in Prophylaxis of DVT and PE during PREGNANCY and following DELIVERY

<50kg	50 - 90kg	>90 - 130kg	>130 - 170kg	>170kg
2500 units daily	5000 units daily	7500 units Daily	10,000 units Daily	75 units/kg/day

Dosing for HIGH Prophylaxis of DVT and PE during PREGNANCY and following DELIVERY

50-90kg
5000 units 12 hourly



2500 units/0.2mL
Blue

5000 units/0.2mL
Orange

7500 units/0.3mL
Green

DALTEPARIN (Fragmin™) Syringe colour identification

syringes are fitted with a needle catch device

IMPORTANT INFORMATION

Once the woman is in labour or thinks she is in labour, she should be advised not to inject any further LMWH. She should be reassessed on admission to hospital and further doses should only be prescribed by medical staff.

Regardless of their risk of VTE, immobilisation of women during pregnancy, labour and the puerperium should be minimised and dehydration should be avoided. Warfarin should usually be avoided during pregnancy. It can be used after delivery and during breastfeeding

Treatment of DVT/PE in all patients managed with LMWH

Full anticoagulation of patients with a diagnosis (or working diagnosis) of DVT/PE

Speciality	Indication	Licensed	Duration
AMBER Traffic Light - For initiation by or on the recommendation of a specialist, and continuation by a primary care prescriber with the relevant competencies to do so. Nursing staff may still administer with written authorisation			
General Medicine / Emergency Department	Treatment of suspected DVT only whilst awaiting scan or scan results, usually only over a weekend	Yes	Until warfarin is in range, or scan is negative
Oncology	Treatment of DVT/PE in an oncology patient with a solid tumour. Tinzaparin given first line (as is superior to warfarin) for the whole of the treatment course. Also given in place of warfarin for patients undergoing chemotherapy that interacts with warfarin	Yes	6 months – DVT and PE then review (NICE CG144)
General Medicine	Warfarin replacement. Full anticoagulation required but where warfarin is not appropriate or not tolerated, or where INR is out of range with warfarin. Including but not exclusively patients with NG/PEG tubes, hepatic failure, erratic lifestyle (e.g. IV drug abuser), unable to monitor INR, warfarin allergy	No	As per intended duration of warfarin treatment. Usually, 3 to 6 months – DVT 6 months - PE OR as stated by the specialist
All Surgical Specialities	Warfarin replacement. Given pre-operatively for up to 5 days up until the day of surgery instead of taking warfarin. Allows INR to fall before operation	No	As directed by the surgeon
RED Traffic Light - Not for GP prescribing. Whole course supplied by hospital. Nursing staff may still administer with written authorisation. Prescribers should ensure adequate supplies for patients, as they will not be able to get additional supplies from their GP.			
All Medical & Surgical Specialities	Given post-operatively in conjunction with warfarin whilst waiting for the INR to come into range	No	Until INR is in range, for a minimum of 6 days treatment with tinzaparin
Obstetrics & Gynaecology	Treatment of DVT/PE in pregnancy. First line treatment of choice.	No	During pregnancy and for at least 6 weeks postnatally, until at least 3 months is given in total
Obstetrics & Gynaecology	Patients with mechanical heart valves or those on long term warfarin prior to pregnancy should be discussed by obstetrics/gynaecology consultants with consultant cardiologists/haematologists, ideally before pregnancy	No	As advised by the specialist. Likely to be throughout pregnancy in place of warfarin.

TINZAPARIN TREATMENT DOSE IN ADULTS

Syringes and vial containing 20,000 units/mL

Based on Tinzaparin 175units/kg bodyweight once daily. Round up or down to the nearest 0.05mL dose volume.

ADMINISTRATION

By subcutaneous injection only

Example Prescription

The dosing chart to aid in selecting the right dose and syringe strength should be used at all times

Mr. A. Jones Weight: 75kg

Dose calculation: 75kg patient requires Tinzaparin 13,000 units = 0.65mL (from a yellow 0.7mL syringe containing 20,000 units / mL)

Prescribe: Tinzaparin – supply 36 syringes
Strength: 20,000 units/mL
Syringe size: 0.6mL
Dose: 0.65mL (13,000 units) once daily by subcutaneous injection. Treatment of DVT in a patient weighing 75kg.
PLUS one 1L Sharpsafe bin with yellow lid.

PLEASE NOTE that there are a variety of different volumes of Tinzaparin syringes available, and one multidose vial – PLEASE MAKE SURE YOU HAVE SELECTED THE CORRECT ONE

		Bodyweight		Prescribed Dose	Injection Volume
Syringe marking / volume		kg	stones/lbs	Anti-factor Xa units	mL
ORANGE	0.4mL	35	5/7	6,000 units	0.3mL
ORANGE	0.4mL	40	6/4	7,000 units	0.35mL
ORANGE	0.4mL	45	7/1	8,000 units	0.4mL
RED	0.5mL	50	7/12	9,000 units	0.45mL
RED	0.5mL	55	8/9	10,000 units	0.5mL
BROWN	0.6mL	60	9/6	11,000 units	0.55mL
BROWN	0.6mL	65	10/3	11,000 units	0.55mL
BROWN	0.6mL	70	11/0	12,000 units	0.6mL
YELLOW	0.7mL	75	11/11	13,000 units	0.65mL
YELLOW	0.7mL	80	12/8	14,000 units	0.7mL
GREEN	0.8mL	85	13/5	15,000 units	0.75mL
GREEN	0.8mL	90	14/2	16,000 units	0.8mL
BLUE	0.9mL	95	14/13	17,000 units	0.85mL
BLUE	0.9mL	100	15/10	18,000 units	0.9mL
BLUE	0.9mL	105	16/7	18,000 units	0.9mL
Multidose vial 40,000 units in 2mL		110	17/5	19,000 units	0.95mL
		115	18/2	20,000 units	1mL
		120	18/13	21,000 units	1.05mL
		125	19/10	22,000 units	1.10mL
		130	20/7	23,000 units	1.15mL
		135	21/4	24,000 units	1.2mL
		140	22/1	25,000 units	1.25mL

Contraindications

- Recent cerebral haemorrhage or acute cerebral infarct
- Uncontrolled hypertension (BP > 210/120 mHg)
- Active peptic ulcer disease or oesophageal varices
- Severe liver disease
- Thrombocytopenia (Platelets < 80 x 10^9/L)
- Active bleeding or raised BASELINE INR >1.5 - seek advice
- Previous heparin induced thrombocytopenia
- Prophylactic doses are not required if receiving therapeutic anticoagulation (e.g. Warfarin)
- Endocarditis
- Recent neurosurgery or eye / ear surgery
- Patients aged 90 years or over who have renal insufficiency
- Impending miscarriage or abortion
- Hypersensitivity to active ingredients

Treatment doses of low molecular weight heparin should not be given in conjunction with spinal or epidural anaesthesia.
For prophylactic doses see 'Thromboprophylaxis Guidelines' online at **www.elmmb.nhs.uk**.

Cautions

LMWH should be used with caution in patients with a history of asthma due to the presence of sodium bisulphite

Caution is recommended in the treatment of patients with renal impairment. In moderate renal impairment (eGFR <30mL/min) for treatment doses consider monitoring of anti-factor Xa. and in severe impairment (eGFR <20mL/min) seek urgent advice from hospital pharmacy/haematology. Note contraindication in patients over 90 years with renal impairment above.

Renal Function

For tinzaparin at treatment dose, renal function tests should be carried out. This should not delay the first dose but subsequent dosing must be based on renal function.
There is no dose adjustment required for prophylactic Dalteparin in renal impairment. Monitoring of anti-Xa levels can be considered in patients with renal impairment and in patients thought to be at risk of major bleeding, however the benefit of monitoring is uncertain and accumulation of prophylactic dose dalteparin in renal impairment has not been reported. See ELHT Standard Operating Procedure for Transporting & Processing Blood Samples and Communicating and Monitoring Results for Anti Xa Assays at ELHT during Treatment Dosing with LMWH.

- Take pre–dose (trough) and 4 hours post dose (peak).
- Aim for trough less than 0.25iu/mL and peak 0.2 –0.5iu/mL

Results outside this range should be discussed with Haematology.
Clinicians may choose to use unfractionated heparin if risk of bleeding is a particular concern, though this is much more complex in terms of administration and monitoring and this decision should be made at consultant level.

Weight

The patient's weight is required to calculate the appropriate dose of LMWH, and should be recorded in the patient's record. Patients should be weighed at the start of therapy and, where applicable, during treatment. In exceptional circumstances, when a patient cannot be weighed, obtain the body weight from patients (or carers) as this is a more reliable source of information than estimates by healthcare staff. Patients who are morbidly obese (BMI >40 kg/m^2) may be considered for anti-Xa levels monitoring and treatment dose adjustments.

Licensing of LMWH's

Dalteparin and Tinzaparin have been recommended for use locally in some indications for which it is not licensed, but where it is defined that it is best practice to use a LMWH.
Healthcare professionals should follow normal procedures and adhere to their professional guidance when prescribing, dispensing or administering a licensed preparation in an indication/method it is not licensed for, as they would in any other similar situation.

Monitoring of blood results

Heparin Induced thrombocytopenia (HIT)

• HIT is a possible complication of treatment with heparins. The immune-mediated type usually occurs 7-11 days (up to 20 days) after initiating treatment

• Patients who are to receive any type of heparin require a baseline platelet count

• No further monitoring is required during or following treatment unless clinically indicated (e.g. following cardiopulmonary bypass) or if the patient has received heparin in the preceding 100 days.

• Post-operative patients and cardiopulmonary bypass patients who have been exposed to heparin in the previous 100 days should have a platelet count 24 hours after starting heparin.

• Medical patients receiving heparin do not need routine platelet monitoring

• If the platelet count falls by 30% or more or the patient develops new thrombosis or skin allergy or any other of the rarer manifestations of HIT between Day 4 and 14 consider a diagnosis of Heparin Induced Thrombocytopenia and discuss with a haematologist URGENTLY.

• There is NO need to monitor the anticoagulant activity of dalteparin or tinzaparin (e.g. INR or APTT).

It is the responsibility of the prescriber who initiates LMWH to arrange patients attendance for any blood tests. Either directly at the hospital, or with prior agreement with the GP, in primary care.

Side Effects

Skin rashes / minor bruising: These can occur at the site of injection occasionally. Systemic allergic reactions have been reported extremely rarely.

Haemorrhage: LMWHs have been shown to increase the risk of haemorrhage. However, at the recommended dose this risk is low.

Thrombocytopenia: As with heparin, thrombocytopenia may occur rarely.

Skin necrosis: This has been reported. If this occurs treatment must be withdrawn immediately.

Priapism: This has been reported rarely.

Liver Function Tests: As for heparin, a transient increase in aminotransferase levels is frequently seen. Cessation of treatment is not usually required.

Hyperkalaemia: LMWHs can suppress adrenal secretion of aldosterone leading to hyperkalaemia, particularly in patients such as those with diabetes mellitus, chronic renal failure, pre-existing metabolic acidosis, raised plasma potassium or taking potassium sparing drugs. The risk of hyperkalaemia appears to increase with duration of therapy but is usually reversible. The SPC recommends that plasma potassium should be measured in patients at risk before starting LMWH therapy and monitored regularly thereafter particularly if treatment is prolonged beyond about 7 days. However, the British Society of Haematology takes a more pragmatic approach advising that the development of symptomatic hyperkalaemia appears to be unlikely in the absence of an additional cause of hyperkalaemia.

Osteoporosis: Long-term LMWH use can cause osteoporosis but the absolute risk of symptomatic osteoporosis is unknown. Several lines of evidence now suggest that LMWHs are associated with a lower risk of osteoporosis than heparin. The conclusion from the data at present is that LMWH is preferred for long-term use and clinicians and patients should be aware of the risks of osteoporosis and consider this knowledge when determining the risk–benefit ratio of LMWH therapy.

Overdose: Emergency advice should be sought immediately Protamine reverses the anticoagulant effect of LMWHs incompletely (about 75-85%), although there is anecdotal evidence of clinical benefit in the bleeding patient. The risks and benefits of reversal should be weighed against the risks of overdose.

Subcutaneous administration

It is not necessary to remove the air bubble from the prefilled syringe before the injection as injection of the small air bubble is quite harmless. Avoiding the removal of the air bubble saves nursing time and helps avoid injection fluid on the tip of the needle, which might cause pain during injection.

It is recommended that heparins should be injected into the abdominal fat layer. Other sites of injection can be used without problems. Administration should be avoided within 5cm of the umbilicus and should be alternated between the left and right side.

A skin fold should be held between the thumb and forefinger and the entire length of the needle inserted at an angle of 90 degrees into the
skin fold. The skin fold should be held during the injection and the solution slowly and fully injected.
Dalteparin (Fragmin™) syringes contain a plastic needle catch system which should be used directly after the injection needle is withdrawn from the injection site.

Provision of Patient Information

It is the responsibility of the initiating prescriber to give patients adequate information about their condition, and their treatment.

Although a patient information leaflet is included alongside any dispensed medication, patients should also be given additional information. Leo Pharmaceuticals whose website www.VTE-support.com (password code: *innohep*) provides a range of patient specific materials including self-injection guidance.

Patients can also access information online at http**://www.medguides.medicines.org.uk**. Just search for 'tinzaparin' for additional patient information produced by the NHS and the pharmaceutical industry.

Out of area, or private referrals?

Patients initiated on any LMWHs from other NHS hospitals or providers should be managed in line with this guidance. This may involve referring prescribing back to the specialist where the indication is RED, or considering changing the patient from another LMWH to dalteparin or tinzaparin where it is AMBER & where the GP is happy to prescribe. Advice should be sought from a member of the CCG medicines management team to advise and facilitate this where necessary.

Patients from private providers should be managed in the same way.
People who opt to be referred privately (i.e. outside the NHS) are expected to pay the full cost of any treatment they receive in relation to the referral, including that of any drugs and appliances. Following a private consultation, there is no obligation for the GP to prescribe the recommended treatment if it is contrary to his/her normal clinical practice.

Self-administration?

Patients should be taught how to self-administer heparin injections, and the majority of patients will be able to do so, or have a carer do so. It is the responsibility of the prescriber initiating treatment to ensure patients and/ or their carers are adequately trained where they are to self-administer (also see **Provision of Patient Information** above).

Waste Disposal: Where people inject themselves it is their responsibility to dispose of any waste, clinical or household, that arises in a responsible way. The dalteparin syringes contain a needle catch system which enables the needle to be covered safely after use. Innohep syringes are supplied in plastic sleeves which are suitable for patients to re-use after administration – and provide adequate sharps protection. However, patients can be supplied with a 1L yellow SharpsSafe®1L bin on an FP10 prescription. The syringes come with a needle already attached. Only fill sharps boxes to 2/3 full before replacing. The sharps bin should be returned to the practice or selected community pharmacists for disposal.

- The administration chart should be completed and signed to allow the nursing staff to see the indication, dose and duration of treatment, patient's weight, and allow them to record their administration against this authorisation.

- The administration chart should be completed and signed prior to faxing to District Nurse Liaison. A new detailed transfer form for faxing is also being introduced which will provide additional information such as patient weight, indication, duration and monitoring information.

Guidance for community pharmacists or for nursing staff checking prescriptions for dalteparin and tinzaparin

Community pharmacists and nursing staff should have access to the following information prior to dispensing or administering dalteparin or tinzaparin. This can be obtained from the patient where possible, or confirmed with the prescriber where missing and this should be recorded:

- **Indication:** whether prophylaxis or treatment is intended (and whether the patient is pregnant where relevant). This is needed to be able to check the appropriate dose.

- **Strength of syringe required:** Note there are two strengths of tinzaparin available 10,000 units/mL and 20,000 units/mL – the latter is the treatment strength.

- **Volume of syringe required:** There are multiple injection volume syringes of the LMWH's available. There are also multi-dose vials of tinzaparin available.

- **Weight of patient:** This is required to check that the appropriate dose has been prescribed.

- **Dose in international units for tinzaparin and daltaparin:** The dosing charts on the inside of this guidance should be used to check the dose.

- **Frequency of administration:** Always given subcutaneously, usually self-administered.

- **Timing of administration:** LMWH should be given once daily ideally around the same time of day (exception is twice daily in some pregnant patients and patients with high body weight). In any single 24 hour period the dose time may be occasionally be varied by up to 2 hours before or after the dose time. However, where the dose timing for administering requires amending to facilitate administration (e.g. after hospital discharge), it is acceptable to move the dose time forwards or backwards on one occasion. As long as a dosing gap of at least 12 hours has occurred.

Guidance for community pharmacists dispensing tinzaparin and dalteparin (Fragmin™)

Community pharmacists are advised to produce Standard Operating Procedures to govern the checking and dispensing of prescriptions for the LMWHs. It should be noted that the community pharmacist should have the relevant information outlined above prior to dispensing any prescription, and should obtain this from the patient, or from the GP where it is missing. Community pharmacists are advised to keep minimum stocks of tinzaparin where possible to ensure that patients do not miss doses. In addition, patients should be counselled to order prescriptions in advance of running out of stocks to prevent this.

SharpSafe® bins are allowed on an FP10 Prescription. They are listed in the 'Hypodermic Equipment/Accessories Section of Part IXA of the Drug Tariff and have a fixed Drug Tariff Price. This product is a 1L bin and has a fixed reimbursement price. Sharps bins are now available with different coloured lids, it is therefore important that when supplying sharps bins to a patient, a bin with an appropriate lid colour is supplied. Yellow lidded bins are suitable for sharps that are contaminated with medicinal products, other than cytotoxic drugs.