NICE National Institute for Health and Care Excellence

NICE guideline

Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism

NICE guideline
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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

This guideline replaces CG92.

This guideline is the basis of QS3 and QS201.

Overview

This guideline covers assessing and reducing the risk of venous thromboembolism (VTE or blood clots, including deep vein thrombosis and pulmonary embolism) in people aged 16 and over in hospital. It aims to help healthcare professionals identify people most at risk and describes interventions that can be used to reduce the risk of VTE.

For guidance on pharmacological VTE prophylaxis for people with COVID-19 pneumonia who are being treated in a hospital or community setting, see our COVID-19 rapid guideline on managing COVID-19.

Who is it for?

- Healthcare professionals
- People going into hospital who are at risk of VTE. This includes people discharged from hospital, (including from A&E) with lower limb devices such as plaster casts and braces, people attending hospital for day procedures including cancer treatment and surgery, and pregnant women admitted to hospital or a midwife-led unit including up to 6 weeks after giving birth, and their carers

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Risk assessment

All patients

1.1.1 Assess all patients to identify the risk of venous thromboembolism (VTE) and bleeding (see the recommendation for all medical patients, for all surgical patients, for all pregnant women and all women who gave birth or had a miscarriage or termination of pregnancy in the past 6 weeks, for all people admitted to the critical care unit and for all acute psychiatric patients). **[2018]**

People admitted to hospital

Medical patients

1.1.2 Assess all medical patients to identify the risk of VTE and bleeding:

- as soon as possible after admission to hospital or by the time of the first consultant review

- using a tool published by a national UK body, professional network or peer-reviewed journal.

  A tool commonly used to develop a treatment plan for medical patients is the Department of Health VTE risk assessment tool. (Reproduced with the permission of the Department of Health and Social Care under the Open Government Licence.) **[2018, amended 2021]**

1.1.3 Balance the person's individual risk of VTE against their risk of bleeding when deciding whether to offer pharmacological thromboprophylaxis to medical patients. **[2018]**

1.1.4 If using pharmacological VTE prophylaxis for medical patients, start it as soon as possible and within 14 hours of admission, unless otherwise stated in the population-specific recommendations (see the sections on interventions for people with acute coronary syndromes or acute stroke or for acutely ill patients, interventions for people with renal impairment, interventions for people with cancer, interventions for people having palliative care, interventions for people admitted to critical care, and interventions for people with psychiatric illness). **[2018]**

Surgical and trauma patients

1.1.5 Assess all surgical and trauma patients to identify the risk of VTE and bleeding:

- as soon as possible after admission to hospital or by the time of the first consultant review
- using a tool published by a national UK body, professional network or peer-reviewed journal.

  A tool commonly used to develop a treatment plan for surgical patients is the Department of Health VTE risk assessment tool. (Reproduced with the permission of the Department of Health and Social Care under the Open Government Licence.) **[2018, amended 2021]**

1.1.6 Balance the person's individual risk of VTE against their risk of bleeding when deciding whether to offer pharmacological thromboprophylaxis to

surgical and trauma patients. **[2018]**

1.1.7 If using pharmacological VTE prophylaxis for surgical and trauma patients, start it as soon as possible and within 14 hours of admission, unless otherwise stated in the population-specific recommendations (see the sections on interventions when using anaesthesia, interventions for people having orthopaedic surgery, interventions for people having elective spinal surgery or cranial surgery people with spinal injury, interventions for people with major trauma, interventions for people having abdominal, thoracic or head and neck surgery, and interventions for people having cardiac or vascular surgery). **[2018]**

Reassessment of risk of VTE and bleeding

1.1.8 Reassess all medical, surgical and trauma patients for risk of VTE and bleeding at the point of consultant review or if their clinical condition changes. **[2018]**

Pregnant women and women who gave birth or had a miscarriage or termination of pregnancy in the past 6 weeks

1.1.9 Assess all women on admission to hospital or a midwife-led unit if they are pregnant or gave birth, had a miscarriage or had a termination of pregnancy in the past 6 weeks, to identify their risk of VTE and bleeding. Use a tool published by a national UK body, professional network or peer-reviewed journal. The most commonly used tool is the Royal College of Obstetricians and Gynaecologists risk assessment tool. (Reproduced from: Royal College of Obstetricians and Gynaecologists. Reducing the risk of venous thromboembolism during pregnancy and the puerperium. Green-top Guideline No. 37a. London: RCOG, 2015, with the permission of the Royal College of Obstetricians and Gynaecologists.) **[2018]**

1.1.10 Reassess risk of VTE and bleeding, and assess the need for thromboprophylaxis for all women:

- within 6 hours of giving birth, having a miscarriage or having a termination of pregnancy **or**

- if their clinical condition changes **and** they:
  - are pregnant **or**
  - gave birth, had a miscarriage or had a termination of pregnancy within the past 6 weeks. **[2018]**

1.2 Giving information and planning for discharge

1.2.1 On admission ensure that people understand the reason for having a risk assessment for VTE and bleeding. **[2018]**

1.2.2 For people admitted to hospital who are at increased risk of VTE, give them and their family members or carers (as appropriate) verbal and written information on the following before offering VTE prophylaxis:

- the person's risks and possible consequences of VTE
- the importance of VTE prophylaxis and its possible side effects – for example, pharmacological prophylaxis can increase bleeding risk
- the correct use of VTE prophylaxis – for example, anti-embolism stockings, intermittent pneumatic compression
- how people can reduce their risk of VTE (such as keeping well hydrated and, if possible, exercising and becoming more mobile). **[2018]**

1.2.3 Be aware that heparins are of animal origin and this may be of concern to some people (See Religion or belief: a practical guide for the NHS). Discuss the alternatives with people who have concerns about using animal products, after discussing their suitability, advantages and disadvantages with the person. **[2018]**

1.2.4 As part of the discharge plan, give patients and their family members or carers (as appropriate) verbal and written information on:

- the signs and symptoms of deep vein thrombosis (DVT) and pulmonary embolism

- how people can reduce their risk of VTE (such as keeping well hydrated and, if possible, exercising and becoming more mobile)
- the importance of seeking help if DVT, pulmonary embolism or other adverse events are suspected. **[2018]**

1.2.5 Give people discharged with VTE prophylaxis and their family members or carers (as appropriate) verbal and written information on:

- the importance of using VTE prophylaxis correctly (including the correct administration and disposal of pharmacological prophylaxis)
- the importance of continuing treatment for the recommended duration
- the signs and symptoms of adverse events related to VTE prophylaxis
- the importance of seeking help and who to contact if people have problems using VTE prophylaxis. **[2018]**

1.2.6 Ensure that people who are discharged with anti-embolism stockings:

- understand the benefits of wearing them
- understand the importance of wearing them correctly
- understand the need to remove them daily for hygiene purposes
- are able to remove and replace them, or have someone available who will be able to do this for them
- know what to look for if there is a problem – for example, skin marking, blistering or discolouration, particularly over the heels and bony prominences
- know who to contact if there is a problem
- know when to stop wearing them. **[2018]**

1.2.7 Ensure that people who are discharged with pharmacological and/or mechanical VTE prophylaxis are able to use it correctly, or have arrangements made for someone to be available who will be able to help them. **[2018]**

1.2.8 Notify the person's GP if the person has been discharged with

pharmacological and/or mechanical VTE prophylaxis to be used at home. **[2018]**

1.3 All patients

Mechanical prophylaxis

1.3.1 Do not offer anti-embolism stockings to people 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 anti-embolism stockings may cause damage – for example, fragile 'tissue paper' skin, dermatitis, gangrene or recent skin graft
- known allergy to material of manufacture
- severe leg oedema
- major limb deformity or unusual leg size or shape preventing correct fit.

Use caution and clinical judgement when applying anti-embolism stockings over venous ulcers or wounds. **[2010, amended 2018]**

1.3.2 Ensure that people who need anti-embolism stockings have their legs measured and that they are provided with the correct size of stocking. Anti-embolism stockings should be fitted and patients shown how to use them by staff trained in their use. **[2010]**

1.3.3 Ensure that people who develop oedema or postoperative swelling have their legs re-measured and anti-embolism stockings refitted. **[2010]**

1.3.4 If arterial disease is suspected, seek expert opinion before fitting anti-embolism stockings. **[2010]**

1.3.5 Use anti-embolism stockings that provide graduated compression and produce a calf pressure of 14 mmHg to 15 mmHg. (This relates to a

pressure of 14 mmHg to18 mmHg at the ankle and is in line with the British Standard Institution's BS 661210:2018 Specification for graduated compression hosiery, anti-embolism hosiery and graduated support hosiery.) **[2010]**

1.3.6 Encourage people to wear their anti-embolism stockings day and night until they no longer have significantly reduced mobility. **[2010]**

1.3.7 Remove anti-embolism stockings daily for hygiene purposes and to inspect skin condition. In people with a significant reduction in mobility, poor skin integrity or any sensory loss, inspect the skin 2 or 3 times a day, particularly over the heels and bony prominences. **[2010]**

1.3.8 Monitor the use of anti-embolism stockings and offer assistance if they are not being worn correctly. **[2010]**

1.3.9 Stop 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 person experiences pain or discomfort. If suitable, offer intermittent pneumatic compression as an alternative. **[2010, amended 2018]**

1.3.10 Do not offer intermittent pneumatic compression to people with a known allergy to the material of manufacture. **[2010, amended 2018]**

1.3.11 Advise the person to wear their device for as much time as possible. **[2010, amended 2018]**

Pharmacological prophylaxis

1.3.12 For pharmacological VTE prophylaxis in people under 18, follow the recommendations on apixaban, aspirin, dabigatran etexilate, fondaparinux sodium, low-molecular-weight heparin (LMWH) and rivaroxaban in this guideline. **[2018]**

In March 2018, the use of these drugs in young people under 18 was off label. See NICE's information on prescribing medicines.

All surgery

1.3.13 Advise people to consider stopping oestrogen-containing oral contraceptives or hormone replacement therapy 4 weeks before elective surgery. If stopped, provide advice on alternative contraceptive methods. **[2010]**

Nursing care: early mobilisation and hydration

1.3.14 Encourage people to mobilise as soon as possible. **[2010]**

1.3.15 Do not allow people to become dehydrated unless clinically indicated. **[2010]**

People using antiplatelet agents

1.3.16 Consider VTE prophylaxis for people who are having antiplatelet agents for other conditions and whose risk of VTE outweighs their risk of bleeding. Take into account the risk of bleeding and of comorbidities such as arterial thrombosis.

- If the risk of VTE outweighs the risk of bleeding, consider pharmacological VTE prophylaxis based on their condition or procedure.
- If the risk of bleeding outweighs the risk of VTE, consider mechanical VTE prophylaxis. **[2018]**

People using anticoagulation therapy

1.3.17 Consider VTE prophylaxis for people at increased risk of VTE who are interrupting anticoagulant therapy. **[2018]**

1.4 Interventions for people with acute coronary syndromes or acute stroke or for acutely ill patients

Acute coronary syndromes

1.4.1 Be aware that people receiving anticoagulant drugs as part of their treatment for an acute coronary syndrome do not usually need VTE prophylaxis. See also the recommendation in the section on people using anticoagulation therapy. **[2018]**

Acute stroke patients

1.4.2 Do not offer anti-embolism stockings for VTE prophylaxis to people who are admitted for acute stroke. **[2010, amended 2018]**

1.4.3 Consider intermittent pneumatic compression for VTE prophylaxis for people who are immobile and admitted with acute stroke. If using, start it within 3 days of acute stroke. **[2018]**

1.4.4 Explain to the person admitted with acute stroke and their family members or carers (as appropriate) that intermittent pneumatic compression:

- reduces the risk of DVT and may increase their chances of survival
- will not help them recover from stroke, and there may be an associated increased risk of surviving with severe disability. **[2018]**

1.4.5 When using intermittent pneumatic compression for people who are admitted with acute stroke, provide it for 30 days or until the person is mobile or discharged, whichever is sooner. **[2018]**

Acutely ill medical patients

For guidance on pharmacological VTE prophylaxis for people with COVID-19 pneumonia who are being treated in a hospital or community setting, see our COVID-19 rapid guideline

on managing COVID-19.

1.4.6 Offer pharmacological VTE prophylaxis for a minimum of 7 days to acutely ill medical patients whose risk of VTE outweighs their risk of bleeding:

- Use LMWH as first-line treatment.
- If LMWH is contraindicated, use fondaparinux sodium. **[2018]**

  In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

1.5 Interventions for people with renal impairment

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.5.1 If using pharmacological VTE prophylaxis for people with renal impairment, choose either LMWH or unfractionated heparin (UFH). **[2018]**

1.5.2 If needed, reduce the dose of LMWH and UFH for people with renal impairment. Base the decision on multidisciplinary or senior opinion, or locally agreed protocols. **[2018]**

1.6 Interventions for people with cancer

In March 2018:

- the use of LMWH in young people under 18 in recommendations 1.6.2 and 1.6.3 was off label
- the use of aspirin in recommendation 1.6.2 was off label.

See NICE's information on prescribing medicines.

1.6.1 Do not offer VTE prophylaxis to people with cancer who are receiving cancer-modifying treatments such as radiotherapy, chemotherapy or immunotherapy and who are mobile, except as outlined in recommendations 1.6.2 and 1.6.3, unless they are also at increased risk of VTE because of something other than the cancer. **[2018]**

1.6.2 Consider pharmacological VTE prophylaxis for people with myeloma who are receiving chemotherapy with thalidomide, pomalidomide or lenalidomide with steroids. Choose either:

- aspirin (75 mg or 150 mg) **or**
- LMWH. **[2018]**

1.6.3 Consider pharmacological VTE prophylaxis with LMWH for people with pancreatic cancer who are receiving chemotherapy. **[2018]**

1.6.4 If giving VTE prophylaxis to people with cancer (see recommendations 1.6.2 and 1.6.3), continue for as long as they are receiving chemotherapy. **[2018]**

1.7 Interventions for people having palliative care

1.7.1 Consider pharmacological VTE prophylaxis for people who are having palliative care. Take into account temporary increases in thrombotic risk factors, risk of bleeding, likely life expectancy and the views of the person and their family members or carers (as appropriate):

- Use LMWH as first-line treatment.
- If LMWH is contraindicated, use fondaparinux sodium. **[2018]**

  In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

1.7.2 Do not offer VTE prophylaxis to people in the last days of life. **[2018]**

1.7.3 For recommendations on shared decision-making in the last days of life, see the NICE guideline on care of dying adults in the last days of life.

[2018]

1.7.4 Review VTE prophylaxis daily for people who are having palliative care, taking into account the views of the person, their family members or carers (as appropriate) and the multidisciplinary team. **[2018]**

1.8 Interventions for people admitted to critical care

For guidance on pharmacological VTE prophylaxis for people with COVID-19 pneumonia who are being treated in a hospital or community setting, see our COVID-19 rapid guideline on managing COVID-19.

1.8.1 Assess all people admitted to the critical care unit for risk of VTE and bleeding. **[2018]**

1.8.2 Provide LMWH to people admitted to the critical care unit if pharmacological VTE prophylaxis is not contraindicated. For people with renal impairment, see the recommendations on interventions for people with renal impairment. **[2018]**

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.8.3 Consider mechanical VTE prophylaxis for people admitted to the critical care unit if pharmacological prophylaxis is contraindicated based on their condition or procedure. **[2018]**

1.8.4 If using mechanical VTE prophylaxis for people admitted to the critical care unit, start it on admission and continue until the person no longer has reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.8.5 Reassess VTE and bleeding risk daily for people in critical care units. **[2018]**

1.8.6 Assess VTE and bleeding risk more than once a day in people admitted

to the critical care unit if the person's condition is changing rapidly. **[2018]**

1.9 Interventions for people with psychiatric illness

In March 2018:

- the use of LMWH in young people under 18 in recommendations 1.9.3 and 1.9.4 was off label
- the use of fondaparinux sodium in young people under 18 in recommendation 1.9.4 was off label.

See NICE's information on prescribing medicines.

1.9.1 Assess all acute psychiatric patients to identify their risk of VTE and bleeding:

- as soon as possible after admission to hospital or by the time of the first consultant review
- using a tool published by a national UK body, professional network or peer-reviewed journal.

  A tool commonly used to develop a treatment plan for surgical patients is the Department of Health VTE risk assessment tool. (Reproduced with the permission of the Department of Health and Social Care under the Open Government Licence.) **[2018, amended 2021]**

1.9.2 Reassess all people admitted to an acute psychiatric ward for risk of VTE and bleeding at the point of consultant review or if their clinical condition changes. **[2018]**

1.9.3 Consider pharmacological VTE prophylaxis with LMWH for people admitted to an acute psychiatric ward whose risk of VTE outweighs their risk of bleeding. **[2018]**

1.9.4 Consider pharmacological VTE prophylaxis with fondaparinux sodium if LMWH is contraindicated for people admitted to an acute psychiatric ward whose risk of VTE outweighs their risk of bleeding. **[2018]**

1.9.5 Continue pharmacological VTE prophylaxis for people admitted to an acute psychiatric ward until the person is no longer at increased risk of VTE. **[2018]**

1.10 Interventions when using anaesthesia

1.10.1 Consider regional anaesthesia for individual patients, in addition to other methods of VTE prophylaxis, as it carries a lower risk of VTE than general anaesthesia. Take into account the person's preferences, their suitability for regional anaesthesia and any other planned method of VTE prophylaxis. **[2010]**

1.10.2 If regional anaesthesia is used, plan the timing of pharmacological VTE prophylaxis to minimise the risk of epidural haematoma. If antiplatelet or anticoagulant agents are being used, or their use is planned, refer to the summary of product characteristics for guidance about the safety and timing of these in relation to the use of regional anaesthesia. **[2010]**

1.10.3 Do not routinely offer pharmacological or mechanical VTE prophylaxis to people undergoing a surgical procedure with local anaesthesia by local infiltration with no limitation of mobility. **[2010]**

1.11 Interventions for people having orthopaedic surgery

Lower limb immobilisation

1.11.1 Consider pharmacological VTE prophylaxis with LMWH or fondaparinux sodium for people with lower limb immobilisation whose risk of VTE outweighs their risk of bleeding. Consider stopping prophylaxis if lower limb immobilisation continues beyond 42 days. **[2018]**

In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

Fragility fractures of the pelvis, hip and proximal femur

In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 in recommendations 1.11.2 and 1.11.3 was off label. See NICE's information on prescribing medicines.

1.11.2 Offer VTE prophylaxis for a month to people with fragility fractures of the pelvis, hip or proximal femur if the risk of VTE outweighs the risk of bleeding. Choose either:

- LMWH, starting 6 to12 hours after surgery **or**
- fondaparinux sodium, starting 6 hours after surgery, providing there is low risk of bleeding. **[2018]**

1.11.3 Consider pre-operative VTE prophylaxis for people with fragility fractures of the pelvis, hip or proximal femur if surgery is delayed beyond the day after admission. Give the last dose no less than 12 hours before surgery for LMWH or 24 hours before surgery for fondaparinux sodium. **[2018]**

1.11.4 Consider intermittent pneumatic compression for people with fragility fractures of the pelvis, hip or proximal femur at the time of admission if pharmacological prophylaxis is contraindicated. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

Elective hip replacement

In March 2018:

- the use of LMWH and rivaroxaban in young people under 18 in recommendation 1.11.5 was off label
- the use of aspirin in recommendation 1.11.5 was off label
- the use of apixaban and dabigatran etexilate in young people under 18 in recommendation 1.11.6 was off label.

See NICE's information on prescribing medicines.

1.11.5 Offer VTE prophylaxis to people undergoing elective hip replacement surgery whose risk of VTE outweighs their risk of bleeding. Choose any one of:

- LMWH for 10 days followed by aspirin (75 mg or 150 mg) for a further 28 days.
- LMWH for 28 days combined with anti-embolism stockings (until discharge).
- Rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery. (This text is from NICE technology appraisal guidance on rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults [TA170 2009].) **[2018]**

1.11.6 Consider one of the following if none of the options in recommendation 1.11.5 can be used:

- Apixaban is recommended as an option for the prevention of venous thromboembolism in adults after elective hip or knee replacement surgery. (This text is from NICE technology appraisal guidance on apixaban for the prevention of venous thromboembolism after total hip or knee replacement in adults [TA245 2012].)

- Dabigatran etexilate, within its marketing authorisation, is recommended as an option for the primary prevention of venous thromboembolic events in adults who have undergone elective total hip replacement surgery or elective total knee replacement surgery. (This text is from NICE technology appraisal guidance on dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults [TA157 2008].) **[2018]**

1.11.7 Consider anti-embolism stockings until discharge from hospital if pharmacological interventions are contraindicated in people undergoing elective hip replacement surgery. **[2018]**

Elective knee replacement

In March 2018:

- the use of LMWH and rivaroxaban in young people under 18 in recommendation 1.11.8 was off label
- the use of aspirin in recommendation 1.11.8 was off label
- the use of apixaban and dabigatran etexilate in young people under 18 in recommendation 1.11.9 was off label.

See NICE's information on prescribing medicines.

1.11.8 Offer VTE prophylaxis to people undergoing elective knee replacement surgery whose VTE risk outweighs their risk of bleeding. Choose any one of:

- Aspirin (75 mg or 150 mg) for 14 days.
- LMWH for 14 days combined with anti-embolism stockings until discharge.

- Rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery. (This text is from NICE technology appraisal guidance on rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults [TA170 2009].) **[2018]**

1.11.9 Consider one of the following if none of the options in recommendation 1.11.8 can be used:

- Apixaban is recommended as an option for the prevention of venous thromboembolism in adults after elective hip or knee replacement surgery. (This text is from NICE technology appraisal guidance on apixaban for the prevention of venous thromboembolism after total hip or knee replacement in adults [TA245 2012].)

- Dabigatran etexilate, within its marketing authorisation, is recommended as an option for the primary prevention of venous thromboembolic events in adults who have undergone elective total hip replacement surgery or elective total knee replacement surgery. (This text is from NICE technology appraisal guidance on dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults [TA157 2008].) **[2018]**

1.11.10 Consider intermittent pneumatic compression if pharmacological prophylaxis is contraindicated in people undergoing elective knee replacement surgery. Continue until the person is mobile. **[2018]**

Non-arthroplasty orthopaedic knee surgery

1.11.11 Be aware that VTE prophylaxis is generally not needed for people undergoing arthroscopic knee surgery where:

- total anaesthesia time is less than 90 minutes **and**

- the person is at low risk of VTE. **[2018]**

1.11.12 Consider LMWH 6 to12 hours after surgery for 14 days for people undergoing arthroscopic knee surgery if:

- total anaesthesia time is more than 90 minutes **or** the person's risk of VTE outweighs their risk of bleeding. **[2018]**

  In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.11.13 Consider VTE prophylaxis for people undergoing other knee surgery (for example, osteotomy or fracture surgery) whose risk of VTE outweighs their risk of bleeding. **[2018]**

Foot and ankle orthopaedic surgery

1.11.14 Consider pharmacological VTE prophylaxis for people undergoing foot or ankle surgery:

- that requires immobilisation (for example, arthrodesis or arthroplasty); consider stopping prophylaxis if immobilisation continues beyond 42 days (see the recommendation on lower limb immobilisation) **or**
- when total anaesthesia time is more than 90 minutes **or**
- the person's risk of VTE outweighs their risk of bleeding. **[2018]**

Upper limb orthopaedic surgery

1.11.15 Be aware that VTE prophylaxis is generally not needed if giving local or regional anaesthetic for upper limb surgery. **[2018]**

1.11.16 Consider VTE prophylaxis for people undergoing upper limb surgery if the person's total time under general anaesthetic is over 90 minutes or where their operation is likely to make it difficult for them to mobilise. **[2018]**

1.12 Interventions for people having elective spinal surgery or cranial surgery or people with spinal injury

Elective spinal surgery

In March 2018, the use of LMWH in young people under 18 in recommendations 1.12.2, 1.12.3 and 1.12.4 was off label. See NICE's information on prescribing medicines.

1.12.1 Offer mechanical VTE prophylaxis on admission to people undergoing elective spinal surgery. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue for 30 days or until the person is mobile or discharged, whichever is sooner. **[2018]**

1.12.2 Consider adding pharmacological VTE prophylaxis with LMWH for people undergoing elective spinal surgery whose risk of VTE outweighs their risk of bleeding, taking into account individual patient and surgical factors (major or complex surgery) and according to clinical judgement. **[2018]**

1.12.3 If using LMWH for people undergoing elective spinal surgery, start giving it 24 to 48 hours postoperatively according to clinical judgement, taking into account patient characteristics and surgical procedure. Continue for 30 days or until the person is mobile or discharged, whichever is sooner. **[2018]**

1.12.4 If needed, start LMWH earlier than 24 hours after the operation for people undergoing elective spinal surgery. Base the decision on multidisciplinary or senior opinion, or a locally agreed protocol. **[2018]**

Cranial surgery

In March 2018, the use of LMWH in young people under 18 in recommendations 1.12.7, 1.12.8 and 1.12.9 was off label. See NICE's information on prescribing medicines.

1.12.5 Consider mechanical VTE prophylaxis for people undergoing cranial surgery. **[2018]**

1.12.6 If using mechanical VTE prophylaxis for people undergoing cranial surgery, start it on admission. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue for 30 days or until the person is mobile or discharged, whichever is sooner. **[2018]**

1.12.7 Consider adding pre-operative pharmacological VTE prophylaxis with LMWH. Give the last dose no less than 24 hours before surgery for people undergoing cranial surgery whose risk of VTE outweighs their risk of bleeding. **[2018]**

1.12.8 Consider adding pharmacological VTE prophylaxis with LMWH, starting 24 to 48 hours after surgery for people undergoing cranial surgery whose risk of VTE outweighs their risk of bleeding. Continue for a minimum of 7 days. **[2018]**

1.12.9 If needed, start LMWH earlier than 24 hours after the operation for people undergoing cranial surgery. Base the decision on multidisciplinary or senior opinion, or a locally agreed protocol. **[2018]**

1.12.10 Do not offer pharmacological VTE prophylaxis to people with ruptured cranial vascular malformations (for example, brain aneurysms) or people with intracranial haemorrhage (spontaneous or traumatic) until the lesion has been secured or the condition has stabilised. **[2018]**

Spinal injury

1.12.11 Consider mechanical VTE prophylaxis on admission for people with spinal injury. Choose either:

- anti-embolism stockings (only in a specialist spinal injury unit and after multidisciplinary team discussion) **or**
- intermittent pneumatic compression. **[2018, amended 2019]**

1.12.12 Reassess risk of bleeding 24 hours after initial admission in people with spinal injury. **[2018]**

1.12.13 Consider adding pharmacological VTE prophylaxis with LMWH 24 hours after initial admission for people with spinal injury who are not having surgery in the next 24 to 48 hours, if the benefit of reducing the risk of VTE outweighs the risk of bleeding. **[2018]**

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.12.14 Continue VTE prophylaxis in people with spinal injury for 30 days or until the person is mobile or discharged, whichever is sooner. **[2018]**

1.13 Interventions for people with major trauma

1.13.1 Offer mechanical VTE prophylaxis with intermittent pneumatic compression on admission to people with serious or major trauma. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.13.2 Reassess risk of VTE and bleeding in people with serious or major trauma whenever their clinical condition changes and at least daily. **[2018]**

1.13.3 Consider pharmacological VTE prophylaxis for people with serious or major trauma as soon as possible after the risk assessment when the risk of VTE outweighs the risk of bleeding. Continue for a minimum of 7 days. **[2018]**

1.14 Interventions for people having abdominal, thoracic or head and neck surgery

Abdominal surgery

1.14.1 Offer VTE prophylaxis to people undergoing abdominal (gastrointestinal, gynaecological, urological) surgery who are at increased risk of VTE. For people undergoing bariatric surgery, follow the recommendations in the section on bariatric surgery. **[2018]**

1.14.2 Start mechanical VTE prophylaxis on admission for people undergoing abdominal surgery. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.14.3 Add pharmacological VTE prophylaxis for a minimum of 7 days for people undergoing abdominal surgery whose risk of VTE outweighs their risk of bleeding, taking into account individual patient factors and according to clinical judgement. Choose either:

- LMWH **or**
- fondaparinux sodium. **[2018]**

In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

1.14.4 Consider extending pharmacological VTE prophylaxis to 28 days postoperatively for people who have had major cancer surgery in the abdomen. **[2018]**

Bariatric surgery

1.14.5 Offer VTE prophylaxis to people undergoing bariatric surgery. **[2018]**

1.14.6 Start mechanical VTE prophylaxis on admission for people undergoing bariatric surgery. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.14.7 Add pharmacological VTE prophylaxis for people undergoing bariatric surgery for a minimum of 7 days for people whose risk of VTE outweighs their risk of bleeding. Choose either:

- LMWH **or**
- fondaparinux sodium. **[2018]**

In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

Thoracic surgery

1.14.8 Consider VTE prophylaxis for people undergoing thoracic surgery who are at increased risk of VTE. **[2018]**

1.14.9 Start mechanical VTE prophylaxis on admission for people undergoing thoracic surgery. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.14.10 Consider adding pharmacological VTE prophylaxis for people undergoing thoracic surgery for a minimum of 7 days to people whose risk of VTE outweighs their risk of bleeding:

- Use LMWH as first-line treatment.
- If LMWH is contraindicated, use fondaparinux sodium. **[2018]**

  In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

Head and neck surgery

Oral and maxillofacial surgery

1.14.11 Consider pharmacological VTE prophylaxis with LMWH for a minimum of 7 days for people undergoing oral or maxillofacial surgery whose risk of VTE outweighs their risk of bleeding. **[2018]**

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.14.12 Consider mechanical VTE prophylaxis on admission for people undergoing oral or maxillofacial surgery who are at increased risk of VTE and high risk of bleeding. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

  Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

ENT surgery

1.14.13 Consider pharmacological VTE prophylaxis with LMWH for a minimum of 7 days for people undergoing ears, nose or throat (ENT) surgery whose risk of VTE outweighs their risk of bleeding. **[2018]**

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.14.14 Consider mechanical VTE prophylaxis on admission for people undergoing ENT surgery who are at increased risk of VTE and high risk of bleeding. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.15 Interventions for people having cardiac or vascular surgery

Cardiac surgery

1.15.1 Consider mechanical VTE prophylaxis on admission for people who are undergoing cardiac surgery who are at increased risk of VTE. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.15.2 Consider adding pharmacological VTE prophylaxis for a minimum of 7 days for people who are undergoing cardiac surgery and are not having other anticoagulation therapy:

- Use LMWH as first-line treatment.

- If LMWH is contraindicated, use fondaparinux sodium. **[2018]**

  In March 2018, the use of LMWH and fondaparinux sodium in young people under 18 was off label. See NICE's information on prescribing medicines.

Vascular surgery

Open vascular surgery or endovascular aneurysm repair

1.15.3 Consider pharmacological VTE prophylaxis with LMWH for a minimum of 7 days for people who are undergoing open vascular surgery or major endovascular procedures, including endovascular aneurysm repair whose risk of VTE outweighs their risk of bleeding. **[2018]**

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.15.4 Consider mechanical VTE prophylaxis on admission for people who are undergoing open vascular surgery or major endovascular procedures, including endovascular aneurysm repair, if pharmacological prophylaxis is contraindicated. Choose either:

- anti-embolism stockings **or**
- intermittent pneumatic compression.

  Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

Lower limb amputation

1.15.5 Consider pharmacological VTE prophylaxis with LMWH for a minimum of 7 days for people who are undergoing lower limb amputation whose risk of VTE outweighs their risk of bleeding. **[2018]**

In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.15.6 Consider mechanical VTE prophylaxis with intermittent pneumatic compression on the contralateral leg, on admission, for people who are undergoing lower limb amputation and if pharmacological prophylaxis is contraindicated. **[2018]**

1.15.7 For people undergoing lower limb amputation, continue mechanical VTE prophylaxis until the person no longer has significantly reduced mobility relative to their anticipated mobility. **[2018]**

Varicose vein surgery

1.15.8 Be aware that VTE prophylaxis is generally not needed for people undergoing varicose vein surgery where:

- total anaesthesia time is less than 90 minutes **and**
- the person is at low risk of VTE. **[2018]**

1.15.9 Consider pharmacological VTE prophylaxis with LMWH, starting 6 to 12 hours after surgery and continuing for 7 days for people undergoing varicose vein surgery if:

- total anaesthesia time is more than 90 minutes **or**
- the person's risk of VTE outweighs their risk of bleeding. **[2018]**

  In March 2018, the use of LMWH in young people under 18 was off label. See NICE's information on prescribing medicines.

1.15.10 Consider mechanical VTE prophylaxis with anti-embolism stockings, on admission, for people undergoing varicose vein surgery:

- who are at increased risk of VTE **and**
- if pharmacological prophylaxis is contraindicated. **[2018]**

1.15.11 If using anti-embolism stockings for people undergoing varicose vein surgery, continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility. **[2018]**

1.16 Interventions for pregnant women and women who gave birth or had a miscarriage or termination of pregnancy in the past 6 weeks

In March 2018, the use of LMWH in young people under 18 in recommendations 1.16.1, 1.16.4, 1.16.5 and 1.16.6 was off label. See NICE's information on prescribing medicines.

1.16.1 Consider LMWH for all women who are admitted to hospital or a midwife-led unit if they are pregnant or gave birth, had a miscarriage or had a termination of pregnancy in the past 6 weeks, and whose risk of VTE outweighs their risk of bleeding. **[2018]**

1.16.2 Do not offer VTE prophylaxis to women admitted to hospital or a midwife-led unit who are in active labour. **[2018]**

1.16.3 Stop pharmacological VTE prophylaxis when women are in labour. **[2018]**

1.16.4 If using LMWH in pregnant women, start it as soon as possible and within 14 hours of the risk assessment being completed and continue until the woman is no longer at increased risk of VTE or until discharge from hospital or the midwife-led unit. **[2018]**

1.16.5 If using LMWH in women who gave birth or had a miscarriage or termination of pregnancy, start 4 to 8 hours after the event unless contraindicated and continue for a minimum of 7 days. **[2018]**

1.16.6 Consider combined prophylaxis with LMWH plus mechanical prophylaxis for pregnant women or women who gave birth or had a miscarriage or termination of pregnancy in the past 6 weeks and who are likely to be immobilised, or have significantly reduced mobility relative to their normal or anticipated mobility for 3 or more days after surgery, including caesarean section:

- Use intermittent pneumatic compression as first-line treatment.

- If intermittent pneumatic compression is contraindicated, use anti-embolism stockings.

  Continue until the woman no longer has significantly reduced mobility relative to her normal or anticipated mobility or until discharge from hospital. **[2018]**

Terms used in this guideline

Admission

Admission in the context of this guideline refers to admission as an inpatient, where a bed is provided for 1 or more nights, or admission as a day patient, where a bed is provided for a procedure including surgery or chemotherapy but not for an overnight stay.

Discharge

Discharge in the context of this guideline refers to discharge from hospital as an inpatient or after a day procedure.

Intermittent pneumatic compression

A method of prophylaxis that includes an air pump and inflatable garments in a system designed to improve venous circulation in the lower limbs of people at risk of DVT or pulmonary embolism. The inflation–deflation cycle of intermittent pneumatic compression therapy simulates the thigh, calf and foot's normal ambulatory pump action increasing both the volume and rate of blood flow, eliminating venous stasis and replicating the effects of the natural muscle pump. Intermittent pneumatic compression devices can be thigh- or knee-length sleeves that are wrapped around the leg, or a garment that can be wrapped around or worn on the foot that is designed to mimic the actions of walking.

Lower limb immobilisation

Any clinical decision taken to manage the affected limb in a way that would prevent normal weight-bearing status or use of that limb, or both.

Renal impairment

People with an estimated glomerular filtration rate (eGFR) of less than 30 ml/min/1.73 m^2. For more detailed information on renal impairment, see the NICE guideline on chronic kidney disease in adults.

Significantly reduced mobility

People who are bed bound, unable to walk unaided or likely to spend a substantial proportion of their day in bed or in a chair.

Recommendations for research

The guideline committee has made the following recommendations for research. The committee's full set of research recommendations is detailed in the full guideline.

1 Risk assessment

What is the accuracy of individual risk assessment tools in predicting the risk of venous thromboembolism (VTE) and risk of bleeding in people admitted to hospital?

Why this is important

Risk assessment is a mandatory for all people admitted or having day procedures in hospital. Since 2010, the National VTE Risk Assessment Tool has been widely used in the NHS to assess a person's risk of VTE. This tool has not been validated or tested against other tools to evaluate its diagnostic accuracy or effectiveness at correctly identifying people at risk of VTE. There is concern that the tool may not accurately identify those who are most likely to get VTE.

According to national figures, over 70% of medical patients in the UK have prophylaxis when the national tool has been used, with some trusts offering prophylaxis to over 90% of medical patients. Around 40% of medical patients have prophylaxis in largely US-based populations when other tools are used (although this may partially relate to different indications for hospital admission). It is not known if this means that the national tool identifies too many people or the other tools do not identify enough. The potential impact of giving unnecessary prophylaxis is that people may be at increased risk of bleeding and discomfort through repeated injections. There is also the potential for reducing the cost of thromboprophylaxis by better defining 'at risk' populations, so that the number of those given thromboprophylaxis is reduced.

2 Dose strategies for people who are obese

What is the clinical and cost effectiveness of weight-based dose-adjustment strategies of low-molecular-weight heparin (LMWH) compared with fixed-dose strategies of LMWH for preventing VTE in people who are very obese (BMI over 35) who are admitted to hospital

or having day procedures (including surgery and chemotherapy)?

Why this is important

Obesity is on the rise in England. The prevalence of obesity increased by 11% between 1993 and 2014 (15% in 1993 and 26% in 2014), which has resulted in more obese people being admitted to hospital. Obesity may as much as double a person's risk of developing hospital-acquired VTE, therefore most obese people will need prophylaxis. There is much uncertainty about what dose to use and the clinical and cost effectiveness of using weight-based dose-adjustment versus fixed-dose strategies. In current practice, a higher than usual dose is given but this may not be necessary, especially if the person has obesity-related liver disease. Several studies have reported effectiveness in terms of biological measures rather than clinical outcomes such as deep vein thrombosis (DVT) and bleeding events. It is important that there is a clearer understanding of the effects that different dose strategies can have in terms of clinical outcomes. This is because they can directly influence the quality of life of obese people admitted to hospital and help inform clinical decisions on patient care.

3 Direct oral anticoagulants for people with lower limb immobilisation

What is the clinical and cost effectiveness of direct oral anticoagulants for preventing VTE in people with lower limb immobilisation?

Why this is important

The Computerized registry of patients with venous thromboembolism (RIETE) study, a multicentre prospective cohort study of 30,886 patients with acute VTE, estimated that 5.7% of VTE events were associated with lower limb immobilisation for non-major orthopaedic surgery. Estimates of DVT risk in people with lower limb immobilisation, based on meta-analyses of trials comparing chemothromboprophylaxis with placebo, range between approximately 4% and 40%. Given that lower limb immobilisation following trauma or non-major orthopaedic surgery is so common, the consequent burden of disease from VTE from this cause in the whole population is very considerable. For example, the annual incidence of ankle fracture is 187 per 100,000, translating to over 120,000 incident fractures per year in the UK. If 10% of these fractures are complicated by VTE, then we might expect approximately 12,000 events per year only related to immobilisation following

ankle trauma.

Despite this burden of ill-health, no randomised studies comparing modern anticoagulants that are available in oral preparations (perhaps more suitable for outpatient treatments) with established treatments such as LMWH or fondaparinux were identified in the evidence review. The committee were unable to make a recommendation to consider oral anticoagulants for this patient group given this lack of evidence.

4 Aspirin prophylaxis for people with fragility fractures of the pelvis, hip or proximal femur

What is the clinical and cost effectiveness of aspirin alone versus other pharmacological and/or mechanical prophylaxis strategies (alone or in combination) for people with fragility fractures of the pelvis, hip or proximal femur?

Why this is important

Fragility fractures are the greatest burden of musculoskeletal disease in hospitals in the UK. There are approximately 70,000 fragility hip fractures per year in England alone leading to 1.5 million bed days being used each year, which equates with the continuous occupation of over 4,000 NHS beds.

Current evidence supports a recommendation for prophylaxis with LMWH or fondaparinux. Both involve a subcutaneous injection for 28 days requiring either self-injection at home or a community nurse attending to deliver the injection. Patient adherence to treatment may be improved with an oral rather than injectable treatment.

A large but controversially reported trial suggests that aspirin may be at least as effective as currently recommended treatments. However, because of methodological and reporting limitations, the evidence for the effectiveness of aspirin alone is not clear. There is potentially a large cost saving if aspirin is clinically effective because it is very inexpensive.

5 Duration of prophylaxis for elective total hip replacement surgery

What is the clinical and cost effectiveness of standard versus extended duration

pharmacological prophylaxis for preventing VTE in people undergoing elective total hip replacement surgery?

Why this is important

In 2015, there were 84,462 hip replacements in England, Wales and Northern Ireland. The current recommended duration of prophylaxis is 28 days in the elective total hip replacement population. This extended duration of prophylaxis is based on few, small and older trials. The quality of the evidence supporting extended duration prophylaxis is very low. Modern pharmaceutical trials of newer interventions use extended duration prophylaxis based on these historical data, with the added incentive of more expensive prophylaxis strategies. There is a large potential cost saving if a shorter duration of prophylaxis is as clinically effective, given the considerable cost of prophylaxis and the number of people for whom it is prescribed.

Putting this guideline into practice

We have produced NICE tools and resources to help you put this guideline into practice.

Putting recommendations into practice can take time. How long may vary from guideline to guideline, and depends on how much change in practice or services is needed. Implementing change is most effective when aligned with local priorities.

Changes recommended for clinical practice that can be done quickly – like changes in prescribing practice – should be shared quickly. This is because healthcare professionals should use guidelines to guide their work – as is required by professional regulating bodies such as the General Medical and Nursing and Midwifery Councils.

Changes should be implemented as soon as possible, unless there is a good reason for not doing so (for example, if it would be better value for money if a package of recommendations were all implemented at once).

Different organisations may need different approaches to implementation, depending on their size and function. Sometimes individual practitioners may be able to respond to recommendations to improve their practice more quickly than large organisations.

Here are some pointers to help organisations put NICE guidelines into practice:

1. **Raise awareness** through routine communication channels, such as email or newsletters, regular meetings, internal staff briefings and other communications with all relevant partner organisations. Identify things staff can include in their own practice straight away.

2. **Identify a lead** with an interest in the topic to champion the guideline and motivate others to support its use and make service changes, and to find out any significant issues locally.

3. **Carry out a baseline assessment** against the recommendations to find out whether there are gaps in current service provision.

4. **Think about what data you need to measure improvement** and plan how you will collect them. You may want to work with other health and social care organisations and specialist

groups to compare current practice with the recommendations. This may also help identify local issues that will slow or prevent implementation.

5. **Develop an action plan**, with the steps needed to put the guideline into practice, and make sure it is ready as soon as possible. Big, complex changes may take longer to implement, but some may be quick and easy to do. An action plan will help in both cases.

6. **For very big changes** include milestones and a business case, which will set out additional costs, savings and possible areas for disinvestment. A small project group could develop the action plan. The group might include the guideline champion, a senior organisational sponsor, staff involved in the associated services, finance and information professionals.

7. **Implement the action plan** with oversight from the lead and the project group. Big projects may also need project management support.

8. **Review and monitor** how well the guideline is being implemented through the project group. Share progress with those involved in making improvements, as well as relevant boards and local partners.

NICE provides a comprehensive programme of support and resources to maximise uptake and use of evidence and guidance. See NICE's into practice pages for more information.

Also see Leng G, Moore V, Abraham S, editors (2014) Achieving high quality care – practical experience from NICE. Chichester: Wiley.

Context

Hospital-acquired venous thromboembolism (VTE), also known as hospital-acquired or hospital-associated thrombosis (HAT), covers all VTE that occurs in hospital and within 90 days after a hospital admission. It is a common and potentially preventable problem. VTE most frequently occurs in the deep veins of the legs or pelvis (a deep vein thrombosis [DVT]). If it dislodges and travels to the lungs, it is called a pulmonary embolism, which in some cases can be fatal.

Hospital-acquired VTE accounts for thousands of deaths annually in the NHS, and fatal pulmonary embolism remains a common cause of in-hospital mortality. HAT accounts for 50% to 60% of all VTE seen. In 2013 to 2014, there were around 24,700 admissions for pulmonary embolism and 19,400 for DVT in England. In 2013 in England and Wales, there were 2,191 deaths recorded as due to pulmonary embolism and 2,816 due to DVT. Treatment of non-fatal symptomatic VTE and related long-term morbidities is associated with a considerable cost to the health service.

People admitted to hospital or mental health units have varying risk factors for VTE. The spectrum of VTE risk is broad, and understanding the scale of the problem has led to a paradigm shift in preventing and managing VTE in the NHS. In particular, patients now undergo VTE risk assessment as a routine event in all NHS care pathways. By July 2013, 96% of adult admissions to NHS-funded acute care hospitals were risk assessed for VTE compared with less than 50% of patients in July 2010.

VTE prophylaxis has been shown to reduce the incidence of DVT. It includes mechanical methods (such as anti-embolism stockings and intermittent pneumatic compression devices), and pharmacological treatments (such as heparin and other anticoagulant drugs).

This guideline is about reducing the risk of VTE in over 16s admitted to or treated as day procedures in hospitals. It provides recommendations on the most clinically and cost-effective measures to reduce the risk of VTE, while considering the potential risks of the various VTE prophylaxis options and patient preferences. It highlights the importance of risk assessment for VTE and for bleeding for all people being admitted and of clinical judgement in deciding on a prophylaxis strategy for each person at risk.

The 2018 update takes into account newer evidence and newer therapies and has been

made more relevant for specific groups such as surgical sub-specialities, people with mental health conditions and pregnant women.

Finding more information and committee details

You can see everything NICE says on this topic in the NICE Pathway on venous thromboembolism.

To find NICE guidance on related topics, including guidance in development, see the NICE webpage on embolism and thrombosis.

For full details of the evidence and the guideline committee's discussions, see the full guideline. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

Update information

August 2019: Recommendation 1.12.11 was amended to clarify when anti-embolism stockings can be used for VTE prophylaxis for people with spinal injury.

March 2018: New recommendations were added on risk assessment for venous thromboembolism (VTE) and reducing the risk of VTE. These recommendations are marked as **[2018]**.

Some changes were made to recommendation wording without an evidence review. These recommendations are marked as **[2010, amended 2018]**. The changes are:

- Minor edits to recommendation 1.3.1 to clarify meaning.
- In recommendation 1.3.9 'discontinue' was changed to 'stop' for plain English purposes, and 'patient' changed to 'person'.
- In recommendations 1.3.9 and 1.3.10 the words 'foot impulse' and 'devices' were deleted from recommendations because the guideline committee noted that the term 'intermittent pneumatic compression' covers both sleeves applied to the legs and garments wrapped around the foot. The options are considered equal in the recommendations. The guideline committee left it to clinicians to decide which were the most suitable.
- Recommendation 1.3.11 was edited to simplify wording.
- In recommendation 1.4.2, 'stroke' was changed to 'acute stroke' to make it clear the recommendation is about someone currently experiencing a stroke or having treatment for stroke, not people receiving rehabilitation treatments for stroke. 'Patients' was changed to 'people'.

Recommendations are marked as **[2010]** when the evidence was last reviewed in 2010.

Minor changes since publication

May 2021: Recommendation 1.9.1 was amended to clarify that the Department of Health tool is commonly used to develop a treatment plan.

January 2021: Recommendations 1.1.2 and 1.1 5 were amended to clarify that the Department of Health tool is commonly used to develop a treatment plan.

November 2020: We added links in the sections on acutely ill medical patients and interventions for critical care to the NICE COVID-19 rapid guideline on reducing the risk of venous thromboembolism in over 16s.

December 2019: In recommendation 1.3.5 the British Standards for anti-embolism hosiery were updated because BS 6612 and BS 7672 have been withdrawn.

April 2018: Cross-references to recommendations were corrected.

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