

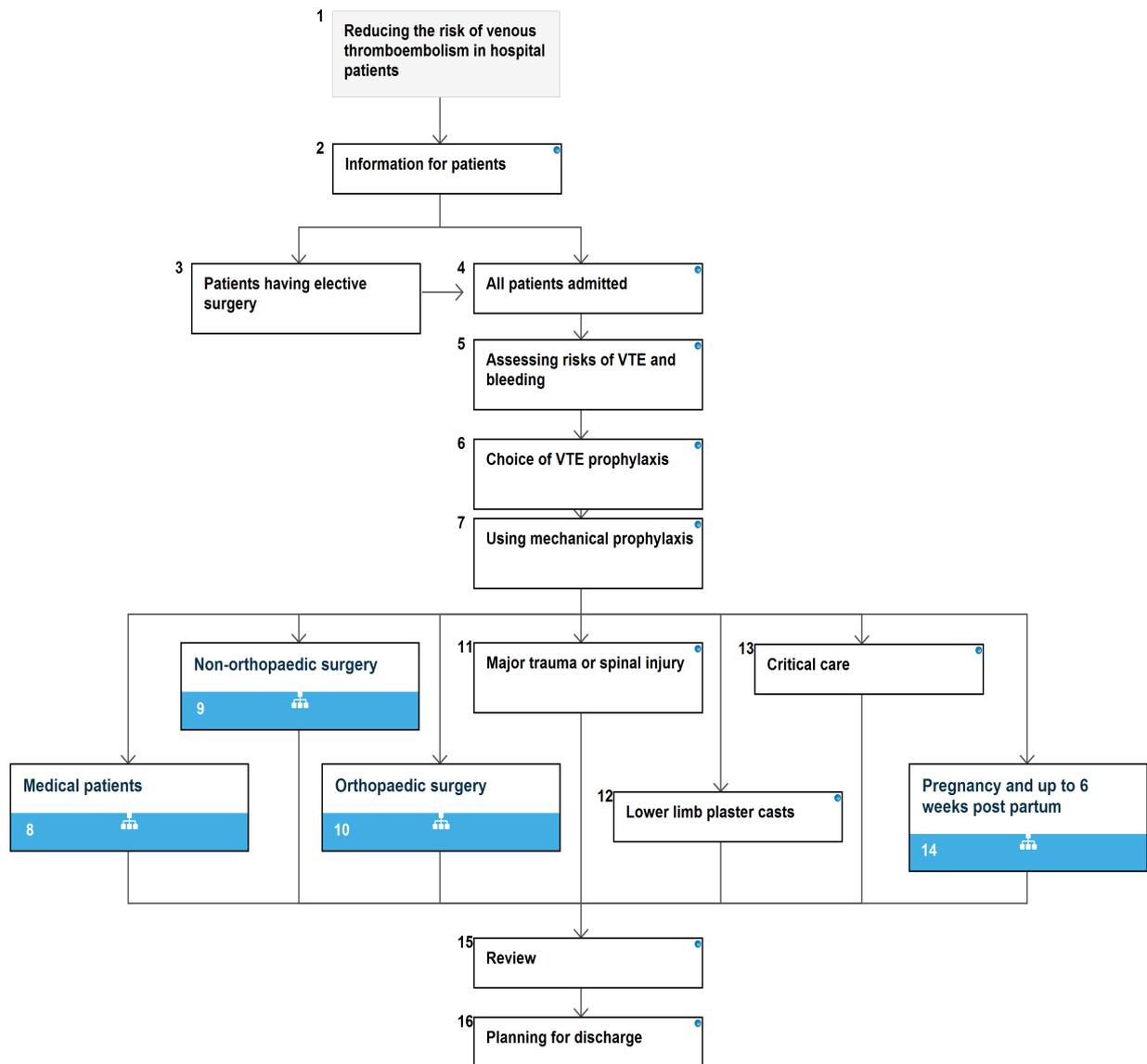
## Reducing the risk of venous thromboembolism in hospital patients

A NICE pathway brings together all NICE guidance, quality standards and materials to support implementation on a specific topic area. The pathways are interactive and designed to be used online. This pdf version gives you a single pathway diagram and uses numbering to link the boxes in the diagram to the associated recommendations.

To view the online version of this pathway visit:

<http://pathways.nice.org.uk/pathways/venous-thromboembolism>

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## 1 Reducing the risk of venous thromboembolism in hospital patients

No additional information

## 2 Information for patients

Before starting VTE prophylaxis, offer verbal and written information on:

- risks and possible consequences of VTE
- importance of VTE prophylaxis and its possible side effects
- correct use of VTE prophylaxis
- how to reduce risk of VTE.

Consider offering synthetic alternatives to heparin to patients who have concerns about using animal products, since heparin is of animal origin.

NICE has written information for the public explaining the guidance on [reducing the risk of VTE in hospital patients](#) and information for public explaining the [NICE quality standard on VTE prevention](#).

### Quality standards

The following quality statement is relevant to this part of the pathway.

#### VTE prevention quality standard

2. Verbal and written information on VTE prevention

### Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

### 3 Patients having elective surgery

#### Oral contraceptives and HRT

Advise women to consider stopping oestrogen-containing contraceptives or HRT 4 weeks before surgery.

#### Pre-existing antiplatelet therapy

Assess risks and benefits of stopping pre-existing antiplatelet therapy 1 week before surgery. Consider involving the multidisciplinary team in the assessment.

#### Anaesthesia

Consider regional anaesthesia, in addition to other methods of VTE prophylaxis, as it carries a lower risk of VTE than general anaesthesia. Take into account patient preferences, suitability for regional anaesthesia and any other planned method of VTE prophylaxis.

If regional anaesthesia is used, plan the timing of pharmacological prophylaxis to minimise 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 safety and timing of these agents in relation to regional anaesthesia.

**Do not** routinely offer pharmacological or mechanical VTE prophylaxis to patients having surgery with local anaesthesia by local infiltration with no limitation of mobility.

### 4 All patients admitted

Assess risk of VTE and risk of bleeding at admission. For more information see [assessing risks of VTE and bleeding](#) in this pathway.

Offer VTE prophylaxis if appropriate.

Re-assess the risks of VTE and bleeding within 24 hours of admission and whenever the clinical situation changes.

**Do not** allow patients to become dehydrated unless clinically indicated.

Encourage patients to mobilise as soon as possible.

**Do not** regard aspirin or other antiplatelet agents as adequate prophylaxis for VTE.

Consider offering temporary IVC filters to patients who are at very high risk of VTE (such as patients with a previous VTE event or active malignancy) if mechanical and pharmacological VTE prophylaxis contraindicated.

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

1. VTE and bleeding risk assessment
4. Re-assessment
5. VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 5 Assessing risks of VTE and bleeding

Balance the risks of VTE and bleeding before offering VTE prophylaxis.

**Do not** offer pharmacological VTE prophylaxis if the patient has any risk factor for bleeding and the risk of bleeding outweighs the risk of VTE.

### Patients who are at risk of VTE

#### Medical patients

- If mobility significantly reduced for  $\geq 3$  days **or**
- If expected to have ongoing reduced mobility relative to normal state plus any VTE risk factor (see below).

**Surgical patients and patients with trauma**

- If total anaesthetic + surgical time > 90 minutes **or**
- If surgery involves pelvis or lower limb and total anaesthetic + surgical time > 60 minutes **or**
- If acute surgical admission with inflammatory or intra-abdominal condition **or**
- If expected to have significant reduction in mobility **or**
- If any VTE risk factor present (see below).

**VTE risk factors<sup>1</sup>**

- Active cancer or cancer treatment
- Age > 60 years
- Critical care admission
- Dehydration
- Known thrombophilias
- Obesity (BMI > 30 kg/m<sup>2</sup>)
- One or more significant medical comorbidities (for example: heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)
- Personal history or first-degree relative with a history of VTE
- Use of HRT
- Use of oestrogen-containing contraceptive therapy
- Varicose veins with phlebitis

**Patients who are at risk of bleeding**

All patients who have any of the following.

- Active bleeding
- Acquired bleeding disorders (such as acute liver failure)
- Concurrent use of anticoagulants known to increase the risk of bleeding (such as warfarin with INR > 2)
- Lumbar puncture/epidural/spinal anaesthesia within the previous 4 hours or expected within the next 12 hours
- Acute stroke
- Thrombocytopenia (platelets < 75 x 10<sup>9</sup>/l)
- Uncontrolled systolic hypertension (≥ 230/120 mmHg)

<sup>1</sup> For women who are pregnant or have given birth within the previous 6 weeks see [pregnancy and up to 6 weeks post partum](#) in this pathway.

- Untreated inherited bleeding disorders (such as haemophilia or von Willebrand's disease)

## Quality standards

The following quality statement is relevant to this part of the pathway.

### VTE prevention quality standard

1. VTE and bleeding risk assessment

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 6

### Choice of VTE prophylaxis

Base the choice of mechanical VTE prophylaxis on clinical condition, surgical procedure and patient preference. Choose any one of:

- anti-embolism stockings (thigh or knee length)
- foot impulse devices
- intermittent pneumatic compression devices (thigh or knee length).

For more information see [using mechanical prophylaxis](#) in this pathway.

Base the choice of pharmacological VTE prophylaxis on local policies, clinical condition (for example, severe renal impairment or established renal failure) and patient preference.

### **VTE prophylaxis for patients already having antiplatelet or anticoagulant therapy to treat other conditions**

Consider offering additional mechanical or pharmacological VTE prophylaxis if patient is at risk of VTE. Take into account risk of bleeding and of comorbidities such as arterial thrombosis. For more information see [assessing risks of VTE and bleeding](#) in this pathway.

- If the risk of VTE outweighs the risk of bleeding, consider offering pharmacological VTE prophylaxis according to the reason for admission.
- If the risk of bleeding outweighs the risk of VTE, offer mechanical VTE prophylaxis.

**Do not** offer additional pharmacological or mechanical VTE prophylaxis to patients who are taking vitamin K antagonists and who are within their therapeutic range, providing anticoagulant therapy is continued.

**Do not** offer additional pharmacological or mechanical VTE prophylaxis to patients who are having full anticoagulant therapy (for example, fondaparinux, LMWH or UFH).

### Medical technologies

NICE medical technologies guidance addresses specific technologies notified to NICE by sponsors. The 'case for adoption' is based on the claimed advantages of introducing the specific technology compared with current management of the condition. This case is reviewed against the evidence submitted and expert advice. If the case for adopting the technology is supported, then the technology has been found to offer advantages to patients and the NHS. The specific recommendations on individual technologies are not intended to limit use of other relevant technologies which may offer similar advantages.

### The geko device for reducing the risk of venous thromboembolism

The case for adopting the geko device is supported for use in people who have a high risk of venous thromboembolism and for whom other mechanical and pharmacological methods of prophylaxis are impractical or contraindicated. Although clinical evidence is limited, the case is supported because of the plausibility that the geko device may reduce the high risk of venous thromboembolism in patients who cannot use other forms of prophylaxis, and the low risk of the device causing harm.

In patients at high risk of venous thromboembolism who would otherwise receive no prophylaxis, using the geko device is estimated to be cost saving. The amount saved depends on the level of reduction in relative risk of deep vein thrombosis associated with geko treatment compared with no treatment. There is no direct evidence on the size of this reduction, but when values obtained with other mechanical methods of prophylaxis were used in cost modelling, the estimated cost saving for the geko device in patients at high risk of venous thromboembolism compared with no prophylaxis was £197 per patient.

These recommendations are from [The geko device for reducing the risk of venous thromboembolism](#) (NICE medical technology guidance 19).

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

3. Anti-embolism stockings
5. VTE prophylaxis

## Resources

The following implementation tools are relevant to this part of the pathway.

[The geko device for reducing the risk of venous thromboembolism: costing statement](#)

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 7 Using mechanical prophylaxis

### Anti-embolism stockings

**Do not** offer anti-embolism stockings to patients with:

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

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

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Measure legs and use correct stocking size. Staff who fit stockings should be trained in their use and should show patients how to use them.

If oedema or postoperative swelling develops, ensure legs are re-measured and stockings refitted.

If arterial disease suspected, seek expert opinion before fitting stockings.

Use stockings that provide graduated compression and produce a calf pressure of 14–15 mmHg.

(This relates to a pressure of 14–18 mmHg at the ankle and is in line with British Standards [6612:1985 Specification for graduated compression hosiery](#) and [7672:1993 Specification for compression, stiffness and labelling of anti-embolism hosiery](#).)

Encourage patients to wear the stockings day and night from admission until they no longer have significantly reduced mobility.

Remove stockings daily for hygiene purposes and to inspect skin condition. If patient has significant reduction in mobility, poor skin integrity or sensory loss, inspect skin two or three times per day, particularly over heels and bony prominences.

Discontinue use of stockings if there is marking, blistering or discolouration of skin, particularly over heels and bony prominences, or if patient has pain or discomfort. If suitable, offer intermittent pneumatic compression or foot impulse devices as alternative.

Show patients how to use anti-embolism stockings correctly and ensure they understand that this will reduce their risk of developing VTE.

Monitor use of anti-embolism stockings and offer assistance if they are not being worn correctly.

### **Foot impulse and intermittent pneumatic compression devices**

**Do not offer** these devices to patients with a known allergy to the material of manufacture.

Encourage patients on the ward who have these devices to use them for as much of the time as is possible and practical, both when in bed and when sitting in a chair.

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

3. Anti-embolism stockings
5. VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

### 8 Medical patients

[See Venous thromboembolism / Venous thromboembolism: medical patients](#)

### 9 Non-orthopaedic surgery

[See Venous thromboembolism / Venous thromboembolism: non-orthopaedic surgery](#)

### 10 Orthopaedic surgery

[See Venous thromboembolism / Venous thromboembolism: orthopaedic surgery](#)

### 11 Major trauma or spinal injury

Offer mechanical VTE prophylaxis at admission or as soon as clinically possible, with any one of:

- anti-embolism stockings (thigh or knee length), used with caution (see [using mechanical prophylaxis](#) in this pathway)
- foot impulse devices
- intermittent pneumatic compression devices (thigh or knee length).

Continue until mobility is no longer significantly reduced.

Assess the patient's risks of VTE and bleeding. If the risk of VTE outweighs the risk of bleeding and the bleeding risk is low, offer LMWH (or UFH for patients with severe renal impairment or established renal failure). Continue until mobility is no longer significantly reduced.

Regularly re-assess the risks of VTE and bleeding. For more information, see [assessing risks of VTE and bleeding](#) in this pathway.

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

1. VTE and bleeding risk assessment
3. Anti-embolism stockings
4. Re-assessment
5. VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 12 Lower limb plaster casts

Assess risk of VTE in patients having lower limb plaster casts. For more information see [assessing risks of VTE and bleeding](#) in this pathway.

If VTE risk is increased, consider offering LMWH (or UFH for patients with severe renal impairment or established renal failure) after evaluating the risks and benefits and based on clinical discussion with the patient.

Continue until the plaster cast is removed.

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

1. VTE and bleeding risk assessment
4. Re-assessment
5. VTE prophylaxis
7. Extended VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 13 Critical care

Assess the risks of VTE and bleeding on admission to the critical care unit. For more information see [assessing risks of VTE and bleeding](#) in this pathway.

Offer VTE prophylaxis according to the reason for admission.

Take into account planned interventions and other therapies that may increase the risk of complications.

Re-assess the risks of VTE and bleeding and review decisions about VTE prophylaxis daily – more frequently if the clinical condition is changing rapidly.

Take into account the known views of the patient, family and/or carers and multidisciplinary team.

## Quality standards

The following quality statements are relevant to this part of the pathway.

## VTE prevention quality standard

1. VTE and bleeding risk assessment
3. Anti-embolism stockings
4. Re-assessment
5. VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 14 Pregnancy and up to 6 weeks post partum

[See Venous thromboembolism / Venous thromboembolism: pregnancy and up to 6 weeks post partum](#)

## 15 Review

Re-assess the risks of VTE and bleeding within 24 hours of admission and whenever the clinical situation changes, to:

- ensure that the methods of VTE prophylaxis being used are suitable
- ensure that VTE prophylaxis is being used correctly
- identify adverse events resulting from VTE prophylaxis.

For more information see [assessing risks of VTE and bleeding](#) in this pathway.

Monitor the use of mechanical VTE prophylaxis, see [using mechanical prophylaxis](#) in this pathway.

Keep patients hydrated and encourage them to mobilise as soon as possible.

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

3. Anti-embolism stockings
4. Re-assessment
5. VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## 16 Planning for discharge

Offer patients and/or their families or carers verbal and written information on:

- signs and symptoms of DVT and PE
- importance of seeking medical help and who to contact if DVT, PE or other adverse event suspected.

If discharged with VTE prophylaxis, also offer patients and/or their families or carers information on:

- correct use and duration of VTE prophylaxis at home
- importance of using VTE at home correctly and for recommended duration
- signs and symptoms of adverse events related to VTE prophylaxis
- who to contact if they have problems using VTE prophylaxis at home.

If discharged with anti-embolism stockings, ensure that the patient:

- understands the benefits of wearing them
- understands the need for daily hygiene removal
- is able to remove and replace the stockings or has someone who can do this

- 
- knows what to look for, such as skin marking, blistering or discolouration, particularly over heels and bony prominences
  - knows who to contact if there is a problem.

If discharged with pharmacological or mechanical VTE prophylaxis ensure that:

- the patient is able to use it or has someone who can do this
- the patient's GP is notified.

NICE has written information for the public explaining the guidance on [VTE](#) and information for the public explaining the [NICE quality standard on VTE prevention](#).

## Quality standards

The following quality statements are relevant to this part of the pathway.

### VTE prevention quality standard

3. Anti-embolism stockings
6. Information for patients and carers
7. Extended VTE prophylaxis

## Resources

The following implementation tool is relevant to this part of the pathway.

[VTE prevention quality standard: cost impact and commissioning assessment](#)

## Glossary

## Sources

[Venous thromboembolism - reducing the risk](#) (2010) NICE guideline CG92

[The geko device for reducing the risk of venous thromboembolism](#) (2014) NICE medical technology guidance 19

## Your responsibility

The guidance in this pathway represents the view of NICE, which was arrived at after careful consideration of the evidence available. Those working in the NHS, local authorities, the wider public, voluntary and community sectors and the private sector should take it into account when carrying out their professional, managerial or voluntary duties. Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way which would be inconsistent with compliance with those duties.

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