Venous Thromboembolism (VTE) Prophylaxis for Adult Inpatients

In Australia each year over 30,000 people are hospitalised with primary or secondary blood clots in their legs or lungs referred to as venous thromboembolism (VTE). Most of the VTE cases that are treated in hospital settings are related to prior hospitalisation for either surgery or acute illness. VTE results in an estimated 5,000 deaths annually and many survivors develop long term and costly complications. Most of these deaths are preventable with appropriate use of cost-effective pharmacological and mechanical prophylaxis measures.

The prevention of VTE in acute care hospitals has been recognised nationally and internationally as a priority patient safety issue because of the strong evidence base for preventive measures and high potential for improvements in patient outcomes. Despite good evidence, VTE prophylaxis measures continue to be under-utilised or used sub-optimally.

This document outlines the procedure for the assessment of VTE risk and for thromboprophylaxis in the adult, non-obstetric, inpatient consistent with the National Health and Medical Research Council (NHMRC) Clinical Practice Guideline for the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals (2009).

Purpose of this Procedure

- To minimize the risks to adult in-patients of VTE while in Caboolture and Kilcoy Hospitals
- To ensure VTE prophylaxis is optimized to prevent adverse outcomes
- To ensure all surgical patients receive appropriate risk assessment and prophylaxis according to the HQCC required standard
- To mandate clinical recording of VTE assessment and prophylaxis interventions to allow for clinical audit

Scope and Target Audience

This procedure applies to all adult patients including:

- Patients undergoing surgery, including orthopaedic, major general, major gynaecological, obstetric, urological,
- Patients with medical illnesses, including, myocardial infarction, stroke; and other medical conditions
- Trauma patients
- Patients admitted to intensive care units
- Cancer patients (with or without cancer treatment)
- Patients admitted during pregnancy and the puerperium

Reference: Health Quality and Complaints Commission Healthcare Standards V2 – Reducing the risk of venous thromboembolism (p12)
This procedure applies to all Caboolture and Kilcoy Hospital clinical staff (permanent, temporary and casual).

**Risk Assessment Guidelines**

It is essential to perform and record a VTE risk assessment for each patient before deciding whether or not to use preventative measures and on the most appropriate measures to use (NHMRC, 2009).

All inpatients are to be assessed for the risk of developing VTE.

It is important to treat patients according to their individual VTE risk assessment, their clinical condition, the bleeding risk and the appropriateness of the prophylaxis. Additional factors unique to the patient may increase their risk of developing a VTE while in hospital and necessitate the need for prophylaxis. The patient is to be reassessed on a regular basis to ensure prophylaxis remains appropriate. Continued encouragement of ambulation and adequate hydration are important principles in all patients regardless of the risk category.

**Patient Risk Factors**

The following risk factors are to be considered for each patient as recommended by the NHRMC Clinical Practice Guideline for the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals (2009).

**Individual Patient Risk Factors**

- Age (the annual incidence of VTE rises with each decade over the age of forty)
- Pregnancy and the puerperium
- Active or occult malignancy
- Previous VTE
- Varicose veins with phlebitis
- Obesity (BMI >30)
- Prolonged severe immobility (prolonged bed rest, immobilisation in a plaster cast or brace or prolonged travel resulting in limited movement and subsequent venous stasis)
- Use of oestrogen-containing hormone replacement therapy or oral contraceptives in women
- Inherited or acquired thrombophilia (conditions that carry a high risk of VTE include inherited deficiency of antithrombin, protein C or protein S, homozygosity or double heterozygosity)
- For factor V Leiden or the G20120A prothrombin gene mutation, the phospholipid antibody syndrome.

**Risks related to an acute medical illness**

- Acute or acute on chronic chest infection (i.e. chronic lung disease / chronic obstructive pulmonary disease (COPD))
- Heart failure
- Myocardial Infarction
- Stroke with immobility
- Some forms of cancer chemotherapy
- Acute inflammatory bowel disease
Risks related to an injury or surgical procedure

- All surgical procedures but especially the following:
  - Abdominal
  - Pelvic
  - Thoracic, or
  - Orthopaedic surgical procedures.

- Risk is determined by:
  - The type of surgery (major joint surgery carries a very high risk, as does curative surgery for cancer)
  - The type of anaesthesia
  - The likely duration of immobility (including duration of surgery), and
  - Surgical complications

- Leg injury that requires surgery or prolonged immobilisation.

Bleeding Risks

The risk of bleeding is elevated in the presence of certain risk factors and when certain procedures are undertaken. Pharmacological thromboprophylaxis may add to these risks (NHRMC 2009).

As a guide, patient related risk factors for bleeding may include, but not be limited to the following:

- Current active major bleeding (defined as requiring at least two units of blood or blood products to be transfused in 24 hours)
- Current chronic, clinically significant and measurable bleeding over 48 hours
- Bleeding disorders (e.g. haemophilia)
- Recent central nervous system bleeding
- Intracranial or spinal lesion
- Abnormal blood coagulation including underlying coagulopathy or coagulation factor abnormalities
- Thrombocytopenia (therapeutic prophylaxis is not recommended for patients with a platelet count < 50,000/μl but is generally considered safe in appropriate at-risk patients with lesser degrees of thrombocytopenia)
- Severe platelet dysfunction
- Active peptic ulcer or active ulcerative gastrointestinal disease
- Obstructive jaundice or cholestasis
- Recent major surgical procedure of high bleeding risk
- Concomitant use of medications that may affect the clotting process (e.g. anticoagulants, antiplatelet agents, selective and non-selective non-steroidal anti-inflammatory drugs or thrombolytic agents)
- Regional axial anaesthesia or recent lumbar puncture for any reason
- High risk of falls.

An assessment of bleeding risk is an essential step in deciding on appropriate thromboprophylaxis for individual patients (NHMRC, 2009).
Contraindications

The risk of VTE in hospitalised patients must be balanced against the actual and perceived risks of pharmacological thromboprophylaxis and patient’s tolerance of pharmacological (i.e. injections) or mechanical prophylaxis. The following table identifies the major contraindications for pharmacological and mechanical prophylaxis.

<table>
<thead>
<tr>
<th>Contraindications to Pharmacological Thromboprophylaxis</th>
<th>Contraindications to Mechanical Thromboprophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Known hypersensitivity to particular types of pharmacological thromboprophylaxis</td>
<td>• Morbid obesity where correct fitting of stocking cannot be achieved</td>
</tr>
<tr>
<td>• History of, or current heparin induced thrombocytopenia</td>
<td>• Inflammatory conditions of the lower leg</td>
</tr>
<tr>
<td>• Creatinine clearance &lt;30mL/minute (note: Specialist advice on choice, dosage or timing of pharmacological thromboprophylaxis may be required in patients with renal or hepatic impairment)</td>
<td>• Severe peripheral arterial disease</td>
</tr>
<tr>
<td>• History of Gastro/intestinal bleed</td>
<td>• Diabetic neuropathy</td>
</tr>
<tr>
<td>• On current anticoagulation</td>
<td>• Severe oedema of the legs</td>
</tr>
<tr>
<td></td>
<td>• Severe lower limb deformity</td>
</tr>
<tr>
<td></td>
<td>• Recent skin graft or vein ligation</td>
</tr>
</tbody>
</table>

Duration of Prophylaxis

Decisions regarding time of commencement and duration of prophylaxis should be made for each patient individually. In high risk patients duration of prophylaxis is recommended to be a minimum of 10 days. If the patient is not fully ambulant after 10 days, prophylaxis should continue until full ambulation is achieved. Increasingly fewer inpatients stay as long as 10 days and after discharge may not be fully mobilizing at home. It is important to be cautious with early discharge patients that may be convalescing and still at risk of VTE, extended prophylaxis may be indicated.

Procedure

- VTE risk category assessment will be determined on all acute inpatients and patients with planned admissions
  - Staff are to use the Algorithm for assessing the risk of VTE (refer to Flowchart 1) for adult inpatients (excluding maternity patients)
  - Staff are to use the following flowcharts for maternity patients
    - Flowchart: Antenatal assessment and management of VTE prophylaxis
    - Flowchart: Postnatal assessment and management of VTE prophylaxis
- Documentation of the assessment and prophylactic requirements will be completed on the VTE section of the National Inpatient Medication Chart (NIMC) (version 11). This section must be signed and dated by the Medical Officer undertaking the risk assessment.
- Assessment for elective patients will be done by the medical officer at the time of booking in specialist outpatients or alternatively in Preadmission Clinic
- Details will be incorporated into patients care path or record at preadmission clinic
- Other inpatients will have the risk assessment completed at the time of admission.
• Patient risk level will be reassessed if patient’s condition or status changes from admission
• Contraindications to any form of prophylaxis should be identified and documented according to their risk level.
• Chemoprophylaxis and mechanical prophylaxis is to be prescribed in the appropriate section of the NIMC (refer to Using the NIMC VTE prophylaxis section, Australian Commission on Safety and Quality in Health Care, 2013)
  o Summary recommendations for the prevention of VTE for the following clinical procedures are based on the NHMRC Clinical Practice Guidelines (2009) and provided for Clinician reference. To access the recommendations and a description of the level of evidence provided please click on the relevant hyperlink below.
    ▪ Grade of recommendations by NHMRC. Refer to Table 1
    ▪ Surgical Patients:
      ➢ General Surgery. Refer to Table 2
      ➢ Gynaecological Surgery. Refer to Table 3
      ➢ Abdominal Surgery. Refer to Table 4
    ▪ Anaesthesia. Refer to Table 5
    ▪ Medical Patients:
      ➢ Stroke. Refer to Table 6
      ➢ Myocardial Infarction (MI). Refer to Table 7
      ➢ General Medical. Refer to Table 8
    ▪ Cancer Patients. Refer to Table 9
    ▪ Pregnancy and Childbirth. Refer to Queensland Clinical Guideline
    ▪ Heparin-induced Thrombocytopenia (HIT) Patients. Refer to Table 10

Patient information
Adult patients admitted to the hospital are to be provided with the patient information brochure “Blood Clots – Reducing your risk” on admission. A copy of the brochure can be accessed online by clicking on the following hyperlink:
• Blood Clots – Reducing your risk (NHMRC, 2010)

Patient Incidents and Near Miss Events
It is the responsibility of all clinical staff involved in the management of preventing VTE’s to report all incidents and near miss events regarding patient care and safety (Queensland Health Incident Management Implementation Standard, 2009). All events are to be reported into PRIME CI. This information will be used to review practice and identify areas for future quality improvement initiatives.

Evaluation Method
An annual report is to be tabled at the Caboolture Hospital Medication Management Committee. The report is to include:
• Number of VTE risk assessments completed for patients (separated in period)
• Number with appropriate VTE prophylaxis by level of risk
• Number of major bleeds by risk level
• Number of clinically detected VTE’s by risk level
Participation in ongoing audits for the National Inpatient Medication Chart with regular feedback to the governing committee on the following:
• Compliance to documented risk assessment being performed in the NIMC
• Compliance to correct prescribing of VTE prophylaxis in the NIMC
Participation in the Queensland Bedside Audit

**Governance**

The Caboolture Hospital Medication Management Committee is responsible for providing governance for this procedure.

**Document developed in response to:**

- National Safety and Quality Health Service (NSQHS) Standards: Standard 4 – Medication Safety
- Health Quality and Complaints Commission recommendation
- National Health and Medical Research Council Clinical Practice Guidelines for the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals (2009)

**References**

- Australian Commission on Safety and Quality in Health Care: Using the NIMC VTE prophylaxis section, (2013)
- National Health and Medical Research Council Clinical Practice Guidelines for the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals (2009)
- National Safety and Quality Health Service (NSQHS) Standards: Standard 4 – Medication Safety
Algorithm for assessing the risk of venous thromboembolism (VTE)

Key Practice Points:
- All patients are to be risked assessed for VTE on admission/presentation to hospital
- All VTE assessments are to be documented on the patients National Inpatient Medication Chart (NIMC) in the appropriate section

Medication Safety - Standard 4
Algorithm for assessing the risk of venous thromboembolism (VTE)

Does the patient have any risk factors for thrombosis?
- Age >60
- Active cancer or cancer treatment*
- Previous VTE*
- Varicose veins with phlebitis
- Obesity (BMI >30)
- Hip fracture / hip or knee replacement
- Total anaesthetic + surgical time >90 minutes
- Surgery involving pelvis or lower limb with a total anaesthetic + surgical time >60 minutes
- *Indicates should be considered as a single major risk factor

Does the patient have 1 or more of the identified risk factors for thrombosis?
- Yes
- No

Does the patient have any bleeding risk factors?
- Current active bleeding
- Current chronic, clinically significant and measurable bleeding over 48 hours
- Bleeding disorders (e.g. haemophilia)
- Recent central nervous system bleeding
- Intracranial or spinal lesion
- Severe platelet dysfunction
- Regional axil anaesthesia or recent lumbar puncture for any reason
- Abnormal blood coagulation including underlying coagulopathy or coagulation factor abnormalities

Does the patient have 1 or more bleeding risk factors?
- Yes
- No

Pharmacological prophylaxis +/- mechanical
Follow protocol for:
- Surgical Patients
- Anaesthetic Patients
- Medical Patients
- Cancer Patients
- Heparin Induced Thrombocytopenia (HIT) Patients

Contraindications to anti embolic stockings:
- Peripheral neuropathy
- Peripheral vascular disease
- Gross oedema
- Leg deformity
- Acute stroke – use intermittent pneumatic compression (IPC) device

* Indicates should be considered as a single major risk factor

Adapted from Grampian Risk Assessment Tool (Scottish Intercollegiate Guidelines Network (SIGN), 122 Prevention and Management of Venous Thromboembolism) and NIMC Clinical Practice Guidelines for prevention of VTE (2005)
Table 1

National Health and Medical Research Council Clinical Practice Guideline – For the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals: Grade of Recommendations for clinical practice

<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Body of evidence can be trusted to guide practice</td>
</tr>
<tr>
<td>B</td>
<td>Body of evidence can be trusted to guide practice in most situations</td>
</tr>
<tr>
<td>C</td>
<td>Body of evidence provides some support for recommendation(s) but care should be taken in its application</td>
</tr>
<tr>
<td>D</td>
<td>Body of evidence is weak and recommendation must be applied with caution</td>
</tr>
<tr>
<td>NA</td>
<td>Not applicable – unable to grade body of evidence</td>
</tr>
<tr>
<td>GPP</td>
<td>Good practice point – consensus-based recommendations</td>
</tr>
</tbody>
</table>
### Table 2: Surgical Patients – General Surgery

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use thromboprophylaxis for all patients admitted to hospital for general surgery.</td>
<td>GPP</td>
</tr>
</tbody>
</table>
| 2. In the absence of contraindications, use pharmacological thromboprophylaxis and continue for up to one week or until the patient is fully mobile following major general surgery. Use one of the following:  
  - Low molecular weight heparin  
  - Unfractionated heparin | B, B                    |
| 3. Use graduated compression stockings for all general surgical patients, whether or not pharmacological thromboprophylaxis is used, until the patient is fully mobile. | B                       |
| 4. If recommended thromboprophylaxis is contraindicated or not available, use a foot pump following general surgery, until the patient is fully mobile. | B                       |
### Surgical Patients – Gynaecological Surgery

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use thromboprophylaxis for all patients admitted to hospital for major gynaecological surgery.</td>
<td>GPP</td>
</tr>
</tbody>
</table>
| 2. In the absence of contraindications, use pharmacological thromboprophylaxis and continue for up to one week or until the patient is fully mobile following major gynaecological surgery. Use one of the following:  
  - Low molecular weight heparin  
  - Unfractionated heparin | B |
| 3. Use graduated compression stockings or other mechanical thromboprophylaxis following major gynaecological surgery, especially if pharmacological thromboprophylaxis is contraindicated. | GPP |
| 4. Warfarin is not recommended for thromboprophylaxis following major gynaecological surgery. | C |

### Surgical Patients – Abdominal Surgery

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use thromboprophylaxis for all patients admitted to hospital for major abdominal surgery.</td>
<td>GPP</td>
</tr>
<tr>
<td>2. In the absence of contraindications, use pharmacological thromboprophylaxis for major abdominal surgery patients and continue for at least five (5) to nine (9) days with low molecular weight heparin.</td>
<td>B</td>
</tr>
<tr>
<td>3. Fondaparinux is not recommended for thromboprophylaxis following major abdominal surgery.</td>
<td>C</td>
</tr>
<tr>
<td>4. Use graduated compression stockings for all patients following abdominal surgery, whether or not pharmacological thromboprophylaxis is used, until the patient is fully mobile.</td>
<td>B</td>
</tr>
</tbody>
</table>
Table 5

Anaesthesia

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consider central neural blockade as an alternative to general anaesthesia if feasible. If central neural blockade is used, there is a risk of developing an epidural haematoma. To minimise this risk, timing of pharmacological thromboprophylaxis should be carefully planned and discussed in advance with the anaesthetist.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

Table 6

Medical Patients – Stroke

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consider the use of thromboprophylaxis for all patients admitted to hospital with ischemic stroke based on an assessment of the patient’s degree of immobility and risk of bleeding.</td>
<td>B</td>
</tr>
<tr>
<td>2. Pharmacological thromboprophylaxis is not recommended for haemorrhagic stroke patients due to the risk of intracranial bleeding.</td>
<td>GPP</td>
</tr>
<tr>
<td>3. Where pharmacological thromboprophylaxis is appropriate and not contraindicated, use low molecular weight heparin for patients with ischemic stroke.</td>
<td>B</td>
</tr>
<tr>
<td>4. If low molecular weight heparin is contraindicated or not available, use unfractionated heparin.</td>
<td>B</td>
</tr>
</tbody>
</table>

Table 7

Medical Patients – Myocardial Infarction (MI)

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use thromboprophylaxis for patients admitted to hospital for myocardial infarction, where full anticoagulation is not in use.</td>
<td>C</td>
</tr>
<tr>
<td>2. In the absence of contraindications, use unfractionated heparin for thromboprophylaxis following myocardial infarction.</td>
<td>C</td>
</tr>
</tbody>
</table>
# Medical Patients – General Medical

Table 8

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consider the use of thromboprophylaxis for patients admitted to hospital for medical conditions based on an assessment of the patient’s risk of VTE and bleeding.</td>
<td>GPP</td>
</tr>
</tbody>
</table>
| 2. Where pharmacological thromboprophylaxis is appropriate and not contraindicated, use one of the following:  
  - Low molecular weight heparin  
  - Unfractionated heparin. | B |

---

# Cancer Patients

Table 9

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
</table>
| 1. Use thromboprophylaxis for all cancer patients undergoing general surgical procedures including abdominal or pelvic surgery or neurosurgery, provided there are no contraindications.  
  Where pharmacological thromboprophylaxis is appropriate and not contraindicated, use one of the following and continue for at least seven to 10 days following major general surgery for cancer:  
  - Low molecular weight heparin  
  - Unfractionated heparin. | GPP |
| 2. Consider using extended thromboprophylaxis with low molecular weight heparin for up to 28 days after major abdominal or pelvic surgery for cancer, especially in patients who are obese, slow to mobilise or have a past history of VTE. | GPP |
| 3. In the absence of other significant risk factors, thromboprophylaxis is not recommended for cancer patients undergoing head and neck surgery. | GPP |
| 4. In non-surgical cancer patients in the absence of contraindications, commence pharmacological thromboprophylaxis on admission and continue until discharge. Use one of the following:  
  - Low molecular weight heparin  
  - Unfractionated heparin. | GPP |
| 5. For both surgical and non-surgical cancer patients, use graduated compression stockings if pharmacological thromboprophylaxis is contraindicated. | GPP |
### Table 10

**Heparin-induced Thrombocytopenia (HIT) Patients**

<table>
<thead>
<tr>
<th>Recommendations by Clinical Procedure</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In patients with heparin-induced thrombocytopenia, use heparinoids such as danaparoid as an alternative antithrombotic drug. Specialist advice from a haematologist is recommended in patients with clinically suspected heparin-induced thrombocytopenia.</td>
<td>B</td>
</tr>
</tbody>
</table>
## Document History

<table>
<thead>
<tr>
<th>Procedure Custodian</th>
<th>Chair, Medication Management Committee, Caboolture Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Rating</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Compliance Evaluation & Audit

- Proportion of surgical patients with a documented VTE risk assessment
- Proportion of surgical patients assessed as requiring thromboprophylaxis, who received the recommended thromboprophylaxis
- Proportion of medical patients with a documented VTE risk assessment
- Proportion of medical patients assessed as requiring thromboprophylaxis, who received the recommended thromboprophylaxis
- Proportion of inpatient medication charts that had a documented record of VTE risk being assessed
- Proportion of inpatient medication charts that had VTE prophylaxis prescribed correctly

### Document Replaced
- RCKHS0469 Version 1 Venous Thromboembolism (VTE) Prophylaxis

### Key Stakeholders
- Facility Heads of Departments
- Membership, Medication Management Committee, Caboolture Hospital
- Director, Pharmacy, Caboolture Hospital
- Caboolture Hospital Nursing Leadership

### Key Words
- RCKHS0469, Venous Thrombosis, VTE, Thromboprophylaxis

### AUTHORISATION

Signature: ........................................ Date: .................................

Chair, Medication Management Committee, Caboolture and Kilcoy Hospital

### AUTHORISATION

Signature: ........................................ Date: .................................

A/Executive Director, Caboolture and Kilcoy Hospital