

## Hospital-Acquired Complication 7

# VENOUS THROMBOEMBOLISM

HOSPITAL-ACQUIRED COMPLICATION		RATE <sup>a</sup>
1	Pressure injury	10
2	Falls resulting in fracture or intracranial injury	4
3	Healthcare-associated infection	135
4	Surgical complications requiring unplanned return to theatre	20
5	Unplanned intensive care unit admission	na <sup>b</sup>
6	Respiratory complications	24
7	Venous thromboembolism	8
8	Renal failure	2
9	Gastrointestinal bleeding	14
10	Medication complications	30
11	Delirium	51
12	Persistent incontinence	8
13	Malnutrition	12
14	Cardiac complications	69
15	Third and fourth degree perineal laceration during delivery (per 10,000 vaginal births)	358
16	Neonatal birth trauma (per 10,000 births)	49

a per 10,000 hospitalisations except where indicated  
b na = national data not available

This hospital-acquired complication includes the diagnoses of pulmonary embolism and deep vein thrombosis.\*



## Why focus on venous thromboembolism?

Each year, patients in Australian hospitals experience a large number of venous thromboembolisms (VTEs), with 3,394 occurring in public hospitals in 2015–16.<sup>1</sup> The rate of hospital-acquired VTE was 7.6 per 10,000 hospitalisations in 2015–16.<sup>1</sup>

VTE is one of the leading causes of preventable death in Australia, accounting for almost 10% of all hospital deaths.<sup>2</sup> VTE can cause distressing symptoms in the form of pain, swelling, tenderness, limited mobility and dyspnoea, tachypnoea and/or respiratory distress, tachycardia, arrhythmias, cough or haemoptysis. VTE has an extremely high patient mortality.<sup>3,4</sup>

Hospital-acquired VTE also prolongs length of stay. Patients with a hospital-acquired VTE remain in hospital for 21.4 days longer on average than patients without this hospital-acquired complication.<sup>1</sup> The national average cost per admitted acute overnight stay is \$2,074.<sup>5</sup> Each hospitalisation involving a hospital-acquired VTE can be presumed to incur approximately \$44,384 in extra costs.

In the majority of cases, hospital-acquired VTE is preventable. There is a strong evidence base for preventive measures and high potential for improvements in patient outcomes.<sup>6</sup> Appropriate intervention, such as pharmacological and mechanical prophylaxis, can significantly reduce the incidence of VTE by 70% for both medical and surgical patients.<sup>7,8</sup>

Significant reductions in VTE rates are being achieved in some hospitals through preventive initiatives. The rate for VTE at Principal Referral Hospitals<sup>†</sup> was 9 per 10,000 hospitalisations in 2015–16.<sup>1</sup> If all Principal Referral Hospitals above this rate reduced their rate to 9 per 10,000 hospitalisations, then 663 hospital-acquired VTEs in Principal Referral Hospitals would have been prevented, and more when other facilities are considered.

\* The specifications for the Hospital-Acquired Complications list providing the codes, inclusions and exclusions required to calculate rates is available on the [Commission's website](#) [\[7\]](#).

† Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the Australian Institute of Health and Welfare's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.



## What is considered best practice for preventing VTE?

All hospital-acquired complications can be reduced (but not necessarily eliminated) by the provision of patient care that mitigates avoidable clinical risks to patients.



The **health service organisation** providing services to patients at risk of VTE:

- Has systems for VTE risk assessment and prophylaxis that are consistent with best-practice guidelines
- Ensures that equipment and devices are available to decrease the risk and effectively manage VTE.



**Clinicians** caring for patients at risk of VTE:

- Conduct comprehensive VTE risk assessments
- Provide VTE prophylaxis and care in accordance with best-practice guidelines.



The National Safety and Quality Health Service (NSQHS) Standards (second edition), in particular the Comprehensive Care Standard<sup>9</sup>, support the delivery of safe patient care.

The advice contained in the hospital-acquired complication fact sheets aligns with the criteria in this standard, which are as follows:

- Clinical governance structures and quality-improvement processes supporting patient care
- Developing the comprehensive care plan
- Delivering the comprehensive care plan
- Minimising specific patient harms.

# Top tips for prevention and management of VTE

The following provides key points for clinicians to consider to avoid this hospital-acquired complication

## Conduct risk assessment

- Conduct a comprehensive risk assessment including assessing the patient's baseline risk of VTEs, their risk of bleeding and any contraindications to pharmacological or mechanical prophylaxis
- Identify risk factors related to the individual such as increased age, pregnancy, active malignancy, previous VTE, varicose veins, obesity, immobility, hormone replacement or oral contraceptive use and/or acquired thrombophilia
- Identify medical illness risk factors such as chest infection, heart failure, current myocardial infarction, stroke with immobility, chemotherapy and/or acute inflammatory bowel syndromes
- Identify injury or surgery risk factors such as all surgical procedures and leg injuries.

For a patient at risk, develop a prevention plan as part of a comprehensive care plan

## Develop prevention plan

Clinicians, patients and carers develop an individualised, comprehensive prevention plan to prevent VTE that identifies:

- Goals of treatment consistent with the patient's values
- Any specific nursing requirements, including equipment needs
- Any allied health interventions required, including equipment needs
- Observations or physical signs to monitor and determine frequency of monitoring
- Laboratory results to monitor and determine frequency of monitoring
- If specialist assistance is required.

## Deliver prevention plan

Deliver the VTE prophylaxis plan including:

- Maintaining the patient's hydration
- Mobilisation of the patient
- Mechanical compression
- Providing medications.

## Monitor

- Monitor the effectiveness of these strategies in preventing VTE and reassess the patient if VTE occurs
- Review and update the care plan if it is not effective or is causing side effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement
- Clinicians develop and document a detailed discharge plan for patients being discharged with VTE prophylaxis and provide this plan to the patient before discharge and to their GP or ongoing care provider within 48 hours of discharge.



# Clinical governance structures and quality-improvement processes

to support best practice in VTE prevention and management

Health service organisations need to ensure systems are in place to prevent VTE through effective clinical governance and quality-improvement processes.

The NSQHS Standards (2nd ed.) describe actions that are relevant to the prevention and management strategies outlined below. These actions are identified in brackets.

## Policies, procedures and /or protocols

Health service organisations ensure policies and procedures, and/or protocols are consistent with evidence-based guidelines for the risk assessment and prophylaxis of VTE. **(1.27, 5.1a)**

## Best-practice screening and management

Health service organisations:

- Agree on the process and criteria for VTE risk screening **(5.7)**
- Identify a format for VTE risk screening **(5.1c)**
- Inform clinical staff of screening requirements. **(5.1c)**

## Identification of key individuals / governance groups

Health service organisations identify an individual or a governance group that is responsible for:

- Monitoring compliance with the organisation's policies, procedures and protocols for VTE prevention **(1.7b, 5.2a)**
- Presenting data on the performance of VTE prevention and management systems to the governing body. **(1.20d, 1.22, 1.28b)**

## Training requirements

Health service organisations:

- Identify workforce training requirements **(1.20a)**
- Train relevant staff on the use of risk screening and prevention plans **(1.20a, 1.20c)**
- Ensure workforce proficiency is maintained. **(1.20, 1.22, 1.28b)**

## Monitoring the delivery of prophylaxis and care

Health service organisations ensure mechanisms are in place to:

- Report VTE **(1.9, 1.11, 5.2)**
- Manage risks associated with VTE prophylaxis and management **(5.1b)**
- Identify performance measures and the format and frequency of reporting **(1.8a)**
- Set performance measurement goals **(1.8a)**
- Collect data on compliance with policies **(1.7b)**
- Collect data about VTE risk screening activities, including whether risk assessment is leading to appropriate action **(1.8, 5.1b, 5.2)**
- Identify gaps in systems for screening patients for VTE. **(5.2)**

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## Quality improvement activities

Health service organisations ensure mechanisms are in place to:

- Implement and evaluate quality improvement strategies to reduce the incidence and harm from VTE **(5.2)**
- Use audits of patient clinical records (such as the National inpatient Medication Chart<sup>10</sup> and transfer and discharge documentation), and other data to:
  - identify opportunities for improving VTE prophylaxis plans **(5.2)**
  - identify gaps and opportunities to improve the use of VTE prophylaxis plans (for example, increasing the number of at-risk patients who have VTE prophylaxis plans implemented) **(5.2)**
  - monitor the overall effectiveness of systems for prevention and management of VTE. **(5.2)**



## Developing the patient's comprehensive care plan

to support best practice in VTE prevention

Clinicians should partner with patients, carers and families, assessing risk, in providing appropriate information to support shared decision making, and in planning care that meets the needs of patients and their carers. As patients may continue to have an elevated risk of VTE after the time of discharge from hospital, the care plan should, where appropriate, address prophylaxis after the transfer of care.

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## Identifying risk factors for VTE

Clinicians identify risk factors for VTE which include<sup>4</sup>:

- Individual
  - increasing age
  - pregnancy
  - active malignancy
  - previous VTE
  - varicose veins
  - obesity
  - immobility
  - hormone replacement or oral contraceptive use
  - acquired thrombophilia
- Medical illness
  - chest infection
  - heart failure
  - current myocardial infarction
  - stroke with immobility
  - chemotherapy
  - acute inflammatory bowel syndromes
- Injury or surgery
  - all surgical procedures and leg injuries.

<b>Implementing risk assessment screening</b>	<p>Clinicians use relevant screening processes at or prior to presentation to assess:</p> <ul style="list-style-type: none"> <li>• The risk of VTE</li> <li>• Requirements for prevention strategies.</li> </ul>
<b>Clinical assessment</b>	<p>Clinicians comprehensively assess:</p> <ul style="list-style-type: none"> <li>• Conditions</li> <li>• Medications</li> <li>• Bleeding risk</li> <li>• Other risks identified through screening processes.</li> </ul>
<b>Planning in partnership with patients and carers</b>	<p>Clinicians inform patients, family and carers about the purpose and process of developing a VTE prophylaxis plan and invite them to be involved in its development.</p>
<b>Informing patients with a high risk</b>	<p>Clinicians provide information to high-risk patients and their carers about:</p> <ul style="list-style-type: none"> <li>• VTE</li> <li>• Their risk factors</li> <li>• Prevention of VTE</li> <li>• Risks and benefits of prevention</li> <li>• Signs and symptoms of VTE</li> <li>• How patients can minimise their risk.</li> </ul>
<b>Collaborating and working as a team</b>	<p>Medical, nursing, pharmacy, physiotherapy and other allied health staff collaborate to perform VTE risk assessment and clinical assessment.</p>
<b>Documenting and communicating the care plan</b>	<p>Clinicians document in the clinical record and communicate:</p> <ul style="list-style-type: none"> <li>• The VTE risk assessment and plan for prophylaxis</li> <li>• The findings of the screening process</li> <li>• The findings of the clinical assessment process</li> <li>• The VTE prophylaxis plan, addressing <ul style="list-style-type: none"> <li>– maintaining hydration</li> <li>– mobilisation</li> <li>– mechanical compression</li> <li>– medications.</li> </ul> </li> </ul>
<b>Reassessing risk</b>	<p>Clinicians reassess risk:</p> <ul style="list-style-type: none"> <li>• Within 24 hours of admission to hospital</li> <li>• Whenever the patient's clinical situation changes</li> <li>• On discharge from hospital.</li> </ul>

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### Planning for appropriate ongoing care post discharge

Clinicians develop and document an individualised care plan for the patient at risk of VTE, during or following their hospital stay. The plan includes:

- Details about the patient's individual risk factors for VTE (see [Assessing risk of VTE](#))
- Signs and symptoms of VTE
- What to do if a VTE is suspected
- When the patient will be reviewed.

If the patient is discharged with VTE prophylaxis, the plan should include:

- Details of the type of prophylaxis
- How to use prophylaxis
- The duration of use
- When prophylaxis should be reviewed
- Monitoring requirements
- Possible side effects and what to do if they occur.

The discharge plan should be provided to the patient before they leave hospital and to their general practitioner or ongoing care provider within 48 hours of discharge.



## Delivering comprehensive care to prevent and manage VTE

Safe care is delivered when the individualised care plan, that has been developed in partnership with patients, carers and family, is followed.

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### Collaboration and working as a team

Medical, nursing, pharmacy, physiotherapy and other allied health staff collaborate to deliver VTE prophylaxis and management.

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### Delivering VTE prophylaxis and management in partnership

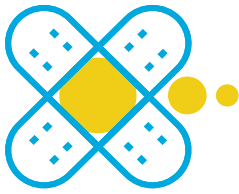
Clinicians, patients and carers work in partnership, and according to best practice guidelines, to manage patients who have VTE.

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### Monitoring and improving care

Clinicians should:

- Monitor the effectiveness of these strategies in preventing VTE and reassess the patient if VTE occurs
- Review and update the care plan if it is not effective or is causing side effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.



## Minimising specific patient harms

Clinicians identify patients at risk of specific harms and deliver targeted strategies to prevent and manage these harms.

### Nutrition and hydration

Ensure the nutritional and fluid requirements of the patient are:

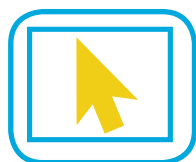
- Planned
- Delivered
- Monitored
- Adjusted as appropriate.

### Assessing risk of VTE

Conduct a comprehensive risk assessment to identify patients at risk of VTE:

- Assess the patient's baseline risk of VTE
  - Consider inherited and/or acquired risk factors
- Assess the patient's additional risk of VTE
  - Account for the reason for hospitalisation:
    - surgical procedures
    - trauma
    - specific medical illness (such as cancer)
- Assess the patient's risk of bleeding
- Consider contraindications to pharmacological or mechanical prophylaxis
- Formulate an overall risk assessment
  - Consideration of risk of VTE prophylaxis against the benefits
- In consultation with the patient, select appropriate methods of VTE prophylaxis.





## Additional resources

Agency for Healthcare Research and Quality (US). Preventing Hospital-Associated Venous Thromboembolism. [↗](#) 2016.

American College of Chest Physicians. Antithrombotic therapy and prevention of thrombosis, [↗](#) 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest [Internet]. 2012; 41(2 Suppl):[e1S-194s pp.]

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Australian Commission on Safety and Quality in Health Care. Venous Thromboembolism Clinical Care Standard. Sydney: ACSQHC; forthcoming.

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Clinical Excellence Commission (AU). Framework for the Prevention of Venous Thromboembolism. Sydney: Clinical Excellence Commission; 2014. [↗](#)

Department of Health (UK). Risk Assessment for Venous Thromboembolism (VTE) 2010. [↗](#)

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Queensland Clinical Guidelines. Venous thromboembolism (VTE) prophylaxis in pregnancy and the puerperium. [↗](#) Brisbane: Department of Health; 2014.

Scottish Intercollegiate Guidelines Network. Prevention and management of venous thromboembolism: A national clinical guideline. [↗](#) Edinburgh: Healthcare Improvement Scotland; 2010.

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## Note on data

The data used in this sheet are for hospital-acquired complications recorded during overnight acute episodes of care in Australian public hospitals in 2015–16. Data are included where hospitals were able to identify that the complication had arisen during an admission using the condition onset flag. Figures reported by the Independent Hospital Pricing Authority (IHPA) may differ due to the IHPA's methodology, which applies different inclusion/exclusion criteria.

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## References

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2. Access Economics (AU). The burden of venous thromboembolism in Australia: Report by Access Economics Pty Ltd for the Australia and New Zealand Working Party on the Management and Prevention of Venous Thromboembolism 2008.
3. Assareh H, Chen J, Ou L, Hillman K, Flabouris A. Incidences and variations of hospital acquired venous thromboembolism in Australian hospitals: a population-based study. [Internet]. 2016. Available from: <http://dx.doi.org/10.1186/s12913-016-1766-y>.
4. National Health and Medical Research Council (AU). Clinical practice guideline for the prevention of venous thromboembolism in patients admitted to Australian hospitals. Melbourne: National Health and Medical Research Council; 2009. Available from: [http://www.nhmrc.gov.au/\\_files\\_nhmrc/publications/attachments/cp115\\_guideline\\_prevention\\_venous\\_thromboembolism.pdf](http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/cp115_guideline_prevention_venous_thromboembolism.pdf).
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