



AUSTRALIAN COMMISSION ON
SAFETY AND QUALITY IN HEALTH CARE

Stop the Clot

Integrating VTE prevention
guideline recommendations into
routine hospital care 2011

3rd edition

Working to build a healthy Australia

About the document

This document is a resource for hospitals wishing to improve practice in VTE prevention. It draws on what is currently known about effective ways of implementing VTE prevention guidelines, as well as lessons learned from teams participating in the NHMRC's VTE Prevention Program. It sets out the key issues that clinicians and managers need to address to systematically integrate best practice guideline recommendations into routine hospital care processes. It includes helpful tips and references for other tools and sources of information.

This document is the third edition of *Stop the Clot: Integrating VTE prevention guideline recommendations into routine hospital care* and replaces the first and second editions, published in May 2007 and October 2008.

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Preface

Improving the prevention of venous thromboembolism (VTE) in hospitalised patients is a national safety and quality priority for both the National Health and Medical Research Council (NHMRC) and Australian Commission on Safety and Quality in Health Care (the Commission). We have jointly supported health professionals to apply best practice evidence in everyday clinical practice through two very successful national VTE prevention programs in the public and private hospital sectors. The Public Hospital VTE Prevention Program, November 2005 to October 2007, included over 40 clinical teams from metropolitan and regional hospitals across Australia. The Private Hospital VTE Prevention Program, August 2008 to August 2009, included 36 teams from private hospitals in most State and Territory jurisdictions. We are working in partnership to build on these successful programs and make VTE prevention a priority in all hospitals across Australia.

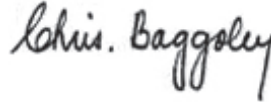
The first edition of this guide was produced by the National Institute of Clinical Studies (NICS) in collaboration with the Public Hospital VTE Prevention Program Advisory Group. The second edition was adapted for the private hospital sector by NHMRC staff at NICS in consultation with the Private Hospital VTE Prevention Program Advisory Committee. This third edition has been produced by the NHMRC and the Commission to reflect new VTE prevention resources developed by both agencies and evidence-based clinical practice guidelines developed by the NHMRC in the 2009 *Clinical Practice Guideline for the Prevention of Venous Thromboembolism (Deep Vein thrombosis and Pulmonary Embolism) in Patients Admitted to Australia Hospitals*.

This guide aims to help health professionals improve the assessment and management of VTE risk in hospitalised patients. It has been designed for use by quality and safety managers, risk managers and clinicians in a variety of hospital settings. The guide draws on what is currently known about effective ways of implementing guidelines, particularly VTE prevention guidelines, as well as lessons learned from teams participating in the NHMRC's VTE prevention programs. It sets out the key issues that clinicians and managers need to address to integrate systematically best practice guideline recommendations into routine hospital care processes.

We have included helpful tips throughout and references to other tools and sources of information. We hope this guide will be a helpful resource for hospitals wishing to improve practice in this fundamentally important area of patient safety.



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Background

Each year around 30,000 Australian hospitalisations relate to venous thromboembolism (VTE),¹ and an estimated 5,000 patients die as a result.² This is more than three times the number of deaths from road traffic accidents each year.³ For those who survive VTE, there are significant long term costs and consequences including a substantially increased long-term risk of subsequent arterial cardiovascular events.⁴

The majority of VTE cases requiring hospitalisation are related to prior hospitalisation for either surgery or an acute illness.⁵ Many of these cases are preventable using safe, efficacious, cost-effective and proven measures. A number of evidence-based guidelines, which outline the appropriate interventions to prevent VTE have been available since the early 1990s.^{6,7,8,9} In spite of these, the problem persists and best practice guidelines and recommendations continue to be under-utilised.

This situation is not unique to Australia. There are many well documented reasons why VTE prevention continues to be a challenge across a range of health care settings and clinical conditions and procedures.¹⁰ Fortunately there are effective strategies that have been used to increase the uptake of VTE prophylaxis for hospitalised patients.⁵

This guide:

- Provides clinicians and risk managers with practical advice on how to ensure that thromboprophylaxis in their health service is in line with best practice.
- Draws on a systematic review¹⁰ of Australian and international experience in introducing and sustaining improvements in VTE prevention, and the experience of the NHMRC and the Commission in implementing VTE prevention programs in public and private hospitals.¹¹ The suggested steps apply to any health service providing acute and subacute care – metropolitan or rural, big or small.
- Covers the main issues that need to be considered when developing a local clinical practice improvement plan as well as providing other resources for further reading.

- Answers typical questions facing clinical practice improvement teams, such as:
 - Do we have a problem?
 - Why do we have a problem?
 - What do we tackle first?
 - Who should be involved in tackling the problem?
 - How do we engage others?
 - What works best to improve practice in this area?
 - What changes should we try in our hospital?
 - What monitoring do we need to keep improvements on track?
 - How can we make sure we sustain the changes?

Essentially, this guide brings together the experiences of others in this area and attempts to shorten the journey of clinical practice improvement for people who are just starting out or have tried and are looking for new ideas.

For simplicity we have arranged the advice in the form of a handy step-by-step guide. In practice, you may decide to run a number of the steps together. It is not our intention to impose a rigid structure but we have tried to present the steps in a logical order.

Changing practice takes time, and to be successful requires multi-pronged strategies at all levels from local hospital to government.¹² Any hospital embarking on a program of clinical practice improvement in this area needs to make a long-term commitment. As a rough guide you would expect that within twelve months you will have developed a whole-of-hospital policy¹³, have an understanding of current practice by interpreting data from clinical practice audits and have tested and evaluated a number of interventions designed to facilitate best practice. Some of these change ideas are described in this guide. Realistically, within two years you would expect to have embedded new risk assessment and management processes into reliable systems of care, have processes in place to orient new staff on standard VTE prevention best practice and be regularly monitoring compliance.

This process of improving practice needs resources and executive endorsement for people to do the necessary work. However, the process doesn't have to be led from the top. People within organisations who don't necessarily hold official roles in quality improvement can instigate and champion moves towards getting better care processes in place. Clinical leadership is required and clinical leaders in VTE prophylaxis come from a wide range of disciplines.

For each step you will find additional resources that you can adapt to your local setting.

STEP 1

Check existing policies

Hospitalised patients include those undergoing major surgery, patients with acute medical illness, trauma patients, patients admitted to intensive care units, cancer patients, and patients hospitalised during pregnancy and the puerperium. They are not at equal risk of developing VTE. Because of this, the risks and benefits of using VTE prevention are different for each patient and need to be assessed for each individual. Hospital-wide policies are an important and effective mechanism to achieve this. The Commission is committed to preventing VTE. It recommends that all hospitals have a VTE prophylaxis policy that describes how to assess and minimise the risk of VTE for every admitted patient.¹⁴

Most hospitals have some protocols or policies in place to prevent patients from developing deep vein thrombosis (DVT) and pulmonary embolism (PE). However, some are clinician-specific, some are unit-specific and very few apply to the whole hospital population. And yet, it is critically important that every patient admitted to hospital is assessed for risk and receives prophylaxis appropriate for their risk. One of the important steps in achieving this goal is to ensure that a hospital wide policy exists or is developed to ensure that risk assessment is applied to all admitted patients (see Step 4). The Commission has developed a hospital *VTE prevention policy template* to assist hospital staff develop a policy that is specific to their local needs and circumstances.¹³

Start by determining whether your hospital, hospital group, local or state jurisdiction area already has a VTE prevention policy. Involve your hospital pharmacist if you can. There should be a central committee that is able to assist with this. It may be called the Medical Advisory Committee, the Drugs and Therapeutics Committee, the Quality Committee, the Patient Safety Committee, the Clinical Review Committee or some other variant that reports to the hospital's executive on quality and safety matters. In addition, contact the heads of clinical departments such as surgery, medicine, nursing and intensive care to find out about policies that pertain to specific units. Consult widely – some hospitals have subspecialty morbidity and mortality committees that instigate specific policies.

Once you have established what is currently recommended as best practice prevention across your hospital, it is important to compare all of your existing protocols with the recommendations contained in the *Clinical Practice Guideline for the Prevention of Venous Thromboembolism*.⁶ The NHMRC guideline is accompanied by a useful summary of recommendations for clinicians.¹⁵

This process may reveal discrepancies between existing policies and current recommended best practice. If you decide that your policies need updating you might consider including this in your plan of action (see Step 7). The task of adapting and updating policies will take time and requires input from multiple stakeholders (see Step 4).

At this stage you will have started a process that can continue alongside other improvement activities.

Helpful tips...

Look widely for existing VTE prophylaxis protocols or policies. Notify your clinical department heads and don't forget to check subspecialty areas.

Check your hospital intranet site and search through the various clinical departments. Remember to check nursing practice manuals.

The Commission has prepared a template to assist hospitals with developing a VTE prevention policy.¹³

STEP 2

Conduct a clinical audit

Having taken stock of your hospital's policies and protocols, you now need to know how well they are put into practice across your health service. A clinical audit can provide this information.

A clinical audit is a systematic and continuing process that involves establishing best practice from the guideline, measuring care against selected criteria, taking action to improve care, monitoring to sustain the improvements, and then re-measuring.

The process is as follows:

1. **SET THE OBJECTIVE:** Define the purpose of the audit, the aspects of care under review, the patient group and clinicians to be included and the time period; e.g. to measure current practice for using thromboprophylaxis for the prevention of VTE after total hip, hip fracture or total knee replacement surgery in adults against the recommendations in the guideline.
2. **PREPARE FOR THE AUDIT:** Ensure that senior staff in the organisation are aware of and support the audit. Identify the project leader and resource requirements and involve all the people needed for the conduct of the audit, encourage them to participate and provide any necessary training, and obtain ethics approval if this is required.
3. **ESTABLISH THE CRITERIA:** Define the audit criteria or target based on the guideline. The standards are typically 100%. However, there may be reasons for setting different standards, based on the local context, and these should be documented.
4. **MEASURE PERFORMANCE:** Define the patient group that is being measured, making sure that it can be measured objectively. Identify potential data sources, which may include routinely collected data, such as patient registers and patient records, and specific purpose data, such as surveys and observation. Consider data collection tools (design your own or adapt an existing one), training in use of tools, method of sampling, sample size, retrospective versus prospective data collection, time-frame, confidentiality and data protection.
5. **MAKE AND SUSTAIN IMPROVEMENTS AND RE-AUDIT:** Analyse, discuss and disseminate the results. Use the improvement methods to make changes and then re-audit when these have had time to make an impact. Typically, several cycles of auditing, making small changes and re-auditing may be necessary to meet best practice.

A clinical audit will enable you to:

- collect baseline data on current practice
- provide feedback on current practice to clinical staff
- identify areas where care processes need improvement
- regularly monitor progress.

More than anything else, a properly conducted clinical audit will define the nature of any departures from recommended practice that may be occurring and help convince people within your organisation that action needs to be taken. Therefore, your initial audit doesn't need to be too elaborate. Start with broadly accepted criteria. However, define the items well because you'll want to ensure that subsequent audits are done in the same way. Establishing a reliable baseline enables post-change comparisons to be made, which will illustrate benefit to clinicians and health service executives.

We recommend that you develop your own audit form to capture the core elements of current VTE prophylaxis practice and to measure compliance with the *Clinical Practice Guideline for the Prevention of Venous Thromboembolism*.⁶ There are a number of resources available to help you design an audit form and conduct the audit. See list of resources below.

However you can also use existing resources such as the *Indicators for Quality Use of Medicines in Australian Hospitals* developed by the NSW Therapeutic Advisory Group and the NSW Clinical Excellence Commission.¹⁶ *Indicator 1.2 Percentage of patients at high risk of venous thromboembolism* addresses the effectiveness of processes for preventing venous thromboembolism.

Audits can be classified as a quality assurance activity so it may not be necessary to obtain approval from a Human Research Ethics Committee.¹⁷ It is important to get clear guidance on this matter locally.

Helpful tips...

Keep each audit to a manageable size: As an initial audit you might aim to sample 33% or a minimum of 50 acute care patients. In smaller hospitals you may need to audit over several days to reach this sample size.

Some prophylaxis measures, especially graduated compression stockings, are not well documented in medical records. Involve nursing or medical staff from the wards in the audits and if necessary check each patient for mechanical prophylaxis.

Involve nurse unit managers, employed and visiting medical practitioners, heads of unit, registrars, consultants or junior staff (if any) in the audits.

Consider using a laptop, or hand held electronic device to record your data. This saves time, provides access to the guideline, and allows you to provide immediate feedback to clinical staff from the relevant wards. Electronic tools are ideal for audits as they save time, enable easy access to guidelines, data capture, storage, analysis, and presentation of results.

Make use of any relevant routinely-collected electronic data. This will lessen the amount of additional work involved and improve consistency over time.

See bibliographic databases for examples of clinical audits. References for some audit resources are included overleaf.

Resources

United Bristol Healthcare NHS Trust Clinical Audit Central Office. Clinical audit “How To” guides. UK: UBHT Clinical Audit Central Office; 2005.

Principles for Best Practice in Clinical Audit. Published by Radcliffe Medical Press Ltd. ISBN: 1-85775-976-1 2008. Available at: <http://www.nice.org.uk/niceMedia/pdf/BestPracticeClinicalAudit.pdf>.

NHS. National Institute for Health and Clinical Excellence. Putting Guidance into Practice. Implementation Tools. Audit Support Criteria. TA157 VTE – dabigtran: audit support. September 2008. Contain a sample audit form. <http://guidance.nice.org.uk/TA157/AuditSupport/doc/English>

NHS Scotland. Educational Resources: Clinical Governance: Clinical Audit: Resources and Templates. <http://www.clinicalgovernance.scot.nhs.uk/section2/audit.asp>

Further reading

Ahmad HA, Geissler A, MacLellan DG. Deep venous thrombosis prophylaxis: are guidelines being followed? *ANZ J Surg* 2002; 72(5):331-4.

Chopard P, Dorffler-Melly J, Hess U, et al. Venous thromboembolism prophylaxis in acutely ill medical patients: definite need for improvement. *J Intern Med* 2005; 257(4):352-7.

Cohen AT, Tapson VF, Bergmann J-F, et al. Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study. *Lancet* 2008; 371(9610): 387-394.

Collins R, MacLellan L, Gibbs H, et.al. Venous Thromboembolism Prophylaxis: The role of the nurse in changing practice and saving lives. *AJAN* 2010; Volume 27 Number 3: 83-89.

Eikelboom JW, Mazzarol A, Quinlan DJ, et al. Thromboprophylaxis practice patterns in two Western Australian teaching hospitals. *Haematologica* 2004; 89(5):586-93.

Learhinan ER, Alderman CP. Venous thromboembolism prophylaxis in a South Australian teaching hospital. *Ann Pharmacother* 2003; 37(10):1398-402.

Wan S, Ting J, Olsen A, et al. Thromboprophylaxis practice patterns in hip fracture surgery patients: experience in Perth, Western Australia. *ANZ J Surg* 2003; 73(10):826-9.

STEP 3

Form a team

Leadership from senior managers and senior clinicians (doctors, nurses, pharmacists and allied health) is essential for changes in clinical practice to be accepted and used long-term.^{18,19} Find the people who are passionate about the need to improve practice in this area and invite them onto the team.

Typically, one or more clinical champions and an executive sponsor work together as leaders of the implementation team, taking advantage of their complementary professional roles and skills. They should be supported by another person, who coordinates the changes on a day-to-day basis.²⁰

A **clinical champion** or local opinion leader is usually someone who can speak with authority on clinical matters, is able to motivate others to recognise that they need to make certain changes, and has the ability to achieve consensus when there are different opinions on whether and how changes need to be made. Ideally your team should include clinical champions from both surgical and medical units if you plan to improve practice across both divisions.

An **executive sponsor** is typically someone who has a sufficient level of influence and authority within the organisation to garner the necessary resources to make changes happen. They also need to be able to provide support and resolve conflicts about responsibilities that may arise.

The **team coordinator** has a pivotal role to play. He or she is the person responsible for overseeing, guiding and carrying out the changes on a day-to-day basis. This person might be a future leader who could benefit from the mentoring opportunities and skills that come from this experience. The team coordinator must have the 'hands-on' capacity to do the work required and to schedule meetings when needed. A realistic allocation of time and resources needs to be provided. The tasks involved in implementing change can't normally be done as an 'add-on' to a full-time clinician's role without leading to burn out.

Local circumstances will dictate who else can help you.

Helpful tips...

Include a hospital pharmacist, nurse unit managers from relevant clinical units and a person with quality improvement experience, such as a quality and safety or risk manager. Involve front-line staff as much as possible or at least keep them in the loop by communicating about VTE prophylaxis issues at their regular meetings.

Maybe ask people from high risk clinical units or units with compliance issues to join the team. Include people who are passionate about change. Recognise that there are often very strong views on issues concerning VTE prophylaxis.

An effective team should not be limited to two or three people, but be careful not to involve more than eight as your meetings may become unmanageable.

Remember you can always set up additional working parties to help with specific tasks, such as auditing, education of new staff, awareness raising or pilot testing of new procedures or policies.

Facts and figures

You might wish to cite some of the following facts and figures when giving reasons to your hospital's executive on why VTE prophylaxis is a priority quality and safety issue.

- Most hospitalised patients have at least one risk factor for developing VTE.²¹
- The incidence of VTE is 100-fold greater among hospitalised patients compared to people of the same age living in the community.²² The incidence of DVT in air travellers, in comparison to the community, is only four times greater.²³
- Ten percent of all hospital deaths are attributed to VTE.²⁴
- VTE is the largest preventable cause of death in hospitalised patients.²⁵
- Thirty thousand¹ Australian hospitalisations per year relate to VTE, with an estimated 5,000² patients dying as a result. Most of these deaths are preventable with appropriate use of cost-effective antithrombotic drugs and mechanical measures.²⁵
- VTE can be very costly. Patients with VTE require diagnostic tests, treatment with anticoagulants, and a longer hospital stay. Many experience subsequent lifelong debilitating complications requiring continuing tests and treatment.^{26,27,28}
- VTE has a significant impact on the community and health care system through mortality, morbidity, and resource expenditure. Access economics has calculated the cost of VTE at \$1.72 billion annually.²
- A Western Australian data linkage study found that 80% of VTE cases in acute hospitals were related to hospitalisation. Most cases were equally attributable to medical (40%) or surgical admissions (40%), and yet most hospitals focus on VTE prevention primarily in surgical patients.⁵
- The incidence of VTE as a complication of hospital admission is commonly underestimated. The Western Australian study was able to demonstrate that over half of secondary cases occur up to three months after hospitalisation.⁵
- There is good evidence that VTE prophylaxis measures continue to be under-utilised or used sub-optimally.^{29,30} The WA study found that the rate of VTE cases in acute hospitals has continued to increase over the last ten years.³¹ A recent international audit of 70,000 patients, which included Australia, found that only 50% of at-risk patients were receiving appropriate prophylaxis.³²
- The need to improve patient safety in this area has been identified as a high priority not just in Australia, but also in the UK^{33,34} and USA.³⁵

STEP 4

Develop a hospital-wide policy

If you don't have a hospital or group wide policy on VTE prophylaxis, it is important that you develop one in your action plan (see Step 7). A policy document template has been developed by the Commission¹³, which you can adapt for your hospital. The main headings you need to include in your policy document are outlined in the box below.

Title of policy document

Staff this policy applies to

Purpose of policy and procedure

Start by defining the purpose of your policy. This is where you state what is known about VTE risk in hospitalised patients, why hospitals need a policy on this issue, what can happen if patients don't receive adequate VTE prophylaxis and what the purpose of the policy is.

Policy aim

This section briefly summarises the aim of the policy in measurable terms.

Process

This section can be written as text, or table, or by inserting your risk assessment tool or form. It will include:

- Which patients need to be risk assessed (with explanations for exclusions)
- When patients need to be risk assessed and reassessed
- Who is responsible for undertaking and documenting risk assessments
- Who is responsible for selecting and prescribing prophylaxis treatments
- Who is responsible for administering chemoprophylaxis and who is responsible for administering mechanical prophylaxis

(continued)

Policy contents continued

- Whether risk assessment tools exist and where they can be found
- What factors are used in the risk assessment of medical and surgical patients
- What recommended treatment options apply
- What contraindications to chemoprophylaxis apply
- What contraindications to mechanical prophylaxis apply
- Timing, dosage and duration of chemoprophylaxis
- Whether audit tools exist and the expected use of clinical audit

Expected outcomes

This section is usually a brief statement that summarises the policy's expected outcomes, including a statement regarding the expected frequency of clinical audit.

Responsibility

This section includes information about the committee responsible for the policy and the timing of the review of the policy as well as clinical staff responsible for prescribing and administering VTE preventative measures.

Acknowledgements and references

Use this section to include references supporting the information provided and to acknowledge any assistance from other groups or organisations.

Appendix

Link or append any related policies, procedures or guidelines.

Helpful tips...

Developing a hospital policy is an important goal, but it will take time. Allow six to 12 months to complete this task.

Involve your hospital pharmacist or Drugs and Therapeutics Committee. Consult widely with all heads of department and clinical specialties. Ask your clinical champion to present the draft policy at Grand Rounds, department, subspecialty group or audit meetings or other hospital wide meetings.

Consider ways to consult visiting medical practitioners.

Consider including unit-specific protocols if necessary. Don't forget to specify this in your policy and risk assessment document.

Take your draft policy to all appropriate committees for sign-off and ratification.

Once the policy is approved, organise a launch and take this opportunity to publicise what your team is doing and what this means for the whole hospital community.

STEP 5

Raise awareness

If you wish to introduce changes to the way an existing system operates, especially one concerned with preventing harm that for many patients happens *after* they leave the hospital, there is a need to develop a clear, consistent and persuasive case for why it is necessary *now*.

Skills in clinical leadership are required and the defining quality of a clinical leader is that others are prepared to follow their example. Clinical leaders typically have the ability to speak with authority without being overbearing. The capacity to listen and learn through informal means of sounding out ideas and gauging the level of interest that currently exists or that could be generated, are all part of the preparation process.

Education and open discussion about current practice and about the evidence are key steps in overcoming resistance and in achieving meaningful dialogue with a whole cross section of people. Taking the time to first engage with senior clinicians and to address any concerns they have about the use of VTE prophylaxis is a critical step in the process of change. It is equally important to engage the nursing staff and junior medical staff because the implementation of a new policy or set of procedures will more directly affect their day-to-day work practices.

As a 'whole-of-hospital' issue, VTE prophylaxis is a topic that would be ideally suited to discussion at Grand Rounds led by one of the implementation team's clinical champions. Your hospital's communications department can assist with awareness raising strategies, such as newsletters, posters, flyers and other activities, such as setting up a patient safety reminder as a screensaver on desktop computers at ward level.

Patients represent a key stakeholder group in patient safety and in the way patient-centred care can be delivered in hospitals. By assisting patients to understand the risks of VTE associated with hospitalisation and the evidence on how such risk can be reduced, patients are likely to understand and be engaged in their own treatment and achieve better health outcomes. NHMRC has produced a brochure for patients *Blood Clots – Reducing Your Risk*, based on the NHMRC's *Clinical Practice Guideline for the Prevention of Venous Thromboembolism*.³⁶

Helpful tips...

Write a communication plan.

Develop a project plan. You can download a *Stop the Clot project plan template* from the NHMRC website.³⁷

Don't forget to use your communications team to help engage the whole hospital community.

Create an identifiable logo so that new information and resources relevant to VTE prophylaxis are immediately recognisable.

Use a wide variety of existing communication mechanisms, such as newsletters, posters and flyers.

Resources and further reading

Deep-Vein Thrombosis: advancing awareness to protect patient lives. White paper. Public health leadership conference on deep-vein thrombosis. Washington, D.C.: American Public Health Association; February 26, 2003. Available at: http://www.apha.org/NR/rdonlyres/A209F84A-7C0E-4761-9ECF-61D22E1E11F7/0/DVT_White_Paper.pdf

“Awareness and Best Practices Regarding Deep Vein Thrombosis Panel #5” by Franklin A. Michota, MD Head, Section of Hospital Medicine Division of Medicine The Cleveland Clinic Foundation. A PowerPoint presentation for public awareness campaign in the US. Available at: http://www.surgeongeneral.gov/topics/deepvein/workshop/presentations/michota_aware.pdf.

STEP 6

Understand the barriers

Your baseline audit will inform the nature and extent of any departures from best practice. And, whilst knowing that there are gaps between current and recommended practice is vital, it is just as important to know why they exist if you are to close these gaps. The challenge is to find out what factors are preventing best evidence from being applied in practice (barriers) and, if possible, what measures you could put in place to facilitate the uptake of evidence (enablers). This is a really critical step because it informs your whole strategy.

There are a few different ways you can go about establishing what barriers to best practice you are encountering.

There is information in the published literature on successful efforts to implement VTE prophylaxis guidelines.¹⁰ Quite possibly, some of the barriers to best practice that others have managed to overcome are ones that are common to your health service too.

Finding out about barriers directly from staff working at your hospital is an obvious way to go. Engaging widely through focus groups, brainstorm sessions and selected one-on-one interviews with key informants can shed light on real obstacles to best practice, especially those facing individual clinicians. For example, you might find barriers in the form of some clinicians not being aware of the recommendations for best practice, or not agreeing with them, or not feeling that they have the capacity to put them into practice.

Often barriers operate at the level of the system as a whole. Creating a workflow diagram and analysing how processes are organised and performed is called process mapping. Looking at an entire process or system in this way provides a means of identifying a different set of barriers to those applying to individuals. It also offers the chance to question underlying assumptions about why certain practices exist and how they might be improved.

Helpful tips...

Engage widely with frontline staff to help identify barriers and enablers. Set up forums for junior medical staff and nursing staff. Map the work flow and discuss issues that are affecting best practice, such as knowledge of risk factors and risk assessment, access to stockings and intermittent pneumatic compression devices, concerns about falls, cost considerations or bleeding complications.

Contact consultants to ask about their standard process for VTE prophylaxis.

Remember to look at system issues as well as individual factors – both are critical.

Facts on known barriers

Lack of awareness

- Of the incidence of the problem
- A silent complication, and usually manifests after discharge from hospital

Knowledge and education deficits

- Appropriate risk assessment
- Appropriate prophylaxis

Disputed, inconsistent or inconclusive evidence

- Disagreement with evidence-based guidelines, particularly for medical patients
- Concerns about bleeding in surgical patients

Lack of system support

- Explicit policies for VTE prophylaxis often absent
- Unclear lines of responsibility
- No systematic audits, data collection or reminders
- Variability in practice tolerated within and between units

Resources and further reading

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STEP 7

Develop a plan

The implementation team must develop a plan that directly addresses the barriers to best practice that have been identified locally (see Step 6). Use the findings of your initial audit to inform decisions about which areas to focus on.

It is critical to involve frontline nurses, physicians, surgeons and pharmacists in the development of the plan and to consider its impact on workflow. A plan that adds an extra burden of work for frontline personnel is much harder to implement, so aim to simplify the system as much as possible and to integrate the plan into existing work processes.

Choose interventions that match the barriers you identified in Step 6. While there is limited evidence on the effectiveness of strategies that are tailored to overcome identified barriers to change, a summary of available evidence to guide the matching of specific interventions to identified barriers is provided below.

Identified barriers	Specific interventions
Lack of knowledge	Interactive education sessions Decision aids
Perception/reality mismatch	Audit and feedback Reminders
Lack of motivation	Incentives/sanctions Leadership
Beliefs/attitudes	Peer influence Opinion leaders
Systems of care	Process redesign

The literature on what interventions have been successful in improving VTE prophylaxis has been systematically reviewed in a report commissioned by NICS.¹⁰ The main finding was that passive dissemination strategies are ineffective; rather, a number of active strategies used together are more likely to result in improvements. Active strategies might incorporate paper or electronic reminders for clinicians to assess patients for VTE risk on admission and to assist in the selection of appropriate prophylaxis.

To effect change in the use of VTE prophylactic measures requires clinical leadership, improved clinician knowledge of risk assessment and prescribing and a supportive reminder system which operates independently of individual clinicians or managers. The key elements you should include in your intervention plan are summarised below.

Key elements in any intervention to improve VTE prevention

Key element	Suggested strategy
Demonstrate importance and relevance of VTE prophylaxis in your hospital.	Conduct local audits and provide unit specific feedback to clinicians and heads of units.
Improve clinician knowledge of VTE risk assessment and appropriate prophylaxis.	Provide clinicians with copies of the Guideline Summary ¹⁵ and risk assessment tools, and include this information in hospital medical officer education and orientation sessions and at Grand Rounds. Use the National Prescribing Service online learning module. Prophylaxis in deep vein thrombosis. ³⁸
Remind clinicians to assess patients for VTE risk.	Include stickers or reminders in care plans, clinical assessments or clinical pathways. Integrate reminders into electronic patient management systems. Consider building preliminary risk assessment into nursing admission process. Use risk assessment forms to assess and document risk.
Assist clinicians to prescribe prophylaxis appropriately.	Include risk assessment and management summaries, forms or guidelines in medical record.
Assess effectiveness of interventions and continue to review and refine your interventions.	Conduct regular small scale audits and surveys. Use the results to identify and overcome issues that are preventing best practice.

Planning involves more than simply deciding how you are going to tackle a problem. A fully-developed plan will provide details of tasks, resources and timelines. It should include a formal justification document which sets out clear-cut aims expressed as numerical targets for the chosen performance indicators. For example one of your performance indicators might be to improve the percentage of at risk patients on appropriate prophylaxis by 30 per cent in five clinical units or wards within 12 months. This level of information provides those responsible

for executing the plan, as well as those overseeing it, with the capacity to monitor progress in practical and measurable terms. For examples see the *Therapeutic Advisory Group Indicators for Quality Use of Medicines in Australian Hospitals*¹⁶ process indicators, such as 1.1 and 1.2 (reference below).

The NHMRC has developed summaries of the 2009 *Clinical Practice Guideline for the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals*.⁶ One summary is designed to meet the needs of hospital-based clinicians¹⁵ and is shown overleaf. The other is aimed at informing patients⁵⁵ about the risk of VTE associated with hospitalisation and measures that can be taken to reduce the level of risk.

For further information on the clinical practice recommendations, consult the guideline. The Guideline Summary and information for patients can be downloaded from: <http://www.nhmrc.gov.au/nics/programs/vtp/prevention.htm>.

Helpful tips...

You can download the *VTE Project Plan template* from the NHMRC website.³⁷

Plan for sustainability from the beginning; avoid making your change reliant on individuals and embed the changes into routine systems of care.

Don't get bogged down in the detail. The plan will change over time.

Use the plan to communicate what you are doing. Include your key performance indicators in the plan from the beginning.

Design your plan with a view to making it easy for people to do the right thing and hard for them to make errors or omissions.

Accept that there is no shame in saying that some things are too hard to change. Focus on what you might be able to achieve as a first step.

Make sure your plan goes to the hospital executive for sign-off and support.



Prevention of Venous Thromboembolism (VTE) in Patients Admitted to Australian Hospitals: Guideline Summary

This summary and full guideline available from www.nhmrc.gov.au

Steps in selecting thromboprophylaxis

STEP 1: If the patient is admitted for any of the following surgical procedures or injury, the procedures carry a high risk of VTE and some form of thromboprophylaxis is warranted (as per page 2 of this guideline summary):

- any surgical procedure, but especially abdominal, pelvic, thoracic or orthopaedic surgery. Major joint surgery and curative surgery for cancer carry very high VTE risk
- leg injury requiring surgery or prolonged immobilisation
- prolonged surgery and/or prolonged immobilisation.

Prior to selecting an appropriate method, consider other VTE risk factors (STEP 2), patient preference and possible pharmacological (STEP 3) or mechanical (STEP 4) contraindications and then refer to page 2 for advice on recommended VTE prophylactic options based on the type of surgery or injury.

STEP 2: Assess other VTE risk factors (patient and condition based).

Presence of any of these risk factors or conditions may warrant VTE prophylaxis for any hospital admission.

VTE risk is increased with:

- previous VTE
- active cancer
- age (incidence of VTE rises with each decade over age 40)
- prolonged severe immobility (prolonged bed rest, immobilisation in a plaster cast/brace, or prolonged travel with limited movement and venous stasis)
- pregnancy and the puerperium
- marked obesity
- oestrogen-containing hormone replacement therapy (HRT) or oral contraceptive
- certain types of thrombophilia
- general anaesthesia (versus regional anaesthesia).

VTE risk is increased with the following medical conditions:

- acute/acute-on-chronic chest infection
- heart failure
- myocardial infarction
- ischemic stroke with immobility
- some forms of cancer chemotherapy
- acute inflammatory bowel disease.

STEP 3: Assess the risk of bleeding/contraindications to pharmacological prophylaxis. Presence of any of the following factors may contraindicate pharmacological prophylaxis. If pharmacological prophylaxis is contraindicated, consider mechanical prophylaxis, if appropriate (STEP 4).

Consider:

- significant renal impairment (reduced creatinine clearance for renally excreted anticoagulants)
- current active major bleeding (i.e. at least 2 units of blood/blood products transfused in 24 hours)
- current chronic, clinically significant and measurable bleeding over 48 hours
- inherited or acquired bleeding disorders, e.g. haemophilia or other coagulation factor abnormality, coagulopathy or disseminated intravascular coagulation (DIC)
- severe platelet function disorder or thrombocytopenia (pharmacological prophylaxis not recommended with platelet count <50,000/ μ L)
- recent central nervous system (CNS) bleeding
- intracranial or spinal lesion
- recent major surgical procedure of high bleeding risk
- active peptic ulcer or active ulcerative gastrointestinal disease
- liver failure or prolonged obstructive jaundice
- concomitant use of medications that may affect clotting (e.g. anticoagulants, antiplatelet agents, selective/non-selective nonsteroidal anti-inflammatory drugs – NSAIDs)
- neuraxial block or recent lumbar puncture.

STEP 4: Assess any contraindications to mechanical prophylaxis.

- Graduated compression stockings may cause reduced blood flow, pressure ulcers or increase the risk of falls, so are contraindicated with:
 - any factor that prevents correct fitting of stockings (e.g. morbid obesity)
 - inflammatory conditions of the lower leg
 - severe peripheral arterial disease
 - diabetic neuropathy
 - severe oedema of the legs
 - severe lower limb deformity or inability to correctly fit stockings.
- Intermittent pneumatic compression (IPC) or foot pumps can exacerbate peripheral arterial disease or arterial ulcers.

STEP 5: Select appropriate thromboprophylaxis.

Consult with patient to ensure support for, and adherence to, VTE prophylaxis measures.

Figure 1: Summary of clinical practice guideline recommendations⁶ (for clinicians)

Thromboprophylaxis for admitted surgical patients

Anaesthesia	<ul style="list-style-type: none"> Consider neuraxial block as an alternative to general anaesthesia if feasible. If neuraxial block is used, there is a risk of developing an epidural haematoma (A) To minimise this risk with neuraxial block, timing of pharmacological thromboprophylaxis should be carefully planned and discussed in advance with the anaesthetist (GPP)
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Type of surgery	Recommendations (and grade of recommendations)	
	Pharmacological options	Mechanical options
Total hip replacement	Use either: <ul style="list-style-type: none"> LMWH (A) or Fondaparinux (B) or Rivaroxaban (B) or Dabigatran etexilate (B) For up to 35 days	<ul style="list-style-type: none"> Use GCS or IPC or foot pump (B) whether or not pharmacological prophylaxis is used If pharmacological prophylaxis is contraindicated, use GCS and foot pump (B) Use until fully mobile
Hip fracture surgery	Use either: <ul style="list-style-type: none"> Fondaparinux (B) or LMWH (B). If using LMWH, consider adding low dose aspirin (B) For up to 35 days	<ul style="list-style-type: none"> If pharmacological prophylaxis is contraindicated, use foot pump or IPC (C) Use until fully mobile
Total knee replacement	Use either: <ul style="list-style-type: none"> LMWH (A) or Fondaparinux (B) or Rivaroxaban (B) or Dabigatran etexilate (B) For up to 14 days	<ul style="list-style-type: none"> Use foot pump or IPC (C) whether or not pharmacological prophylaxis is used Use until fully mobile
Knee arthroscopy	<ul style="list-style-type: none"> Thromboprophylaxis is not recommended unless the patient has additional VTE risk factors (see Step 2, page 1) (C) 	<ul style="list-style-type: none"> Insufficient evidence; unable to make a recommendation
Lower leg fractures/injuries with immobilisation in a brace or plaster cast	<ul style="list-style-type: none"> LMWH (A) For the entire period of immobilisation	<ul style="list-style-type: none"> Insufficient evidence; unable to make a recommendation
General surgery	Use either: <ul style="list-style-type: none"> LMWH (B) or UFH (B) For up to one week or until fully mobile	<ul style="list-style-type: none"> Use GCS, whether or not pharmacological prophylaxis is used (B) Use until fully mobile
Urological surgery	<ul style="list-style-type: none"> Consider thromboprophylaxis based on assessment of the patient's risk of VTE and of bleeding (GPP) 	<ul style="list-style-type: none"> Inconclusive evidence; unable to make a recommendation
Gynaecological surgery	Use either: <ul style="list-style-type: none"> LMWH (B) or UFH (B) For up to one week or until fully mobile	<ul style="list-style-type: none"> Consider using GCS or other mechanical options, especially if pharmacological prophylaxis is contraindicated (GPP) Use until fully mobile
Abdominal surgery	<ul style="list-style-type: none"> Use LMWH (B) For 5–9 days	<ul style="list-style-type: none"> Use GCS, whether or not pharmacological prophylaxis is used (B) Use until fully mobile
Cardiac, thoracic and vascular surgery	Use either: <ul style="list-style-type: none"> LMWH (B) or UFH (B) For up to one week or until fully mobile	<ul style="list-style-type: none"> Use GCS or IPC, whether or not pharmacological prophylaxis is used (C) Use until fully mobile
Neurosurgery	<ul style="list-style-type: none"> Due to high risk of bleeding, use thromboprophylaxis with extreme caution (GPP) If appropriate and not contraindicated, use LMWH or UFH (B) 	<ul style="list-style-type: none"> Use IPC, whether or not pharmacological prophylaxis is used (A) Consider use of GCS (C) Use until fully mobile
Trauma and spinal surgery	<ul style="list-style-type: none"> Use LMWH, starting 5 days after admission (C) Do not start thromboprophylaxis until primary haemostasis has been established (GPP) Use until fully mobile	<ul style="list-style-type: none"> In addition to pharmacological prophylaxis, use foot pump for trauma surgery patients, from admission (C) Use until fully mobile
Cancer patients having general, abdominal, pelvic or neurosurgery (see also next category)	<ul style="list-style-type: none"> Use LMWH or UFH. In particular, consider risk of bleeding (GPP) For at least 7–10 days post surgery Consider extending the duration of LMWH to 28 days for patients having major abdominal or pelvic surgery for cancer, especially if obese, slow to mobilise or with past history of VTE (GPP) 	<ul style="list-style-type: none"> Use GCS, if pharmacological prophylaxis is contraindicated (GPP) Use until fully mobile
Head and neck cancer patients having head and neck surgery	<ul style="list-style-type: none"> Unless other significant VTE risk factors are present (see Step 2, page 1), thromboprophylaxis is not recommended (GPP) 	<ul style="list-style-type: none"> Insufficient evidence; unable to make a recommendation
Caesarean section	<ul style="list-style-type: none"> Mobilise promptly post caesarean (GPP) Use LMWH after caesarean delivery for 5–7 days post caesarean or until fully mobile (GPP) For women with additional risk factors (see Step 2, page 1), extend LMWH or adjusted therapeutic dose warfarin to six weeks (GPP) 	<ul style="list-style-type: none"> Consider using IPC during and 24 hours after caesarean (GPP) Consider using GCS if pharmacological prophylaxis is contraindicated (GPP)

Thromboprophylaxis for admitted medical patients

Medical condition	Recommendations (and grade of recommendations)	
	Pharmacological options	Mechanical options
Ischaemic stroke	<ul style="list-style-type: none"> Consider LMWH, based on degree of immobility and risk of bleeding (B) If LMWH is contraindicated or not available, use UFH (B) 	<ul style="list-style-type: none"> Inconclusive evidence; unable to make a recommendation
Haemorrhagic stroke	<ul style="list-style-type: none"> Do not use any pharmacological prophylaxis due to the risk of intracranial bleeding (GPP) 	<ul style="list-style-type: none"> Inconclusive evidence; unable to make a recommendation
Myocardial infarction	<ul style="list-style-type: none"> UFH (C), only when full anticoagulation is not in use 	<ul style="list-style-type: none"> Insufficient evidence; unable to make a recommendation
General medical: acute/acute-on-chronic chest infection	Use either: <ul style="list-style-type: none"> LMWH or UFH, based on assessment of patient's risk of VTE and bleeding (B) 	<ul style="list-style-type: none"> Insufficient evidence; unable to make a recommendation
Heart failure		
myocardial infarction		
stroke with immobility		
some forms of cancer		
chemotherapy		
acute inflammatory bowel disease		
Cancer (non-surgical)	<ul style="list-style-type: none"> Use LMWH or UFH (GPP) From admission until discharge	<ul style="list-style-type: none"> Use GCS, if pharmacological prophylaxis is contraindicated (GPP)
Pregnancy and childbirth (not caesarean – see surgical recommendations)	<ul style="list-style-type: none"> Minimise immobilisation and ensure adequate hydration during pregnancy, labour and the puerperium (GPP) For women with additional VTE risk factors (see Step 2, page 1), use LMWH or adjusted dose warfarin for six weeks post vaginal delivery (GPP) 	<ul style="list-style-type: none"> Consider using GCS if pharmacological prophylaxis is contraindicated or not used (GPP)

NHMRC grading of recommendations	
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution
GPP	Good practice point – consensus-based recommendations

Key	
LMWH	Low molecular weight heparin
UFH	Unfractionated heparin
GCS	Graduated compression stockings
IPC	Intermittent pneumatic compression

This summary is based on the National Health and Medical Research Council's *Clinical Practice Guideline for the Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals*. This summary and the guideline on which it is based are available for download from www.nhmrc.gov.au

December 2010

Figure 1: (continued) Summary of clinical practice guideline recommendations⁶ (for clinicians)

Resources and further reading

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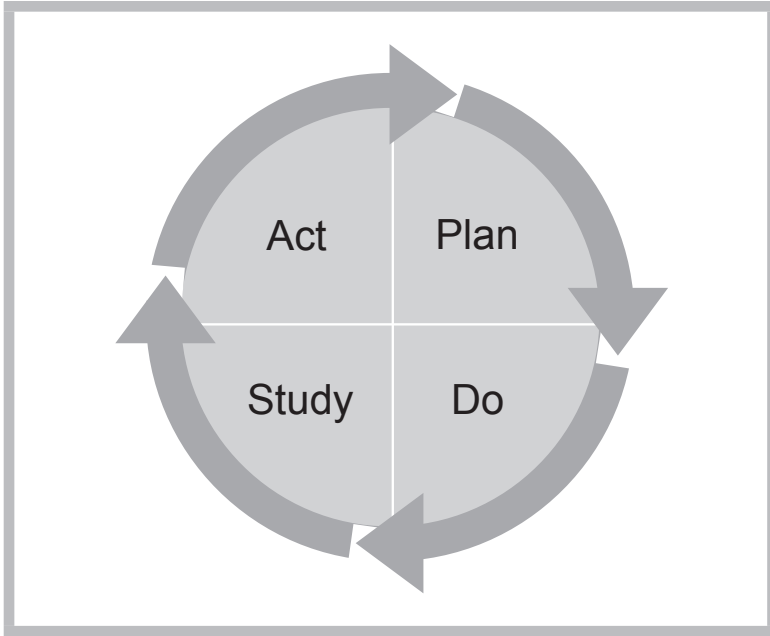
STEP 8

Implement the plan

When implementing the plan, allow yourself a degree of flexibility. Anticipate that your plan will require refinement along the way. It is wise to pilot test the interventions you are planning to introduce on a small scale first to find out what the practical challenges really are. Recognise that change takes time. Be realistic and assign enough time when planning the intervention to allow for learning and adapting the changes as you test them out.

One aspect of implementation that can be overlooked is the need to put strategies in place for measuring the effectiveness of your actions. It's vital to document the implementation issues that arise to facilitate evaluation. A commonly used approach to testing and adapting changes in order to achieve the desired improvements is the Plan-Do-Study-Act (PDSA) model.³⁹

- **Plan** what you are going to do, e.g. include documentation of risk assessment in patient admission forms. Decide who is going to do what, how and when, e.g. educate nursing staff in one pilot ward about new patient admission forms and explain when and how staff are expected to fill them in.
- **Do** it, e.g. introduce new patient admission forms for one week in one pilot ward.
- **Study** it, e.g. get feedback from users about the new forms, monitor how often and how appropriately they are filled in.
- **Act** on the feedback and measurement to amend, implement more widely or abandon the concept being tested.



The PDSA model is underpinned by three improvement questions.⁴⁰

- What are we trying to accomplish?
- What change could be made that might lead to an improvement?
- How will we know that a change is actually an improvement?

The answers to these questions are used to plan the PDSA cycles, as illustrated in the following example.

PDSA Example:

What are we trying to accomplish?

- To increase the percentage of patients who have a documented VTE risk assessment on admission to hospital.

What change could be made that might lead to an improvement?

- Include a risk assessment form in the patient admission pack in two trial units.
- Conduct in-service training sessions about the trial and the risk assessment and management process with medical and nursing staff from the trial units.
- Disseminate copies of the hospital policy on VTE prophylaxis and associated risk assessment form to staff in the trial units.

How will we know that a change is actually an improvement?

- Measure the percentage of admitted patients with completed risk assessments in the two trial units.
- Measure the percentage of at-risk patients on appropriate VTE prophylaxis in the two trial units before and after the trial (use a 30 patient sample size each time).

Helpful tips...

Undertake small scale trials to test and refine ideas for changes and be persistent.

PDSA cycles apply to even the smallest steps in a change process.

Continue to consult with and seek feedback from frontline staff on any new changes you are testing.

Communicate and provide feedback on improvements to clinical groups, and make sure you receive feedback from them.

Resources and further reading

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STEP 9

Monitor progress

There are three key aspects of optimal VTE prophylaxis management: risk assessment, choice of prophylaxis, and dosage and duration.

The following evaluation and monitoring questions address these central issues.

Risk assessment: What proportion of patients has been appropriately risk assessed? Are there mechanisms in place to review patients' risk of VTE during the course of their hospital stay? Is risk assessment being documented?

Choice of intervention: What proportion of patients receives the right form of pharmacological or mechanical prophylaxis? What groups of patients are receiving prophylaxis for which they have a contraindication?

Dosage and duration: Are prophylactic measures commenced at the right time? What proportion of patients receives the optimal dose of pharmacological prophylaxis? Is prophylaxis continued for a sufficient duration in accordance with the evidence? Are mechanisms in place to ensure that prophylaxis continues post-discharge if required?

Good data that is reliable, timely and easily understood is critical. The data you collect needs to relate back to the key performance indicators in your action plan. Most well-planned quality improvement activities produce positive results, though often the improvements are modest. If you can achieve an improvement in practice of around 10 to 20 per cent, you will have done well.⁴¹ Celebrate small gains but aim to meet targets.

You need to be open to the possibility that some of the changes that result from the interventions you introduce will not be effective or may lead to unintended consequences. This is a further reason why evaluation is important, as it allows for unexpected consequences of the intervention to be quantified and addressed.

In this process you will learn lessons by monitoring data and critically examining the observed effects of the intervention. Making evaluation findings actionable involves explaining effectively what has been learned, both to the hospital executive and all other interested stakeholders. Generally, an evaluation report will conclude with a formal set of recommendations on what should happen next.

A likely outcome is that certain aspects of the intervention will be embedded into routine practice, while other aspects will require further planning to develop the next cycle of improvement. Quality improvement is a cyclical process.

Helpful tips...

Report back to your hospital executive on a regular basis.

Include progress reports and data from your team in relevant regular hospital reports, such as quarterly safety and quality reports.

Use a standard format every time.

Sustainable mechanisms must be put in place to allow for ongoing monitoring. These routines should be set up in a way that is not reliant on the involvement of the implementation team.

STEP 10

Sustain improvements

Getting sustained improvements in practice is the biggest challenge. In hospitals this means embedding successful changes into routine systems of care. How this is managed will be determined by local processes. A multitude of issues may arise which the hospital's management will be responsible for resolving. These may include:

- altered role descriptions
- additional equipment
- additional costs
- impacts on medical records and other care processes.

The executive sponsor and team coordinator are integral to ensuring that these outcomes are foreshadowed well in advance and the implications of the new procedures are communicated effectively to those affected.

Finally, while the engagement of clinical leaders is essential to initiating new ways of working, a system that is unduly reliant on the enthusiasm of particular individuals isn't going to work in the long-term. The clinical leaders themselves as well as the organisation's managers must recognise the need to put in place policies, routine procedures and reporting structures that free the advocates for change to get on with their usual job and perhaps start thinking about tackling other issues.

Helpful tips...

You may have new staff at the beginning of each year and rotating junior medical staff throughout the year. Include materials on VTE prevention in all clinical staff orientation presentations, especially junior medical staff orientation sessions.

Ensure that audit results are fed into regular clinical department meetings.

Continue to measure and report VTE prophylaxis audit results. Make this a standing agenda item in safety and quality meetings.

Embed VTE prophylaxis indicators into your hospital's regular performance monitoring systems.

Advocate for VTE indicators to be included in:

- local clinical governance indicators, and
- activities to meet hospital accreditation standards relating to governance and quality improvement systems and clinical practice.

Ask people to tell you what they need to make the change sustainable.

Acknowledge and reward the effort people have put in and the work they have done – regardless of the outcome.

Resources and further reading

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Glossary

Antithrombotic

An agent that prevents the formation of clots or thrombi.

Clinical audit

A summary of clinical performance of healthcare over a specified period. The summary may also include recommendations for clinical action. The information may have been obtained from medical records, computerised databases or observations of patients.

Deep vein thrombosis (DVT)

The formation of a blood clot in a deep vein, most commonly occurring in the lower leg or thigh. Occasionally the clot may occur in other areas such as the upper arm, abdomen or pelvic region.

Dissemination

The act of communicating, distributing or spreading a message or piece of information. The term 'passive dissemination' is often used to refer to the distribution, by hand or in mass mailings, of printed education materials, such as clinical practice guidelines.

Effectiveness

The extent to which a specific intervention, when used under ordinary circumstances, does what it is intended to do.

Evaluation

A formal appraisal, using quantitative and/or qualitative data, of the value of a project or program against a standard or set of specified criteria. An evaluation may be done internally or by an independent body. The purpose of the evaluation will determine whether it is designed to assess process, outcome or impact.

Evidence

Data on the effectiveness of a treatment or intervention derived from studies that compare it with an appropriate alternative. Preferably the evidence is derived from a good quality randomised controlled trial, but it may not be. In areas of medicine that don't involve a therapeutic intervention, such as diagnosis, prognosis, aetiology and screening, evidence constitutes knowledge derived from properly-conducted clinical or health services research.

Evidence-based guideline

A statement that is based on scientific literature, explicitly documents the process used to develop the statement, and grades the strength of the evidence used in making clinical recommendations.

Graduated compression stockings

Elastic stockings that increase the rate of blood flow through the veins in the legs.

Incidence

The number of new cases of a disease or condition among a certain group of people for a certain period of time.

Intervention

An action that produces an effect or that is intended to alter the course of a process.

Performance indicator

A measure that provides information (either qualitative or quantitative) on the extent to which a policy, program or initiative is achieving its outcomes.

Process mapping

A method for depicting a process or information flow in a diagrammatic form. Defines key process inputs and outputs.

Protocol

A specific set of well-defined rules, or step by step procedures, carried out by more than one party.

Prophylaxis

Any measure taken to prevent, rather than treat or cure, disease.

Pulmonary embolism (PE)

Occurs when a segment of a blood clot within a major vein breaks off, travels to the lungs and lodges within the arteries of the lungs.

Systematic review

A review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise the relevant literature, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies.

Thromboprophylaxis

The use of drugs or other protective therapies to reduce thrombosis or blood clots.

Venous thromboembolism (VTE)

A blockage within the venous system. It includes deep vein thrombosis and pulmonary embolism.

Venous thromboembolism prophylaxis

See thromboprophylaxis.

Appendix

Tools and Resources

VTE prevention tools and resources referred to in this guide are available from the web pages specified below:

The Guideline

National Health and Medical Research Council. *Clinical Practice Guideline for the Prevention of Venous Thromboembolism (Deep Vein thrombosis and Pulmonary Embolism) in Patients Admitted to Australia Hospitals*. Melbourne: National Health and Medical Research Council; 2009. Available at: <http://www.nhmrc.gov.au/nics/programs/vtp/prevention.htm>.

Clinician Summary of the Guideline

National Health and Medical Research Council. *Prevention of Venous Thromboembolism in Patients Admitted to Australian Hospitals: Guideline Summary*. Melbourne: National Health and Medical Research Council; 2010. Available at: <http://www.nhmrc.gov.au/nics/programs/vtp/prevention.htm>.

Patient information

National Health and Medical Research Council. *Blood Clots – Reducing Your Risk*. Melbourne: National Health and Medical Research Council; 2010. Available at: <http://www.nhmrc.gov.au/nics/programs/vtp/prevention.htm>.

VTE prophylaxis

Venous thromboembolism prophylaxis policy

Australian Commission on Safety and Quality in Health Care:

- Template for hospital venous thromboembolism prophylaxis policy.
- Examples of hospital venous thromboembolism policies, guidelines.

Available at: <http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/vte-prevention>.

Prescribing antithrombotics for VTE prevention

Safe Use of Heparins and Oral Anticoagulants for Venous Thromboembolism Prophylaxis in Adults. NSW Therapeutic Advisory Group, August 2008, updated August 2010. http://www.ciap.health.nsw.gov.au/nswtag/publications/posstats/Heparin_VTEupdated082010.pdf

National Prescribing Curriculum module on prophylaxis in deep venous thrombosis. Available at: http://www.nps.org.au/health_professionals/online_learning/national_prescribing_curriculum.

Quality Improvement Tools

Stop the Clot project plan template. Available at: http://www.nhmrc.gov.au/nics/programs/vtp/stop_clot.htm.

National Institute of Clinical Studies. Identifying barriers to evidence uptake. Melbourne: NICS; 2006. Available at: http://www.nhmrc.gov.au/nics/material_resources/resources/identifying_barriers.htm.

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Indicators for Quality use of Medicines in Australian Hospitals: NSW Therapeutic Advisory Group, 2007. Available at: <http://www.ciap.health.nsw.gov.au/nswtag/QUMIndicators.html>.

Medication Safety Self Assessment for Antithrombotic Therapy in Australian Hospitals. http://www.cec.health.nsw.gov.au/mssa/MSSA-AT_description.html

Notes
