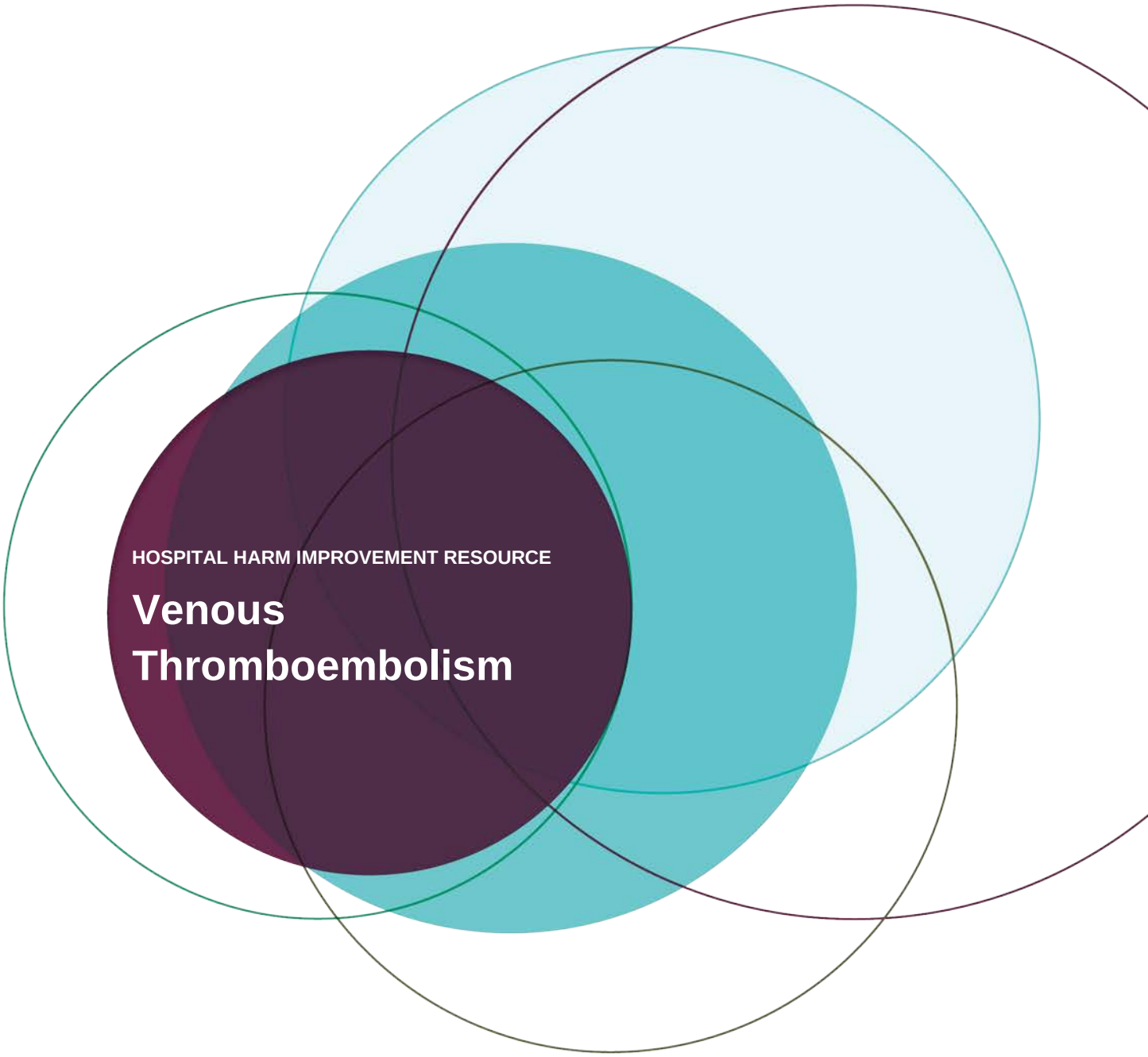

HOSPITAL HARM IMPROVEMENT RESOURCE

Venous Thromboembolism

cpsi icsp
Canadian Patient Safety Institute
Institut canadien pour la sécurité des patients

CIHI ICIS
Canadian Institute for Health Information
Institut canadien d'information sur la santé

ACKNOWLEDGEMENTS

The Canadian Institute for Health Information and the Canadian Patient Safety Institute have collaborated on a body of work to address gaps in measuring harm and to support patient safety improvement efforts in Canadian hospitals.

The Hospital Harm Improvement Resource was developed by the Canadian Patient Safety Institute to complement the Hospital Harm measure developed by the Canadian Institute for Health Information. It links measurement and improvement by providing evidence-informed resources that will support patient safety improvement efforts.

The Canadian Patient Safety Institute acknowledges and appreciates the key contributions of Dr. William Geerts, MD FRCPC for the review and approval of this Improvement Resource.

DISCHARGE ABSTRACT DATABASE (DAD) CODES INCLUDED IN THIS CLINICAL CATEGORY:

A06: Venous Thromboembolism		
Concept	Embolism, thrombosis, phlebitis or thrombophlebitis of the pulmonary vein or other veins (excluding superficial veins) identified during a hospital stay.	
Notes	This clinical group excludes venous thromboembolism associated with incorrect administration or dosage of medications (refer to A10: Medication Incidents).	
Selection criteria	I26.– I80.1 I80.2 I82.2 I82.8 I82.9	Identified as diagnosis type (2) **OR** Identified as diagnosis type (3) **AND** T80.1, T81.7, T82.8, T83.8, T84.8 or T85.8 as diagnosis type (2) **AND** Y60–Y84 **in the same diagnosis cluster**
	O87.102 O87.902	Identified as diagnosis type (M), (1), (2), (W), (X) or (Y)
Exclusions	Events selected from a diagnosis cluster that is also selected for A10: Medication Incidents	
Codes	**Code descriptions**	
I26.–	Pulmonary embolism	
I80.1	Phlebitis and thrombophlebitis of femoral vein	
I80.2	Phlebitis and thrombophlebitis of other deep vessels of lower extremities	
I82.2	Embolism and thrombosis of vena cava	
I82.8	Embolism and thrombosis of other specified veins	
I82.9	Embolism and thrombosis of unspecified vein	
O87.102	Deep phlebothrombosis in the puerperium, delivered with mention of postpartum complication	
O87.902	Venous complication in the puerperium, unspecified delivered with mention of postpartum complication	
Additional codes		
Inclusions		
T80.1	Vascular complications following infusion, transfusion and therapeutic injection	
T81.7	Vascular complications following a procedure, not elsewhere classified	
T82.8	Other specified complications of cardiac and vascular prosthetic devices, implants and grafts	
T83.8	Other complications of genitourinary prosthetic devices, implants and grafts	
T84.8	Other complications of internal orthopedic prosthetic devices, implants and grafts	
T85.8	Other complications of internal prosthetic devices, implants and grafts, not elsewhere classified	
Y60-Y84	Complications of medical and surgical care (refer to Appendix 6)	

For the descriptions of external cause codes of complications of medical or surgical care (Y60–Y84), please refer to the technical notes: Hospital Harm Indicator: Appendices to Indicator Library.

Overview

Venous thromboembolism (VTE) comprises both deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT occurs when an abnormal blood clot forms inside a vein deep in the leg. DVT may cause leg pain and/or swelling but is often clinically silent. PE occurs when all or part of a DVT breaks away from its site in a vein and travels through the venous system to lodge in the lungs. PE may cause chest pain, shortness of breath, tachycardia, hemoptysis, or pre-syncope but is often clinically silent.

In pregnancy, due to hormonal influences on vascular tone and compressive effects on veins by the enlarging uterus, DVT in pregnancy generally presents in the lower extremities, with a predisposition for the left leg (70 to 80 per cent). In contrast to their presentation in non-pregnant patients, DVTs are often isolated to the iliac and/or femoral vein during pregnancy (61 per cent) (Chan et al., 2014).The first and second trimesters of pregnancy convey similar risks for DVT, with a higher risk in the third trimester and the first three weeks postpartum. PE occurs more commonly postpartum, decreasing in incidence after the first six weeks (Chan et al., 2014).

Implications

VTE is one of the most common and preventable complications of hospitalization. The rate of asymptomatic hospital-acquired DVT, if thromboprophylaxis is not used, is 10 to 40 per cent after general surgery and 40 to 60 per cent after hip surgery. The rate of symptomatic VTE is up to five per cent (or more) of medical and surgical patients if thromboprophylaxis is not used (Geerts et al., 2008).

VTE remains an important cause of maternal morbidity and mortality in Canada with an overall incidence of DVT and PE of 12.1 per 10,000 and 5.4 per 10, 000 pregnancies, respectively (Chan et al., 2014). VTE occurs at a rate of 5.4 per 10,000 antepartum, 7.2 per 10,000 peripartum, and 4.3 per 10,000 pregnancies postpartum. Postpartum PE is a leading cause of maternal mortality in Canada, with up to 17 maternal deaths each year (Chan et al., 2014).

Goal

To prevent VTE in hospitalized adult and obstetrical patients by implementing strategies which increase the use of evidence-based thromboprophylaxis.

Importance to Patients and Families

This potentially very serious complication can often be prevented by assessing patients for risk of VTE and then taking steps to prevent DVT. Reducing VTE decreases the chance of readmission to hospital, serious complications, and death (IHI, 2012).

Patient Story

A Real Case of VTE

In January 2007, Mary B., a 61 year-old working artist, was generally healthy apart from leg pain and limitations due to osteoarthritis of her hips and knees. After years of progressive pain and a carefully considered decision, Mary decided to undergo knee arthroplasty. She had a very positive attitude going into the surgery. Unfortunately, Mary developed major bilateral pulmonary emboli a few days after hospital discharge. Although Mary was prescribed low doses of warfarin after surgery, it was given for only five days and she never achieved the target INR range.

“I became what the Sheps/Cardiff Report (2004) to Health Canada would refer to as a near miss in their critical report on the profound ‘lack of safety management culture in healthcare,” says Mary.

Given that the most common serious complication after major orthopaedic surgery is deep vein thrombosis and pulmonary emboli, Mary believes that the hospital where she had surgery has a “serious systemic blind spot in understanding PE which puts any patient at high risk.”

Mary’s marked shortness of breath and chest pain slowly resolved over several weeks after starting anticoagulant therapy. She “felt alone in trying to understand the cause” of her distressing symptoms and why better thromboprophylaxis was not used in her case. She is now reluctant to have more surgery because of her near fatal event.

Mary hopes that healthcare providers will take a serious “step towards a healthier and safer public environment” by understanding the risks for deep vein thrombosis and PE and providing appropriate thromboprophylaxis.

Evidence-Informed Practices

VTE Prevention in Medical and Surgical Patients

Steps for improving the prevention of VTE for medical/surgical hospitalized patients:

1. Is the patient at increased risk for VTE (i.e. is thromboprophylaxis indicated)?
2. Is anticoagulant thromboprophylaxis contraindicated?
3. Provide appropriate thromboprophylaxis (anticoagulant or, if anticoagulant contraindicated, mechanical).
4. Reassess if significant change in patient status and at transitions of care.

The *Safer Healthcare Now!* VTE Getting Started Kit (*Safer Healthcare Now!*, 2012) includes Appendix Q: VTE Pocket Card with detailed information relative to the four steps for improving the prevention of VTE and additional information related to recommended doses of anticoagulant prophylaxis.

VTE Prevention in Obstetrical Patients

It is generally agreed that universal postpartum thromboprophylaxis is neither cost-effective nor recommended. In weighing the risks of treatment, it is recommended to use an absolute VTE risk of greater than one per cent in considering thromboprophylaxis during pregnancy and postpartum (Chan et al., 2014). For specific recommendations for VTE thromboprophylaxis in obstetrical patients refer to the Society of Obstetricians and Gynaecologists of Canada (SOGC) 2014 Clinical Practice Guidelines (Chan et al, 2014).

- Individual risk assessment for venous thromboembolism should be performed prior to all pregnancies, once pregnancy is achieved, and repeated throughout pregnancy as new clinical situations arise (SOGC, 2014).
- Women at increased risk should be advised of the symptoms and signs of venous thromboembolism (SOGC, 2014).
- Good hydration and mobilization should be encouraged for every woman postpartum (SOGC, 2014).

MEASURES

Vital to quality improvement is measurement, and this applies specifically to implementation of interventions. The chosen measures will help to determine whether an impact is being made (primary outcome), whether the intervention is actually being carried out (process measures), and whether any unintended consequences ensue (balancing measures).

Below are some recommended measures to use, as appropriate, to track your progress. In selecting your measures, consider the following:

- Whenever possible, use measures you are already collecting for other programs.
- Evaluate your choice of measures in terms of the usefulness of the final results and the resources required to obtain them; try to maximize the former while minimizing the latter.
- Try to include both process and outcome measures in your measurement scheme.
- You may use different measures or modify the measures described below to make them more appropriate and/or useful to your particular setting. However, be aware that modifying measures may limit the comparability of your results to others.
- Posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful and exciting (IHI, 2011).

For more information on measuring for improvement, contact contact the Canadian Patient Safety Institute Central Measurement Team at measurement@cpsi-icsp.ca

Outcome Measures

1. Incidence of VTE in Medical and Surgical Patients.
2. Incidence of VTE in Obstetrical Patients.

Process Improvement Measures

1. Percentage of Patients Receiving Appropriate Venous Thromboembolism Prophylaxis, Including Appropriate*:
    a. Type of thromboprophylaxis.
    b. Dose.
    c. Start time.
    d. Duration.
    e. Adherence.
2. Type of Thromboprophylaxis Provided.*
3. Reasons the Recommended Thromboprophylaxis was NOT Used.*
4. Percentage of Use of Order Sets That Included Thromboembolism Prophylaxis.*
5. Percentage of Obstetrical Patients with Completed VTE Risk Assessment.

Standards and Required Organizational Practices

Accreditation Canada Required Organizational Practice

The team identifies medical and surgical clients at risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) and provides appropriate thromboprophylaxis.

Global Patient Safety Alerts

Global Patient Safety Alerts provides access and the opportunity to learn from other organizations about specific patient safety incidents including alerts, advisories, recommendations and solutions for improving care and preventing incidents. Learning from the experience of other organizations can accelerate improvement.

Recommended search terms:

- Deep vein thrombosis (DVT)
- Pulmonary embolism (PE)
- Venous thromboembolism (VTE)
- Venous thrombosis

* *Safer Healthcare Now!* 2012

VTE Prevention Success Stories

Three teams share their approach to implementing a VTE strategy

The *Safer Healthcare Now!* Venous Thromboembolism (VTE) intervention promotes the use of pre-printed order sets and timely administration of the appropriate thromboprophylaxis to reduce hospital-acquired VTE. We asked three teams to share their journey in implementing evidence-based best practices to reduce VTE. The *Safer Healthcare Now!* VTE Getting Started Kit helped these teams to develop VTE protocols and the teams participated in a VTE Audit Day to obtain a snapshot and measure their results.

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VTE RESOURCES

*(key resources recommended by Dr. W. Geerts)

Professional Associations and Helpful Websites

- International Society on Thrombosis and Haemostasis (ISTH). http://www.isth.org/
- Thrombosis Canada. http://thrombosiscanada.ca/
- World Thrombosis Day. http://www.worldthrombosisday.org/

VTE Clinical Practice Guidelines

**Safer Healthcare Now!* Venous Thromboembolism (VTE): Getting Started Kit*. Safer Healthcare Now!*, 2012. http://www.patientsafetyinstitute.ca/en/toolsResources/Pages/VTE-resources-Getting-Started-Kit.aspx

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