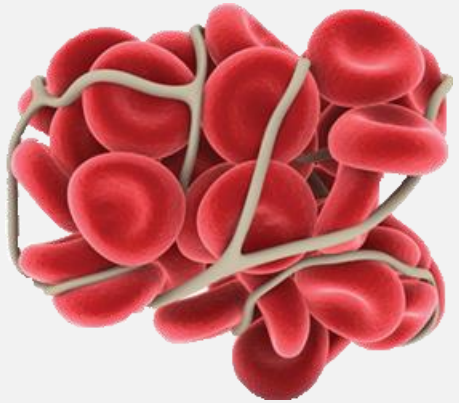
Health Sciences North
Horizon Santé-Nord

VTE Prophylaxis



Disclosures

Health Sciences North
Horizon Santé-Nord

SANOFI

Learning Objectives

- Identifying **the risk & likelihood** of developing a VTE
- Rationale for **initiating** VTE prophylaxis
- Available **agents** for VTE prophylaxis
- and associated ODB **coverage**

- Familiarization of **HSN VTE prophylaxis** policy
- Identifying which patients require **post-discharge prophylaxis** and the **duration** of such treatment

What does VTE Prophylaxis mean?

Anticoagulation to **prevent** venous thromboembolism

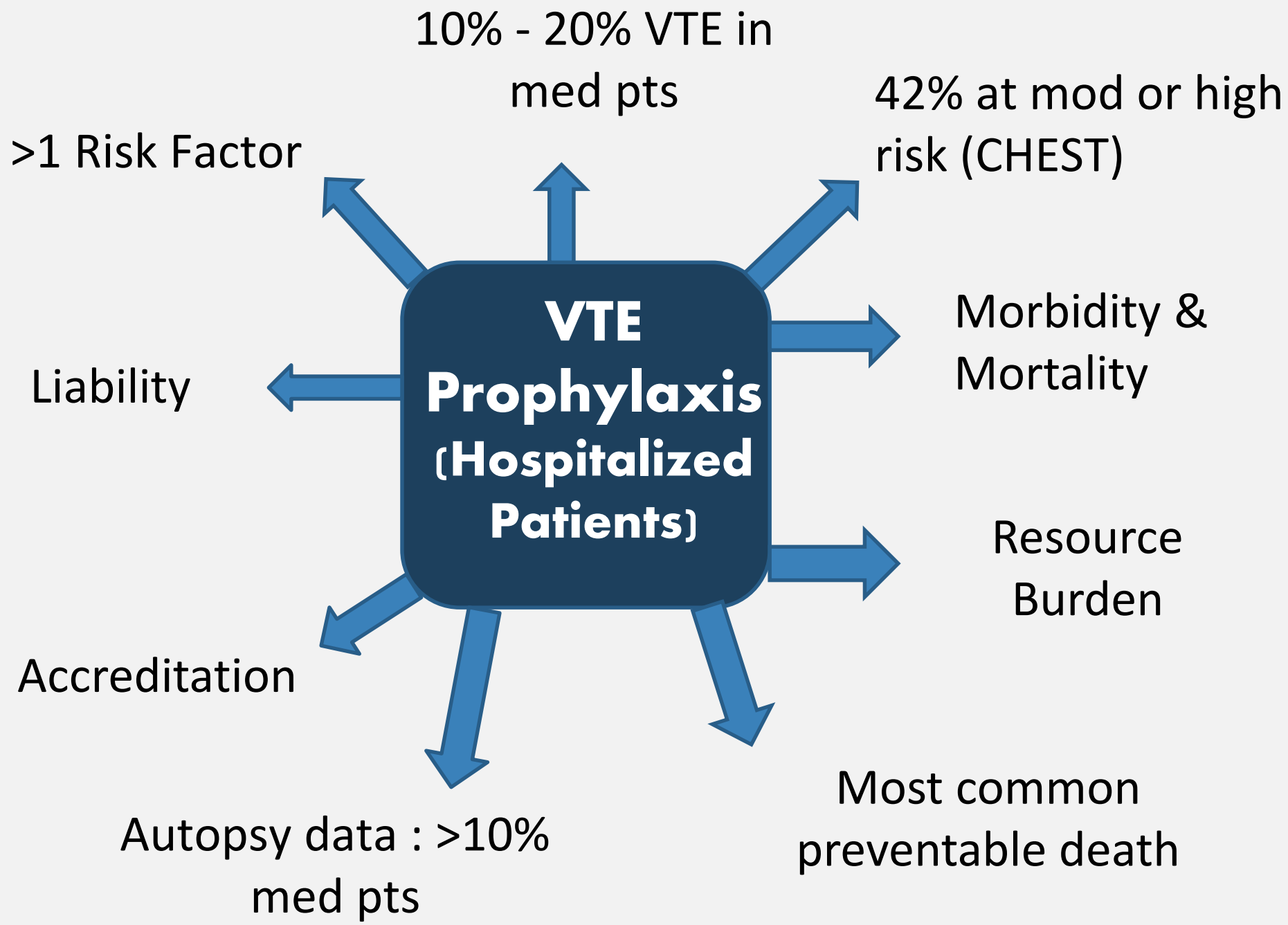
- Deep vein thrombosis (DVT)
- Pulmonary embolism

Why?

Outline

- Reason for VTE prophylaxis
- Indication
- Contraindications
- Available Agents
- Duration of Therapy
- Coverage
- VTE Prophylaxis : Surgical Oncology

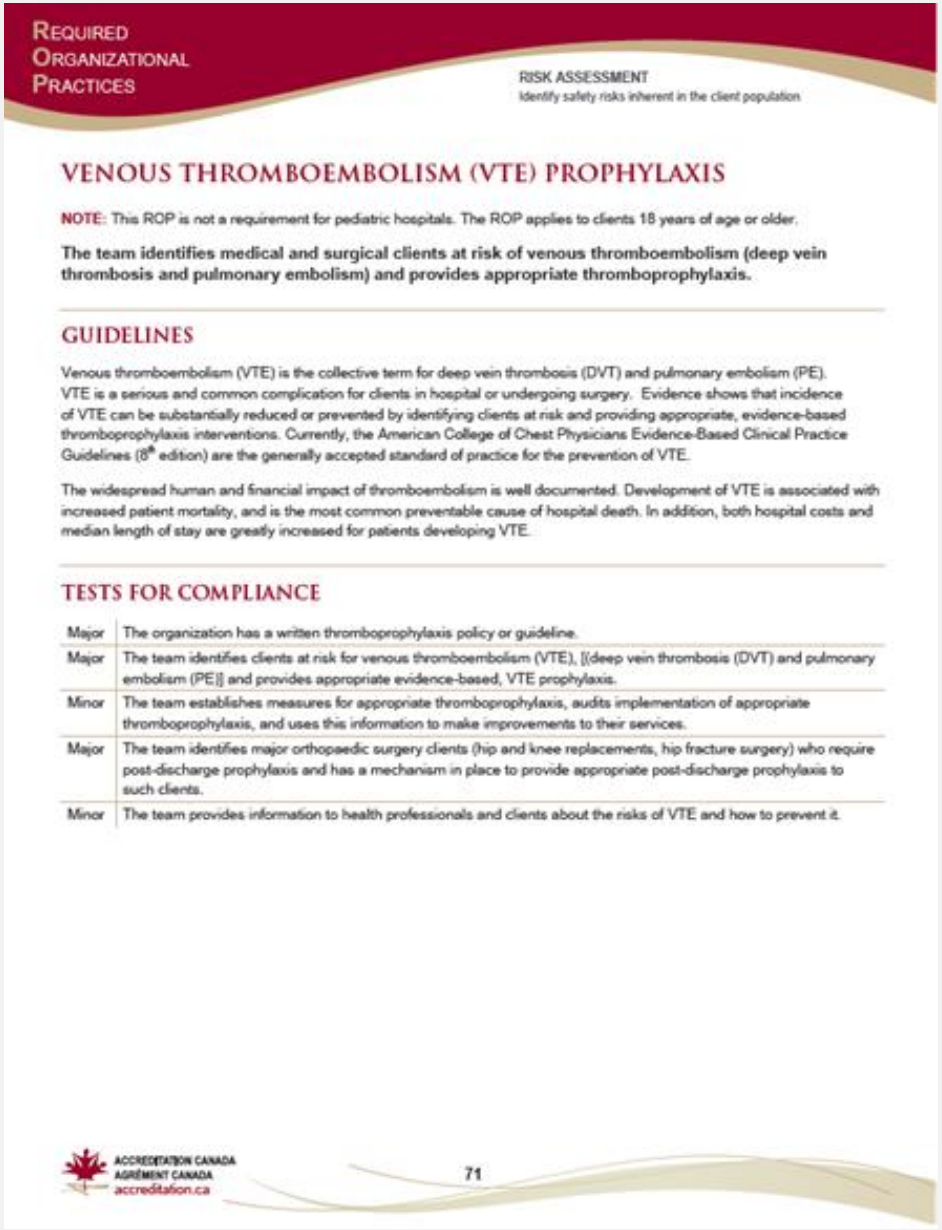
Why use VTE prophylaxis in hospital?



http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

ROP

Required Organization Practice for accreditation



REQUIRED ORGANIZATIONAL PRACTICES

RISK ASSESSMENT
Identify safety risks inherent in the client population

VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS

NOTE: This ROP is not a requirement for pediatric hospitals. The ROP applies to clients 18 years of age or older.

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

GUIDELINES

Venous thromboembolism (VTE) is the collective term for deep vein thrombosis (DVT) and pulmonary embolism (PE). VTE is a serious and common complication for clients in hospital or undergoing surgery. Evidence shows that incidence of VTE can be substantially reduced or prevented by identifying clients at risk and providing appropriate, evidence-based thromboprophylaxis interventions. Currently, the American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th edition) are the generally accepted standard of practice for the prevention of VTE.

The widespread human and financial impact of thromboembolism is well documented. Development of VTE is associated with increased patient mortality, and is the most common preventable cause of hospital death. In addition, both hospital costs and median length of stay are greatly increased for patients developing VTE.

TESTS FOR COMPLIANCE

Major	The organization has a written thromboprophylaxis policy or guideline.
Major	The team identifies clients at risk for venous thromboembolism (VTE), [(deep vein thrombosis (DVT) and pulmonary embolism (PE)] and provides appropriate evidence-based, VTE prophylaxis.
Minor	The team establishes measures for appropriate thromboprophylaxis, audits implementation of appropriate thromboprophylaxis, and uses this information to make improvements to their services.
Major	The team identifies major orthopaedic surgery clients (hip and knee replacements, hip fracture surgery) who require post-discharge prophylaxis and has a mechanism in place to provide appropriate post-discharge prophylaxis to such clients.
Minor	The team provides information to health professionals and clients about the risks of VTE and how to prevent it.

ACCREDITATION CANADA
AGRÉMENT CANADA
accreditation.ca

71

NO VTE

PREVENT VENOUS THROMBOEMBOLISM

safer healthcare now!

The 4 Steps of Thromboprophylaxis

Prevention of Venous Thromboembolism (VTE) should be considered for every patient admitted to acute care

STEP 1: Is thromboprophylaxis INDICATED?

YES

Prophylaxis <u>not</u> indicated if:

- Patient fully mobile AND
- Brief length of stay

Actions:

- No routine prophylaxis
- Reassess daily

Risk Factors

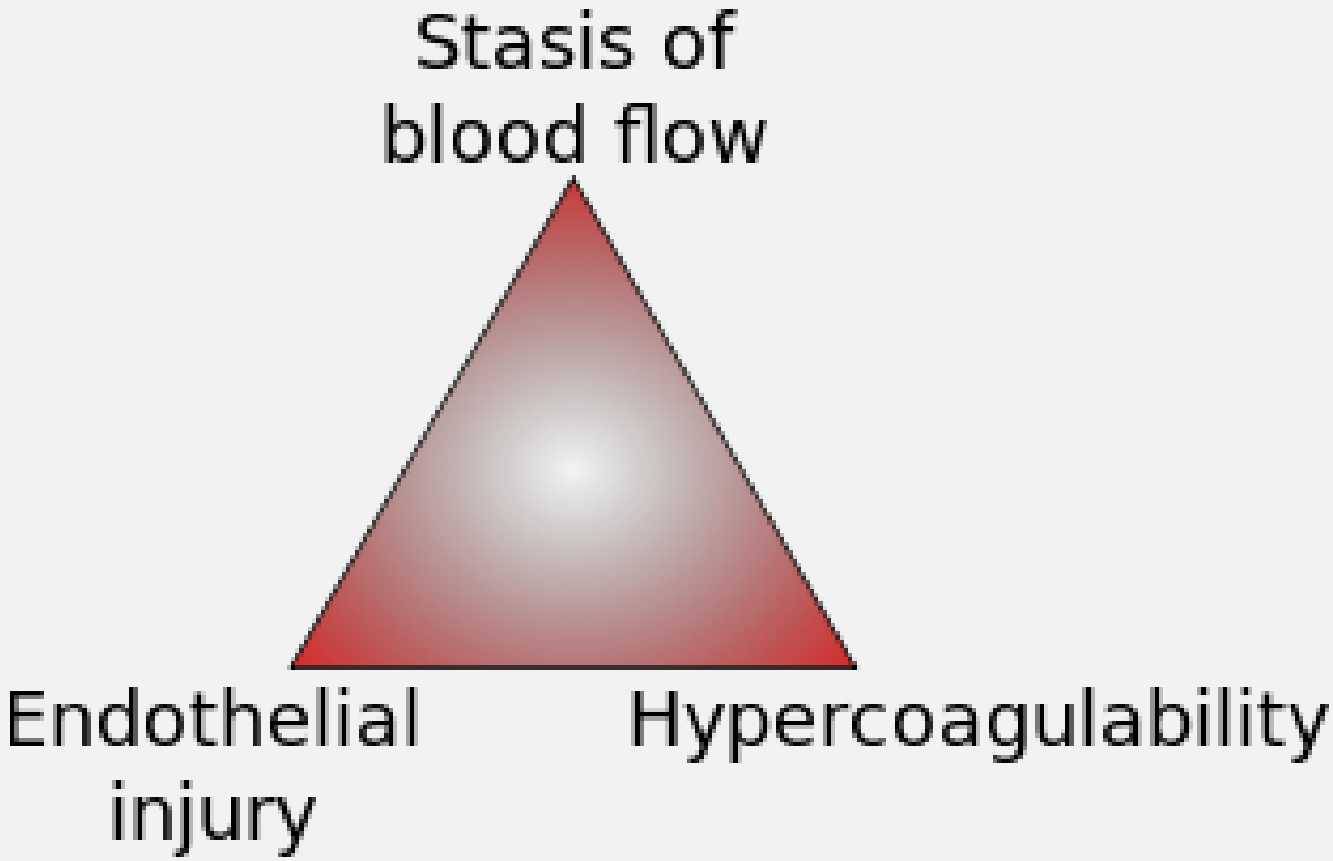
- **Surgery**
- **Trauma** (major trauma or lower-extremity injury)
- **Immobility**, lower-extremity paresis
- **Cancer** (active or occult)
- Cancer therapy (hormonal, chemotherapy, angiogenesis inhibitors, radiotherapy)
- Venous compression (tumor, hematoma, arterial abnormality)
- **Previous VTE**
- **Increasing age (>60)**
- **Pregnancy and the postpartum period**
- Heart failure
- Acute respiratory disease
- Estrogen-containing oral contraceptives or hormone replacement therapy
- Selective estrogen receptor modulators
- Erythropoiesis-stimulating agents
- **Acute medical illness**
- Inflammatory bowel disease
- Nephrotic syndrome
- Myeloproliferative disorders
- Paroxysmal nocturnal hemoglobinuria
- **Obesity**
- Central venous catheterization
- Inherited or acquired thrombophilia

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

Meanwhile, in hospital…

Immobility

Virchow's Triad



Approximate Risks of DVT in Hospitalized Patients

Patient Group	Prevalence of DVT
Medical patients	10–20
General surgery	15–40
Major gynecologic surgery	
Major urologic surgery	
Neurosurgery	
Stroke	20–50
Hip/knee arthroplasty Hip Fracture Surgery	40–60
Major trauma	40–80
Spinal Cord Injury	60–80
Critical care patients	10–80

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1925160/

HSN POLICY

Health Sciences North
Horizon Santé-Nord

PHARMACY POLICY AND PROCEDURE MANUAL
Health Sciences North/Horizon Santé-Nord

ISSUED BY:	Venous Thromboprophylaxis Collaborative Committee		
AUTHORIZED BY:	Pharmacy and Therapeutics Committee		
ISSUE DATE:	September 7th 2011	**REVISION DATE:**	June 6, 2012
CATEGORY:	Policy and Procedure	**PAGE:**	1 of 5

SUBJECT: **Venous Thromboprophylaxis (VTE) Policies and Procedures**

VALUE STATEMENT

Venous thromboembolism (VTE) is one of the most common compli
common preventable cause of hospital death. HSN believes that best
that hospitalized patients are assessed for their risk of VTE and that t
thromboprophylaxis (TP), if indicated.

POLICY

Every hospitalized patient will be assessed for VTE risk and need for
hospital, when there is a significant change in clinical status, at the tim
another, and at discharge.
Optimal evidence-based TP will be provided to every hospitalized pati
their risk of thrombosis, risk of bleeding, and available options.

PROCEDURE

1. **Every patient will be assessed for their risk of VTE:**

- All inpatients are considered at risk of developing VTE, unless
  to have a length of stay less than 48 hours (IF a patient's c
  their VTE risk increases, a decision with regards to TP should
- Pre-printed VTE prophylaxis orders will be inserted into every
- The hospital VTE committee in conjunction with the Pharmac
  ensure that all new, or revised, procedure or service related pre
  prophylaxis in such orders.
- Patients admitted with the following :
  1. to Psychiatry
  2. to Pediatrics

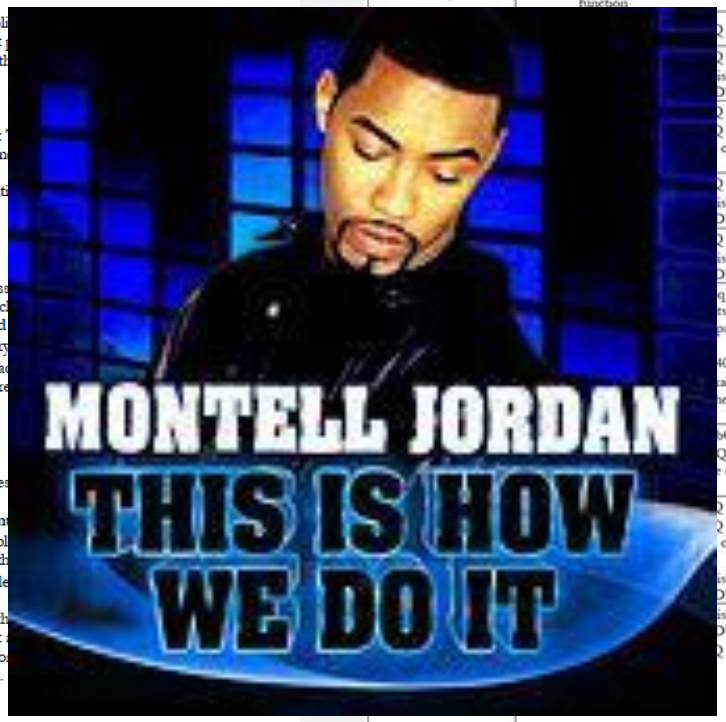
  do not generally require VTE prophylaxis but this will be asse

2. **Every patient will be assessed for contraindications to an**

- For patients who are actively bleeding or have a high risk of bl
  prophylaxis is not given. In this situation, bilateral thigh-length
- These patients will be assessed daily. When the high risk of ble
  Heparin (LMWH) should be provided.

For patients with Heparin Induced Thrombocytopenia (HIT), eith
LMWH is contraindicated. Contact the pharmacy department for
daily may be used for patients with renal function of 30mL/min o
than 3 months ago contact the pharmacy department for options.

- **Thromboprophylaxis Provided:**
- For **most patients**, the recommended TP is enoxaparin (Lovenox)40mg subQ once daily at 1000
- In general, for weight less than 40 kg or creatinine clearance less than 30 mL/min, epidurals enoxaparin 30mg subQ once daily is recommended.
- In general, for weight greater than 100 kg it is recommended that, enoxaparin 40 mg subQ twice daily be considered. For weight greater than 120 kg, contact the pharmacy for advice.
- *Patients receiving epidurals enoxaparin 40mg subQ at 1000 will be used unless they weigh less than 40 kg or have a creatinine clearance of less than 30mL/min then 30mg subQ at 1000 will be prescribed.*



Appendix 1: Specific Thromboprophylaxis Recommendations.

Patient Group	Recommended TP options	Initiation	Duration
High bleeding risk	Bilateral, properly fitted thigh-length TED's used continuously (except for bathing)	ASAP after emergency admission Just prior to surgery for elective procedures	Until bleeding risk allows the use of LMWH
Heparin induced thrombocytopenia (current or previous)	• Suggest consult with pharmacy • No heparin or LMWH • Fondaparinux 2.5 mg subQ daily (check renal function		Until discharge or platelet count >150 x 10^9/L, whichever is longer
	Q 1000		Until discharge
	Q 1000 isk of bleeding, D's	1st dosing time after admission if possible	Until transfer
	Q 1000 Q daily if weighs less clearance less than 30		
	Q 1000 isk of bleeding, D's	1st dosing time after ER admission or post op	Until Discharge
	Q 1000 isk of bleeding, D's	1st dosing time after ER admission or post op	Until Discharge
	q am (Not ts with several renal parin 30 mg subQ 40 mg subQ daily al catheter, e am until the	Morning after surgery	15 days 28 days if high risk (previous VTE after TJR)
	bQ daily Q daily if weighs less clearance less than	If surgery delayed, start enoxaparin 30mg sc daily at bedtime on admission	At least 10 days
	Q 1000 Q daily if weighs less clearance less than 30 isk of bleeding, D's	1st dosing time after admission	Until Discharge
	isk of bleeding, D's Q 1000	For TED's start just prior to surgery for elective surgical procedure and ASAP after admission for major neurotrauma or nontraumatic intracranial hemorrhage. For enoxaparin, no sooner than day after surgery	Until Discharge
Oncology (medical and radiation)	• Enoxaparin 40 mg subQ 1000 • For patients with high risk of bleeding, bilateral calf-length TED's	1st dosing time after admission	Until Discharge Consider benefits of post discharge TP
Spinal Cord injury	• Once hemostasis evident, enoxaparin 40 mg	ASAP after admission	Until discharge from

HSN policy (scan)

Health Sciences North
Horizon Santé-Nord

POLICY

Every hospitalized patient will be assessed for VTE risk and need for TP at the time of admission to the hospital, when there is a significant change in clinical status, at the time of transfer from one level of care to another, and at discharge.

Optimal evidence-based TP will be provided to every hospitalized patient in whom it is indicated based on their risk of thrombosis, risk of bleeding, and available options.

PROCEDURE

1. **Every patient will be assessed for their risk of VTE:**

- All inpatients are considered at risk of developing VTE, unless they are **fully mobile and are expected to have a length of stay less than 48 hours** (IF a patient's clinical status changes significantly and their VTE risk increases, a decision with regards to TP should be reassessed at that time).
- Pre-printed VTE prophylaxis orders will be inserted into every chart at the time of admission

HSN policy

Health Sciences North
Horizon Santé-Nord

Exclusions

- Under 18 years
- Rehab patients
- Psychiatry patients

Pre Printed Order

Health Sciences North
Horizon Santé-Nord

CODE	INITIALS / POSTED	TIME

Order Set:/VTEA.SR

1. Weight____kg Height____cm Allergies/Reaction:_____
2. CBCD and Serum creatinine day 1 and day 4
3. VTE prophylaxis required as per policy

☐ **STANDARD DOSE Enoxaprin 40 mg subQ 1000 h**
Pharmacist will adjust dose as per P&T for weight and creatinine clearance (see reverse)

☐ **PATIENT HAS AN EPIDURAL****	
OR Day	☐ Do not administer Enoxaparin ☐ **Before 1600 h** Enoxaparin 40 mg subQ on _____at_____ (date/time) ☐ **After 1600 h** Heparin 5000 units subQ on _____at_____ (date/time)
Post-op Day 1	Continue Enoxaparin ☐ 40 mg ☐ 30 mg daily at 1000
Post-removal	Restart 2 hours post-removal Continue at daily at 1000 h until discharge

**Recommended to delay the use of LMWH for at least 24 hours if the epidural procedure was particularly traumatic

☐ **POST-OPERATIVE MANAGEMENT (NO EPIDURAL)**	
OR Day	☐ Enoxaparin 40 mg subQ on _____at_____ (date/time) ☐ Heparin 5000 units subQ on _____at_____ (date/time)
Post-Op	Continue Enoxaparin 40 mg subQ 1000 h (Pharmacist will adjust dose as per P&T for weight and creatinine clearance- see reverse)

☐ Other_____

4. ☐ No Anticoagulant thromboprophylaxis required. If patient's clinical status changes significantly and their VTE risk increases then reassess.

REASON MUST BE SELECTED	
☐ Patient actively bleeding or high bleeding risk	☐ Patient currently on anticoagulation
☐ Intra-ocular or intracranial surgery less than 24 h	☐ Major haemostatic disorder
☐ Expected Spinal or epidural anesthesia in next 12 h	☐ Platelets less than 50 x 10^9 /L
☐ Patient fully mobile & expected LOS less than 24 h	☐ Palliative
☐ Recent surgical procedure with high risk of bleeding	

5. At physician discretion
☐ Thigh length antiembolic stockings ☐ Knee length antiembolic stockings
☐ Intermittent pneumatic compression devices (designated areas only)
6. ☐ See post-operative protocol

STEP 2: Is anticoagulant thromboprophylaxis CONTRAINDICATED?

NO

Reasons:

- Active bleeding
- High risk of bleeding

Actions:

- TED stockings and/or Sequential Compression Devices
- Reassess daily

Contraindications

Absolute Bleeding Risk

- Active hemorrhage
- Thrombolytics used within the past 24 hours

Patients should still be re-assessed as contraindications may resolve

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

Relative Bleeding Risk -
If the risk for bleed out weighs the risk for VTE:

- GI/GU hemorrhage within the past 30 days
- INR ≥ 2.0
- End stage liver disease with coagulopathy
- Transfusion ≥ 2 units PRBC in last 72 hours

- Vitamin K use in last 24 hours
- Hgb drop ≥ 20 g/L or 10%
- Epidural catheter placement or removal
- Craniotomy within the past 2 weeks

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

Relative Bleeding Risk – continued…
If the risk for bleed out weighs the risk for VTE:

- Severe trauma to spinal cord or head with hemorrhage in the past 4 weeks
- Recent intraocular, spinal or intracranial surgery
- Recent intraabdominal, retroperitoneal, intrathoracic surgery in last 24 hours

- Hypertensive crisis
- Multiple trauma
- Acute leukemia or other high-grade hematologic malignancy

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

Bleed Risks: HASBLED

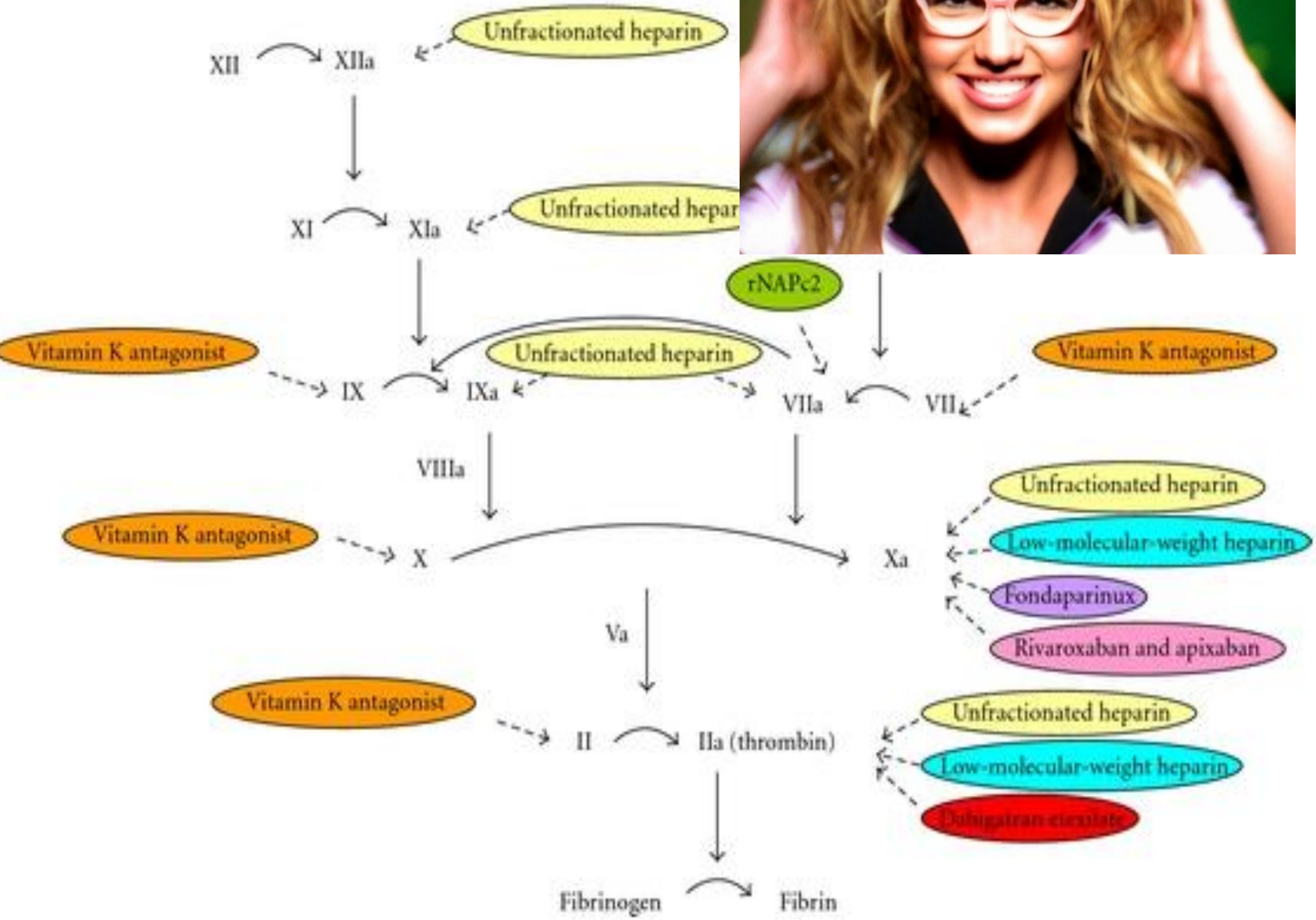
Risk Factor	Score	HAS-BLED Score	Bleeding Rate (%/year)
Hypertension	1	0	1.13
Abnormal renal/hepatic function	1 (each)	1	1.02
Stroke	1	2	1.88
Bleeding	1	3	3.74
Labile INRs	1	4	8.70
Elderly (≥ 65 years)	1	≥5	Insufficient data
Drugs or alcohol use	1 (each)		

STEP 3: Provide APPROPRIATE THROMBOPROPHYLAXIS

- Prophylaxis should generally be started within 24 hours of admission or after surgery
- Evidence-based, guideline-recommended prophylaxis should be initiate and continued at least until discharge (and post-discharge where appropriate, e.g. post-major orthopedic surgery)

Agents for VTE prophylaxis

DRUG	MOA	Dosing for Prophylaxis	Route
Unfractionated **heparin** (UFH)**	Inactivation of Factor Xa and thrombin	5000 Units BID-TID	**IV**, **SubQ**
Low molecular weight heparin **(LMWH)**	Factor Xa inhibition; some thrombin inhibition	Lovenox: 40 mg daily Adjust if >100 kg, poor renal function, or <40 kg	**SubQ,** IV
Fondaparinux	Factor Xa inhibition	2.5 mg daily	**SubQ**
Warfarin	Vitamin K antagonist	Daily	**PO**
NOAC: **Rivaroxaban**	Factor Xa inhibitor	10 mg daily	**PO**
NOAC: **Apixaban**	Factor Xa inhibitor	2.5 mg BID	**PO**


Unfractionated heparin
XII
XIIa
XI
XIa
Unfractionated hepar
rNAPc2
Vitamin K antagonist
Unfractionated heparin
Vitamin K antagonist
IX
IXa
VIIa
VII
VIIIa
Unfractionated heparin
Low-molecular-weight heparin
Fondaparinux
Rivaroxaban and apixaban
Vitamin K antagonist
X
Xa
Va
Vitamin K antagonist
Unfractionated heparin
Low-molecular-weight heparin
II
IIa (thrombin)
Fibrinogen
Fibrin

Approximate Risks of DVT in Hospitalized Patients

Patient Group	Prevalence of DVT (%)
Medical patients	10–20
General surgery	15–40
Major gynecologic surgery	
Major urologic surgery	
Neurosurgery	
Stroke	20–50
Hip or knee arthroplasty, Hip Fracture Surgery	40–60
Major trauma	40–80
Spinal Cord Injury	60–80
Critical care patients	10–80

Low Risk: <10% risk of DVT without thromboprophylaxis

Patient Group	Recommended
Medical patients who are fully mobile	• No thromboprophylaxis • Early ambulation 
Minor surgery in mobile patients	

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

Moderate Risk:10-40% risk of DVT without thromboprophylaxis

Patient Group	Recommended
Most general, open gynecologic or urologic surgery patients	• LMWH • UFH • Fondaparinux
Medical patients, bed rest or sick	
Moderate VTE risk plus high bleeding risk	•Mechanical thromboprophylaxis

http://thrombosiscanada.ca/?page_id=18

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

High Risk:40-80% risk of DVT without thromboprophylaxis

Patient Group	Recommended
Hip or knee arthroplasty Hip Fracture Surgery	•LMWH •Fondaparinux •Warfarin (INR 2–3) •NOACs
Major trauma, spinal cord injury	
High VTE risk + high bleed risk	•Mechanical thromboprophylaxis

http://www.saferhealthcarenow.ca/EN/Interventions/vte/Documents/VTE%20Getting%20Started%20Kit.pdf

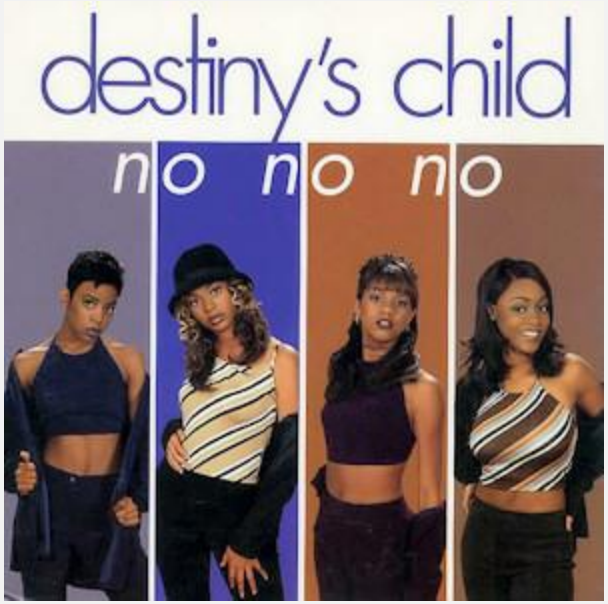
STEP 4: REASSESS if significant change in patient status or at transitions of care

- After surgery
- Transfer to or from intensive care
- Transfer to rehab
- At discharge

Who SHOULD NOT continue prophylaxis?

Acutely ill hospitalized medical patients

Outpatients with cancer who have no additional risk factors



http://thrombosiscanada.ca/?page_id=18

VTE prophylaxis <u>until</u> discharge

- Cardiovascular surgery
- Critical Care (until transfer)
- General Major Surgery
- Gynecology
- Internal medicine/subspecialties
- Neurosurgery
- Oncology (depends)
- Peds
- Spinal Cord injury (discharge from rehab)
- Spine surgery
- Stroke (ischemic or hemorrhagic)
- Trauma (discharge from rehab)
- Urology
- Nephrology

Special Scenarios

Transfer to nursing home

- *In chronically immobilized persons residing at home or at a nursing home, we suggest <u>against</u> the routine use of thromboprophylaxis (Grade 2C).*

In-hospital > 30 days

- Automatic stop date of 15 days
- Checkpoint for re-assessment

Who SHOULD get discharged on prophylaxis?

VTE Prophylaxis post - discharge

Post-natal at high risk

- Hx VTE (unprovoked/estrogen, multiple VTEs, family hx, thrombophilia)
- 6 weeks

Post-natal at intermediate risk

- C-section, BMI>40, prolonged hospitalization, medical comorbidities
- 7 days

http://thrombosiscanada.ca/?page_id=18#

VTE Prophylaxis post - discharge

Oncology outpatients

+ solid tumours
+ risk factors
- risk of bleeds

Additional risk factors for venous thrombosis
in cancer outpatients include previous venous thrombosis, immobilization, hormonal therapy, angiogenesis inhibitors, thalidomide, and lenalidomide.

VTE Prophylaxis post-discharge

Hip and Knee arthroplasty:

Rivaroxaban 10 mg or Lovenox 40 mg subQ daily

Health Sciences North
Horizon Santé-Nord : 15 days; 28 days if high risk (hx VTE post TJR)

CHEST
AMERICAN COLLEGE of CHEST PHYSICIANS : minimum 10 days (up to 35 days)

Hip fracture: Lovenox 40 mg subQ daily

Health Sciences North
Horizon Santé-Nord : minimum 10 days

CHEST
AMERICAN COLLEGE of CHEST PHYSICIANS : minimum 10 days (up to 35 days)

Falck-Ytter Y, et al. Chest 2012;141(2 Suppl):e278S-325S
http://thrombosiscanada.ca/?page_id=18

Coverage

Lovenox (enoxaparin)
No LU code for prophylaxis
Patients must pay out of pocket

Heparin
Not covered

Warfarin
Covered

https://www.healthinfo.moh.gov.on.ca/formulary/

Coverage

Fondaparinux 2.5 mg

Requires LU code

378: For the post-operative prophylaxis of venous thromboembolic events in patients undergoing orthopedic surgery of the lower limbs such as hip fracture, hip replacement or knee surgery.

NOTE: Limited to 9 days of reimbursement

https://www.healthinfo.moh.gov.on.ca/formulary/

Coverage

Xarelto/Apixaban

Requires LU code

433: For the prevention of venous thromboembolic events in patients who have undergone elective total knee replacement surgery.

Note: Limited to 14 days of reimbursement in TKR. Limited to 1 claim in a 120 day period.

434: For the prevention of venous thromboembolic events in patients who have undergone elective total hip replacement.

Note: Limited to 35 days of reimbursement in THR. Limited to1 claim in a 120 day period.

https://www.healthinfo.moh.gov.on.ca/formulary/

Dosing Recommendations

Health Sciences North
Horizon Santé-Nord

Heparin

- 5000 units subQ BID-TID

Lovenox

- 40 mg SubQ daily
- 30 mg SubQ daily if
  - CrCl <30 ml/min
  - Weight <40kg
  - if post-cardiac surgery
- 40 mg SubQ BID if
  - Weight>100 kg

Xarelto/Apixaban- 10 mg daily/2.5 mg BID (orthopedic)

Key Points
We must ask ourselves

- Is it indicated (or still indicated)?
- Risk vs benefit
- Duration (indication may no longer be there)

Your Role

Pharmaceutical opinion to discontinue Lovenox

- Risk of bleeds
- Indication/Contraindications
- Cost
- Patient injection ☹

Assess for indication and duration.

Summary: Who might need VTE prophylaxis on discharge?

- Hip/Knee
- Just had a baby!
- Cancer

Nursing home:
Not indicated unless other risk factors!

Counselling

Xarelto/Apixaban

- Adherence: Importance and reason

  e.g. 40-60% VTE in patients with hip/knee surgery

- Same time each day

- Monitor for bleeds

Counselling Lovenox Injections

PREPARE

Step 1
Wash and dry your hands throughly.

Step 2
Have your patient sit or lie in a comfortable position and choose an area on the right or left side of the abdomen, at least 2 inches from the belly button.

Step 3
Clean the injection site with an alcohol swab and let dry.

INJECT

Step 4
Remove the needle cap by pulling it straight off the syringe and discard it in a sharps collector.

Step 5
With your other hand, pinch an inch of the cleansed area to make a fold in the skin. Next, insert the full length of the needle straight down – at a 90° angle – into the fold of skin.

Step 6
Press the plunger with your thumb until the syringe is empty. Then pull the needle straight out and release the skin fold.

DISPOSE

Step 7
Point the needle down and away from yourself and others, and then push down on the plunger to activate the safety shield.

Step 8
Place the used syringe in the sharps collector.

Questions?

VTE Prophylaxis focusing on Surgical Oncology

General
Urology
Gynecological

No conflicts

Objectives

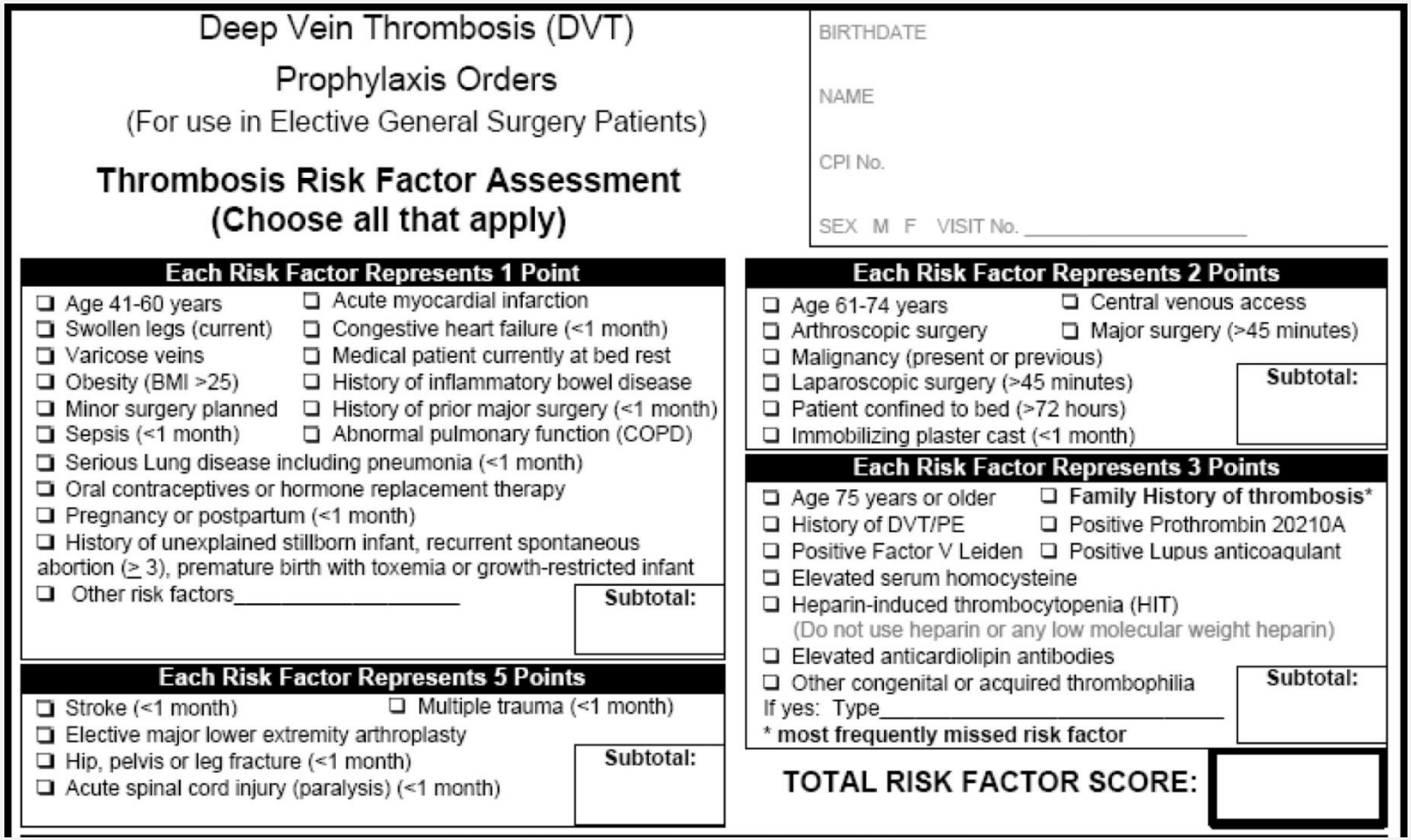
- To describe the kind of tool used to determine VTE risk
- Look at the key evidence-based clinical data and guidelines related to VTE prophylaxis in surgical patients

- Outline current best practices for this small patient population

Risk Factors

- Major abdominal surgery and cancer either treated with chemotherapy or untreated are independent risk factors.
- Looked at the Caprini Predictive Model
- Score 5 or high is considered high risk
- Add on a cancer diagnosis and the recommended length of prophylaxis increases.

VTE in Surgical Patients: Caprini Predictive Model



Deep Vein Thrombosis (DVT)

Prophylaxis Orders

(For use in Elective General Surgery Patients)

Thrombosis Risk Factor Assessment (Choose all that apply)

BIRTHDATE

NAME

CPI No.

SEX M F VISIT No. _____

Each Risk Factor Represents 1 Point

- ❑ Age 41-60 years
- ❑ Swollen legs (current)
- ❑ Varicose veins
- ❑ Obesity (BMI >25)
- ❑ Minor surgery planned
- ❑ Sepsis (<1 month)
- ❑ Acute myocardial infarction
- ❑ Congestive heart failure (<1 month)
- ❑ Medical patient currently at bed rest
- ❑ History of inflammatory bowel disease
- ❑ History of prior major surgery (<1 month)
- ❑ Abnormal pulmonary function (COPD)
- ❑ Serious Lung disease including pneumonia (<1 month)
- ❑ Oral contraceptives or hormone replacement therapy
- ❑ Pregnancy or postpartum (<1 month)
- ❑ History of unexplained stillborn infant, recurrent spontaneous abortion (≥ 3), premature birth with toxemia or growth-restricted infant
- ❑ Other risk factors_____

Subtotal:

Each Risk Factor Represents 5 Points

- ❑ Stroke (<1 month)
- ❑ Multiple trauma (<1 month)
- ❑ Elective major lower extremity arthroplasty
- ❑ Hip, pelvis or leg fracture (<1 month)
- ❑ Acute spinal cord injury (paralysis) (<1 month)

Subtotal:

Each Risk Factor Represents 2 Points

- ❑ Age 61-74 years
- ❑ Arthroscopic surgery
- ❑ Malignancy (present or previous)
- ❑ Laparoscopic surgery (>45 minutes)
- ❑ Patient confined to bed (>72 hours)
- ❑ Immobilizing plaster cast (<1 month)
- ❑ Central venous access
- ❑ Major surgery (>45 minutes)

Subtotal:

Each Risk Factor Represents 3 Points

- ❑ Age 75 years or older
- ❑ History of DVT/PE
- ❑ Positive Factor V Leiden
- ❑ Elevated serum homocysteine
- ❑ Heparin-induced thrombocytopenia (HIT) (Do not use heparin or any low molecular weight heparin)
- ❑ Elevated anticardiolipin antibodies
- ❑ Other congenital or acquired thrombophilia

If yes: Type_____

* most frequently missed risk factor

- ❑ **Family History of thrombosis***
- ❑ Positive Prothrombin 20210A
- ❑ Positive Lupus anticoagulant

Subtotal:

TOTAL RISK FACTOR SCORE:

Case 1

A 46 year-old, obese (BMI = 31 kg/m^2) female schoolteacher is scheduled to undergo laparoscopic colon resection for ulcerative colitis that is retractable to medical therapy. She is to be hospitalized for 1-2 days after surgery.

According to the Caprini risk assessment model, this patient's risk for post-operative DVT is considered…

A) Very low (0-1 points)
B) Low (2 points)
C) Moderate (3-4 points)
D) High (≥5 points)

Case 1

- 46 years = 1point
- Obesity (BMI>25) = 1 point
- History of inflammatory bowel disease = 1 point
- Laparoscopic surgery greater than 45 mins = 2 points
- Total 5 points
- Assuming not at risk for major bleed should receive VTE prophylaxis 7-10 days

Recommendations for Prevention of VTE in Surgical Cancer

	ASCO	NCCN	ESMO	ACCP	Throm can
Initial prophylaxis	All patients with malignancies undergoing major surgery should be considered for prophylaxis with UFH or LMWH unless contraindicated (active bleeding or high risk bleeding)	Prophylaxis anticoagulation is recommended with LMH , UFH or Fondaparinux	Prophylaxis anticoagulation with s.c. **LMWH or UFH** for patients undergoing elective major abdominal or pelvic surgery	LMWH , UFH for moderate /high VTE-risk patients who are not at risk of major bleed	Cancer patients undergoing surgery should receive LMWH prophylaxis while in hospital
Prolonged prophylaxis	**LMWH for up to 4 wks** should be considered in major abdominal /pelvic surgery in **high risk patients** (eg. Restricted mobility, residual malignancy disease, history of VTE) or those with additional risk factors	Outpatient prophylaxis is recommended for **up to 4 wks** post-op . Particularly for **high risk abdominal or pelvic surgery.**	Should receive post-discharge prophylaxis with **LMWH for up to one month after elective major abdominal or pelvic surgery**	Extended prophylaxis (**4 wks)** with LMWH is recommended for high –VTE risk patients undergoing abdominal or pelvic surgery who are not at high risk for bleeding. (Grade 1B)	Patients with additional risk factors may benefit from **extended prophylaxis until 1 month after surgery**

UFH: Unfractionaled heparin; LMWH: Low molecular weight heparin; s.c.: Subcutaneous; VTE: Venous thromboembolism; wks: Weeks; pts: patients;

1. Lyman GH, et al. *J Clin Oncol.* 2013;31(17):2189-2204; 2. National Comprehensive Cancer Network. 2013. Available at: www.nccn.org; 3. Mandalà M, et al. *Ann Oncol.* 2011;20(Suppl 6):vi85-92.; 4. Gould MK, et al. *Chest.* 2012;141(2 Suppl):e227S-77S.; 5. Thrombosis Canada Clinical Guides, Available at: www.thrombosiscanada.ca

Case 2

A 67 year-old non-obese female, recently retired lawyer, is scheduled to undergo liver resection for an isolated hepatic metastasis following a colon resection 2 years ago for colon adenocarcinoma. She is expected to be hospitalized for 4-5 days.

According to the Caprini risk assessment model, this patient's risk for post-operative DVT is considered…

A) Very low (0-1 points)
B) Low (2 points)
C) Moderate (3-4 points)
D) High (≥5 points)

Case 2

- 67 years= 2 points
- Malignancy (past or present)= 2 points
- Confined to bed for greater than 72 hours= 2 points
- Major surgery for greater than 45 minutes= 2 points
- Total 8 pionts

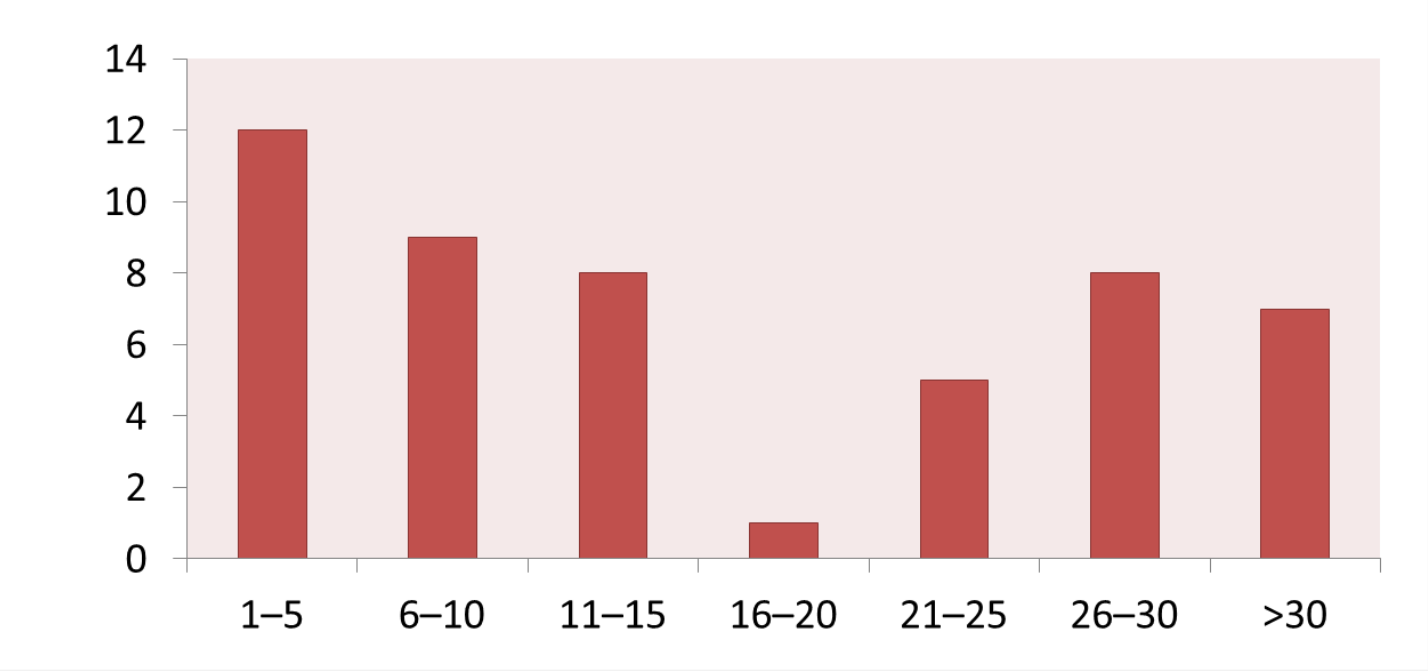
What do guidelines recommend for post-operative DVT prophylaxis? (Grade 1 = strong, Grade 2 = weak)

VTE Risk Category	Average Bleeding Risk (~1%)	High Bleed Risk (~2%) or Severe Impact
Very Low Risk Caprini Score 0	No Specific Prophylaxis **(Grade 1B)**	
Low Risk Caprini Score 1-2	Mechanical prophylaxis, preferably with IPC **(Grade 2C)**	
Moderate Risk Caprini Score 3-4	LMWH **(Grade 2B),** LDUH **(Grade 2B)** or mechanical prophylaxis with ES or IPC **(Grade 2C)**	Mechanical prophylaxis, preferably with IPC **(Grade 2C)**
High Risk Caprini Score ≥5	LMWH **(Grade 1B),** LDUH **(Grade 1B)** plus mechanical prophylaxis with ES or IPC **(Grade 2C)**	Mechanical prophylaxis, preferably with IPC, until risk of bleeding diminishes and pharmacologic prophylaxis can be added **(Grade 2C)**
High Risk Cancer Surgery	LMWH or LDUH plus mechanical prophylaxis with ES or IPC *and* extended-duration prophylaxis (**4 weeks**) with LMWH post-discharge **(Grade 1B)**	
High Risk LMWH and LDUH contraindicated	Fondaparinux or low-dose ASA (160 mg), mechanical prophylaxis, preferable with IPC or both **(Grade 2C)**	

Time Distribution of VTE Events Following Cancer Surgery

40% of VTE events occurred >21 days after surgery

- N=2373, @RISTOS Registry: Prospective cohort study



Agnelli G et al. *Ann Surg.* 2006;243(1):89-95.

Risk Factors for Major Bleeding Complications

General Risk Factors	Procedure-specific risk factors	Procedures*

• Active bleeding
• Previous major bleeding
• Known, untreated bleeding disorder
• Severe renal or hepatic failure
• Thrombocytopenia
• Acute stroke
• Uncontrolled systemic hypertension
• Lumbar puncture, epidural, or spinal anesthesia within previous 4 h or next 12 h
• Concomitant use of anticoagulants, antiplatelet therapy, or thrombolytic drugs
	• Abdominal surgery: Male sex, preoperative hemoglobin level <13 g/dL, malignancy, and complex surgery defined as two or more procedures, difficult dissection, or more than one anastamosis
	• Pancreaticoduodenectomy: Sepsis, pancreatic leak, sentinel bleed
	• Hepatic resection: Number of segments, concomitant extrahepatic organ resection, primary liver malignancy, lower preoperative hemoglobin level, and platelet counts
	• Cardiac surgery:
	  • Use of aspirin
	  • Use of clopidogrel within 3 d before surgery
	  • BMI >25 kg/m^2 , nonelective surgery, placement of ≥ 5 grafts, older age
	  • Older age, renal insufficiency, operation other than CABG, longer bypass time
	• Thoracic surgery: Pneumonectomy or extended resection
		• Craniotomy
		• Spinal surgery
		• Spinal trauma
		• Reconstructive procedures involving free flap

VTE Prophylaxis dosing regimens in Surgical Patients with Cancer

Drug	Regimen
Unfractionated Heparin	5000 units 2-4 hours pre-op and once every 8 hours thereafter or 5000 units 10-12 hours pre-op and 5000 units q8h
Dalteparin	2500 units 2-4 hours pre-op and 5000 units daily there after or 5000 units 10-12 hours pre-op and 5000 units daily there after
Enoxaprin	20mg 2-4 hours pre-op and 40mg once daily thereafter or 4mg 10-12 hours pre-op and 40mg daily thereafter
Fondaparinux	2.5mg once daily beginning 6-8 hours post-op

What does this all mean in Sudbury?

- We use Enoxaparin as our LMWH at HSN
- We dose adjust according to weight and renal function. Therefor could see doses of 30mg sc daily and 40mg sc bid
- General Surgeons are in agreement this is best practice they estimate it will effect about 50 patients per year. (50 prescriptions for 4 week post discharge prophylaxis)
- LU code???? (application made)

QUESTIONS?