VTE Risk Assessment Tools

Database Developed by: Lisa Bartlett, PharmD Candidate – University of Florida College of Pharmacy in association with FMQAI

Hospital	Website	Pages	Update	Advantages	Disadvantages	Evidence
St. Agnes Hospital	http://jeny.ipro.org/showthread.php?t=943	3	7/06	♦ 1 Page ♦ Includes HIT recommendation ♦ Lists risk factors w/o need for scoring (divided evidence- and consensus-based)	♦ No mention of lab Monitoring (ie. CBC) ♦ Doesn't rank risk factors (ie. Low, Mod, High- risk) ♦ Crowded page/ small font	N/A
UW Medical Center	http://vte.washington.edu/SubCategoryContent.asp?SCID=3	4-5	11/06	♦ Extensive list of risk factors ♦ Provides dose adjustment for renal impairment and obesity ♦ Expands thrombophelia to include specific hypercoagulable states	♦ 2 Pages ♦ Need to calculate a score based on risk factors ♦ No mention of lab monitoring or HIT recommendation	N/A
UCSF Medical Center	http://www.hospitalmedicine.org/AM/Template.cfm?Section=QI_Clinical_Tools&Template=/CM/HTMLDisplay.cfm&ContentID=4262	6-7	6/02	♦ Provides detailed instructions for use in pts with catheters ♦ Expands thrombophelia to include specific hypercoagulable states ♦ Includes recommended lab monitoring & special considerations for dosing	♦ 2 Pages ♦ Need to calculate a score based on risk factors ♦ Orders made via a chart that could lead to confusion ♦ No mention of HIT Recommendation	N/A
Carilon Health Systems	http://www.hospitalmedicine.org/AM/Template.cfm?Section=QI_Clinical_Tools&Template=/CM/HTMLDisplay.cfm&ContentID=4265	8	11/03	♦ 1 Page ♦ Includes recommended lab monitoring ♦ Lists risk factors w/o need for scoring (based on amount of risk factors present)	♦ Limited list of risk factors and lists are not ranked (ie. Low, Mod, High- risk) ♦ No HIT recommendation ♦ Doesn't provide dosing adjustment for renal impairment	N/A
ISU Medical Center	http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_VTE/html_VTE/12ClinicalTools/02_Ordersets.cfm	9	N/A	♦ 1 Page ♦ Placed in risk category based on type of surgery and presence of any amount risk factors ♦ Reminder to re-assess daily	♦ Only a protocol, a different sheet is required to enter orders ♦ Doesn't rank risk factors (ie. Low, Mod, High- risk) ♦ No mention of lab monitoring, HIT options, or renal dosing	N/A
Caritas Norwood Hospital	http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_VTE/html_VTE/12ClinicalTools/02_Ordersets.cfm	10	N/A	♦ 1 Page ♦ Placed in risk category based on type of surgery and any amount risk factors (divided as major or minor) ♦ Recommends lab monitoring	♦ No HIT recommendation ♦ Groups relative and absolute contraindications together ♦ Doesn't provide dosing adjustment for renal impairment	N/A

Emory Healthcare	http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_VTE/html_VTE/12ClinicalTools/06_Risk.cfm	11-12	N/A	♦ 1 Page with additional info on back ♦ Includes recommendation for HIT and dosing in renal impairment ♦ Placed in 1 of 2 risk categories based on type of surgery and any amount of risk factors	♦ No mention of lab monitoring ♦ Doesn't rank risk factors (ie. Low, Mod, High- risk)	N/A
UCSD Medical Center	http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_VTE/html_VTE/12ClinicalTools/06_Risk.cfm	13-14	N/A	♦ Placed in risk category (Low, mod, High) based on type of surgery and any amount of risk factors ♦ Divides contraindications into relative, absolute, and other conditions (HIT)	♦ 2 Pages ♦ No mention of lab monitoring, HIT recommendation, or renal Dosing ♦ Doesn't rank risk factors (ie. Low, Mod, High- risk)	N/A
Crozer-Keystone Health System	http://www.qualitynet.org/dcs/ContentServer?siteVersion=textOnly&cid=1147808149675&pagename=Medqic%2FMQTools%2FToolTemplate&c=MQTools	15-16	1/08	♦ 1 Page with additional info for recommended ppx for each surgery on back ♦ Ranks risk factors (Low, mod/high, and very high) and then placed in risk category based on amt ♦ Includes recommended dosing in renal impairment	♦ Does not list contraindications ♦ No mention of lab monitoring or HIT recommendation ♦ No way to check off risk factors, making it difficult to keep track when trying to count them	N/A
Hartford Hospital	http://www.ajhp.org/cgi/content/full/65/18/1755	17	12/03	♦ 1 Page ♦ Incorporated into CPOE ♦ Lists risk factors w/o need for scoring	♦ No mention of lab monitoring, HIT recommendation, or renal dosing ♦ No classification into risk categories or recommendation of which ppx to use ♦ Groups relative and absolute contraindications together	VTE prophylaxis compliance rate- 49% vs 93% after implementation. Pts with a CI to pharmacologic therapy receiving mech. prophylaxis- 25% vs 100% after implementation.
UM Health Care	http://www.jvascnurs.net/article/S1062-0303(07)00053-2/fulltext	18	11/06	♦ 1 Page with additional info for recommended ppx for each surgery on back (back not given in article) ♦ Ranks risk factors (according to point value given)	♦ Need to calculate a score based on risk factors ♦ No mention of lab monitoring, HIT recommendation, or renal dosing	Hospital VTE ppx rates improved up to 82% and were associated with a savings of $34,140/yr

PHYSICIAN ORDERS
Venous Thromboembolism Prophylaxis

DRAFT

PATIENT ID LABEL

1. Fill in date and time
2. Enter prescribed dose and prescribed interval for each medication
3. Please print name, sign order and include pager number
4. **Required information**, designated by **bold type,** must be provided before medication can be dispensed or administered
5. **Pediatric orders** require dose/weight (mg/kg) format

Venous Thromboembolism (VTE) Prophylaxis Assessment and Order Form

MANDATORY LABORATORY ORDERS: 1. Obtain serum creatinine if one has not been ordered within the last 72 hours
2. Daily INR if patient is ordered warfarin therapy below (see section IV)

I. RISK FACTORS (Chest 2005; 128:958-969)
Medically ill, hospitalized patients with any high (evidence –based) or probable (consensus-based) risk factors should receive DVT prophylaxis.
Initial risk factors present (indicate positives):

High Risk- Evidence- Based	Probable Risk – Consensus -Based	Contraindications to Pharmacological Prophylaxis
____ acute cardiac disease ____ active cancer ____ sepsis ____ acute respiratory disease ____ stroke ____ paraplegia ____ history of VTE ____ history of malignancy ____ complicating acute infectious disease ____ age > 75 years	____ acute inflammatory infections with immobility ____ inflammatory bowel disease ____ prolonged immobility ____ age > 70 years ____ varicose veins ____ obesity ____ estrogen hormone therapy ____ pregnancy ____ nephrotic syndrome ____ dehydration ____ thrombophilia or thrombocytosis	____ active bleeding ____ hypersensitivity to heparin or enoxaparin ____ uncontrolled hypertension ____ recent intracranial or intraocular surgery ____ heparin-induced thrombocytopenia ____ coagulopathy ____ **EPIDURAL ANALGESIA Precautions** ____ **SPINAL TAP OR EPIDURAL ANESTHESIA < 24 HOURS** ____ thrombolytic therapy ____ platelet inhibitors (COX-2 inhibitors, NSAIDs, ticlopidine salicylates, GP IIb/IIIa inhibitors, clopidogrel, dipyridamole)

DVT pharmacological prophylaxis is not indicated or is contraindicated in this patient _____MD Signature

II. MECHANICAL PROPHYLAXIS - choose by initialing

____ ~~Sequential compression device (SCDs)~~
____ Anti-embolic stockings (e.g., TEDS) – choose _____ knee length **OR** _____ thigh length
____ Early and persistent mobilization - provide specific ambulation plan: _____
_____

III. MEDICAL PATIENTS - choose by initialing **(for HIT patients use orders in section V)**

___ heparin 5000 units sub-Q q8h for VTE prophylaxis **OR**
___ enoxaparin 40 mg sub-Q q24h for VTE prophylaxis – pharmacy to adjust dose based on creatinine clearance

IV. SURGICAL PATIENTS (Chest 2004; 126:338S-400S) –choose by initialing **(for HIT patients use orders in section V)**

Type Of Surgery	**Recommended Agents** (**choose by initialing):** Pharmacy will automatically change drug and/or dose/interval as necessary to meet these guidelines
Total hip replacement Total knee replacement Hip fracture surgery	____ **fondaparinux** 2.5 mg sub-Q QDAY **Start day at least 6 hours post-op but within 24 hour; (start date = _____)** ***OR* if patient wt < 50 kg or CLcr < 30 mL/min then use:** ____ enoxaparin 30 mg sub-Q q12h; or if CLcr <30 mL/min enoxaparin 30 mg sub-Q q24h **Start day at least 12 hours post-op but within 24 hours (start date = _____)** ***OR*** ____ Warfarin _____ mg PO at 2200 on day of surgery[#] (initiate with 2.5 mg in the elderly and/or weight < 50 kg; or 5 mg dose for other) [#]Subsequent warfarin doses will be ordered daily upon review of INR target=2 to 3.
Elective spinal surgery (with advanced age, known malignancy, presence of a neurologic deficit, previous VTE, or an open anterior surgical approach)	____ **heparin** 5000 units sub-Q Q8H ***OR*** ____ enoxaparin 30 mg sub-Q q12h; or if CLcr <30 mL/min enoxaparin 30 mg sub-Q q24h **Start after surgery (date= _____)**
Neurosurgery Urologic surgery General surgery Gynecologic surgery	____ **heparin** 5000 units sub-Q Q8H ***OR*** ____ enoxaparin 30 mg sub-Q q12h; or if CLcr <30 mL/min enoxaparin 30 mg sub-Q q24h **Start day after surgery (date=_____)**

V. PATIENTS WITH HEPARIN INDUCED THROMBOCYTOPENIA (HIT):

_____ fondaparinux 2.5 mg sub-Q daily

DATE	TIME	MD PRINT NAME	MD SIGNATURE	MD BEEPER/CONTACT #
ORDER TO PHARMACY	US/NURSE SIGNATURE	ORDER RECORDED	US SIGNATURE	NURSE SIGNATURE

UWMC VTE RISK ASSESSMENT AND PROPHYLAXIS ORDER SET (page 1 of 2)

STEP 1: PREDISPOSING RISK FACTORS: (Scores are Additive for this section)

HYPERCOAGULABLE STATES (Thrombophilia) *Assign 3 points for each*		
	points	
☐	3	Antiphosphosolipid syndrome (anticardiolipin antibody, lupus anticoagulant)
☐	3	Antithrombin deficiency
☐	3	Disorders of plasminogen or plasmin activation
☐	3	Dysfibrinogenemia
☐	3	Elevated factor VIII/normal CRP
☐	3	Factor V Leiden/Activated Protein C resistance
☐	3	Hyperhomocysteinemia
☐	3	Hyperviscosity syndrome
☐	3	Myeloproliferative disorders
☐	3	Protein C or S deficiency
☐	3	Prothrombin gene mutation

CLINICAL RISK FACTORS *(Assign 1 point each unless otherwise noted)*		
	points	
☐	1	Abnormal pulmonary function (COPD)
☐	1	Age 41 to 60 years
☐	2	Age 60-74 years
☐	3	Age 75 & above
☐	1	Collagen vascular disease
☐	1	Estrogen use (OC, HRT, tamoxifen)
☐	3	Heparin-induced thrombocytopenia (< 3 months)
☐	3	History of DVT/PE
☐	1	History of recent surgery (<1 month)
☐	1	History of unexplained stillborn infant or recurrent spontaneous abortion (≥3 months)
☐	1	Inflammatory Bowel Disease
☐	3	Malignancy
☐	1	Nephrotic syndrome
☐	2	Obesity (BMI >25)
☐	3	Pregnancy or post partum <1 month
☐	1	Varicose Veins

ADD POINTS FOR PREDISPOSING RISK FACTOR SCORE_____ (Score A; range= 0 to 58)

STEP 2: EXPOSING RISK FACTORS: Choose highest risk category that describes the patient 's status in order to determine the baseline risk factor score.)

Assign 5 Points	Assign 2 Points	Assign 1 Point
☐ Acute spinal cord injury (< 1 mo)	☐ Central venous access	☐ Acute myocardial infarction
☐ Elective hip/knee arthroplasty	☐ Immobilizing plaster cast (<1 month)	☐ Acute CHF exacerbation
☐ Hip, pelvis, or leg fracture (<1 month)	☐ Laparoscopic surgery (>45 min)	☐ Acute respiratory failure
☐ Multiple trauma (< 1 month)	☐ Major Surgery (>45 min)	☐ Infection,serious
☐ Stroke (<1 month)	☐ Patient confined to bed >72 hrs	☐ Medical pt at bed rest (<72 hrs)
		☐ Minor Surgery (< 45 min)
Total score for any checked risk factors = 5	Total score for any checked risk factors =2	Total score for any checked risk factors =1

SELECT POINTS FOR EXPOSING RISK FACTOR SCORE: _____(Score B; options = 5, 2, or 1)

STEP 3: TOTAL RISK FACTOR SCORE:

PREDISPOSING: (Score A) _____ + EXPOSING: (Score B)_____ Total Score

Place score here ↑

PHYSICIAN SIGNATURE	PRINT NAME	PAGER	UPIN	DATE	TIME

PHYSICIAN ORDER

PT.NO

NAME

DOB

UW Medicine
Harborview Medical Center – UW Medical Center
University of Washington Physicians
Seattle, Washington

VTE RISK ASSESSMENT AND PROPHYLAXIS

U0000
U0000

UH0000 REV DEC 05

WHITE - MEDICAL RECORD
CANARY - PHARMACY
PINK - NURSING

YELLOW

UWMC VTE RISK ASSESSMENT AND PROPHYLAXIS ORDER SET (page 2 of 2)

STEP 4: **PROPHYLAXIS SAFETY CONSIDERATIONS: Check if any of the following contraindications to heparin or enoxaparin are present**

○	active bleeding within 48-72 hours
○	hypertensive crisis
○	coagulopathy / severe liver disease
○	heparin induced thrombocytopenia
○	thrombocytopenia (< 20,000 if no coagulopathy; < 50,000 if coagulopathy present)
○	Recent intraocular, spinal or intracranial surgery
○	Use of TPA for stroke within 24 hours
○	Head trauma or CNS hemorrhage
○	Multiple trauma with high bleeding risk
○	Proven or suspected peri-spinal hematoma
○	Other high risk for bleeding or active bleeding conditions based on clinical judgment

If any of the above boxes are checked, the patient *is not* a candidate for anticoagulant therapy. Mechanical prophylaxis [elastic stockings (ES) or intermittent pneumatic compression (IPC)] should be used.

STEP 5: **NEURAXIAL ANESTHESIA CONSIDERATIONS:**

○	Recent LP, spinal injection, or removal of epidural catheter: (< 12 hours)
○	Indwelling epidural catheter; indwelling or removal intrathecal catheter

If either of these boxes is checked, special precautions for use and timing of prophylactic anticoagulation are required to prevent spinal hematoma. See *Guidelines for Neuraxial Anesthesia in the Anticoagulated Patient*.

STEP 6: **RECOMMENDED PROPHYLACTIC REGIMENS FOR EACH RISK GROUP:**

LOW RISK (Total = 1Point)	MODERATE RISK (Total = 2 Points)	HIGH RISK (Total = 3-4 Points)	VERY HIGH RISK (Total = 5 or more Points)
○ Early Ambulation (< 72 hours)	○ Heparin 5,000 units SC q12H ○ Enoxaparin 40mg SC once daily ○ *If CrCl < 30ml/min,use 30mg SC once daily* ○ *If BMI > 50, use 40mg SC bid* ○ Elastic Stockig ○ SCD	○ Heparin 5,000 units SC q8H ○ Enoxaparin 40mg SC once daily ○ *If CrCl < 30ml/min, use 30mg SC once daily* ○ *if BMI > 50, use 40mg SC bid* ○ Elastic Stocking & SCD	○ Enoxaparin 30mg sc q12H (reserved for TKR, THR & hip fracture; SCI; & trauma patients only) ○ Enoxaparin 40mg SC once daily ○ *If CrCl < 30ml/min, use 30mg SC once daily* ○ *if BMI > 50, use 40mg SC bid* ○ Elastic Stocking & SCD

PHYSICIAN SIGNATURE	PRINT NAME	PAGER	UPIN	DATE	TIME

PHYSICIAN ORDER

PT.NO

NAME

DOB

UW Medicine
Harborview Medical Center – UW Medical Center
University of Washington Physicians
Seattle, Washington

VTE RISK ASSESSMENT AND PROPHYLAXIS

U0000
U0000

UH0000 REV DEC 05

WHITE - MEDICAL RECORD
CANARY - PHARMACY
PINK - NURSING

YELLOW

UCSF Medical Center

Unit Number:

Adult Venous Thromboembolism Prophylaxis Order Form

Pt. Name:

DRAFT 1

Questions? Call Comprehensive Hemostasis & Antithrombotic Service (CHAS) at 719-4023.

DATE:	TIME:	*ALLERGIES:*	Birthdate:

RECOMMENDED REGIMENS FOR PROPHYLAXIS BASED ON RISK FACTOR ASSESSMENT

1. **Assign risk score**: _____ (see reverse side for risk assessment criteria)
2. **Patient has contraindication to pharmacologic prophylaxis** (circle one): **Y** or **N**
   (See reverse side for list of relative and absolute contraindications)
3. **Order for thromboprophylaxis** *(√ in box activates order)*
   NOTE: Do not use these guidelines if the patient is receiving therapeutic anticoagulation.

	NON-PHARMACOLOGIC		**PHARMACOLOGIC (Send order to Pharmacy)**				
	Early Ambulation Only	**SCD (Knee High)**	**Unfractionated Heparin**		**Enoxaparin (Low Molecular Weight Heparin)**		**Other**
Risk Factor Score			5,000 Units SQ Q12H	5,000 Units SQ Q8H	30 mg SQ Q12H	40 mg SQ Q24H	
Contraindication to drug therapy							
Low (0)							
Moderate (1-2)							
High (3-4)							
Very High (>4)							

4. **Order for laboratory** ☐ **CBC with platelets every other day** if Heparin or Low Molecular Weight Heparin is used ☐ **Daily INR** if Warfarin is used

(√ in box activates order)

☐ **Other laboratory order (describe):** _____

SPECIAL CONSIDERATIONS:

Renal impairment: Use low molecular weight heparins with caution in patients with SCr>2 or CrCL <30 mL/min. Use of fondaparinux is contraindicated in patients with a CrCL<30 mL/min.

Patients <50kg: consider dose adjustments for pharmacologic prophylaxis in patients with a weight of < 50 kg. Fondaparinux should not be used in patients<50 kg.

Obesity: Appropriate dosing for obese patients is not well established. Consider CHAS consult.

Signature _____ *M.D.#* _____ *Time*_____ *Date*_____ *Pager* _____

FLAG CHART Checked by _____ **R.N. Time** _____ **Date**_____

DEEP VEIN THROMBOSIS RISK FACTOR ASSESSMENT

Check all pertinent thromboembolism risk factors (RFs)

RFs with value of 1 point	RFs with value of 2 points	RFs with value of 3 points
❑ Age 41-60 years ❑ Prior history of postoperative DVT ❑ Family history of DVT or PE ❑ Leg swelling, ulcers, stasis, varicose veins ❑ MI/CHF ❑ Stroke with paralysis ❑ Inflammatory bowel disease ❑ Central line ❑ Bed confinement / immobilization >12 hours ❑ General anesthesia time >2 hours ❑ Pregnancy, or postpartum<1 month ❑ Obesity (>20% over IBW) ❑ Hyperviscosity syndromes ❑ Estrogen therapy	❑ Age 61-70 years ❑ Prior h/o unprovoked/idiopathic DVT ❑ Major surgery ❑ Malignancy ❑ Multiple trauma ❑ Spinal cord injury with paralysis	❑ Age over 70 years ❑ Prior history of PE ❑ Inherited thrombophilia * ❑ Acquired thrombophilia *

TOTAL RISK FACTOR SCORE = Low =0 Moderate=1-2 High=3-4 Very High=>4

* Thrombophilia includes Factor V Leiden, and prothrombin variant mutations; anticardiolipin antibody syndrome; antithrombin, protein C or protein S deficiency; hyperhomocysteinemia; myeloproliferative disorders.

Abbreviations

LDUH - low dose unfractionated heparin **LMWH -** low molecular weight heparin
SCD - sequential compression device

Low Risk (0 RFS)	Moderate Risk (1-2 RFS)	High Risk (3-4 RFS)	Very High Risk (>4 RFS)
• Early ambulation	• LDUH (5,000 Units) q 8-12 h *or* • LMWH *or* • SCD	• LDUH (5,000 Units) q 8h *or* • LMWH *or* • SCD	• LMWH *or* • Warfarin, INR 2-3

CONTRAINDICATIONS TO PHARMACOLOGIC PROPHYLAXIS

Relative	**Absolute**
❑ History of cerebral hemorrhage ❑ Craniotomy within 2 weeks ❑ GI, GU hemorrhage within the last 6 months ❑ Thrombocytopenia ❑ Coagulopathy (PT >18 sec) ❑ Active intracranial lesions/neoplasms/monitoring devices ❑ Proliferative retinopathy ❑ Vascular access/biopsy sites inaccessible to hemostatic control	❑ Active hemorrhage ❑ Heparin or warfarin use in patients with heparin-induced thrombocytopenia ❑ Warfarin use in the first trimester of pregnancy ❑ Severe trauma to head, spinal cord or extremities with hemorrhage within the last 4 weeks ❑ Epidural/indwelling spinal catheter – placement or removal

Recommendations for the Use of Antithrombotic Prophylaxis in Patients with Epidural Catheters

For patients receiving low-dose SQ unfractionated heparin (5,000 units Q12h)

- Wait 4-6 hours after a prophylactic dose of unfractionated heparin before placing or removing a catheter.
- Initiate unfractionated heparin thromboprophylaxis 1-2 hours after placing or removing a catheter.
- Concurrent use of epidural or spinal catheter and SQ low-dose unfractionated heparin is not contraindicated.

For patients receiving prophylactic-dose Low Molecular Weight Heparin

- Wait 24 hours after a prophylactic dose of low molecular weight heparin before placing a catheter or performing a neuraxial block.
- Wait 12-24 hours after a prophylactic dose of low molecular weight heparin before removing a catheter.
- Initiate low molecular weight heparin thromboprophylaxis 2-4 hours after removal of the catheter.
- Initiate low molecular weight heparin thromboprophylaxis 24 hours after a “single shot” spinal procedure.
- Concurrent use of an epidural catheter and low molecular weight heparin thromboprophylaxis needs to be approved by the pain service

For patients receiving fondaparinux

- Extreme caution is warranted given the sustained antithrombotic effect, early postoperative dosing, and "irreversibility."
- Until further clinical experience is available, an alternate method of prophylaxis should be utilized.

MED/SURG SERVICES

VENOUS THROMBOEMBOLIC (VTE) PROPHYLAXIS ORDERS (ADULT)

ORDER NUMBER: **MS-27.0** **LAST REVIEWED/REVISED:** **PILOT 11/03**

DATE OF ORIGIN: **08/03** **APPROVED:**

DATE/TIME: _____ **Height/Weight:**_____

DIAGNOSIS: _____

ALLERGIES: _____

Risk Factors:

Any **two or more** is an indication for VTE prophylaxis

- ► Age over 40 years
- ► Obesity
- ► ICU admission
- ► Presence of a central venous line
- ► Prolonged immobility, more than 24 hours
- ► Past history of Chronic Lung Disease or an inflammatory disorder

"High" Risk Factors:

Any **One** is an indication for VTE prophylaxis

- ► Major trauma (abdomen, pelvis, hip or leg)
- ► Ischemic (non hemorrhagic) stroke or paralysis
- ► Malignancy
- ► Any prior history of deep vein thrombosis or pulmonary embolism

Anticoagulant prophylaxis exclusion criteria:

- ► Significant renal insufficiency (affects low molecular weight heparin only!)
- ► Uncontrolled hypertension
- ► Presence or history of heparin induced thrombocytopenia
- ► Recent intraocular or intracranial surgery
- ► Spinal tap or epidural anesthesia within the previous 24 hours
- ► Any active bleeding
- ► Coagulopathy or thrombocytopenia

LAB: CBC with diff every 2 days while on Heparin or LMWH (Low Molecular Weight Heparin)

TREATMENTS: (please check appropriate boxes for patient)

For patients with three or more risk factors or any two risk factors with one risk factor being stroke/paralysis, cancer, major surgery, trauma, or prior VTE, consider using Enoxaparin every 12 hours or the higher dose of Dalteparin.

1. ❑ Intermittent Sequential Pneumatic Compression Device (SCD) bilateral for the leg/calf

PHARMACY: (please check appropriate boxes for patient)

2. ❑ Heparin 5000 units subcutaneously every eight hours
3. ❑ Enoxaparin (Lovenox) injection 40 milligrams subcutaneously daily or
   ❑ Enoxaparin (Lovenox) injection 30 milligrams subcutaneously every 12 hours
4. ❑ Dalteparin (Fragmin) injection 2500 units subcutaneously daily or
   ❑ Dalteparin (Fragmin) injection 5000 units subcutaneously daily
5. ❑ No VTE Prophylaxis at this time

Physician Signature: _____ **date**_____ **Pager**_____

CARILION® Health System

Post Office Box 13727
Roanoke, Virginia 24036-3727

CBASH CFMH CGMH CMC-CRCH CMC-CRMH CNRV CSAH BMH

PATIENT IDENTIFICATION

VTE Protocol Specs: **Adult inpatients**
Institution: Idaho State University Format: Paper Scope: new patients admitted Pages: 1
Content/Use: this risk assessment supports decision making for any admission orders

VTE PROPHYLAXIS ASSESSMENT			
Low Risk	**Moderate Risk**	**High Risk**	**Very High Risk**
Outpatient surgery	No "risk factors" and general moderate/major surgery in patient age 40 to 60 years old	General moderate/major surgery in patient age over 60 and no other risk factors	Elective major lower extremity arthroplasty (hip or knee)
No "risk factors" and minor surgery in patient age less than 40 years old	No "risk factors" and major gynecological surgery for benign disease	Major gynecologic surgery for malignant disease	Non-elective hip, pelvic or other lower extremity orthopedic procedure
No "risk factors" vascular surgery	No "risk factors" and extensive open GU procedures	Risk factors and general moderate/major surgery in patient age greater than 40	Acute spinal cord injury with paresis
No "risk factors", minor laparoscopic procedure	Risk factors and minor general surgery	Risk factors and vascular surgery	Multiple major trauma
0-1 "risk factors" and independent ambulatory medical patient	Risk factors and laparoscopic procedures	Risk factors and major gynecological surgery for benign disease	
	Medical patients with risk factors but not high risk medical conditions	Risk factors and extensive open GU procedures	
		High risk medical conditions: Ischemic CVA with limited mobility Central venous catheter with 2 or more risk factors ICU admission with 2 or more risk factors	

RECOMMENDED PROPHYLAXIS			
Low Risk	**Moderate Risk**	**High Risk**	**Very High Risk**
Early ambulation	Intermittent pneumatic compression devices AND/OR	Intermittent pneumatic compression devices AND	Intermittent pneumatic compression devices AND
Range of motion exercises	Enoxaparin 40 mg SC daily OR	Enoxaparin 40 mg SC daily OR	Enoxaparin 30 mg SC q12 hours OR
	Heparin 5,000 units SC q 8 hours OR	Heparin 5,000 units SC q8 hours OR	Fondaparinux 2.5 mg SC daily OR
	Heparin 5,000 units SC q 12 hour OR	Heparin 7,500 units SC q12 hours	Warfarin INR 2-3
	Heparin 7,500 units SC q 12 hours		

RISK FACTORS	RELATIVE OR ABSOLUTE CONTRAINDICATION TO PHARMACOLOGIC PROPHYLAXIS
○ Age over 65 ○ Prior history of VTE ○ Decompensated CHF ○ Bed rest/impaired mobility ○ Central line ○ Estrogen or other hormonal therapy ○ Myeloproliferative disease ○ Known thrombophilia ○ Active malignancy ○ Obesity ○ Pregnancy/post partum ○ Inflammatory bowel disease ○ Active or chronic lung disease ○ Active rheumatological disease ○ Nephrotic syndrome ○ Sickle cell disease ○ Tobacco use ○ Dehydration ○ Varicose veins or venous stasis	Lumbar puncture or epidural anesthesia within 24 hours Active bleeding Coagulopathy (INR greater than 1.5) or thrombocytopenia (platelet count less than 60,000) Significant renal insufficiency (Creatinine clearance less than 30 – do not use LMWH or fondaparinux) Hypertensive urgency, emergency or crisis Presence or history of HIT (heparin induced thrombocytopenia) Recent intraocular or intracranial surgery or lesions

RE-ASSESS DAILY!!!

Caritas Norwood Hospital

ADULT DVT PROPHYLAXIS

PHYSICIAN ORDER SHEET

ALLERGIES (FOOD AND/OR DRUG): [ ] NKA

HEIGHT: WEIGHT:

Risk Factors for Deep Vein Thrombosis / Pulmonary Embolism (DVT/PE) *(Check risk factors)*

Major

- ☐ Prior DVT or PE
- ☐ Malignancy
- ☐ Age greater than 60 yrs
- ☐ Hypercoagulable state, inherited or acquired
- ☐ Central venous access
- ☐ Nonhemorrhagic Stroke
- ☐ Prolonged Immobility (greater than 72 hrs), or Paralysis
- ☐ Major Surgery
- ☐ Immobilizing Lower Extremity Cast
- ☐ Myocardial Infarction
- ☐ Heart Failure (Decompensated)
- ☐ Sepsis or Severe Infection

Minor

- ☐ Age 40-60 yrs
- ☐ Heart Failure, Compensated
- ☐ Obesity (BMI greater than or equal to 30)
- ☐ Inflammatory bowel disease
- ☐ Trauma/Burns
- ☐ Smoking
- ☐ Minor Surgery
- ☐ Pregnancy or less than 1 month postpartum
- ☐ Oral Contraceptive, Hormone Replacement Therapy use
- ☐ Estrogen Receptor Modulators (i.e Tamoxifen, Raloxifene)
- ☐ Varicose veins

Contraindications for Anticoagulation Therapy

Hx -Heparin Induced Thrombocytopenia	Hemorrhagic blood dyscrasia	Active peptic ulcer disease
Severe hypertension (uncontrolled)	PT or aPTT greater than 1.5 x control	Bacterial endocarditis
Head or spinal trauma (w/ hemorrhage)	Severe thrombocytopenia (Plt below 100,000)	Threatened abortion
Hemorrhagic CVA	Active, uncontrolled bleeding	Pre/post spinal decompression surgery (within 10 days)
Dissecting or cerebral aneurysm	Recent TURP (within 6 weeks)	Eye or brain surgery (within 48 hours)

Use of epidural requires clearance by anesthesiology

DVT Prophylaxis for Medical and Surgical Patients

Review risk factors/Contraindications prior to ordering appropriate prophylaxis

Patient Category — Risk Factors (RF)	Risk	Prophylaxis Method
• Minor procedure and less than 40 yrs and no additional RF • Medical inpatient with no major or minor RF	Low	❑ Early ambulation – Prophylaxis Not Indicated
• Non-major procedure (less than 45 min) and 40-60 yrs or additional RF • Major surgery (greater than 45 min) and less than 40 yrs without additional RF	Moderate	❑ Heparin 5000 units subcut every 12 hours
• Non-major surgery greater than 60 yrs or additional RF • Major surgery (greater than 45 min) greater than 40 yrs or additional RF • Medical inpatient with any risk factor	High	❑ Heparin 5000 units subcut every 8 hours
• Knee Replacement Surgery • Trauma (Major or Lower Extremity) (warfarin not indicated)	High	❑ Enoxaparin (Lovenox) 30mg subcut Q12h ❑ Warfarin (Coumadin) orally per MD order
• Hip Replacement Surgery	High	❑ Enoxaparin (Lovenox) 40mg subcut daily ❑ Warfarin (Coumadin) orally per MD order
• Combine with pharmacologic methods in high risk surgical patients and multiple RF • Contraindications to anticoagulation therapy	High	❑ Intermittent pneumatic compression device ❑ Graduated Compression Stockings
• Check CBC with platelet count on day 2 of heparin or enoxaparin and every third day thereafter. Notify MD if platelet counts falls 50% or more from baseline.		

Date/Time Prescriber Signature Print Name

The Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy Evidence-Based Guidelines. Supplement to Chest Vol 126/No.3/Sept 2004

EMORY HEALTHCARE
EMORY HOSPITALS

Standardized VTE Risk Assessment

DATE: _____/_____/_____ **TIME:** _____

VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS and Risk Stratification:
--For decision support, see tables on reverse: "VTE Risk Stratification" and "Contraindications to Pharmacologic VTE Prophylaxis"—

Medical & Surgical (Non-Orthopedic) patients

- ☐ Enoxaparin (Lovenox) 40 mg SQ q 24 hr, or
- ☐ Enoxaparin (Lovenox) 30mg SQ q 24 hr (CrCl < 30)
- ☐ Heparin 5000 units SQ q 8 hr, or
- ☐ Heparin 5000 units SQ q 12 hr (inadequate except for age > 75 yrs)

} **Intermediate – to – High Risk**

- ☐ Ambulate q shift

} **Low Risk**

Special Situations

Contraindication(s) to Pharmacologic VTE Prophylaxis (or as supplement to anticoagulation for higher risk patients)

- ☐ Graduated Compression Stockings, or
- ☐ Pneumatic / Sequential Compression Devices

Contraindication to Heparin-Based Pharmacologic VTE Prophylaxis

- ☐ Fondaparinux 2.5mg SQ q24 hr

Alternative prophylaxis

- ☐ Patient already on therapeutic anticoagulation
- ☐ No order for VTE prophylaxis requires reason here: _____

Physician Signature: _____ Contact Number: _____

This page printed upside-down on back of 1st page above

VTE Risk Stratification

Low Risk	Intermediate – to – High Risk
▪ **0 risk factors** (or expected LOS ≤ 2 days), plus patient ambulatory, or ▪ **Minor Surgery** (same day or < 45 minutes OR time)	**Any VTE risk factor** below.

VTE Risk Factors

Patient Circumstances		Medical or Surgical Conditions		
Age > 40 years	*CV*	Myocardial Infarction (< 3months)	*ID*	Sepsis
Hospitalization for surgery or acute illness		CHF (NYHA Class III or IV)	*Heme/*	Hypercoagulable state
Obesity (BMI > 30)		Venous stasis/ varicose veins	*Onc*	Sickle cell disease
Immobility (confined to bed or chair)	*Pulm*	Lung disease (acute or chronic)		Malignancy (active)
Previous ischemic stroke w/paresis	*Renal*	Dehydration, severe (>10% weight)		Myeloproliferative disorder
Multiple major trauma*		Nephrotic syndrome	*Rheum*	Rheumatologic disease (active)
Central venous catheter	*GI*	Inflammatory bowel disease	*Ortho*	Elective hip or knee arthroplasty*
History of DVT or PE	*Neuro*	Acute ischemic stroke		Fractured hip, pelvis, femur, or leg
Family history DVT or PE (1st deg relative)		Spinal cord injury*	*Gyn*	Pregnancy or post-partum (<1month)
Recent major surgery (≤ 3 months)				Estrogen-based therapy (OCP, HRT)

Evidence: *Prevention of venous thromboembolism: the 7th ACCP Conference on Antithrombotic and Thrombolytic Therapy.Chest. 2004 Sep;126 (3 Suppl):338S-400S.*

Contraindications To Pharmacologic VTE Prophylaxis

Absolute	Relative	Within
Spine surgery	Intracranial hemorrhage	1 year
Active hemorrhage	GI hemorrhage	1 month
Hemorrhage from severe trauma to head or spinal cord (< 1 month)	GU hemorrhage	1 month
	Craniotomy	2 weeks
	Intraocular surgery	2 weeks
	Epidural catheter insertion	12 hours
	Epidural catheter removal	4 hours
	Post-operative bleeding concerns	
	Active intracranial lesions/neoplasm	
	Hypertensive urgency/emergency	
	Thrombocytopenia (<50K) or falling platelet count	
	Coagulopathy (INR > 2, or PT > 18)	
	End stage liver disease	
	Other: _____	

Contraindications To Heparin-based Pharmacologic VTE Prophylaxis*

Immune mediated Heparin Induced Thrombocytopenia (HIT)

For management of HIT, see "HIT Algorithm" and "Fondaparinux/Argatroban" order form (available online at MD Support)

* Heparin-based pharmacologic prophylaxis = unfractionated heparin, or low molecular weight heparin (Enoxaparin)

VTE Protocol Specs: **Adult inpatients admitted, transferred between units, or post-op**
Institution: UCSD Format: CPOE (shown here in paper format) Scope: every patient admitted or transferred to any service from any area including post-op Pages: N/A in CPOE Content/Use: when completing admission, transfer, or post-op orders (and every 4 days) in CPOE, the provider receives a prompt to complete an order for VTE prophylaxis Formulary: one LMWH (Enoxaparin)

Venous Thromboembolism (VTE) Risk in the Hospitalized Inpatient		
❑ LOW	❑ MODERATE	❑ HIGH
▪ Ambulatory patient *without* additional VTE Risk Factors ▪ Ambulatory patient with expected LOS <= 2 days, or same day/minor surgery Only a few patients! *Ambulation and Education*	▪ All other patients Most patients! (not in LOW or HIGH category) *LMWH or UFH 5000 units q 8h*	▪ Elective major lower extremity arthroplasty ▪ Hip, pelvic, or severe lower extremity fractures ▪ Acute spinal cord injury with paresis ▪ Multiple major trauma ▪ Abdominal or pelvic surgery for cancer *LMWH or Arixtra or Coumadin, AND IPC*

Pharmacologic Prophylaxis Options: Choose ONE:

- ☐ Enoxaparin 30 mg subcutaneous q 12 hours (HIGH risk, knee replacement)
- ☐ Enoxaparin 40 mg subcutaneous q 24 hours (both MODERATE and HIGH risk patients, except knee replacement)
- ☐ UFH 5000 units subcutaneous q 8 h (MODERATE risk only)
- ☐ UFH 5000 units subcutaneous q 12 h. (for MODERATE risk patients < 50 kg or > 75 years of age)
- ☐ Fondaparinux 2.5 mg subcutaneous q 24 hours (alternate in selected HIGH risk patients)
- ☐ Coumadin _____ mg po daily, target INR 2-3 (alternate in selected HIGH risk patients)
- ☐ NO pharmacologic prophylaxis, patient has a contraindication to pharmacologic prophylaxis or is on therapeutic anticoagulation (please check contraindication(s) on reverse.)
- ☐ NO pharmacologic prophylaxis, patient has NO VTE risk factors listed on reverse and meets LOW risk criteria above.

Mechanical Prophylaxis:

- ☐ Venodynes (IPC) (Default adjunct in HIGH risk patients, or if contraindications to anticoagulation)
- ☐ Graduated compression stockings
- ☐ NO mechanical VTE prophylaxis

VTE Risk Factors and Contraindications listed on reverse

Physician Signature: _____ Contact Number: _____

Date and Time: _____

Venous Thromboembolism Risk Factors		
Age > 50 years	Prior history of VTE	Acute or chronic lung disease
Myeloproliferative disorder	Impaired mobility	Obesity
Dehydration	Inflammatory bowel disease	Known thrombophilic state
CHF	Active rheumatic disease	Varicose veins /chronic stasis
Active malignancy	Sickle cell disease	Recent post-partum w/ immobility
Hormonal replacement	Estrogen based contraceptives	Nephrotic syndrome
Moderate to Major surgery	Central venous catheter	Myocardial infarction

Contraindications or other Conditions to Consider with Pharmacologic VTE Prophylaxis		
❑ **ABSOLUTE** ▪ Active hemorrhage ▪ Severe trauma to head or spinal cord *with hemorrhage* in the last 4 weeks ▪ Other_____	❑ **RELATIVE** ▪ Intracranial hemorrhage within last year ▪ Craniotomy within 2 weeks ▪ Intraocular surgery within 2 weeks ▪ GI, GU hemorrhage within the last month ▪ Thrombocytopenia (<50K) or coagulopathy (PT > 18 seconds) ▪ End stage liver disease ▪ Active intracranial lesions/neoplasms ▪ Hypertensive urgency / emergency ▪ Post-operative bleeding concerns*	❑ **OTHER CONDITION** ▪ Immune mediated HIT ▪ Epidural analgesia with spinal catheter (current or planned)

*Scheduled return to OR within the next 24 hours *Major Ortho: 24 hours leeway
*Spinal cord or Ortho Spine: 7 days leeway *General Surgery, s/p transplant, s/p Trauma admission: 48 hours leeway

CROZER-KEYSTONE HEALTH SYSTEM

Adult VTE Prophylaxis
Assessment and Order Sheet

PLEASE ADDRESS DVT ASSESS/ORDERS

VTE prophylaxis orders contained on specialty preprinted order sheets may be utilized in lieu of this order sheet

Nursing to be completed after admission screening

- ☐ No risk identified; no Sequential Compression Device placed
- ☐ Sequential Compression Device initiated per nursing admission screening
- ☐ Sequential Compression Device initiated per orders/protocol
- ☐ Patient currently receiving prophylaxis
- ☐ Unable to initiate. Reason _____

_____RN/LPN Date/Time_____

VTE Risk Factors (see back for recommendations)

Low Risk Factors	Moderate/High Risk Factors	Very High Risk Factors
Prophylaxis Should Be Considered Based on Number of Risk Factors	***Patient Should Receive Prophylaxis***	***Patient Should Receive Chemical Prophylaxis and SCD's***
• Leg swelling, ulcers, varicose veins • Pregnancy or postpartum less than one month • Hormonal Therapy • Inflammatory Bowel Disease • Obesity (greater than 30% over BMI) • Family history of VTE • Minor Surgery/Anesthesia time less than one hour, except GYN (see Moderate Risk)	• Congestive Heart Failure or AMI • Sepsis • Malignancy and/or chemotherapy • Hypercoagulable Syndrome • Nephrotic Syndrome • Respiratory Failure/COPD • Anticipated bed confinement/ immobilization greater than 24 hrs • Major surgery/Anesthesia time greater than one hour • GYN surgery, age greater than 40 and surgery time greater than 30 minutes • Previous history of VTE • Age greater than 60 years	• Critical Care Admission • Hip or knee arthroplasty • Hip, pelvic or leg fracture • Trauma or spinal cord injury • Stroke with paresis

VTE PROPHYLAXIS ORDERS to be completed on first visit or when patient transfers to higher level of care or has surgery (see back for recommendations)

Indicate Patient Risk:

☐ **Low Risk**	☐ **Moderate/ High Risk**	☐ **Very High Risk**
0 – 1 Low Risk Factors Prophylaxis Not Indicated	2-3 Low Risk Factors or 1 Moderate/High Risk Factor	4 or More Low Risk Factors or 2 or More Moderate/High Risk or 1 or More Very High Risk Factors

Check Appropriate Orders:

- ☐ Heparin 5,000 units subcutaneously every 8 hours
- ☐ Enoxaparin (Lovenox) 40 mg subcutaneously daily (if CrCl is greater than 30 ml/min)
- ☐ Enoxaparin (Lovenox) 30 mg subcutaneously daily (if CrCl is between 15 - 30 ml/min)
- ☐ Warfarin (Coumadin) (goal INR 2-3) give _____ mg orally tonight at 1800; draw INR at _____
- ☐ Other: _____
- ☐ Institute SCD's only Reason: ☐ Patient at risk for bleeding ☐ Other: _____
- ☐ VTE Prophylaxis Contraindicated at this time. Reason: _____
- ☐ Yes ☐ No Continue SCDs placed during Nursing Screening Protocol
  - • Discontinue SCDs when patient is ambulating unassisted TID

Physician Signature: _____ Date/Time: _____

Form #433 Rev. 1/08

PLEASE ADDRESS
DVT ASSESS/ORDERS

Venous Thromboembolism Prophylaxis Recommendations for Medical/Surgery Patients

Instructions for Use:

1) Select specific Medical/Surgery Services patient category
2) In surgical patient, recommendations below are usually instituted peri-operatively. Prior to surgery, it is often appropriate to use risk assessment table for medical patients to determine appropriate pre-op prophylaxis.
3) From categories below select prophylaxis treatment and complete corresponding order on front of order sheet.

General Surgery Patients (Includes Critical Care)	Low Risk	• No prophylaxis other than early ambulation
	Moderate Risk and High Risk	• Heparin 5000 units subcutaneous every 8 hours starting after surgery – OR – • Enoxaparin (Lovenox) 40 mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily*
	Very High Risk	• Enoxaparin (Lovenox) 40 mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily* **and** in combination with pneumatic compression device – OR – • Heparin 5000 units subcutaneous every 8 hours starting after surgery **and** in combination with pneumatic compression device

***Abdominal Surgery: start 2 hours prior to surgery**

Orthopedic Surgery Patients		**Operative Patients**
	Hip Surgery	• Enoxaparin (Lovenox) 40 mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily; start 12 hours prior to surgery – OR – • Enoxaparin (Lovenox) 30 mg subcutaneous every 12 hours (30 mg daily if CrCl 15 - 30 mL/min); start 12 – 24 hours after surgery if hemostasis is established – OR – • Fondaparinux (Arixtra) 2.5 mg subcutaneous daily (contraindicated if CrCl less than 30 mL/min); start 8 hours after surgery *(check formulary status)* • Warfarin (Coumadin) at 1800 hours daily, preoperatively and adjusted to INR range 2- 3 • Consider in combination with pneumatic compression device in addition to one of the above
	Knee Surgery	• Enoxaparin (Lovenox) 30 mg subcutaneous every 12 hours (30 mg daily if CrCl 15 - 30 mL/min); start 12 – 24 hours after surgery if hemostasis is established – OR – • Fondaparinux (Arixtra) 2.5 mg subcutaneous daily (contraindicated if CrCl less than 15 - 30 mL/min); start 8 hours after surgery *(check formulary status)* • Warfarin (Coumadin) at 1800 hours daily, preoperatively and adjusted to INR range 2- 3 • Consider in combination with pneumatic compression device in addition to one of the above
		Non-operative Patients
		• May follow guidelines for medical patients below, when appropriate

Neurosurgery		**Neurosurgery – Intracranial Procedure**
		• Pneumatic compression device
	High Risk Patients	• Consider use of pharmacologic prophylaxis (heparin or enoxaparin (Lovenox)) if risk of bleeding is not felt to be high.
	Moderate Risk and High Risk	• Enoxaparin (Lovenox) 30 mg every 12 hours (30 mg daily if CrCl 15 - 30 mL/min) if risk of bleeding acceptable – OR – • Pneumatic compression device if risk of bleeding high
	Very High Risk	• Enoxaparin (Lovenox) 30 mg every 12 hours (30 mg daily if CrCl 15 - 30 mL/min) **and** in combination with pneumatic compression device
		Rehabilitation Phase of Acute Spinal Cord Injury • Enoxaparin (Lovenox) 30 mg q 12 hours (30 mg daily if CrCl 15 - 30 mL/min) – OR – • Warfarin (Coumadin) at 1800 hours daily, preoperatively **and** adjusted to INR range 2- 3

Medical Patients (Includes Critical Care)	Low Risk	• No prophylaxis other than early ambulation
	Moderate Risk and High Risk	• Heparin 5000 units subcutaneous every 8 hours – OR – • Enoxaparin (Lovenox) 40mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily – OR – • Pneumatic compression device (if risk of bleeding high)
	Very High Risk	• Heparin 5000 units subcutaneous every 8 hours – OR – • Enoxaparin (Lovenox) 40 mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily • **CONSIDER** pneumatic compression device in addition to either heparin or enoxaparin (Lovenox)

Gynecologic Surgery Patients	Low Risk *	• No prophylaxis other than early and aggressive ambulation
	Moderate Risk and High Risk **	• Heparin 5000 units subcutaneous every 8 hours; start 2 hours prior to surgery – OR – • Enoxaparin (Lovenox) 40mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily; start 12 hours prior to surgery – OR – • Intermittent pneumatic compression device started just before surgery
	Very High Risk ***	• Heparin 5000 units subcutaneous every 8 hours; start 2 hours prior to surgery – OR – • Enoxaparin (Lovenox) 40mg (30 mg if CrCl 15 - 30 mL/min) subcutaneous daily; start 12 hours prior to surgery – OR – • Heparin or enoxaparin (Lovenox) with Intermittent pneumatic compression device
Low risk: *	Surgery less than 30 minutes in patient below 40 years with no additional risk factors	
Moderate Risk: **	Surgery less than 30 minutes in patients with additional risk factors; surgery less than 30 minutes in patients 40-60 years with no additional risk factors; Major surgery in patients less than 40 with no additional risk factors	
High Risk: **	Surgery less than 30 minutes in patients over 60 years or with additional risk factors, major surgery in patients over 40 years with additional risk factors	
Very High Risk: ***	Major surgery in patients older than 60 years plus prior VTE, cancer, or hypercoaguable state	

The following recommendations are derived from the references listed below and represent consensus guidelines for the groups of patients. The physician must make decisions about VTE prophylaxis for individual patients by combining knowledge of the literature with knowledge of patient-specific factors and clinical judgment. As this is a rapidly evolving field, these guidelines are not intended to replace evidence-based clinical practice cited in current literature. **References:**

- Committee on Practice Bulletins—Gynecology, American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 84: Prevention of deep vein thrombosis and pulmonary embolism. Obstet Gynecol. 2007 Aug;110(2 Pt 1):429-40.
- Geerts WH, Pineo GF, Heit JA, Bergqvist D, Lassen MR, Colwell CW, Ray JG. Prevention of venous thromboembolism: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest. 2004 Sep;126(3 Suppl):338S-400S.
- Geerts W, Selby R. Prevention of venous thromboembolism in the ICU. Chest. 2003 Dec;124(6 Suppl):357S-363S.
- Lovenox [package insert]. sanofi-aventis U.S. LLC., Bridgewater, NJ, 08807, May 2007.

Hartford Hospital

D Sobieraj. Development and Implementation of a program to assess medical patients' need for venous thromboembolism prophylaxis. Am J Health-Syst Pharm; 9/15/2008, Vol. 65 (18), p1755-1760.

Venous Thromboembolism (VTE) Prophylaxis Risk-Assessment Tool

Patient: Medical Record #: Admission Date:

Please check any of the following risk factors the patient may have:

o Age >40
o Nephrotic syndrome
o Active collagen-vascular disease
o Obesity
o Congestive heart failure
o Order for bed rest
o Chronic lung disease
o Physical limitation to transfer or gait
o CVC or PICC
o Previous thromboembolic event
o Estrogen (HRT/OCP)
o Respiratory failure
o Hypercoagulable state
o Severe infection (pneumonia, bacteremia)
o Impaired cognitive status
o Smoking
o Inflammatory bowel disease
o Thrombophilia
o Intensive care unit
o Use of physical or chemical restraint
o Ischemic, nonhemorrhagic stroke
o Varicose veins
o Malignancy

Please select any contraindications to prophylaxis:

o Platelets <100,000
o Active bleeding (GI or otherwise)
o Hypersensitivity
o Documented uncontrolled hypertension
o Recent CNS surgery
o History of heparin-induced thrombocytopenia
o Other

Please select one of the following:

o Patient received VTE prophylaxis
o Heparin 5000 units s.c. every 8 hours
o Enoxaparin 40 units s.c. daily
o Other _____
o Dalteparin 5000 units s.c. daily
o Intermittent pneumatic compression
o Graduated compression stockings
o Patient did not receive prophylaxis and qualifies for prophylaxis
o Patient did not receive prophylaxis, did not qualify for prophylaxis

V Gilpin. Cost Savings in quality improvement project to prevent venous thromboembolism. J Vasc Nurs 2007; 25:70-74.

Venous Thromboembolism (VTE)
PROPHYLAXIS ASSESSMENT AND ORDER FORM

☐ VTE risk has been assessed and current VTE orders written *(Proceed to Physician Signature)*

☐ See preprinted orders for VTE Prophylaxis

Please check all pertinent factors and add risk factor scores

- ❑ (1) Age 40 to 60 years
- ❑ (1) Leg swelling, ulcers, varicose veins
- ❑ (1) Pregnancy or postpartum < 1 month
- ❑ (1) Estrogen therapy
- ❑ (1) Nephrotic Syndrome
- ❑ (1) Inflammatory bowel disease
- ❑ (1) Acute Infection other then sepsis
- ❑ (1) Obesity (greater 20% over ideal body weight)
- ❑ (1) Smoker
- ❑ (1) Central Venous Catheterization
- ❑ (1) Family history of VTE
- ❑ (1) Minor surgery / anesthesia time < 1 hour
- ❑ (2) Acute respiratory failure/severe COPD
- ❑ (2) Age over 60 years
- ❑ (2) Major surgery / anesthesia time > 1 hours
- ❑ (2) Anticipated bed confinement or immobilization > 24 hours
- ❑ (3) Malignancy and / or chemotherapy
- ❑ (3) Sepsis
- ❑ (3) Documented history of VTE
- ❑ (3) Congestive heart failure or myocardial infarction
- ❑ (3) Hypercoagulable syndrome
- ❑ (5) Elective knee or hip arthroplasty
- ❑ (5) Hip, pelvis or leg fracture
- ❑ (5) Major trauma or spinal cord injury
- ❑ (5) Stroke with paralysis
- ❑ ( ) Other

TOTAL RISK FACTOR SCORE: _____

❑ **Low risk**	❑ **Moderate risk**	❑ **High risk**	❑ **Very high risk**
Score of 1 or less	Score of 2	Score of 3 or 4	Score of 5+
(Risk proximal DVT 0.4%)	(Risk proximal DVT 2-4%)	(Risk proximal DVT 4-8%)	(Risk proximal DVT 10-20%+)
No prophylaxis needed	***Prophylaxis needed***	***Prophylaxis needed***	***Prophylaxis needed***

Relative contraindications to anticoagulation:

Prior history of cerebral, GI, or, GU hemorrhage
Proliferative retinopathy
Coagulopathy
Thrombocytopenia
Intracranial neoplasms

Absolute contraindications to anticoagulation:

Active hemorrhage
Major solid organ injury
Intracranial hemorrhage

IVC filter insertion is recommended if proximal DVT is demonstrated, and anticoagulation is contraindicated.

PLEASE SEE BACK OF FORM FOR VTE PROPHYLAXIS RECOMMENDATIONS FOR SPECIFIC MEDICAL OR SURGICAL SERVICES

ORDER (S) FOR VTE PROPHYLAXIS

- ❑ No prophylaxis needed
- ❑ Standard Unfractionated Heparin 5000 units subcutaneous (*circle one)* : every 8 hours (*or)* every 12 hours
- ❑ Calf Pneumatic Compression Device
  - ❑ Contraindication to calf device; utilize Foot Pneumatic Compression Device
- ❑ Enoxaparin (Lovenox®)* (*circle one):*

  30 mg subcutaneous every 12 hours (or) 30 mg subcutaneous daily (or) 40 mg subcutaneous daily
- ❑ Warfarin (Coumadin®) per physician order
- ❑ Early mobilization *(circle one):* assist to ambulate *(or)* Physical therapy referral for ambulation

*See back of form for guidelines and cautions for enoxaparin use

Physician Signature: _____ Date: _____

1. D Sobieraj. Development and Implementation of a program to assess medical patients' need for venous thromboembolism prophylaxis. Am J Health-Syst Pharm; 9/15/2008, Vol. 65 (18), p1755-1760. PMID: 18769004

   PURPOSE: The development and implementation of a program to assess medical patients' need for venous thromboembolism (VTE) prophylaxis are described.
   SUMMARY: The pharmacy services, medicine, and information services departments at Hartford Hospital collaborated to institute a program to improve VTE prophylaxis in medical patients. After baseline VTE prophylaxis compliance was assessed, the departments developed an intervention consisting of a message to be displayed to providers using the institution's computerized prescriber-order-entry (CPOE) system as a reminder to assess the current patient for VTE risk factors and the need for VTE prophylaxis. The message was displayed when a patient met predefined criteria for VTE risk factors. The message would not continue to be displayed once either mechanical or pharmacologic VTE prophylaxis was an active order on the patient's medication profile. Extensive education about the program was provided to hospital staff, pharmacists, physicians, nurse practitioners, physician assistants, and nurses. The program was implemented in March 2007 on a pilot medical floor. To measure the impact of the program, a retrospective chart review was conducted using the risk-assessment tool developed. The VTE prophylaxis compliance rate post-implementation was 93%, compared with 49% preimplementation of the program ($p < 0.001$). Before the program, only 25% of patients with a contraindication to pharmacologic therapy received mechanical prophylaxis, compared with 100% after program implementation.
   CONCLUSION: Use of message alerts through a CPOE system and an interdisciplinary team approach to assess patients' risk for VTE appeared to improve the use of VTE prophylaxis in medical patients.

2. V Gilpin. Cost Savings in quality improvement project to prevent venous thromboembolism. J Vasc Nurs 2007; 25:70-74. PMID: 18036491

   At the University of Missouri Health Care, a VTE form was developed to define patient-specific risk categories, relative and absolute contraindications to anticoagulation, and recommended VTE treatments. Physicians and ARNPs were made aware of the VTE QI project and were educated on the importance of prophylaxis. Clinic nurses were also educated to include the form in admission packets. The project was implemented in December of 2003, and by December 2005 improved use of calf PCDs vs foot pumps resulted in an annual institutional cost savings of $175,975 for 3 yrs. The use/cost of LMWH use also increased to $141,833/yr. With all taken into account, the hospital VTE prophylaxis rate improved up to 82% and resulted in an annual cost of $34,142/yr.

3. D Pham, et al. Evaluating the appropriateness of thromboprophylaxis in an acute care setting using a computerized reminder, through order-entry system. Int J Clin Pract. 2008 Jan;62(1):134-7. PMID: 17892471

   AIMS: Evidence suggests that thromboprophylaxis is still significantly underutilised across the United States despite its relationship with morbidity, mortality and resource expenditure. Previous randomised trials that have incorporated computerised reminders, through order-entry systems, have resulted in increased rates of thromboprophylaxis and lower incidences of clinically diagnosed deep-vein thrombosis or pulmonary embolism. The primary purpose of this prospective, observational study is to evaluate the use and appropriateness of preset

computerized thromboprophylaxis regimens for patients in a major county metropolitan hospital over a 1-month period by evaluating the proportion of patients actually receiving recommended thromboprophylaxis according to established hospital guidelines.
METHODS: This prospective, observational study was conducted in a large county hospital that recently established an evidence-based routine computerised policy to decrease risk of venous thromboembolism. Physicians, residents, medical interns, medical students, pharmacy students, and nurses were the targets of the investigation. Data were randomly collected between 10 internal medicine teams from 10 October 2006 to 10 November 2006. Investigators completed one DVT/PE risk assessment form for each patient reviewed and compared this to actual prescribed therapy to determine appropriateness of therapy.
RESULTS: Pharmacological or non-pharmacological thromboprophylaxis was administered to 100% of patients evaluated. Eighty-six patients received recommended DVT/PE prophylaxis based on established hospital guidelines.
DISCUSSION: Reported values seem to indicate that computerized reminders are capable of providing venous thromboprophylaxis for medically ill (non-surgical) patients relative to published norms.
CONCLUSION: Results of this observational study reinforces the evidence that computerized, reminders, through order-entry systems might increase the delivery of thromboprophylaxis for hospitalized patients.

4. N Kucher, et al. Electronic alerts to prevent venous thromboembolism among hospitalized patients. N Engl J Med. 2005 Mar 10;352(10):969-77. PMID: 15758007

   BACKGROUND: Prophylaxis against deep-vein thrombosis in hospitalized patients remains underused. We hypothesized that the use of a computer-alert program to encourage prophylaxis might reduce the frequency of deep-vein thrombosis among high-risk hospitalized patients.
   METHODS: We developed a computer program linked to the patient database to identify consecutive hospitalized patients at risk for deep-vein thrombosis in the absence of prophylaxis. The program used medical-record numbers to randomly assign 1255 eligible patients to an intervention group, in which the responsible physician was alerted to a patient's risk of deep-vein thrombosis, and 1251 patients to a control group, in which no alert was issued. The physician was required to acknowledge the alert and could then withhold or order prophylaxis, including graduated compression stockings, pneumatic compression boots, unfractionated heparin, low-molecular-weight heparin, or warfarin. The primary end point was clinically diagnosed, objectively confirmed deep-vein thrombosis or pulmonary embolism at 90 days.
   RESULTS: More patients in the intervention group than in the control group received mechanical prophylaxis (10.0 percent vs. 1.5 percent, P<0.001) or pharmacologic prophylaxis (23.6 percent vs. 13.0 percent, P<0.001). The primary end point occurred in 61 patients (4.9 percent) in the intervention group, as compared with 103 (8.2 percent) in the control group; the Kaplan-Meier estimates of the likelihood of freedom from deep-vein thrombosis or pulmonary embolism at 90 days were 94.1 percent (95 percent confidence interval, 92.5 to 95.4 percent) and 90.6 percent (95 percent confidence interval, 88.7 to 92.2 percent), respectively (P<0.001). The computer alert reduced the risk of deep-vein thrombosis or pulmonary embolism at 90 days by 41 percent (hazard ratio, 0.59; 95 percent confidence interval, 0.43 to 0.81; P=0.001).
   CONCLUSIONS: The institution of a computer-alert program increased physicians' use of prophylaxis and markedly reduced the rates of deep-vein thrombosis and pulmonary embolism among hospitalized patients at risk.