



## **Order Set: VTE Prophylaxis for the Medically Ill Patient**

### **About This Order Set**

As leaders in the field of anticoagulant therapy, the Anticoagulation Forum (AC Forum) has created the following Order Set template on VTE prophylaxis in the medically ill. This Order Set incorporates both evidence-based data and consensus opinion to provide practical guidance on a range of real-world clinical situations that may be encountered by clinicians managing patients in the acute care setting. The AC Forum created this resource to guide facilities in the creation, implementation, and maintenance of order sets for their own facilities.

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Further information and handouts are available at the AC Forum website at [www.acforum.org](http://www.acforum.org).

VTE Prophylaxis for the Medically Ill Patient	Action
<p><b>Administration</b></p> <p><b>DOCUMENT PURPOSE</b></p> <p>This order set is intended to facilitate standardized venous thromboembolism (VTE) prophylaxis risk stratification of hospitalized medically ill patients for:</p> <ul style="list-style-type: none"> <li>• Prevention of hospital-acquired VTE</li> <li>• Anticoagulant prophylaxis-associated bleeding</li> <li>• Prescription of risk-appropriate VTE prophylaxis</li> </ul> <hr/> <p><b>VTE Risk Assessment</b></p> <p>See appendices for risk assessment tools (IMPROVE, Padua, Caprini) to assist with VTE risk assessment.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> High or moderate risk of VTE</li> <li><input type="checkbox"/> Low risk of VTE</li> </ul> <p><i>If the patient is low risk for VTE per your hospital's Risk Assessment Model and is not anticipated to experience severe immobility, then no VTE prophylaxis (pharmacological or mechanical) is necessary. Reassess your patients' VTE risk status as clinically indicated.</i></p> <p><b>LOW VTE RISK BASED ON RISK ASSESSMENT SCORES</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Improve 4 Score: 0-1</li> <li><input type="checkbox"/> Improve 7 Score: 0-1</li> <li><input type="checkbox"/> Padua Score: 0-3</li> <li><input type="checkbox"/> Caprini Score: 0-1</li> </ul> <p><b>HIGH OR MODERATE VTE RISK BASED ON RISK ASSESSMENT SCORES</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Improve 4 Score <math>\geq 2</math></li> <li><input type="checkbox"/> Improve 7 Score: <math>\geq 2</math></li> <li><input type="checkbox"/> Padua Score: <math>\geq 4</math></li> <li><input type="checkbox"/> Caprini Score: <math>\geq 2</math></li> </ul>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Reference Document Only © 2021 ACFForum. All rights reserved.</p>



VTE Prophylaxis for the Medically Ill Patient

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Bleeding Risk Assessment

IMPROVE Bleeding Risk Factor		Points
<input type="checkbox"/>	Moderate renal failure (GFR 30-59)	1.0
<input type="checkbox"/>	Sex: Male	1.0
<input type="checkbox"/>	Age: 40 – 84	1.5
<input type="checkbox"/>	Current cancer	2.0
<input type="checkbox"/>	Rheumatic diseases	2.0
<input type="checkbox"/>	CV catheter	2.0
<input type="checkbox"/>	ICU / CCU stay	2.5
<input type="checkbox"/>	Severe renal failure (GFR < 30 ml/min)	2.5
<input type="checkbox"/>	Hepatic failure (INR > 1.5)	2.5
<input type="checkbox"/>	Age ≥ 85	3.5
<input type="checkbox"/>	Admission platelets < 50 x 10 <sup>9</sup>	4.0
<input type="checkbox"/>	Bleeding prior 3 months	4.0
<input type="checkbox"/>	Gastro-duodenal ulcer	4.5
<b>Total Score...</b>		

Scores ≥ 7 indicate higher bleeding risk and caution with pharmacologic prophylaxis.  
Reassess candidacy for anticoagulant or mechanical prophylaxis as clinically indicated.

Baseline Information

ASSESSMENTS

- aPTT\_\_\_\_\_
- Prothrombin time (PT) \_\_\_\_\_
- HGB\_\_\_\_\_
- PLTS\_\_\_\_\_     AST\_\_\_\_\_     ALT\_\_\_\_\_

RENAL FUNCTION

- Calculate estimated CrCl using the Cockcroft-Gault equation

$$\frac{[(140 - \text{Age}) \times \text{actual weight in kg}]}{[72 \times \text{serum creatinine}]} \times 0.85 \text{ if female}$$

- |   |
|---|
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Age: _____</li> <li><input type="checkbox"/> Actual Body Weight: _____ (kg)</li> <li><input type="checkbox"/> Gender: _____</li> <li><input type="checkbox"/> Serum Creatinine: _____ (mg/dL)<br/>*monitor renal function during hospital stay</li> <li><input type="checkbox"/> Estimated CrCL: _____ (mL/minute)</li> </ul> |
|---|

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VTE Prophylaxis for the Medically Ill Patient	Action
<p><b>Risk-Appropriate VTE Prophylaxis Orders</b></p> <p>Review inclusion criteria to determine if your patient may benefit from in-hospital and extended prophylaxis with rivaroxaban. For patients at high risk of VTE, and low risk for bleeding, consider extended prophylaxis with rivaroxaban for up to 39 days. If patients do not meet criteria, likely avoid use of rivaroxaban and post-discharge prophylaxis.</p> <p><b>CRITERIA FOR ORAL EXTENDED PROPHYLAXIS IN ACUTELY ILL MEDICAL PATIENTS</b></p> <ul style="list-style-type: none"> <li>• No invasive procedures are planned in the next 30 days</li> <li>• No contraindications to anticoagulant prophylaxis</li> <li>• Creatinine clearance <math>\geq 30</math> ml/min*</li> <li>• Not taking concomitant therapy with a known combined P-gp and strong CYP3A4 inhibitor (e.g., ketoconazole, ritonavir) or inducer (e.g., carbamazepine, phenytoin, rifampin)</li> <li>• Non-pregnant or breastfeeding</li> <li>• Not currently on dual antiplatelet therapy (DAPT)</li> <li>• No active bleeding within last 3 months</li> <li>• No gastroduodenal ulcers within the last 3 months</li> <li>• No history of bronchiectasis, pulmonary cavitation, or pulmonary hemorrhage</li> <li>• No active cancer (undergoing, acute, in-hospital cancer treatment)</li> <li>• Confirmation of insurance coverage of rivaroxaban for duration of prophylactic regimen and hospitalized with acute NYHA Class III/IV heart failure, respiratory failure, acute infectious disease or rheumatic illness or ischemic stroke with lower extremity paresis, and severe immobility (bed or chair bound 100% of the day) for at least 1 day and moderate immobility (bed or chair bound 50% of day) for at least 3 days</li> </ul> <p><b>AND ALL OF THE FOLLOWING:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Appropriate hospitalization condition</li> <li><input type="checkbox"/> Age &gt;60</li> <li><input type="checkbox"/> Age 40-59 and a prior VTE or active cancer and one additional risk factor:</li> </ul> <p><b>RISK FACTORS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Previous VTE or superficial vein thrombosis</li> <li><input type="checkbox"/> History of NYHA Class III or IV HF</li> <li><input type="checkbox"/> Concomitant acute infection</li> <li><input type="checkbox"/> Obesity (BMI &gt;35)</li> <li><input type="checkbox"/> History of cancer</li> <li><input type="checkbox"/> Inherited or acquired thrombophilia</li> <li><input type="checkbox"/> Current use of erythropoiesis-stimulating agent</li> <li><input type="checkbox"/> Hormone therapy</li> </ul>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Reference Document Only © 2021 ACForum. All rights reserved.</p>



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Risk-Appropriate VTE Prophylaxis Orders Continued

VTE PROPHYLAXIS OPTIONS (SELECT ONE):

**Oral (if patient meets extended prophylaxis criteria)**

If CRCL  $\geq$  30mL/min:

- Rivaroxaban 10 mg PO once daily for 31-39 days total

For CRCL <30 mL/min:

**AVOID** Rivaroxaban\*

**Parenteral (preferred for non-extended prophylaxis)**

**Select one option based on patient characteristics and drug availability (Agents are in alphabetical order)**

**Enoxaparin**

- Standard Dosing: 40mg SC once daily
- CrCL 20-30mL/min: 30mg SC once daily
- CrCl <20ml/min: **AVOID USE**

*Obese (BMI > 40kg/m<sup>2</sup>): (Evidence limited; Select option per clinical judgement)*

- 40mg SC BID
- 60mg SQ BID (some evidence among BMI >47kg/m<sup>2</sup>)
- 0.5mg/kg SQ QD

**Dalteparin**

- Standard Dosing: 5000u SQ once daily
- CrCl<30mL/min: **AVOID USE**
- Obese (BMI >40kg/m<sup>2</sup>): 7500u SQ once daily

**Fondaparinux**

- Standard Dosing (wt  $\geq$  50kg): 2.5mg SQ once daily
- Wt <50kg or CrCL<30mL/min: **AVOID USE**

**Unfractionated Heparin (UFH)**

- Standard Dosing: 5000u SC every 8 or 12 hours
- Obese (BMI > 40kg/m<sup>2</sup>): 7500u SQ every 8 or 12 hours

\*Rivaroxaban is FDA-approved for this indication in patients with CrCl  $\geq$ 15mL/min, but based on limited evidence. Utilize caution in this population.

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**VTE Prophylaxis for the Medically Ill Patient** Action

**Appendixes: VTE Risk Assessments**

**IMPROVE: 7- ELEMENT IN-HOSPITAL RISK MODEL**

**VTE RISK FACTORS**

- |  |   |   |
|--|---|---|
| <p><b>3 POINTS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Previous VTE</li> </ul> | <p><b>2 POINTS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Thrombophilia</li> <li><input type="checkbox"/> Lower limb paralysis</li> <li><input type="checkbox"/> Current cancer</li> </ul> | <p><b>1 POINT</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Age &gt; 60 years</li> <li><input type="checkbox"/> Immobilization ≥ 7 days</li> <li><input type="checkbox"/> ICU / CCU stay</li> </ul> |
|--|---|---|

**IMPROVE 7 VTE Score:**

Scores 0-6 are low risk with no indication for prophylaxis  
Scores ≥ 7 are high risk and warrant prophylaxis

**IMPROVE: 4-ELEMENT IN-HOSPITAL RISK MODEL**

**VTE RISK FACTORS**

- |  |  |  |
|--|--|--|
| <p><b>3 POINTS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Previous VTE</li> </ul> | <p><b>2 POINTS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Thrombophilia</li> <li><input type="checkbox"/> Current cancer</li> </ul> | <p><b>1 POINT</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Age &gt; 60 years</li> </ul> |
|--|--|--|

**IMPROVE 4 VTE Score:**

Scores 0-2 are low risk with no indication for prophylaxis  
Scores ≥ 2 are high risk and warrant prophylaxis

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Appendixes: VTE Risk Assessments Continued...

**CAPRINI SCORE**

*Below depicts the different weighted points for the risk factors included in the Caprini Score:*

**5 POINTS**

- |  |   |
|--|---|
| <input type="checkbox"/> Stroke (in the previous month)      | <input type="checkbox"/> Elective arthroplasty                        |
| <input type="checkbox"/> Fracture of the hip, pelvis, or leg | <input type="checkbox"/> Acute spinal cord injury (in the last month) |

**3 POINTS**

- |  |   |
|--|---|
| <input type="checkbox"/> Age $\geq$ 75 years             | <input type="checkbox"/> Lupus anticoagulants                       |
| <input type="checkbox"/> Prior episode of VTE            | <input type="checkbox"/> Anticardiolipin antibodies                 |
| <input type="checkbox"/> Positive family history for VTE | <input type="checkbox"/> High homocysteine in the blood             |
| <input type="checkbox"/> Prothrombin 20210A              | <input type="checkbox"/> Heparin induced thrombocytopenia           |
| <input type="checkbox"/> Factor V Leiden                 | <input type="checkbox"/> Other congenital or acquired thrombophilia |

**2 POINTS**

- |   |   |
|---|---|
| <input type="checkbox"/> Age: 61 – 74 years                           | <input type="checkbox"/> Cancer                           |
| <input type="checkbox"/> Arthroscopic surgery                         | <input type="checkbox"/> Plaster cast                     |
| <input type="checkbox"/> Laparoscopy lasting more than 45 minutes     | <input type="checkbox"/> Bed bound for more than 72 hours |
| <input type="checkbox"/> General surgery lasting more than 45 minutes | <input type="checkbox"/> Central venous access            |

**1 POINT**

- |  |   |
|--|---|
| <input type="checkbox"/> Age 41 – 60 years                 | <input type="checkbox"/> Sepsis (in the previous month)                                 |
| <input type="checkbox"/> BMI > 25 kg/m <sup>2</sup>        | <input type="checkbox"/> Serious lung disease such as pneumonia (in the previous month) |
| <input type="checkbox"/> Minor surgery                     | <input type="checkbox"/> Abnormal pulmonary function test                               |
| <input type="checkbox"/> Edema in the lower extremities    | <input type="checkbox"/> Acute myocardial infarction                                    |
| <input type="checkbox"/> Varicose veins                    | <input type="checkbox"/> Congestive heart failure (in the previous month)               |
| <input type="checkbox"/> Pregnancy                         | <input type="checkbox"/> Bed rest   |
| <input type="checkbox"/> Post-partum                       | <input type="checkbox"/> Inflammatory bowel disease                                     |
| <input type="checkbox"/> Oral contraceptive                |   |
| <input type="checkbox"/> Hormonal therapy                  |   |
| <input type="checkbox"/> Unexplained or recurrent abortion |   |

**Note:** The Caprini score is calculated by adding the scores of all factors present in the patient.

The Caprini score is interpreted in the following way:

Total score of **0-1**: Low risk of VTE

Total score of  **$\geq$ 2**: High/moderate risk of VTE

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Appendixes: VTE Risk Assessments Continued...

**PADUA PREDICTION SCORE**

**3 POINTS**

- Active cancer
- Previous VTE
- Reduced mobility
- Thrombophilic condition

*Active Cancer:* local or distant metastases and with chemo or radiotherapy in previous 6 months

*Mobility:* anticipated bed rest with bathroom privileges for at least 3 days

**2 POINTS**

- Recent (<1 month) trauma/surgery

**1 POINT**

- Age  $\geq$  70 years
- Heart or respiratory failure
- Acute myocardial infarction or ischemic stroke
- Acute infection or rheumatologic disorder
- BMI  $\geq$  30
- Ongoing hormonal treatment

**Padua Scores:**

Scores 0-3 are low risk and do not warrant prophylaxis.

Scores  $\geq$ 4 are high risk for VTE and subsequent complications; recommendation for thromboprophylaxis.

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