The information contained in this protocol should never be used as a substitute for clinical judgment.

The clinician and the patient need to develop an individual treatment plan that is tailored to the specific needs and circumstances of the patient.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREVENTION</td>
<td>1</td>
</tr>
<tr>
<td>RISK ASSESSMENT</td>
<td>2-3</td>
</tr>
<tr>
<td>PROPHYLACTIC TREATMENT</td>
<td>3-4</td>
</tr>
<tr>
<td>EVALUATION OF THROMBOTIC DISEASE ETIOLOGY</td>
<td>5</td>
</tr>
<tr>
<td>VENOUS</td>
<td>6</td>
</tr>
<tr>
<td>ARTERIAL</td>
<td>7</td>
</tr>
<tr>
<td>ACUTE/CHRONIC TREATMENT</td>
<td>8</td>
</tr>
<tr>
<td>INPATIENT</td>
<td>9-19</td>
</tr>
<tr>
<td>OUTPATIENT</td>
<td>20-29</td>
</tr>
<tr>
<td>MANAGEMENT OF PATIENTS WITH HYPERCOAGUABLE STATE</td>
<td>30</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>31-38</td>
</tr>
<tr>
<td>LENGTH OF TREATMENT</td>
<td>39-41</td>
</tr>
<tr>
<td>BRIDGING</td>
<td>42-50</td>
</tr>
<tr>
<td>VITAMIN K ADMINISTRATION</td>
<td>51-52</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>53-55</td>
</tr>
</tbody>
</table>
Prevention
RISK FACTORS

Patient is High Risk if they have 2 or more risk factors

- Age greater than 40
- Inflammatory bowel disease (Crohn's, Ulcerative Colitis)
- Leg edema, ulcers or venous stasis
- Infection (i.e., Pneumonia, cellulitis, etc.)
- Chronic lung disease
- I strogen use (birth control, hormone replacement
- Pelvic/Abdominal surgery or total joint replacement last 3 months
- History of pelvic or long bone fracture within 6 months
- General Anesthesia greater than 30-minutes
- Prolonged immobility (Bedrest greater than 72-hours)
- Trauma (abdomen, pelvis, hip & legs)
- Collagen vascular/rheumatologic diseases (i.e., lupus, sarcoidosis, scleroderma, rheumatoid arthritis)
- Selective Estrogen Receptor Modular therapy (i.e., Raloxifene, tamoxifen)

Patient is High Risk if they have 1 or more risk factors

- Prior history of DVT/PE or thrombophilia
- Cancer treatment within 6 months of treatment
- Paralysis (para/quadriplegia/lumiparesis)


<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Interventions</th>
<th>Exclusions from Pharmacologic Therapy</th>
<th>Contraindications to SCD (sequential compression device)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>Early ambulation</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>High Risk</td>
<td>Pharmacological</td>
<td>Active bleeding</td>
<td>C/I, IIT, Leg ulcers, Skin graft, Decrease leg circulation</td>
</tr>
<tr>
<td></td>
<td>- Heparin SubQ or</td>
<td></td>
<td>Fracture or wound</td>
</tr>
<tr>
<td></td>
<td>- Enoxaparin (Lovenox) SubQ or</td>
<td></td>
<td>Active Phlebitis in legs</td>
</tr>
<tr>
<td></td>
<td>- Arintra or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Warfarin INR 1.8 or greater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS = Pharmacologic with SCD's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A = Adjunct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- SCD's</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- TED Hose</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Foot Pumps</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date | Time | Risk Level | Interventions (see above) based on Risk level | Record Platelet Count and/or INR Baseline Ptt. Cl. | Nurse Signature

Call MD if: Risk Factors change from low to high; Baseline platelet count is less than 100,000 or decreases 50% or more, or contraindications no longer apply to the patient.

Carolina Medical Center NorthEast
920 Church St., North-Concord, NC 28025

DVT RISK ASSESSMENT

GEN0150 (MSQIC Appr. 10/14/08; Rev. 12/08) Nurses Notes

DOS: DOB: // Sex:
Age: Race: Serv.Type: Visit Type: Loc: Rm:
Attend. Phy:
Inclusions: Inpatient 18 years or older

Admission Risk Assessment: □ Low Risk □ High Risk (To be completed by RN)

Exclusions from Pharmacologic Therapy: (To be completed by MD)
□ Already receiving systemic therapeutic anticoagulation (INR 1.8 or greater on warfarin)
□ Comfort care/palliative care, no prophylaxis indicated
□ Epidural in place

Nonpharmacologic Therapy:
□ Ambulation
□ SCDs
□ TED Hose □ Thigh □ Knee

Pharmacologic Therapy:
□ Heparin 5000 units Subq q 8 hrs Per Protocol

□ Heparin 5000 units Subq q 12 hrs Per Protocol (if low risk surgical procedure per CHEST Guidelines 2008)

□ Enoxaparin (Lovenox) 40mg Subq daily Per Protocol (30 mg daily if creatinine clearance less than 30mL/min – pharmacy will adjust)

□ Fondaparinux (Arixtra) 2.5 mg Subq once daily. (Do not use in patients with creatinine clearance less than 30 mL/min or with weight less than 50 kg.)
□ Other ____________________________

Physician Signature_________________________________________ Date______ Time______
Scanned to pharmacy by_______________________________________ Date______ Time______
Transcribed by_______________________________________________ Date______ Time______
Verified by_________________________________________________ Date______ Time______

Carolinias Medical Center
NorthEast
920 Church St., North-Concord, NC 28025

DVT/PE PROPHYLAXIS PREPRINTED ORDERS
ORD0115 (MSQIC Appr. 10/14/08; Rev. 7/09) Physician Orders

DOS: DOB: // Sex: Age: Race: Serv.Type: Visit Type: Loc: Rm: Attend. Phy:
Labs:
- ABC, aPTT, PT, serum creatinine prior to Heparin or Enoxaparin administration.
- Platelet Count on day #2 with AM labs, then every other day for 14 days then discontinue. Discontinue
  platelet monitoring when Heparin or Enoxaparin is stopped.
- Guaiac stool prior to initiation of Enoxaparin (only if dose greater than 40mg). Call MD if positive.

Notify prescribing MD IF:
- Bleeding/hematoma and/or pulse greater than 120.
- Platelet count less than 100,000 OR greater than 50% decrease from baseline.
- If Creatinine Clearance drops below 30ml/min.

Transcribed by: ____________________________ Date: _________ Time: _________

Verified by: ______________________________ Date: _________ Time: _________
Evaluation of
Thrombotic Disease Etiology
Thrombotic Disease

Arterial

See Page 7

Venous

1. First thromboembolic event occurring prior to age 50
   or
2. History of recurrent thrombotic episodes
   or
3. A first-degree relative with a documented venous thromboembolic event prior to age 50

No

Order:
- Lupus anticoagulant
- Anti-cardiolipin, IgG and IgM antibodies
- Anti Beta 2-glycoprotein I, IgG and IgM antibodies
- Activated protein C resistance-Reflex Factor V Leiden
- Factor II (prothrombin) G20210A mutation

Yes

Order:
- Lupus anticoagulant
- Anti-cardiolipin, IgG and IgM antibodies
- Anti Beta 2-glycoprotein I, IgG and IgM antibodies
- Activated Protein C resistance – Reflex Factor V Leiden
- Factor II (prothrombin) G20210A mutation
- Protein C, Functional
- Protein S, Functional
- Free and Total Protein S Antigen
- Antithrombin III Activity

Activated Protein C Resistance Present or Borderline

Order:
- Factor V Leiden genetic test
Arterial

Is significant arteriosclerosis present?

Yes → No further workup

No → Order TEE with bubble study

Evidence of embolism → No further workup

No evidence of embolism → Order:
- Homocysteine
- Lupus anticoagulant
- Anti-cardiolipin, IgG and IgM antibodies
- Anti Beta 2-glycoprotein I, IgG and IgM antibodies
- Factor VIII activity (at times when not actually ill).
- Fibrinogen activity (at time when not actually ill).

If these studies unremarkable consider:
- Protein C Activity
- Protein S Activity
- Free and Total Protein S Antigen
- Antithrombin Activity
Acute/Chronic Treatment
Inpatient Treatment
### FOCUS AREA

#### Problems/

#### Nursing Interventions

<table>
<thead>
<tr>
<th>Address potential/actual problems:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pain</strong></td>
</tr>
<tr>
<td>• Assess patient's pain level per routine</td>
</tr>
<tr>
<td>• Manage pain with analgesics as ordered</td>
</tr>
<tr>
<td>• Elevate leg with knee slightly flexed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extremity Swelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess extremity per routine, skin and nail bed color, skin temperature, edema, circulation/pulse, measurements</td>
</tr>
<tr>
<td>• Elevate leg with knee slightly flexed</td>
</tr>
<tr>
<td>• Bed rest</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess for signs of bleeding:</td>
</tr>
<tr>
<td>• bleeding gums, bruising</td>
</tr>
<tr>
<td>• decreased H&amp;H</td>
</tr>
<tr>
<td>• thrombocytopenia</td>
</tr>
<tr>
<td>• hypotension</td>
</tr>
<tr>
<td>• Guaiac stools</td>
</tr>
<tr>
<td>• If signs of bleeding noted, Notify MU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge Deficit Regarding:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment Plan</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruct patient on:</td>
</tr>
<tr>
<td>• Restricted activity/Bed rest</td>
</tr>
<tr>
<td>• Ambulation with assistance</td>
</tr>
<tr>
<td>• Fallsafety precautions</td>
</tr>
<tr>
<td>• Equipment, SCDs, antiembolism stockings</td>
</tr>
<tr>
<td>• Laboratory tests</td>
</tr>
<tr>
<td>• Goals of anticoagulant therapy</td>
</tr>
<tr>
<td>• Signs of bleeding</td>
</tr>
<tr>
<td>• Review Coumadin and food-related interactions</td>
</tr>
<tr>
<td>• Teach Leovox self-administration (video tape, return demonstration) if going home on Leovox</td>
</tr>
<tr>
<td>• Consult Case Management to arrange home care for Coumadin or Leovox management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Factor Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Using antiembolism stockings</td>
</tr>
<tr>
<td>• Avoid sitting/lying for long periods of time</td>
</tr>
<tr>
<td>• Stop smoking</td>
</tr>
<tr>
<td>• Control diabetes</td>
</tr>
<tr>
<td>• Avoid dehydration</td>
</tr>
<tr>
<td>• Alternatives to oral contraceptive use</td>
</tr>
<tr>
<td>• Frequent plantar fixation and dorsifixion</td>
</tr>
<tr>
<td>• Review signs/symptoms of PE: restlessnes, anxiety, dyspnea, tachypnea, chest pain</td>
</tr>
</tbody>
</table>

### Plan of Care

**Plan of Care Initiated by**

<table>
<thead>
<tr>
<th>RN / Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Reviewed Q 12 o**

(Signature/ Date/Time)

<table>
<thead>
<tr>
<th>RN / Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

---

**Carolinias Medical Center NorthEast**

920 Church St., North-Concord, NC 28025

**DVT/PE PROTOCOL – PLAN OF CARE**

GEN0077 (Rev. 10/03) **Nurses’ Notes**

**DOS: DOB:**

**Sex:**

**Age:**

**Race:**

**Serv.Type:**

**Visit Type:**

**Loc:**

**Rm:**

**Attend. Phy:**
Actual Patient Weight = _______ Kg          Height= _______ Inches

Ideal weight-MALE: 2.3 x # inches greater than 5 feet + 50 = _______ Kg
 ideal weight-FEMALE: 2.3 x # inches greater than 5 feet + 45.5 = _______ Kg

Dosing Weight = (Actual Wt - IBW) 0.3 + IBW
If patient’s actual weight is less than IBW, use the patient’s actual weight

<table>
<thead>
<tr>
<th>Calculation by: Pharmacist signature</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verified by: Nurse signature</td>
<td>Date</td>
<td>Time</td>
</tr>
</tbody>
</table>

### Dosing Weight

<table>
<thead>
<tr>
<th>Initial Bolus (70Units/kg)</th>
<th>Initial Infusion Units/kg/hour (25000units/250mL)</th>
<th>Antifactor Xa Heparin Less than 0.2</th>
<th>Antifactor Xa Heparin 0.2 - 0.29</th>
<th>Antifactor Xa Heparin 0.3 - 0.7</th>
<th>Antifactor Xa Heparin 0.71 - 0.8</th>
<th>Antifactor Xa Heparin Greater than 0.8</th>
<th>Hold x 1 hour And Rate Decrease (mL/hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KG</td>
<td>Units</td>
<td>Units/hour</td>
<td>mL/hour</td>
<td>Bolus (Units)</td>
<td>Rate Increase (mL/hour)</td>
<td>Dose (Units)</td>
<td>Rate Increase (mL/hour)</td>
</tr>
<tr>
<td>Up to 40</td>
<td>2800</td>
<td>600</td>
<td>6</td>
<td>2800</td>
<td>+1.5</td>
<td>1400</td>
<td>+1</td>
</tr>
<tr>
<td>41-44</td>
<td>3000</td>
<td>650</td>
<td>6.5</td>
<td>3000</td>
<td>+1.5</td>
<td>1500</td>
<td>+1</td>
</tr>
<tr>
<td>45-47</td>
<td>3200</td>
<td>700</td>
<td>7</td>
<td>3200</td>
<td>+1.5</td>
<td>1600</td>
<td>+1</td>
</tr>
<tr>
<td>48-50</td>
<td>3400</td>
<td>750</td>
<td>7.5</td>
<td>3400</td>
<td>+2</td>
<td>1700</td>
<td>+1</td>
</tr>
<tr>
<td>51-53</td>
<td>3600</td>
<td>800</td>
<td>8</td>
<td>3600</td>
<td>+2</td>
<td>1800</td>
<td>+1</td>
</tr>
<tr>
<td>53-56</td>
<td>3800</td>
<td>850</td>
<td>8.5</td>
<td>3800</td>
<td>+2</td>
<td>1900</td>
<td>+1</td>
</tr>
<tr>
<td>57-59</td>
<td>4000</td>
<td>900</td>
<td>9</td>
<td>4000</td>
<td>+2.5</td>
<td>2000</td>
<td>+1</td>
</tr>
<tr>
<td>60-62</td>
<td>4200</td>
<td>950</td>
<td>9.5</td>
<td>4200</td>
<td>+2.5</td>
<td>2100</td>
<td>+1</td>
</tr>
<tr>
<td>63-65</td>
<td>4400</td>
<td>990</td>
<td>9.5</td>
<td>4400</td>
<td>+2.5</td>
<td>2200</td>
<td>+1.5</td>
</tr>
<tr>
<td>66-68</td>
<td>4600</td>
<td>1000</td>
<td>10</td>
<td>4600</td>
<td>+2.5</td>
<td>2300</td>
<td>+1.5</td>
</tr>
<tr>
<td>69-70</td>
<td>4800</td>
<td>1050</td>
<td>10.5</td>
<td>4800</td>
<td>+3</td>
<td>2400</td>
<td>+1.5</td>
</tr>
<tr>
<td>71-73</td>
<td>5000</td>
<td>1100</td>
<td>11</td>
<td>5000</td>
<td>+3</td>
<td>2500</td>
<td>+1.5</td>
</tr>
<tr>
<td>74-76</td>
<td>5200</td>
<td>1150</td>
<td>11.5</td>
<td>5200</td>
<td>+3</td>
<td>2600</td>
<td>+1.5</td>
</tr>
<tr>
<td>77-79</td>
<td>5400</td>
<td>1200</td>
<td>12</td>
<td>5400</td>
<td>+3</td>
<td>2700</td>
<td>+1.5</td>
</tr>
<tr>
<td>80-81</td>
<td>5600</td>
<td>1200</td>
<td>12</td>
<td>5600</td>
<td>+3</td>
<td>2800</td>
<td>+1.5</td>
</tr>
<tr>
<td>82-84</td>
<td>5800</td>
<td>1250</td>
<td>12.5</td>
<td>5800</td>
<td>+3.5</td>
<td>2900</td>
<td>+1.5</td>
</tr>
<tr>
<td>85-87</td>
<td>6000</td>
<td>1300</td>
<td>13</td>
<td>6000</td>
<td>+3.5</td>
<td>3000</td>
<td>+1.5</td>
</tr>
<tr>
<td>88-90</td>
<td>6200</td>
<td>1350</td>
<td>13.5</td>
<td>6200</td>
<td>+3.5</td>
<td>3100</td>
<td>+2</td>
</tr>
<tr>
<td>91-93</td>
<td>6400</td>
<td>1400</td>
<td>14</td>
<td>6400</td>
<td>+3.5</td>
<td>3200</td>
<td>+2</td>
</tr>
<tr>
<td>94-96</td>
<td>6600</td>
<td>1450</td>
<td>14.5</td>
<td>6600</td>
<td>+4</td>
<td>3300</td>
<td>+2</td>
</tr>
<tr>
<td>97-99</td>
<td>6800</td>
<td>1500</td>
<td>15</td>
<td>6800</td>
<td>+4</td>
<td>3400</td>
<td>+2</td>
</tr>
<tr>
<td>100-102</td>
<td>7000</td>
<td>1500</td>
<td>15</td>
<td>7000</td>
<td>+4</td>
<td>3500</td>
<td>+2</td>
</tr>
<tr>
<td>103-105</td>
<td>7200</td>
<td>1550</td>
<td>15.5</td>
<td>7200</td>
<td>+4</td>
<td>3600</td>
<td>+2</td>
</tr>
<tr>
<td>106-108</td>
<td>7400</td>
<td>1600</td>
<td>16</td>
<td>7400</td>
<td>+4.5</td>
<td>3700</td>
<td>+2</td>
</tr>
<tr>
<td>109-111</td>
<td>7600</td>
<td>1650</td>
<td>16.5</td>
<td>7600</td>
<td>+4.5</td>
<td>3800</td>
<td>+2</td>
</tr>
<tr>
<td>112-114</td>
<td>7800</td>
<td>1700</td>
<td>17</td>
<td>7800</td>
<td>+4.5</td>
<td>3900</td>
<td>+2.5</td>
</tr>
<tr>
<td>116-118</td>
<td>8000</td>
<td>1750</td>
<td>17.5</td>
<td>8000</td>
<td>+4.5</td>
<td>4000</td>
<td>+2.5</td>
</tr>
<tr>
<td>119-121</td>
<td>8200</td>
<td>1800</td>
<td>18</td>
<td>8200</td>
<td>+5</td>
<td>4100</td>
<td>+2.5</td>
</tr>
<tr>
<td>121-123</td>
<td>8400</td>
<td>1850</td>
<td>18.5</td>
<td>8400</td>
<td>+5</td>
<td>4200</td>
<td>+2.5</td>
</tr>
<tr>
<td>124-126</td>
<td>8600</td>
<td>1900</td>
<td>19</td>
<td>8600</td>
<td>+5</td>
<td>4300</td>
<td>+2.5</td>
</tr>
</tbody>
</table>
### Ideal Weight Calculation

- **MALE:** 2.3 x # of inches greater than 5 feet + 50 = ________ kg
- **FEMALE:** 2.3 x # of inches greater than 5 feet + 45.5 = ________ kg

### Dosing Weight Calculation

\[ \text{Dosing weight} = (\text{Actual Wt} - \text{IBW}) \times 0.3 + \text{IBW} \]

If patient's actual weight is less than IBW, use the patient's actual weight.

### Weight-Based Heparin Protocol

**MON0049 MEC Appr. 11/22/10; Rev. 12/10**

#### Physician Orders

- **920 Church St., North-Concord, NC 28025**

---

#### Table: Weight-Based Heparin Protocol

<table>
<thead>
<tr>
<th>Dosing Weight</th>
<th>Initial Bolus (70 Units/kg)</th>
<th>Initial Infusion 15 Units/kg/hour (25000 Units/250 mL)</th>
<th>Antifactor Xa Heparin Less than 0.2</th>
<th>Antifactor Xa Heparin 0.2 - 0.29</th>
<th>Antifactor Xa Heparin 0.3 - 0.7</th>
<th>Antifactor Xa Heparin 0.71 - 0.8</th>
<th>Antifactor Xa Heparin Greater than 0.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>KG</td>
<td>Units</td>
<td>Units/hour</td>
<td>mL/hour</td>
<td>Bolus (Units)</td>
<td>Rate Increase (mL/hour)</td>
<td>Bolus (Units)</td>
<td>Rate Increase (mL/hour)</td>
</tr>
<tr>
<td>Up to 40</td>
<td>2800</td>
<td>600</td>
<td>6</td>
<td>2800</td>
<td>+1.5</td>
<td>1400</td>
<td>+1</td>
</tr>
<tr>
<td>41-44</td>
<td>3000</td>
<td>650</td>
<td>6.5</td>
<td>3000</td>
<td>+1.5</td>
<td>1500</td>
<td>+1</td>
</tr>
<tr>
<td>45-47</td>
<td>3200</td>
<td>700</td>
<td>7</td>
<td>3200</td>
<td>+1.5</td>
<td>1600</td>
<td>+1</td>
</tr>
<tr>
<td>48-50</td>
<td>3400</td>
<td>750</td>
<td>7.5</td>
<td>3400</td>
<td>+2</td>
<td>1700</td>
<td>+1</td>
</tr>
<tr>
<td>51-53</td>
<td>3600</td>
<td>800</td>
<td>8</td>
<td>3600</td>
<td>+2</td>
<td>1800</td>
<td>+1</td>
</tr>
<tr>
<td>53-56</td>
<td>3800</td>
<td>850</td>
<td>8.5</td>
<td>3800</td>
<td>+2</td>
<td>1900</td>
<td>+1</td>
</tr>
<tr>
<td>57-59</td>
<td>4000</td>
<td>900</td>
<td>9</td>
<td>4000</td>
<td>+2.5</td>
<td>2000</td>
<td>+1</td>
</tr>
<tr>
<td>60-62</td>
<td>4200</td>
<td>950</td>
<td>9.5</td>
<td>4200</td>
<td>+2.5</td>
<td>2100</td>
<td>+1</td>
</tr>
<tr>
<td>63-65</td>
<td>4400</td>
<td>950</td>
<td>9.5</td>
<td>4400</td>
<td>+2.5</td>
<td>2200</td>
<td>+1.5</td>
</tr>
<tr>
<td>66-68</td>
<td>4600</td>
<td>1000</td>
<td>10</td>
<td>4600</td>
<td>+2.5</td>
<td>2300</td>
<td>+1.5</td>
</tr>
<tr>
<td>69-70</td>
<td>4800</td>
<td>1050</td>
<td>10.5</td>
<td>4800</td>
<td>+3</td>
<td>2400</td>
<td>+1.5</td>
</tr>
<tr>
<td>71-73</td>
<td>5000</td>
<td>1100</td>
<td>11</td>
<td>5000</td>
<td>+3</td>
<td>2500</td>
<td>+1.5</td>
</tr>
<tr>
<td>74-76</td>
<td>5200</td>
<td>1150</td>
<td>11.5</td>
<td>5200</td>
<td>+3</td>
<td>2600</td>
<td>+1.5</td>
</tr>
<tr>
<td>77-79</td>
<td>5400</td>
<td>1200</td>
<td>12</td>
<td>5400</td>
<td>+3</td>
<td>2700</td>
<td>+1.5</td>
</tr>
<tr>
<td>80-81</td>
<td>5600</td>
<td>1250</td>
<td>12.5</td>
<td>5600</td>
<td>+3</td>
<td>2800</td>
<td>+1.5</td>
</tr>
<tr>
<td>82-84</td>
<td>5800</td>
<td>1250</td>
<td>12.5</td>
<td>5800</td>
<td>+3</td>
<td>2900</td>
<td>+1.5</td>
</tr>
<tr>
<td>85-87</td>
<td>6000</td>
<td>1300</td>
<td>13</td>
<td>6000</td>
<td>+3.5</td>
<td>3000</td>
<td>+1.5</td>
</tr>
<tr>
<td>88-90</td>
<td>6200</td>
<td>1350</td>
<td>13.5</td>
<td>6200</td>
<td>+3.5</td>
<td>3100</td>
<td>+2</td>
</tr>
<tr>
<td>91-93</td>
<td>6400</td>
<td>1400</td>
<td>14</td>
<td>6400</td>
<td>+3.5</td>
<td>3200</td>
<td>+2</td>
</tr>
<tr>
<td>94-96</td>
<td>6600</td>
<td>1450</td>
<td>14.5</td>
<td>6600</td>
<td>+4</td>
<td>3300</td>
<td>+2</td>
</tr>
<tr>
<td>97-99</td>
<td>6800</td>
<td>1500</td>
<td>15</td>
<td>6800</td>
<td>+4</td>
<td>3400</td>
<td>+2</td>
</tr>
<tr>
<td>100-102</td>
<td>7000</td>
<td>1550</td>
<td>15.5</td>
<td>7000</td>
<td>+4</td>
<td>3500</td>
<td>+2</td>
</tr>
<tr>
<td>103-105</td>
<td>7200</td>
<td>1550</td>
<td>15.5</td>
<td>7200</td>
<td>+4</td>
<td>3600</td>
<td>+2</td>
</tr>
<tr>
<td>106-108</td>
<td>7400</td>
<td>1600</td>
<td>16</td>
<td>7400</td>
<td>+4.5</td>
<td>3700</td>
<td>+2</td>
</tr>
<tr>
<td>109-111</td>
<td>7600</td>
<td>1650</td>
<td>16.5</td>
<td>7600</td>
<td>+4.5</td>
<td>3800</td>
<td>+2</td>
</tr>
<tr>
<td>112-114</td>
<td>7800</td>
<td>1700</td>
<td>17</td>
<td>7800</td>
<td>+4.5</td>
<td>3900</td>
<td>+2.5</td>
</tr>
<tr>
<td>115-118</td>
<td>8000</td>
<td>1750</td>
<td>17.5</td>
<td>8000</td>
<td>+4.5</td>
<td>4000</td>
<td>+2.5</td>
</tr>
<tr>
<td>119-121</td>
<td>8200</td>
<td>1800</td>
<td>18</td>
<td>8200</td>
<td>+5</td>
<td>4100</td>
<td>+2.5</td>
</tr>
<tr>
<td>121-123</td>
<td>8400</td>
<td>1850</td>
<td>18.5</td>
<td>8400</td>
<td>+5</td>
<td>4200</td>
<td>+2.5</td>
</tr>
<tr>
<td>124-126</td>
<td>8600</td>
<td>1900</td>
<td>19</td>
<td>8600</td>
<td>+5</td>
<td>4300</td>
<td>+2.5</td>
</tr>
</tbody>
</table>

- **Hold 1 hour or And Rate Decrease (mL/hour):**
- **Up to 40 KG:** -1
- **41-44 KG:** -1.5
- **45-47 KG:** -2
- **48-50 KG:** -1.5
- **51-53 KG:** -1.5
- **53-56 KG:** -2
- **57-59 KG:** -2
- **60-62 KG:** -1.5
- **63-65 KG:** -1.5
- **66-68 KG:** -1.5
- **69-70 KG:** -1.5
- **71-73 KG:** -1.5
- **74-76 KG:** -2
- **77-79 KG:** -2
- **80-81 KG:** -2
- **82-84 KG:** -2
- **85-87 KG:** -2
- **88-90 KG:** -2
- **91-93 KG:** -2
- **94-96 KG:** -2
- **97-99 KG:** -2
- **100-102 KG:** -2
- **103-105 KG:** -2
- **106-108 KG:** -2
- **109-111 KG:** -2
- **112-114 KG:** -2
- **115-118 KG:** -2
- **119-121 KG:** -2
- **121-123 KG:** -2
- **124-126 KG:** -2

**Calculate by:** 
- Pharmacist signature

**Verified by:** 
- Nurse signature

**Date:** 
- Time:

**Location:**
- Room:
- Attend Phy:
CMC-NorthEast Pharmacy
Warfarin (Coumadin) Dosing Protocol

WARFARIN (Coumadin) INITIATION GENERAL GUIDELINES

1. Baseline INR at protocol initiation, then daily PT/INR with AM labs.
2. Daily orders must be written for warfarin doses based on daily INR evaluation.
3. Patient will be evaluated daily for symptoms of bleeding.
4. INR’s greater than or equal to 5, with bleeding and/or high risk of bleeding, consider vitamin K guidelines.
5. Must have at least 5 days of concurrent UFH/LMWH bridge therapy with warfarin and/or two days overlapping therapeutic INR in new blood clots.
6. Patient and family will be educated by the pharmacist prior to discharge.
7. At discharge, pharmacy will be contacted to assist with outpatient follow-up.
8. GENERAL PROTOCOL GUIDELINES:
   (please document for clinical considerations outside the protocol guideline)

2.5mg nomogram to be considered if patients have one of the following:
- H/o warfarin dose less than 2mg daily
- Patient on concurrent medications with severe drug interactions with warfarin (ie: fluconazole, metronidazole, sulfa antibiotics)
- Patient malnourished and/or NPO for more than 3 days
- Baseline INR greater than 1.4

5mg nomogram to be considered if patients have one of the following:
- Age greater than or equal to 60 years old
- H/o previous dose less than 5mg/daily, but greater than or equal to 2mg daily
- H/o CHF or active clinical CHF (EF<=40%)
- Liver Disease
- Concurrent broad spectrum antibiotics
- Prolonged hospital stay (greater than7 days)
- Concurrent drugs known to interact with warfarin
- H/o poor nutrition (low BMI)
- Chronic renal insufficiency or HD pt
- Unfractionated Heparin not therapeutic or not on unfractionated heparin

10mg nomogram to be considered if patients have one of the following:
- Less than 60 year old relatively healthy patients
- Patients taking medications known to induce warfarin metabolism (ie: rifampin, nafcillin, azathioprine)
- H/o warfarin dose greater than 7.5mg daily

(Any treatment decisions need to take a patients individual circumstances into consideration and may need to be adapted when using algorithm).
**Warfarin (Coumadin) Initiation Dosing Nomogram (new patients on warfarin)**

- Not every patient will conform to nomogram. Patient past response and speed of INR rising to be considered.
- Any treatment decisions need to take a patient’s individual circumstances into consideration and may need to be adapted when using algorithm.
- Please document for clinical considerations outside this dosing protocol.

<table>
<thead>
<tr>
<th>Day</th>
<th>INR</th>
<th>2.5mg Initiation</th>
<th>5mg Initiation</th>
<th>10mg Initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>2.5mg</td>
<td>5mg</td>
<td>10mg</td>
</tr>
<tr>
<td>2</td>
<td>&lt;1.5</td>
<td>2.5mg</td>
<td>5mg</td>
<td>10mg</td>
</tr>
<tr>
<td></td>
<td>1.5-1.9</td>
<td>1.25mg</td>
<td>2.5mg</td>
<td>5mg</td>
</tr>
<tr>
<td></td>
<td>2-2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>&gt;2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>&lt;1.5</td>
<td>2.5-5mg</td>
<td>5-7.5mg</td>
<td>10-12.5mg</td>
</tr>
<tr>
<td></td>
<td>1.5-1.9</td>
<td>1.25-2.5mg</td>
<td>2.5-5mg</td>
<td>5-7.5mg</td>
</tr>
<tr>
<td></td>
<td>2-2.5</td>
<td>0.5-1.25mg</td>
<td>1-2.5mg</td>
<td>2.5-5mg</td>
</tr>
<tr>
<td></td>
<td>2.5-3</td>
<td>0-1mg</td>
<td>0-1.25mg</td>
<td>0-2.5mg</td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>&lt;1.5</td>
<td>5-7.5mg</td>
<td>7.5-10mg</td>
<td>10-12.5mg</td>
</tr>
<tr>
<td></td>
<td>1.5-1.9</td>
<td>2.5-5mg</td>
<td>5-7.5mg</td>
<td>5-7.5mg</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>0-2.5mg</td>
<td>0-5mg</td>
<td>0-5mg</td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>&lt;1.5</td>
<td>5-7.5mg</td>
<td>7.5-10mg</td>
<td>12.5-15mg</td>
</tr>
<tr>
<td></td>
<td>1.5-1.9</td>
<td>2.5-5mg</td>
<td>7.5-10mg</td>
<td>7.5-10mg</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>2.5</td>
<td>5mg</td>
<td>5-7.5mg</td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>&lt;1.5</td>
<td>5-7.5mg</td>
<td>7.5-10mg</td>
<td>12.5-15mg</td>
</tr>
<tr>
<td></td>
<td>1.5-1.9</td>
<td>2.5-5mg</td>
<td>7.5-10mg</td>
<td>7.5-10mg</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>1-5mg</td>
<td>1-7.5mg</td>
<td>1-7.5mg</td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>0-2.5mg</td>
<td>0-5mg</td>
<td>0-7.5mg</td>
</tr>
<tr>
<td>7</td>
<td>All INR’s</td>
<td>Weekly dose based on average of last 7 days doses (increase/decrease by 5-20% based on current &amp; target INR)</td>
<td>Weekly dose based on average of last 7 days doses (increase or decrease by 5-20% based on current &amp; target INR)</td>
<td>Weekly dose based on average of last 7 days doses (increase or decrease by 5-20% based on current &amp; target INR)</td>
</tr>
</tbody>
</table>
INPATIENT WARFARIN (Coumadin) ADJUSTMENT PROTOCOL
(Patients on chronic warfarin)

1. Baseline and daily PT/INR to be ordered.

2. Warfarin doses to be written daily in patient's chart.

3. Daily dosing of warfarin to be evaluated based on the patients current INR, past and present history, weekly warfarin dose, and INR stability.

4. Acute factors that can influence sensitivity to warfarin include:
   - Clinical congestive heart failure
   - Diarrhea
   - Drug interactions
   - Fever
   - Hyperthyroidism
   - Malnutrition and/or NPO greater than 3 days
   - Malignancy
   - Elevated Baseline INR

5. INR's greater than or equal to 5, if bleeding or high risk of bleeding, consider vitamin K guideline.

6. Patient will be evaluated daily for signs and symptoms of bleeding.

7. If INR is sub-therapeutic, patient will be evaluated for need of bridge therapy and physician notified with recommendations.

8. Patient and family will be counseled by the pharmacist.

9. At discharge pharmacy must be contacted to assist with outpatient follow-up.

10. Not every patient will conform to nomogram. Patient past response and speed of INR rising to be considered.

11. Please document for clinical considerations outside this dosing protocol.
### Inpatient Warfarin (Coumadin) Adjustment Nomogram
(for patients on chronic warfarin)

<table>
<thead>
<tr>
<th>Goal INR of 2-3</th>
<th>Goal INR of 2.5-3.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=1.4</td>
<td>Increase dose 50-100%*</td>
</tr>
<tr>
<td>1.5-1.8</td>
<td>Increase dose 25-50%*</td>
</tr>
<tr>
<td>1.9-3</td>
<td>No change</td>
</tr>
<tr>
<td>3.1-3.2</td>
<td>Decrease dose 25-50%</td>
</tr>
<tr>
<td>3.3-4</td>
<td>Hold dose</td>
</tr>
<tr>
<td>4.1-4.5</td>
<td>Hold dose</td>
</tr>
<tr>
<td>4.6-4.9</td>
<td>Hold dose</td>
</tr>
<tr>
<td>&gt;=5</td>
<td>Hold dose **</td>
</tr>
</tbody>
</table>

*(assess if bridge therapy needed for higher risk pt)  
**(see guidelines for managing high INR)  
*** (Consider holding dose if INR trending up)

Not every patient will conform to nomogram. Patient past response and speed of INR rising to be considered prior to dosing warfarin. Please document for clinical considerations outside this dosing nomogram.
Warfarin (Coumadin) dosing guide for patients on Argatroban infusion

1. Baseline PT/INR at protocol initiation, then at least daily INR with am labs.

2. Daily orders must be written for warfarin doses based on daily INR evaluation. Patient will be evaluated daily for symptoms of bleeding.

3. INR’s greater than or equal to 5, with bleeding and/or high risk of bleeding should be discussed with physicians and individualized plan determined for each patient.

4. Must have at least 5 days of concurrent bridge therapy with warfarin for new clots.

5. Do not need 5 days of concurrent therapy bridging for low INR/or post-procedures unless specified by the physician.

6. Initiate warfarin only when the platelet count has substantially recovered to 150,000 cells/mm3 and/or baseline platelet level and remains stable.

7. Argatroban will independently elevate the PT/INR and provide false PT/INR values. Follow warfarin dosing nomogram recommendations, argatroban infusion adjustment guidelines and then review patient individually to determine dose adjustment of warfarin daily.

8. For new blood clot patients, use the warfarin initiation nomogram.
   a. The warfarin 5mg nomogram should be initiated for most patients.
   b. The warfarin 2.5mg nomogram should be used for patients with significant drug interactions, history of warfarin dose less than 2mg daily, patients that have liver disease, patients malnourished, or patients with INRs greater than 2 while on argatroban infusion alone.

9. Patients on chronic warfarin and bridging for low INR or procedures should have an individualized dose based on the chronic warfarin patient nomogram and argatroban infusion dosing guidelines.

10. Argatroban must be continued concurrent with warfarin until INR at least 4 and then follow argatroban drip infusion adjustment guidelines below.

11. Not every patient will conform to nomogram. Patient past response and speed of INR rising to be considered.

12. Please document for clinical considerations outside this dosing protocol.

13. As a rule, Argatroban infusion tends to raise the INR from 1-2 points independently, but can drastically differ from patient to patient.

14. Any treatment decisions need to take a patients individual circumstances into consideration and may need to be adapted when using algorithm.

15. Patients should be checked daily for several days after stopping argatroban infusion to evaluate maintenance dose requirements.
Argatroban Drip Infusion Adjustments:

1. Argatroban recommended initial dose for adult patients without hepatic impairment is 2mcg/kg/min as a continuous infusion.

2. For patients with Hepatic impairment or critically ill patients, the initial dose for adult patients is Argatroban 0.5mcg/kg/min.

3. Follow Argatroban protocol guidelines for dose adjustments.

4. If the INR climbs rapidly above 4 prior to the 5 days of concurrent therapy, the physician should be contacted and dosing evaluated.

5. Argatroban can be used for New blood clots and treatment of HIT. Patients should be on warfarin and argatroban infusion for a minimum of 5 days.

6. Argatroban can be used for bridging a low INR in patients with history of HIT.

7. Follow the guidelines below to stop Argatroban once the INR is pushed to greater than 4:

   a. **For patients with Argatroban infusion rates less than or equal to 2 mcg/kg/min (most patients):**

      Step 1: Stop the argatroban infusion completely.
      a. When the INR is greater than 4, discontinue Argatroban and repeat INR in 4 hours.
      b. If the INR holds therapeutic range off Argatroban infusion for 4 hours (INR of 2-3 or 2.5-3.5), then discontinue argatroban and continue warfarin monotherapy.
      c. If the INR is less than the desired therapeutic range (2-3 or 2.5-3.5), restart the infusion at the previous rate, and repeat the process above with daily INR until the result holds at therapeutic range after completely stopping argatroban for 4 hours.

   d. **For patients with Argatroban infusion rates greater than 2 mcg/kg/min:**

      Step 1: Reduce rate to 2mcg/kg/min
      a. When the INR is greater than 4, reduce the rate of Argatroban infusion to 2mcg/kg/min and repeat the INR in 4 hours.
      b. If the INR is greater than 4, discontinue Argatroban completely and recheck the INR in 4 hours again (go to step 2)
      c. If the INR is less than 4, resume the infusion at the rate prior to reduction, and repeat the process above with daily INR until the result holds greater than 4 after reducing the rate to 2mcg/kg/min.

      Step 2: Stop the Argatroban infusion completely.
      a. If the INR holds therapeutic range off Argatroban infusion for 4 hours (INR of 2-3 or 2.5-3.5), then discontinue argatroban and continue warfarin monotherapy.
      b. If the INR is less than the desired therapeutic range (2-3 or 2.5-3.5), start the infusion back at the rate prior to step 1. Repeat the process above with daily INR until the result holds at therapeutic range after completely stopping Argatroban for 4 hours.
Guidelines for the Administration of Vitamin K

1. Oral vitamin K is the preferred treatment for managing patients with elevated INRs. Studies have shown oral vitamin K to correct the INR more rapidly than intravenous or subcutaneous routes without an over-correction. Vitamin K is available as a 5mg tablet or parenteral 1mg ampule that can be given orally.

2. Subcutaneous routes of administering vitamin K are not recommended because of erratic absorption that is unpredictable and delayed allowing patient to be at increased risk of bleeding.

3. IM routes of administering vitamin K are not recommended because of decreased absorption and sometimes delayed effects. Patients are also at risk for injection site hematoma or delayed skin reactions 4-5 days after exposure.

4. Vitamin K should never be given as IV push. Intravenous (IV) doses of 10-20mg can cause hypersensitivity reactions or anaphylaxis. If given IV, must give as slow infusion no faster than 1mg/min and benefit must outweigh the risk.

5. High Vitamin K doses can result in overcorrection of the INR with a subsequent increase in clotting risk and warfarin resistance for up to a week.

Nomogram for Managing Patients with High INR values

<table>
<thead>
<tr>
<th>INR Values</th>
<th>Clinical Setting</th>
<th>Action/Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>INR greater than therapeutic, but less than 5</td>
<td>[ ]</td>
<td>Lower dose or omit warfarin dose and resume at a lower maintenance dose. If only minimally above therapeutic range or associated with a transient causative factor, no dose reduction may be required.</td>
</tr>
<tr>
<td></td>
<td>Reversal for urgent procedure</td>
<td>Hold warfarin and vitamin K 1.25 mg po x 1 dose with expectation that INR reduction will occur in 24 hours. If INR still elevated in 24 hours, may administer additional vitamin K 1.25mg po.</td>
</tr>
<tr>
<td>INR of 5 to 8.9</td>
<td></td>
<td>Hold 1-2 doses of warfarin until INR in therapeutic range and resume at lower warfarin dose. If patient at increased risk of bleeding, omit dose and consider vitamin K 1.25 to 2.5mg po x 1 dose.</td>
</tr>
<tr>
<td></td>
<td>Reversal for urgent procedure</td>
<td>Hold warfarin AND give vitamin K 2.5-5mg po x 1 dose with expectation that INR reduction will occur in 24 hours. If INR still elevated in 24 hrs, may give additional vitamin K 1.25-2.5mg po.</td>
</tr>
<tr>
<td>INR greater than or equal to 9</td>
<td></td>
<td>Hold warfarin therapy and give vitamin K 2.5-5mg po with expectation that INR will be reduced substantially in 24-48 hours. If INR still elevated in 24-48 hours, may give additional 2.5-5mg po. Resume warfarin therapy at a lower dose when INR therapeutic.</td>
</tr>
<tr>
<td>Any INR</td>
<td>Serious or Life Threatening Bleeding</td>
<td>Hold warfarin and give vitamin K 10mg IV slow infusion supplement with FFP and consider Recombinant Factor VIIa. Monitor INR frequently and vitamin K can be repeated q12h. (Recombinant Factor VIIa dose: 90mcg/kg every 2 hours until hemostasis established or therapy judged ineffective).</td>
</tr>
</tbody>
</table>

**adapted from Ansell J et al. Chest 2008: 133 (suppl): 160S-176.**
Outpatient Treatment
Outpatient Anticoagulation Clinic Protocol

General Protocol Guidelines

1. Referring physician must provide referral for patients to the clinic.
2. Physicians will be allowed to refer patients to the clinic if they are on the Medical Staff at CMC-Northeast. The physicians will read and sign an approval of the protocol prior to being able to refer patients.
3. Baseline INR to be obtained at protocol initiation.
4. Patients will be initiated on 2.5mg or 5mg doses of warfarin and monitored according to dosing nomogram guidelines below.
5. Patients will be evaluated on an ongoing basis for signs and symptoms of bleeding. If bleeding occurs, patient will be instructed to contact physician and/or go to the ECC depending on the severity of the bleeding.
6. Patients will be educated extensively on diet, compliance, medication interactions, bleeding risk, and overall clinic process at their first clinic visit by the pharmacist. Patients will also review the clinic agreement and sign it.
7. At each visit, the patients will be questioned on bleeding issues, changes in diet, missed doses, compliance, the addition of new medications, changes in maintenance medications and other lifestyle changes that could affect dosing.
8. Patients INR frequency will depend on stability of INR and length of time patient has been on warfarin as per algorithm guidelines. Patients will not be allowed to go longer than 4 week checks unless extenuating circumstances prevail.
9. Patients, family members, or caregivers for newly initiated warfarin patients will be educated at initial visits to the clinic and given education materials.
10. INR values greater than 4 are considered a critical value and will be addressed immediately per standing protocol. INR values greater than or equal to 5 will be communicated to the referring physician. INRs greater than or equal to 5 on the fingerstick machine will be communicated with the referring physician and reviewed individually to determine if a lab verification per venipuncture is necessary. If INR values on the finger-stick machine are greater than 8 or the reading is undetectable, the value will be verified at lab via venipuncture to correlate results. The lab result will then be used for dosing decisions.
11. The following situations are appropriate to send the patient to the outpatient lab for venipuncture result of the INR:
   - Suspicious INR results that do not correlate with current patient condition/previous INRs.
   - Patients on concurrent medications that can affect accuracy of finger stick machine (defined as all concurrent bridge anticoagulants such as heparin, enoxaparin, or fondaparinux).
   - Low Hemoglobin/Hematocrit
   - High Triglycerides
12. The pharmacist will write an order for labs on the standard lab form, clinic lab order sheet, or physician order sheet. The order must include the appropriate labs, diagnosis for therapy, date of labs ordered and the place to call resultant labs. The pharmacist will sign the form including specifically the following: Per protocol, referral physician name and the pharmacist name.

13. INR values greater than or equal to 5 will be reported to the referring physician for approval of plan of therapy within one hour.

14. Patients on concurrent anticoagulants with warfarin specifically heparin, enoxaparin or fondaparinux should not have their INR checked via the finger stick machine because of the variability of the INR results unless venipuncture not an option.

15. Patients with variable INR response not attributed to any of the usual known causes for instability will be considered for low dose daily vitamin K 100-200 ug therapy regimen when applicable. The referring physician will be contacted for approval.

16. Patients with new blood clots will need at least 5 days of bridge therapy and at least 24 hours of therapeutic INR prior to stopping bridge therapy.

17. Patients on bridging therapy for low INR do not need 2 days of overlap of therapeutic INR unless specified by the physician.

18. Patients on bridging therapy will have Platelets drawn every other day unless specified by the physician.

19. Once patients are stabilized on a warfarin dose, any further dose adjustments are based on the total weekly dose.

20. Any treatment decisions will take patients individual circumstances into consideration and may need to be adapted when using the algorithm using the clinical judgment of the pharmacist.
I have reviewed and approve of the NEMC outpatient coumadin management protocol.

I agree to have the clinical pharmacists staffing the clinic to manage my patient’s coumadin therapy according to the outpatient coumadin management protocol. I understand that the dosage protocol will be used as a guide to adjust the regimens, but clinical judgment may be utilized as patients are evaluated on an individualized manner.

Consideration will be given to variables such as trends in INRs, compliance; patient’s risk for complications of therapy, patient’s risk for complications due to recurrent disease/thromboembolism, comorbid disease states, diet and alcohol influence, and drug interactions.

If a patient is extremely difficult to maintain or achieve a therapeutic INR, the pharmacist will discuss the plan for adjustment with the physician as deemed necessary.

Physician’s Name__________________________________________________

Physician Signature: _____________________ Date/Time:__________________

Pharmacist Review:______________________ Date/Time:________________
Anticoagulation Clinic

PATIENT REFERRAL

I am referring patient ______________________________ Last 4 digit SS#___________
ACCT #______________________ DOB________________Phone # (____)____________
to the Anticoagulation clinic for warfarin monitoring by the Clinical pharmacists. This includes standing orders
for as needed PT/INR testing via a fingerstick using the Coaguchek monitor and dosage adjustments as per the
NorthEast Medical Center outpatient warfarin protocol.

Physician name: _____________________ Office phone #: _______________________

Physician signature: ________________________MD:_____ Date/Time: ____________________

Current Indications for Therapy:

- DVT
- PE
- AFIB-no embolic complications
- Arterial Thrombus
- MVR Type _________
- VTE Prophylaxis

- Recurrent DVT
- Recurrent PE
- AFIB- embolic complications
- Stroke
- Stroke
- AVR Type
- Abnormal Coagulation Profile

Risk for Warfarin Related Complications:

- High Risk of Bleeding
- History of Noncompliance

Please explain _________________________ Please explain ___________________________

Therapy Plan:

Date patient began coumadin:____________________________ Baseline INR:

Date/ Result:____________________________

Target INR range for anticoagulation (Circle one):

INR 2.0 - 3.0
INR 2.5 - 3.5

Intended duration of anticoagulation therapy (Circle one):

3 months  6 months  > 6 months

Peri-operative 3 weeks To be determined at later date

Risk for Thromboembolic Events:

- High Risk (>10%/yr)
- Moderate Risk (4-10%/yr)
- Low Risk (<4%/yr)

Mechanical Heart Valves

- Mitral Valve Prosthesis
- Caged Ball or Tilting Disc Aortic valve prosthesis
- Embolic stroke, TIA, or other arterial embolus within 6 mos

Atrial Fibrillation

- CHADS; score of 5 or 6
- Embolic Stroke or TIA, or arterial embolus within 3 mos
- Rheumatic valvular heart disease

Venous Thromboembolism

- VTE within 3 mos
- Severe thrombophilia (def of protein C, S, AT3, or antiphospholipid antibodies, homozgyous factor V leiden or factor 2 mutation).
- Pulmonary Artery Hypertension

- Bileaflet Aortic valve prosthesis, and one of the following: atrib, prior embolic stroke, or TIA, hypertension, diabetes, CHF, or age > 75 years old.

- CHADS; score of 3 or 4 and no prior embolic stroke,TIA or other arterial embolus
- Single VTE > 12 mos and no other risk factors

- VTE last 3 to 12 mos
- Less severe thrombophilia (Heterozygous factor V leiden or factor 2 mutation)
- Recurrent VTE or active cancer within 6 mos/palliative

- CHADS; score of 0 to 2 and no prior embolic stroke, TIA, or other arterial embolus.
ANTICOAGULATION CLINIC REFERRAL RENEWAL FORM

I am renewing the referral for ________________________________

DOB ______________________ to be seen in the Anticoagulation Clinic.

This includes standing orders for as needed PT/INR testing.

The patient’s diagnosis for anticoagulation and PT/INR monitoring is ___________

__________________________________________________________________________.

I have reviewed the above diagnoses; and they are the correct and current indications for PT/INR monitoring in this patient.

Date/Time: ______ MD Signature: __________________________ Acct #: __________

Date/Time: ______ MD Signature: __________________________ Acct #: __________

Date/Time: ______ MD Signature: __________________________ Acct #: __________

Date/Time: ______ MD Signature: __________________________ Acct #: __________

Date/Time: ______ MD Signature: __________________________ Acct #: __________

Date/Time: ______ MD Signature: __________________________ Acct #: __________

Date/Time: ______ MD Signature: __________________________ Acct #: __________

FAX BACK TO COUMADIN CLINIC: __________________________
Anticoagulation Clinic Patient Agreement

Patient: ________________________  MRN: ________________________
Doctor: ________________________  Date: _________________________

You have been started on Coumadin (Warfarin) to prevent clot formation in your body. The regulation of Coumadin (Warfarin) is important to your health and can only be done with your complete participation. The team approach is the best approach to help reach your INR goal. Therefore, you have been enrolled in the Coumadin Clinic to monitor your Coumadin (Warfarin) therapy. The INR is adjusted to keep you within the safety range set by your physician.

As a patient in the clinic, you agree to:
1. Take your medication as directed.
2. Have your blood tested as directed by the Coumadin Coordinator, but must be checked at least monthly.
3. Report any changes in all medications (prescription or over the counter), especially antibiotics or pain medications.
4. Call if you have any signs or symptoms of bleeding.
5. Let all your health care providers know that you are taking Coumadin (Warfarin).
6. Your referring physicians will refill all prescriptions for Coumadin (Warfarin).

As the Coumadin Coordinator, I agree to:
1. Monitor your Protime and INR levels.
2. Answer your phone calls within 24 hours.
3. Maintain communication with your physician regarding problems or concerns.

The Anticoagulation Clinic is open Monday through Friday, 7:30 a.m. to 4:30 p.m. The clinic phone number is __________. Any messages left after 4:00 p.m. may not be returned until the next business day. In case of an emergency when the office is closed, please call your physician’s office.

I GIVE THE COAG CLINIC MY PERMISSION TO LEAVE MEDICAL INFORMATION OR INSTRUCTIONS ON MY ANSWERING MACHINE OR WITH A FAMILY MEMBER OR CONTACT PERSONS.

I have read the above and have had the opportunity to ask questions.

________________________________________  ______________________________
Patient                                           Coumadin Clinic Pharmacist
Warfarin Outpatient Initiation Nomogram

The following warfarin initiation guidelines to be used in ambulatory outpatients starting Coumadin primarily with target range of 2 to 3. If target INR is higher, more aggressive dosing at day 6-10 is warranted.

2.5mg nomogram to be considered if patients have one of the following:
- Age greater than or equal to 60 years old.
- H/o warfarin dose less than or equal to 2.5mg daily
- Patient on concurrent medications with severe drug interactions with warfarin (fluconazole, metronidazole, sulfa antibiotics).
- Patients debilitated, malnourished or body weight less than or equal to 60kg
- Patients with liver disease or active congestive heart failure
- Patients with high risk of bleeding
- Patients with baseline INR greater than or equal to 1.4

5mg nomogram to be considered if patients have one of the following:
- Patients less than 60 years old and relatively healthy
- Patients with body weight greater than 60kg
- H/o warfarin dose greater than 2.5mg daily
- Patients on concurrent drugs known to induce warfarin metabolism (rifampin, nafcillin, azathioprine).

**7.5mg initiation dose can be considered if pt is less than 50 years old and has more than one of the following: low bleeding risk, significant drug induction interaction, greater than or equal to 1 pack per day cigarette smoker or significant chewing tobacco user**

<table>
<thead>
<tr>
<th>Initial labs</th>
<th>Warfarin 2.5mg Nomogram</th>
<th>Warfarin 5mg Nomogram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial dose</td>
<td>Baseline INR</td>
<td>Baseline INR</td>
</tr>
<tr>
<td>First INR</td>
<td>2.5mg daily dose</td>
<td>5mg daily dose</td>
</tr>
<tr>
<td></td>
<td>3 days</td>
<td>3 days</td>
</tr>
<tr>
<td>INR less than 1.5</td>
<td>Increase to 5mg daily</td>
<td>Increase to 7.5mg daily</td>
</tr>
<tr>
<td>INR 1.5 to 1.9</td>
<td>Continue 2.5mg daily</td>
<td>Continue 5mg daily</td>
</tr>
<tr>
<td>INR 2 to 3</td>
<td>Decrease to 1.25mg daily</td>
<td>Decrease to 2.5mg daily</td>
</tr>
<tr>
<td>INR 3.1 to 4</td>
<td>Hold 1 dose and decrease to 0.5 to 1mg daily</td>
<td>Hold 1 dose and decrease to 1.25-2.5mg daily</td>
</tr>
<tr>
<td>INR greater than 4</td>
<td>Hold dose 2 days</td>
<td>Hold dose 2 days</td>
</tr>
<tr>
<td>Next INR</td>
<td>2-3 days</td>
<td>2-3 days</td>
</tr>
</tbody>
</table>

- Further dosing adjustment based on average daily dose/total weekly dose for target INR then refer to outpatient chronic dosing nomogram
- INR must be rechecked at least every 2-3 days for first 1 to 2 weeks in new patients until stabilization of INR.
Patients with two consecutive INR’s at 1.8 or 3.2, maintenance dose adjustment will be considered.

If patients INR within normal range will recheck in 1 wk x 2 checks then 2 wks x 2 then 3 wks x 2 then every 4 weeks thereafter if remains stable.

If reason for high /low INR known, and patient has history of stable INR’s, consider giving extra doses and resuming previous stable dose.

If INR is subtherapeutic (INR less than 1.8)
- Patients treated for DVT/PE will be questioned about new or worsening symptoms of shortness of breath, chest pain, coughing up blood, pain or swelling of the legs.
- Patients treated for atrial fibrillation or stroke will be questioned about new or worsening symptoms of numbness, tingling or weakness of their face, arms or legs, loss of decreased vision, slurring of speech or difficulty with speech.
- Patients will be considered for bridge therapy if intermediate to high risk blood clots (See risk stratification protocol)

If INR is supratheraeutic (INR greater than 3.2)
- Patients will be questioned about signs and symptoms of bleeding.
- If bleeding, or high risk of bleeding, vitamin K will be considered and/or ECC visit.
CMC-NorthEast Warfarin Outpatient Chronic Therapy Adjustment Protocol

**Adjust Warfarin dose for INR goal 2.5-3.5**

<table>
<thead>
<tr>
<th>INR</th>
<th>INR</th>
<th>*INR</th>
<th>INR</th>
<th>INR</th>
<th>INR</th>
<th>INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 1.9</td>
<td>2-2.2</td>
<td>2.3-3.7</td>
<td>3.8-4</td>
<td>4.1-4.9</td>
<td>5-8.9</td>
<td>≥ 9</td>
</tr>
<tr>
<td>*Evaluate for Bridge therapy if and discuss with physician.</td>
<td>Hold 1 dose and/or decrease weekly dose 5%</td>
<td>Hold 0-1 dose and/or decrease weekly dose 10-15%</td>
<td>Hold Warfarin, Notify MD of INR &gt;=5 and discuss Vitamin K, 1.25mg-2.5mg po if at increased risk of bleeding.</td>
<td>Hold Warfarin, Notify MD of INR &gt; 5 Consider Vitamin K, 2.5mg-5mg po</td>
<td>Hold Warfarin, Notify MD of INR &gt; 5 Consider Vitamin K, 2.5mg-5mg po</td>
<td></td>
</tr>
<tr>
<td>Extra 1-2 doses and/or increase weekly Warfarin dose by 10-20%</td>
<td>Extra 1-2 doses and/or increase weekly Warfarin dose by 10-15%</td>
<td>Recheck INR 1-4 weeks</td>
<td>Recheck INR 1-2 weeks</td>
<td>Recheck INR 7-10 days</td>
<td>Recheck INR 1-3 days</td>
<td></td>
</tr>
<tr>
<td>Recheck INR 1 week</td>
<td>Recheck INR 1-2 weeks</td>
<td>When INR 2.3-3.7, resume Warfarin at 15-20% lower weekly dose.</td>
<td>When INR 2.3-3.7, resume Warfarin at 20-25% lower weekly dose</td>
<td>Recheck INR 3-4 days</td>
<td>Recheck INR 2-4 days</td>
<td></td>
</tr>
</tbody>
</table>

1. Patients with two consecutive INR’s at 2.3 or 3.7, maintenance dose adjustment will be considered.
2. If patients INR within normal range will recheck in 1 wk x 2 checks then 2 wks x 2 then 3 wks x 2 then every 4 weeks thereafter if remains stable.
3. If reason for high/low INR known, and patient has history of stable INR’s, consider giving extra doses and resuming previous stable dose.
4. If INR is subtherapeutic (INR less than 2.3)
   - Patients treated for DVT/PE will be questioned about new or worsening symptoms of shortness of breath, chest pain, coughing up blood, pain or swelling of the legs.
   - Patients treated for atrial fibrillation or stroke will be questioned about new or worsening symptoms of numbness, tingling or weakness of their face, arms or legs, loss of decreased vision, slurring of speech or difficulty with speech.
   - Patients will be considered for bridge therapy if intermediate to high risk blood clots (See risk stratification protocol)
4. If INR is supratherapeutic (INR greater than 3.7)
   - Patients will be questioned about signs and symptoms of bleeding.
   - If bleeding, or high risk of bleeding, vitamin K will be considered and/or ECC visit.
Anticoagulation Clinic INR Correlation for Hypercoagulable Patients

1. Point-of-care machines do not give accurate readings in some patients with Anticardiolipin Antibody, Lupus Anticoagulant, and Antiphospholipid Antibody Syndrome. The increased INRs are primarily because the antibodies interfere with the test results.

2. Patients with positive results for Anticardiolipin Antibody, Lupus Anticoagulant, and Antiphospholipid Antibody Syndrome on warfarin therapy will have the point-of-care INR correlated with a venipuncture INR and factor two activity level per the following procedure:

Correlation procedure:
- Patients new to warfarin therapy must be stabilized on a warfarin dose per outpatient initiation protocol prior to correlation.
- Patients new to warfarin therapy should have completed bridge therapy prior to correlation.
- Patients will be booked in anticoagulation clinic for point-of-care INR and then sent to the lab for venipuncture INR and factor 2 activity level at same visit.
- INRs will be adjusted using venipuncture INRs until correlation of point-of-care device for patient is verified.
- A minimum of 6 results will be obtained prior to correlation evaluation.

Evaluation of Correlation:
- Results will be plotted out to verify if therapeutic INRs are correlating with therapeutic factor 2 activity levels.

Target Factor 2 Levels are the following:
- Target factor 2 level for INR goal of 2-3 is 15-30%
- Target factor 2 level for INR goal of 2.5-3.5 is 10-25%

- If the patient’s point-of-care INR does not correlate with factor 2 activity levels, patient cannot be checked chronically on point-of-care machine.
- If patient’s venipuncture INR does not correlate with the target factor 2 activity levels, patients INR range will need to be individualized to level that provides adequate anticoagulation beyond the normal INR ranges.
- Results of correlation will be discussed with physician and decisions made based on individual results for future monitoring of anticoagulation.
- Patients should have correlation repeated at a minimum every 12 months or as determined by pharmacist or physician if patients clinical condition changes or if INR results start to become variable.
- All results, follow-up, and physician discussion will be documented in anticoagulation monitoring software.

3. Patients with positive results for Anticardiolipin Antibody, Lupus Anticoagulant, and Antiphospholipid Antibody Syndrome on warfarin therapy should be re-tested to confirm presence of antibodies every 6-12 months and if still positive, the correlation should be completed again at that time.
Education
Anticoagulation Therapy

Wafarin (Coumadin®)

Patient Information Pamphlet

Patient Name: ___________________________

Patient Room# ___________________________________

Diagnosis: ___________________________________

Target INR: ___________________________________

Carolinas Medical Center NorthEast

Uncompromising Excellence. Commitment to Care.
What are anticoagulants?
Anticoagulants, such as warfarin, decrease the clotting ability of the blood and help prevent harmful clots from forming in your blood vessels. Often referred to as “blood thinners”, they do not actually thin the blood. They are used to prevent the formation of clots which have been associated with medical conditions such as deep vein thrombosis (blood clots in the legs) and pulmonary embolism (clots in the lungs). Warfarin is also used to prevent clots in patients with heart valve replacements and with an abnormal heart rhythm called “atrial fibrillation”.

How is warfarin (Coumadin®) monitored?
INR or “International Normalized Ratio” is used to evaluate how long it takes for the blood to clot. Your dosage of warfarin may be adjusted based on these results. Doses can range from 0.5 mg to 20 mg per day. Regular laboratory monitoring will prevent blood clots from forming and will decrease bleeding problems. Initially, the INR will be checked once or twice weekly. As the INR and dose of warfarin stabilizes, the blood test will usually be done every four weeks for as long as you are on the medication.

How do I take warfarin (Coumadin®)?
Take the medication only as directed by your health care provider or pharmacist. Anticoagulation is an extremely delicate process. Relatively small changes in dose can make a big difference. Taking more than directed can increase your chance of serious bleeding. Taking less or stopping the medication could cause your blood to clot, resulting in a stroke, heart attack or other serious problems.
• Know the strength of your warfarin dose or know the color of your warfarin tablet.
• Take your warfarin once each day at the same time.
• If you miss a dose, take it as soon as possible if you remember the same day. However, if you do not remember until the next day, do no take the missed dose at all, but continue with your usual prescribed dose.
• Be sure to let your doctors, pharmacists and dentists know you are taking warfarin.
• Store this medication out of the reach of children.
• In prescribing your anticoagulant dosage, the goal is to produce an INR which prevents too much clot formation and at the same time does not allow excess bleeding.
• If you have any questions or if you want more information about this medication, please ask your health care provider or pharmacist.
Where should my INR number be?

INR values show the ability of your blood to clot:

- **Too thin** - bleed easier
- **Too thick** - risk of clot

**Most patients** (2.0 - 3.0):
- May need to increase Coumadin dose
- Too thick - risk of clot

**Mechanical Valve patients** (2.5 - 3.5):
- May need to increase dose
- Too thick - bleed easier

**Things that can make INR decrease:**
- Missing 1 or more doses
- Extra green, leafy vegetables
- Certain medications (like antibiotics)
- CHF worsening
- Other illnesses
- Increased alcohol

**Things that can make INR increase:**
- Illness
- Diarrhea
- Nausea/vomiting
- Fever > 100
- Certain medications
- Eating fewer green, leafy vegetables
- CHF worsening
- Increased alcohol
- Certain medications (like antibiotics)

Deanna Hansen, Pharm D
What are the side effects of warfarin (Coumadin®)?
Since anticoagulants decrease blood clotting, you may bleed more easily. Don’t be alarmed but call your doctor or Anticoagulation Clinic promptly if you develop any of the following:

1. Excessive bruising.
2. Excessive or prolonged nosebleed or excessive bleeding from the gums.
3. Urine which is any color other than clear or yellow.
4. Bleeding from your rectum or having black, tarry stools.
5. Coughing up blood.
6. Vomiting bright red blood or coffee ground appearing vomit.
7. Unusual pain and/or swelling around joints.
8. A severe or new, prolonged headache.
9. Severe or new stomach or back pain or swelling of the abdomen.

What are the common medication that interact with warfarin (Coumadin®)?
Many medications (both prescription and OTC) interact with warfarin. Always ask the doctor or pharmacist before taking any new medications, or before you stop taking any other medications.

You should always read the labels of all medications before you take them. In general, avoid medications that contain Aspirin, unless prescribed by your doctor.

Medications that contain pain relivers or anti-inflammatories similar to aspirin such as ibuprofen, naproxen or ketoprofen should also be avoided unless approved by your doctor.

Aspirin-free products, such as Tylenol® (acetaminophen), are preferred for the treatment of pain or headaches. However, large doses of acetaminophen may increase the INR. Limit the amount you take to no more than 6 or 7 regular strength tablets a week. If you use higher doses, try to take the same amount from week to week.

Common Medications that affect Warfarin

<table>
<thead>
<tr>
<th>Advil</th>
<th>Empirin</th>
<th>Aleve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excedrin PM</td>
<td>Alka-Selter</td>
<td>Goody’s Powders</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>Midol</td>
<td>Anacin</td>
</tr>
<tr>
<td>Motrin</td>
<td>Certain Antibiotics</td>
<td>Nuprin</td>
</tr>
<tr>
<td>Ascriptin</td>
<td>Pepto-Bismol</td>
<td>Aspergum</td>
</tr>
<tr>
<td>Orudis</td>
<td>Bayer Aspirin</td>
<td>Questran</td>
</tr>
<tr>
<td>BC Powders</td>
<td>Sine-Off Sinus</td>
<td>Bufferin</td>
</tr>
<tr>
<td>Tagamet</td>
<td>Ecotrin</td>
<td></td>
</tr>
</tbody>
</table>

*Multivitamins (may contain vitamin K)
What can I eat while I am taking warfarin (Coumadin®)?
Keep your diet consistent, especially the amount of green vegetables you eat. Foods high in vitamin K, such as those listed below may be eaten as long as the amounts remain the same from week to week. 1 portion = 2/3 cup.

<table>
<thead>
<tr>
<th>Low in Vitamin K</th>
<th>Moderate in Vitamin K</th>
<th>High in Vitamin K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>Celery, raw (2.5 stalks)</td>
<td>Brussel Sprouts</td>
</tr>
<tr>
<td>Soda</td>
<td>Lettuce (iceberg)</td>
<td>Broccoli</td>
</tr>
<tr>
<td>Fruit drinks</td>
<td>Okra</td>
<td>Cabbage</td>
</tr>
<tr>
<td>Cereals &amp; Grain products</td>
<td>Squash (summer, peel only)</td>
<td>Canola Oil</td>
</tr>
<tr>
<td>Honey</td>
<td>Asparagus</td>
<td>Coleslaw</td>
</tr>
<tr>
<td>Jelly</td>
<td>Beef chow mein</td>
<td>Endive</td>
</tr>
<tr>
<td>Syrup</td>
<td>Margarine</td>
<td>Lettuce</td>
</tr>
<tr>
<td>Most desserts</td>
<td>Salad dressing, French</td>
<td>Mayonnaise</td>
</tr>
<tr>
<td>Eggs</td>
<td>Apple (green peel)</td>
<td>Parsley, raw</td>
</tr>
<tr>
<td>Apple (red peel)</td>
<td></td>
<td>Pistachio Nuts</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td>Sauerkraut, cooked</td>
</tr>
<tr>
<td>Dairy products</td>
<td></td>
<td>Soybean Oil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spring Onions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Swiss Chard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watercress, raw</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black &amp; Green tea leaves</td>
</tr>
<tr>
<td></td>
<td>Very HIGH Vitamin K</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beet Greens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collard Greens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mustard Greens, cooked</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spinach, cooked</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turnip greens</td>
<td></td>
</tr>
</tbody>
</table>

Avoid “binge” eating or “crash” diets. Inform your doctor or anticoagulation clinic about any major changes in your food intake, such as decreased appetite or weight reduction diets.
Alcohol Restrictions
Alcohol can cause changes in INR values. Therefore, alcohol should be avoided completely. If this is not possible, you need to be honest with your doctor or anticoagulation clinic staff about your usual intake of alcohol and any deviation from normal. Most important – avoid “binge” drinking.

Herbal Medicines
You should be aware that many herbal or “natural” products may contain ingredients that affect your response to warfarin. Do not start or stop any herbal products without letting your doctor or anticoagulation clinic know. Your INR may need to be checked more frequently than normal.

Changes in General Health
It is important to inform your doctor or anticoagulation clinic staff if you have any of the following:
• Rapid changes in weight caused by illness with loss of appetite.
• Prolonged nausea, vomiting or diarrhea.
• Fever.

Safety Precautions
A normal lifestyle is possible while taking warfarin. However, because you bleed and bruise more easily, you should avoid contact sports or activities where there is a high risk of injury.

How can I alert others that I am on warfarin (Coumadin®)?
It is very important that you wear a medic alert tag and carry an ID card indicating you are on warfarin in case you become injured or unconscious. If you carry a medication list, make sure it has a complete list of your current medications listed on it.

What if I become pregnant while on warfarin (Coumadin®) therapy?
Warfarin is not recommended during pregnancy, especially during the first trimester, because of increased risk of miscarriage or birth defects.

If you are on warfarin and are pregnant or plan to become pregnant you should speak to your doctor about your options.

Lovenox® (enoxaperin) injections may be an option instead of warfarin during pregnancy.
What if I need to stop taking warfarin (Coumadin®) for a surgery or procedure?

- It is important that you make sure the doctor who will be performing your surgery/procedure and the doctor who prescribed your Coumadin are both aware that you are on this medication and will be having surgery/procedure.

- For surgery and many other procedures you may need to come off Coumadin. This may be for 3-7 days prior to surgery depending on what type of procedure you are having done. The doctor who will be performing the surgery/procedure will let you know how long you need to be off the medication.

- During the time that you are off Coumadin you may have to get Lovenox® (enoxaparin) injections before and/or after the procedure. This is something you should ask your anticoagulation clinic or doctor about.

Where can I find more information?

- www.coumadin.com
- www.nattinfo.org
- www.webmd.com
Length of Treatment
Length of treatment for Venous Thromboembolic Disease

More than one spontaneous event
Or
One spontaneous life-threatening event, near fatal pulmonary embolism or cerebral/mesenteric/portal venous thrombosis
Or
One spontaneous event in association with antiphospholipid antibody syndrome, antithrombin deficiency, Protein C deficiency, Protein S deficiency or homozygous factor V Leiden or double heterozygosity for Factor V Leiden plus Factor II 20210A mutation

Yes

Indefinite anticoagulation
INR ≥ 2.3

No

See Page 40
First episode of venous thromboembolism

Any trigger factors present such as:
- Major surgery (especially orthopedic surgery)
- Estrogen administration
- SERMS
- Active malignancy
- Nephrotic syndrome
- Inflammatory bowel disease
- Long-distance air travel
- Muscle trauma
- Pregnancy
- Immobilization
- Fracture(s) of lower extremity

Yes

Is trigger factor transient?

Yes

Anticoagulation for 3-6 months

No

Indefinite anticoagulation

No (i.e. it’s a spontaneous VTE)

Anticoagulation for 6 months

Obtain follow up Doppler ultrasound of legs, D-Dimer, Factor VIII activity and Factor XI activity

Discuss with patient discontinuing anticoagulations with a 5-15% risk of recurrent event in one year and 25% risk in 5 years (risk is lower if D-dimer negative, no residual clot present [defined as <60% luminal obstruction], if patient is female, if factors VIII, XI are not elevated, and may be VTE was triggered by OCP or HRT.

Patient is low risk and/or wishes to stop anticoagulation

Stop anticoagulation

Consider long-term full dose warfarin, INR = if risk factors for higher recurrence rate are present.

Consider low intensity anticoagulation

INR = 1.5-20
Bridging
Risk Stratification Guideline for Thromboembolic Events

General Guidelines
- The following is a list of examples to help determine a patient’s risk for thromboembolism for patients in the peri-procedural period.
- All patients will have to be assessed on an individual basis based on procedure planned, past medical history, current clinical condition, risk of bleeding, blood clots and/or stroke.
- The risk categories below are not all-inclusive and should be used only as a guideline.

Procedural Bleeding Risks

Lower Risk
- Patients are recommended to continue warfarin therapy around the time of the procedure for minor dermatological procedures and cataract removal due to the low risk of bleeding (Grade 1C).
- Patients are recommended to continue warfarin therapy for minor dental procedures and co-administer an oral hemostatic agent if bleeding suspected. (Grade 1B).

Higher Risk
- Post-operative anticoagulation should be administered with caution in the following surgical procedures which are associated with the highest bleeding risk: coronary artery bypass, valve procedures, intracranial and spinal surgery, major vascular surgery, major orthopedic surgery, and major cancer surgery and prostate and bladder surgery.

Patient Risk Stratification for Arterial or Venous Thromboembolism

<table>
<thead>
<tr>
<th>Risk Stratification</th>
<th>Indications for VKA therapy</th>
<th>Atrial Fibrillation</th>
<th>Venous Thromboembolism</th>
</tr>
</thead>
</table>
| **High Risk** (>10% per year) | • Mitral Valve Prosthesis  
• Caged Ball or Tilting Disc Aortic Valve Prosthesis  
• Stroke or TIA within 6 mos | • CHADS₂ score of 5 or 6 Stroke or TIA within 3 months  
• Rheumatic valvular heart disease | • VTE within 3 months  
• Severe thrombophilia (deficiency of protein C, protein S, antithrombin, antiphospholipid antibodies or multiple abnormalities) |
| **Moderate Risk** (4 to 10% per year) | • Bileaflet aortic valve prosthesis and one of the following: atrial fibrillation, prior stroke or TIA, hypertension, diabetes, CHF, age >75 | • CHADS₂ score of 3 or 4 | • VTE within the past 3-12 months  
• Non-severe thrombophilia conditions (heterozygous factor V Leiden mutation, heterozygous factor 2 mutation)  
• Recurrent VTE  
• Active Cancer treated within last 6 months or palliative |
| **Low Risk** (<4% per year) | • Bileaflet aortic valve prosthesis without atrial fibrillation and no other risk factors for stroke | • CHADS₂ score of 0 to 2 and no prior stroke or TIA  
• Single VTE occurred >12 months ago and no other risk factors |

(CHA2DS2 point scoring for atrial fibrillation stroke risk: CHF hx +1; HTN hx +1; Age greater than or equal to 75 years old +1; DM hx +1; Stroke or previous TIA hx +2)

Recommendations for Bridge Therapy:
- **HIGH RISK**- Therapeutic dosing of Low Molecular Weight Heparin or IV Unfractionated Heparin (Grade 1C)
- **MODERATE RISK**- Therapeutic dosing of Low Molecular Weight Heparin, IV Unfractionated Heparin or low-dose LMWH(Grade 2C).
- **LOW RISK**- Low dose Low Molecular Weight Heparin or no bridge therapy (Grade 2C)

*adapted from Ansell J et al. Chest 2008; 133 (suppl):229S-339S*
Anticoagulant Bridge Therapy for sub-therapeutic INR values

1. The pharmacist will recommend bridge therapy to the referring physician per the protocol guidelines if the patient’s INR is sub-therapeutic, and moderate to high risk for blood clots.

2. The physician will give a verbal order to start the patient on lovenox once daily, twice daily or fondiparinux bridge therapy. Decisions and recommendations will be based on patient parameters.

3. The physician will be asked to send a follow-up written order for “bridge therapy per protocol” to the clinic immediately prior to the bridge therapy being set up or sign the bridge therapy form.

4. The pharmacist will complete the “anticoagulation bridge therapy for low INR” protocol sheet when starting bridge therapy.

5. The patient’s current height, weight, and labs (to include platelet count, serum creatinine) will be obtained. Labs obtained in last 30 days can be used as baseline values for the patient. The estimated creatinine clearance will be calculated using the adjusted body weight. The estimated creatinine clearance will be calculated using the adjusted body weight.

6. The patient’s dose of enoxaparin or fondiparinux will be determined by the patient’s current weight, estimated renal function and indication for anticoagulation.

7. The dose of the enoxaparin will be 1mg/kg subq bid or 1.5mg/kg subq daily. The dose of enoxaparin will automatically be adjusted for patient’s current renal function estimated by creatinine clearance.

8. The fondaparinux will be dosed at 5mg once daily for patients <50kg, 7.5mg once daily for patients weighing 50-100kg, or 10mg once daily for patients weighing >100kg. The dose of the fondaparinux is based strictly on weight and contraindicated for patients with estimated creatinine clearance less than 30 and used with caution in patients with creatinine clearance less than 50.

9. The patient will either self inject the enoxaparin or fondiparinux, be sent to the infusion center for injections (private referral), or have home health for labs and medication injections.

10. If the patient chooses to self inject the enoxaparin or fondiparinux, the prescription will be called to their pharmacy for pickup. The patient must have the INR checked daily at the outpatient lab.

11. For patients on bridge therapy, a daily INR will be ordered unless special circumstances warrant the INR to be checked less often. Documentation of situation and physician approval should be completed.

12. Patients on lovenox should also have baseline and platelets checked every other day, unless specified by the physician while on the bridge therapy. Patients on fondiparinux should also have platelets checked periodically especially if long term usage. The MD will be called for platelet count less than 100,000 or less than 50% of baseline values.

13. If the patient will be going to the infusion center, an appointment will have to be arranged with the staff at the infusion center via a phone call.

14. The clinic pharmacist will obtain the INR via the hospital lab system daily while patient on bridge therapy and adjust INR per the protocol.
15. The patient will be called daily with dose and follow-up instructions by the pharmacist. The patient will continue on bridge therapy with daily labs until the INR is therapeutic x 1 day unless otherwise specified by the physician. After the patient has finished bridge therapy, an appointment for follow-up will be made based on current and previous stability of INR, patient parameters and other factors that can influence the decision for follow-up based on current adjustment protocol guidelines.
CMC-NE ANTICOAGULATION CLINIC BRIDGE THERAPY FOR LOW INR

Clinic Location:________ Person completing form:________ Date:____________

Patient Name:______________________ Phone #:______________

DOB:_________ Referring Physician:________________________

Patient Parameters/ Baseline Labs:
Ht:_____________  Wt:___________    IBW:___________     Albumin:_______
Last labs date:___________
Baseline Platelet:_________________   Scr:____________ Est Crcl:_________

Anticoagulation Indication:_________________________________________

Today’s INR:_____________  INR goal:___________

Risk for Thromboembolic Events
  □ High Risk
  □ Moderate Risk
  □ Low Risk (usually no bridge therapy needed)

Enoxaparin (Lovenox) Bridge Therapy
  □ 1.5mg/kg day       □ 1mg/kg twice daily
  (renal adjustments made for patients with GFR/ecc less than /equal to 30ml/min)
  Lovenox Dose:________________________________________

Or

Fondaparinux (Arixtra) Bridge Therapy
* contraindicated in patients with ECC less than 30 / use with caution ECC less than 50*
  □ 5mg once daily  (weight <50 kg)
  □ 7.5mg once daily (weight 50-100 kg)
  □ 10mg once daily  (weight >100 kg)

Enoxaparin (Lovenox) Administration
  □ Private Referral       □ Home Health       □ Patient Self-Injects at home
  Patient educated by:__________

Warfarin (Coumadin) therapy to be continued by the Coumadin Clinic.

Labwork
  1. Daily pt/inr until therapeutic x 1 day unless otherwise specified by md.
  2. Platelets □ Daily Platelets □ Every other day platelets □ Mon/Wed/Fri
  3. Labwork Location
     □ Private Referral orders faxed:______________
     □ NEMC Outpatient lab orders faxed:______________
     □ Home health orders faxed:______________
     □ Coumadin Clinic (finger stick for INR/will still need plt monitoring from lab)

Physician Signature:_____________________________ Date/Time:__________

Pharmacist:_____________________________ Date/Time:__________
Peri-Procedural Anticoagulant Bridge Therapy

1. The pharmacist will recommend bridge therapy for upcoming procedure to the referring physician per the protocol guidelines if the patient is moderate to high risk for blood clots.

2. The physician will give a verbal order to start the patient on bridge therapy with lovenox once daily, twice daily or fondiparinux bridge therapy. Decisions and recommendations will be based on patient parameters.

3. The physician will be asked to send a follow-up written order for “bridge therapy per protocol” or sign the bridge therapy form prior to the bridge therapy being set up.

4. The pharmacist will complete the Peri-procedural thromboembolic prophylaxis protocol order sheet.

5. The patients current height, weight, and labs (to include platelet count, serum creatinine) will be obtained at baseline. Labs obtained in last 30 days can be used as baseline values for the patient.

6. The estimated creatinine clearance will be calculated using the adjusted body weight. The pharmacist will automatically adjust the enoxaparin dose for creatinine clearance less than 30 ml/min.

7. Fondiparinux should not be used in patients with creatinine clearance less than 30 and/or wt less than 50kg and used with caution in patients with creatinine clearance less than 50.

8. Patients on lovenox should also have baseline and Platelets checked every other day unless specified by the physician. Patients on fondiparinux should also have platelets checked periodically especially if long term usage. The MD will be called for platelet count less than 100,000 or less than 50% of baseline values.

9. Warfarin will be stopped approximately 5 days prior to the procedure unless otherwise noted by the physician. The enoxaparin and fondiparinux will be started 2 days after stopping warfarin unless noted otherwise by physician.

10. The last dose of enoxaparin prior to the procedure will be 50% of ordered dose and it will be given approximately 24 hours prior to procedure. The last dose of fondiparinux will be determined by the procedural physician prior to the procedure.

11. Enoxaparin and Fondiparinux will be resumed 24-72 hours after procedure or as specified by the procedural physician. Warfarin will resume the night of the procedure unless otherwise specified by the procedural physician.

12. Post-procedure, the platelet count will be resumed every other day unless specified by the physician, starting after the procedure. The daily INR will resume the day after the procedure.

13. The enoxaparin/fondiparinux will be continued until the INR is therapeutic for indication for one day unless otherwise specified by referring physician.
14. The patient will either self inject the enoxaparin or fondiparinux, be sent to the infusion center for injections ( private referral ), or have home health for labs and medication injections. If the patient chooses to self inject the enoxaparin or fondiparinux, the prescription will be called to their pharmacy for pickup. The patient must have the INR checked daily at the outpatient lab.

15. A daily INR will be ordered and Platelet checks every other day unless specified by the physician, if on enoxaparin, while on the bridge therapy. If the patient will be going to the infusion center, an appointment will have to be arranged with the staff at the infusion center via a phone call.

16. The clinic pharmacist will obtain the INR via the hospital lab system daily while patient on bridge therapy and adjust INR per the protocol. The patient will be called daily with dose and follow-up instructions by the pharmacist. The patient will continue on bridge therapy with daily labs until the INR is therapeutic x 1 day unless otherwise specified by the physician.

17. After the patient has finished bridge therapy, an appointment for follow-up will be made based on current and previous stability of INR, patient parameters and other factors that can influence the decision for follow-up based on current adjustment protocol guidelines.
Anticoagulation Clinic
Peri-procedural Thromboembolic Prophylaxis Protocol

Patient Name: ___________________________ Last 4 digits SS#:___________ DOB________
Anticoagulation Indication:_________________________ Target INR range:_____________________
Reffering Physician: _________________ Phone # _________________ fax#__________________

Type of Procedure:_________________________ Date/Time of Procedure:____________________
Procedure physician:_______________________ Phone # __________________ Fax #______________

Patient Information and Baseline labs:
Ht: ________  Wt: ________ Baseline Platelet_________    GFR:_____ml/min
Risk for VTE :  
❑ HIGH RISK  ❑ MODERATE RISK  ❑ LOW RISK

Pre-procedure:
• Baseline labs: ❑ Serum creatinine     ❑ platelet count      Date for baseline labs:____________________
   ➢ Every other day platelet starting Date:_________. (call MD if platelet count <50% baseline or <100,000)
   ➢ Warfarin to stop 5 days prior to procedure. Last dose of warfarin on Date: _____________________.
   ➢ Start Enoxaparin 2 days after stopping warfarin. Dose:___________ Start Date:______.
   >> Last dose of Enoxaparin (50% of dose) 24 hrs prior to procedure. Dose:___________ Date:______.
   or
   ➢ Start Fondaparinux 2 days after stopping warfarin. Dose:___________ Start Date:______
   >> Last dose of Fondaparinux to be determined by MD. Date:____________.

High Risk:  Enoxaparin ❑ 1.5mg/kg/day or ❑ 1mg/kg q12h ❑ 1mg/kg daily (crcl < 30ml/min)
            Fondaparinux ❑ 5mg/day ❑ 7.5mg/day ❑ 10mg/day
Moderate Risk:Enoxaparin ❑ 1.5mg/kg/day
            ❑ 1mg/kg q12h (1mg/kg daily if GFR less than 30.)
            ❑ 40mg daily (30mg/day if GFR less than 30)
            Fondaparinux ❑ 2.5mg/day ❑ 5mg/day ❑ 7.5mg/day ❑ 10mg/day
Low Risk:   ❑ Enoxaparin 40mg/day (30mg daily if GFR less than 30)
            ❑ Fondaparinux 2.5mg daily
*Fondaparinux should be used with caution in pts with crcl less than 50 and contraindicated in patients with crcl less than 30 and wt less than 50kg

➢ Resume every other day platelet counts Date:______________.
➢ Resume daily INR starting Date:_____________________.
➢ Resume Warfarin Date:_________________________ Dose:______________________.
➢ Resume Enoxaparin/Fondaparinux 24-72 hrs after procedure or as specified by MD. Date ________.
➢ Continue Enoxaparin/Fondaparinux until INR is therapeutic for indication with goal INR of ________.

Enoxaparin/Fondaparinux Administration:
❑ Patient self-injects
   ➢ INR to be checked at the following lab location:_________________ ❑ faxed lab orders
   ➢ Pharmacy ____________________ phone #:_____________________ ❑ Lovenox RX called in
❑ Private Referral Infusion Center ❑ Other __________________ Date faxed orders:______________
Patient instructed on orders. Date:____________________Signature:________________________
Physician Signature:_________________________ Date:________________________

Anticoagulation Clinic Patient Instruction Sheet for Bridge Therapy

Clinic Name and Phone Number: ________________________________
_______________________________________________________________________

Patient Name: ____________________________ DOB: __________
Date and time of Procedure: ________________________________

Pt will be on the following medication for bridge therapy:
☐ Enoxaparin (Lovenox)  ☐ Fondaparinux (Arixtra)

Fondaparinux/Enoxaparin will be given by:
Private Referral / Self Administration / Home Health / Other__________ (Circle One)

Date: ______________ Last dose of warfarin (Coumadin)

Date(s): ______________ Start enoxaparin (Lovenox)/fondaparinux (Arixtra)

Date/Time: ______________ Last dose of enoxaparin (Lovenox) - which will be 50% of dose 24 hrs prior to procedure
or
Date : _______________ Last dose of Fondaparinux (Arixtra)

Date: ______________ Procedure Date – No lovenox or fondaparinux this day

Date: ______________ Restart warfarin (Coumadin) at _____mg in pm.

Date: ______________ Restart enoxaparin (Lovenox) with daily / every other day (circle one) INR and Platelets until INR is greater than or equal to _______.
Or
Date: ______________ Restart fondaparinux (Arixtra) with daily INR until INR is greater than or equal to _______.

Additional Instructions: ____________________________________________________________
Vitamin K Administration
Guidelines for the Administration of Vitamin K

1. Oral vitamin K is the preferred treatment for managing patients with elevated INRs. Studies have shown oral vitamin K to correct the INR more rapidly than intravenous or subcutaneous routes without an overcorrection. Vitamin K is available as a 5mg tablet or parenteral 1mg ampule that can be given orally.

2. Subcutaneous routes of administering vitamin K are not recommended because of erratic absorption that is unpredictable and delayed allowing patient to be at increased risk of bleeding.

3. IM routes of administering vitamin K are not recommended because of decreased absorption and sometimes delayed effects. Patients are also at risk for injection site hematoma or delayed skin reactions 4-5 days after exposure.

4. Vitamin K should never be given as IV push. Intravenous (IV) doses of 10-20mg can cause hypersensitivity reactions or anaphylaxis. If given IV, must give as slow infusion no faster than 1mg/min and benefit must outweigh the risk.

5. High Vitamin K doses can result in overcorrection of the INR with a subsequent increase in clotting risk and warfarin resistance for up to a week.

Nomogram for Managing Patients with High INR values

<table>
<thead>
<tr>
<th>INR Values</th>
<th>Clinical Setting</th>
<th>Action/Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>INR greater than therapeutic, but less than 5</td>
<td>Reversal for urgent procedure</td>
<td>Hold warfarin and vitamin K 1.25 mg po x 1 dose with expectation that INR reduction will occur in 24 hours. If INR still elevated in 24 hours, may administer additional vitamin K 1.25mg po.</td>
</tr>
<tr>
<td>INR of 5 to 8.9</td>
<td>Reversal for urgent procedure</td>
<td>Hold 1-2 doses of warfarin until INR in therapeutic range and resume at lower warfarin dose. If patient at increased risk of bleeding, omit dose and consider vitamin K 1.25 to 2.5mg po x 1 dose.</td>
</tr>
<tr>
<td>INR greater than or equal to 9</td>
<td>Reversal for urgent procedure</td>
<td>Hold warfarin AND give vitamin K 2.5-5mg po x 1 dose with expectation that INR reduction will occur in 24 hours. If INR still elevated in 24 hrs, may give additional vitamin K 1.25-2.5mg po.</td>
</tr>
<tr>
<td>Any INR</td>
<td>Serious or Life Threatening Bleeding</td>
<td>Hold warfarin and give vitamin K 10mg IV slow infusion supplement with FFP and consider Recombinant Factor VIIa. Monitor INR frequently and vitamin K can be repeated q12h. (Recombinant Factor VIIa dose: 90mcg/kg every 2 hours until hemostasis established or therapy judged ineffective).</td>
</tr>
</tbody>
</table>

References
References


Cedars-Sinai Medical Center Pharmacist-Managed Warfarin Dosing Protocol.


University of NC General Internal Medicine Anticoagulation Algorithm.
References: This document is part referenced to the following material:


Cedars-Sinai Medical Center Pharmacist-Managed Warfarin Dosing Protocol.


University of NC General Internal Medicine Anticoagulation Algorithms.

University of New Mexico Anticoagulation Algorithms.

Argatroban® manufacturers package insert.

www.lexicomp.com

Updated by Tina G. Hipp, PharmD, BCPS 3-20-2012