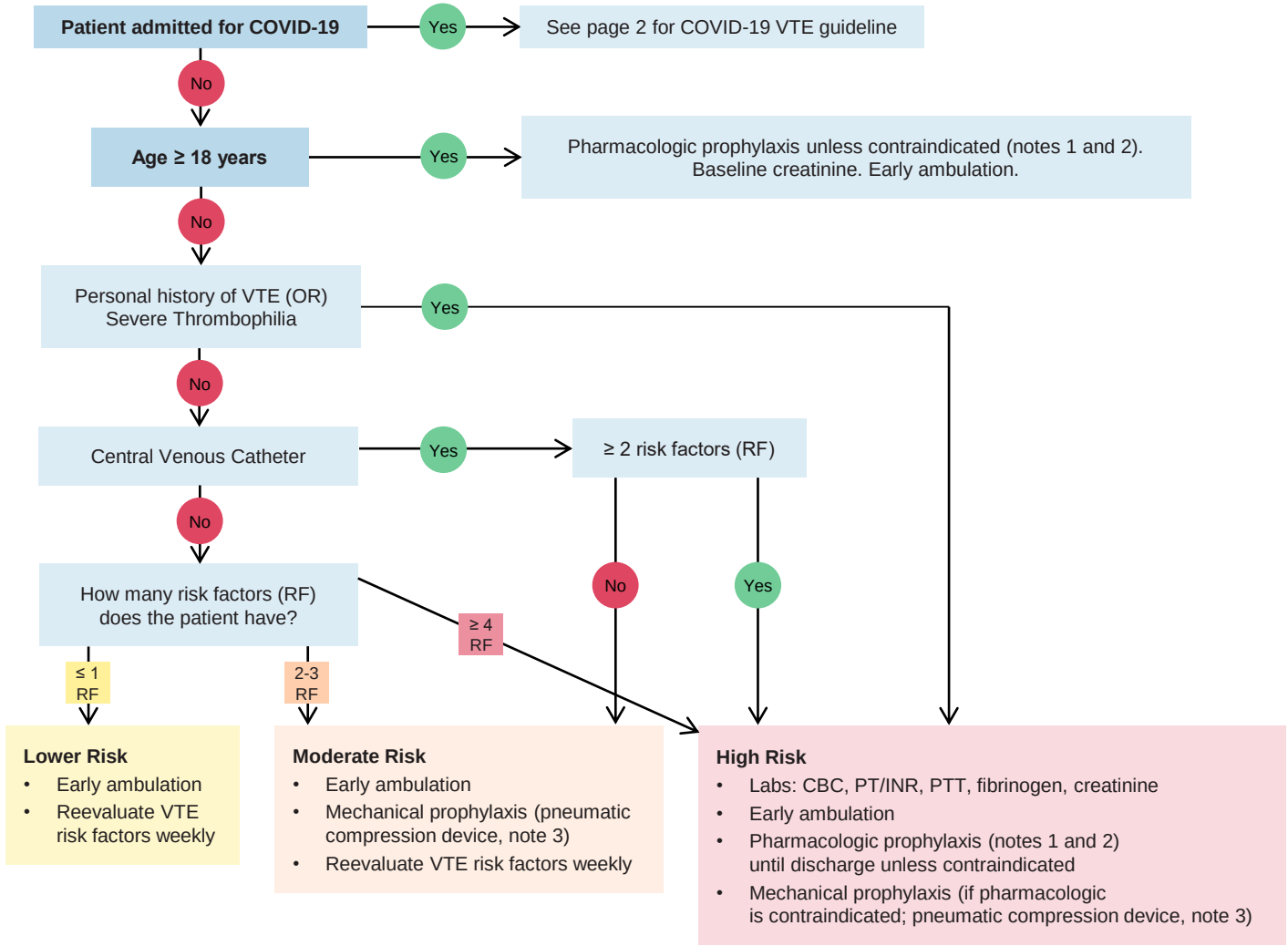
HOSPITAL GUIDELINE

VTE RISK STRATIFICATION
(AGE > 6 MONTHS)

Children's MINNESOTA

Aim: To standardize risk screening and prophylaxis for VTE in hospitalized patients.



RISK FACTORS (RF)

- 1st degree relative with VTE
- Asparaginase within 30 days
- Autoimmune disease
- Brain Injury
- Burn
- Cardiac disease (involving dilated cardiomyopathy, atrial fibrillation, single ventricle pathology, or palliative surgical shunts)
- DKA
- Estrogen-containing medications
- Glasgow Coma Score < 8
- Immobility > 3 days
- Infection (severe and active)
- Inflammatory disease
- Inotropes/Vasopressors, current
- Malignancy, active
- Mechanical ventilation/intubation
- Nephrotic syndrome
- Obesity (BMI > 30 or > 95th percentile)
- Ortho surgery involving immobility
- Smoker
- Spinal cord injury (< 6 weeks from injury)
- Stroke, personal history of
- Surgery, major and within 2 weeks
- Thrombophilia, confirmed
- TPN for more than 2 weeks

Of note, trauma is a risk factor; however, trauma patients are excluded from this guideline and provider should use "VTE Prophylaxis in Trauma Patients (>12 years)" instead.

SEVERE THROMBOPHILIA

- Antiphospholipid Antibody Syndrome
- Antithrombin deficiency
- Homozygous Factor V Leiden
- Homozygous Prothrombin mutation
- Protein C deficiency
- Protein S deficiency

EXCLUSION GUIDELINES

Patients **excluded** from this guideline:

- Identified thrombus or VTE
- ≤ 6 months age
- NICU patients (young infants are also at risk for VTE, however this was out of scope for guideline due to lack of studies on pharmacologic interventions)
- Mental health or disordered eating (e.g., CTED program) related admissions
- Trauma admissions/consultations (see separate guideline titled "VTE Prophylaxis in Trauma Patients (>12 years)")
- COVID-19 patients in OBSERVATION status with mild illness. See page 2 for non-observation status.

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HOSPITAL GUIDELINE

VTE RISK STRATIFICATION IN COVID-19+ PATIENTS
(AGE > 6 MONTHS)

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Hospitalized (inpatient/ICU status*) patient positive for COVID-19?

Yes → **Age ≥ 12 years**

Yes → Start pharmacologic thromboprophylaxis unless contraindicated (note 1 and 2). Baseline labs: PT/PTT/fibrinogen, BMP, CBC. Early ambulation.

No → Refer back to page 1 or off guideline. If patient admitted for COVID-19 in observation status and this changes to inpatient, please re-evaluate on guideline.

No → Assess risk factors

Lower Risk:
No additional risk factors
Not critically ill

1. Early ambulation
2. Mechanical prophylaxis (note 3)

Moderate Risk:
1-2 additional risk factors
Not critically ill

1. Baseline labs: BMP, CBC, PT/PTT/fibrinogen, d-dimer.
2. Early ambulation
3. Mechanical prophylaxis with pneumatic compression device (note 3)
4. Discuss with Hematology possible pharmacologic thromboprophylaxis

High Risk: any of the following:

1. Critically ill
2. Multi-system inflammatory syndrome
3. Multiple risk factors (≥3)
4. Previous VTE or clot
5. Severe Thrombophilia

1. Baseline labs: PT/PTT/fibrinogen, BMP, CBC, d-dimer.
2. Early ambulation
3. Pharmacologic prophylaxis (notes 1 and 2) unless contraindicated (discuss with hematology)
4. Mechanical prophylaxis (if pharmacologic is contraindicated): pneumatic compression device (note 3)

RISK FACTORS

Reassess Q 24-48 hr to determine need to start/continue or discontinue prophylaxis

Pre-existing conditions
1st degree relative with VTE (before 50 yr)
Inflammatory disease
Autoimmune disease
Nephrotic syndrome
Congenital heart disease (uncorrected)

Current Medical Problems
Malignancy
Co-infection (in addition to COVID-19)
Major surgery
Major trauma and/or burn
Immobility >3 days
Pregnancy
Obesity (BMI>30 or > 95%ile)
Smoker

Medications
Estrogen-containing medications
Asparaginase within 30 days
Prolonged steroids

Iatrogenic Issues
Shunt or stent or artificial valve
Central venous catheter/PICC

Lab Abnormalities
Elevated D-Dimer >5xULN (upper limit of normal) may indicate increased risk. Discuss with Hematology if no other risk factors to prompt prophylaxis

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NOTE 1

Pharmacologic prophylaxis options:

LMWH-enoxaparin, or unfractionated heparin, see hospital policy 322

- **< 60 kg:** Enoxaparin 0.5 mg/kg/dose subQ q12 hours. Pharmacy to monitor and titrate.
- **≥ 60 kg:**
  - ≥ 60 kg with BMI ≤ 30 kg/m2 AND no renal dysfunction: Enoxaparin 40 mg subQ q24 hours. No levels.
  - ≥ 60 kg with BMI 31-40 kg/m2 OR renal dysfunction: Enoxaparin 30 mg subQ q12 hours. Pharmacy to monitor and titrate
  - ≥ 60 kg with BMI > 40 kg/m2 AND no renal dysfunction: Enoxaparin 40 mg subQ BID. Pharmacy to monitor and titrate
- Avoid LMWH-enoxaparin if creatinine clearance < 30, consider unfractionated heparin
- If patients previously on aspirin, recommend discussing the addition or substitution of pharmacologic ppx with prescribing service
- Patients with MIS-C may receive aspirin AND LMWH-enoxaparin.
- Currently insufficient evidence to recommend routine use of direct oral anticoagulants (DOAC) in pediatrics/
- Discuss with heme if needing to avoid porcine-derived products such as enoxaparin.

NOTE 2

Contraindications to Pharmacologic VTE Prophylaxis:

Discuss thromboprophylaxis with any involved surgical services

Absolute contraindications:

- Active hemorrhage
- Diagnosed bleeding disorder, known or tendency
- Thrombocytopenia (platelets < 25 k)
- Neurosurgery, TBI, or major solid organ injury in last 72 hr
- Recent intracranial hemorrhage or acute stroke
- Thrombolytic therapy within last 24 hr
- Epidural or paraspinal hematoma
- Epidural catheter in place (may use unfractionated heparin)
- Lumbar puncture or epidural catheter removed in last 6 hr
- Significant uncorrected coagulopathy (e.g. INR > 2, or fibrinogen < 100, or PTT > 40): *Consult hematology in this scenario*
- Heparin-induced thrombocytopenia, or other hypersensitivity to heparin or LMWH-enoxaparin

Relative contraindications:

- For LMWH-enoxaparin, renal dysfunction (may need dose adjustment)
- Significant uncontrolled hypertension with blood pressure > 99th percentile
- Pelvic fracture in last 24–48 hr
- Intracranial/spinal lesion at high risk of bleed
- Anti-platelet therapy (discuss management with primary service, e.g. cardiology)

*For invasive procedures: hold heparin x 6 hrs, hold LMWH-enoxaparin x 12–24 hrs

NOTE 3

Contraindications to mechanical prophylaxis:

Affected extremity has acute fracture, vascular access line under location of compression device, or skin/other condition (dermatitis, burn, tumor), OR unable to achieve correct fit due to patient size (generally age < 5 yr), OR lower extremity peripheral arterial insufficiency

NOTE 4

Monitor for signs and symptoms of bleeding if on pharmacologic prophylaxis:

- Oozing at sites (IV, surgical wounds, etc.)
- Gross hematuria
- Severe epistaxis (requiring intervention)
- Bleeding causing a drop in Hgb by 2 g/dL
- Lower GI bleeding (black tarry stools, frank blood)
- Upper GI bleeding (hemoptysis)
- Ecchymosis or petechiae

Workgroup: Garland, Lissick, Huntley, MacIver, Orioles, Morhack

References:

1. https://www.hematology.org/covid-19/covid-19-and-vte-anticoagulation
2. Sharathkumar AA, Faustino EVS, Takemoto CM. How we approach thrombosis risk in children with COVID-19 infection and MIS-C. Pediatr Blood Cancer. 2021 Jul; 68(7): e29049. Published online 2021 May 6. doi: 10.1002/pbc.29049
3. Children's Minnesota policy 322.00 Administration and Monitoring of Anticoagulation Therapy
4. CHOP VTE-COVID Prophylaxis Pathway: COVID Disease — Anticoagulation — Clinical Pathway: All Settings | Children's Hospital of Philadelphia (chop.edu)
5. Cuker et al. American Society of Hematology living guidelines on the use of anticoagulation for thromboprophylaxis in patients with COVID-19: May 2021 update on the use of intermediate-intensity anticoagulation in critically ill patients. *Blood Adv* (2021) 5 (20): 3951–3959.

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