Clinical Safety & Effectiveness
Cohort # 7

Venous Thromboembolism Prophylaxis

CENTER FOR PATIENT SAFETY & HEALTH POLICY
UT Health Science Center
SAN ANTONIO

Educating for Quality Improvement & Patient Safety
DISCLOSURE

Kevin Schindler, MD has no relevant financial relationships with commercial interests to disclose.

Sheryl Cobb, MSN, RN has no relevant financial relationships with commercial interests to disclose.
What We Are Trying to Accomplish?

OUR AIM STATEMENT

The aim of this project is to increase the compliance of ordering Venous Thromboembolism Prophylaxis for at risk 9th Floor General Medicine patients at University Hospital from 76% to 95% by June 1, 2011.
The Team

• **CS&E Participants**
  – Kevin Schindler, MD
    • UHS Hospitalist
  – Sheryl Cobb, RN MSN
    • Q&PI Director

• **Sponsor Departments**
  – UHS, Quality & Process Improvement and Pharmacy Departments
  – UTHSCA, Dept. of Medicine

• **Support Staff (IT)**
  – Dr. Alton Powell
    • Chief Medical Information Officer
  – Lorri Savoie
    • Director, Computer Training Services

• **Team Members**
  – Michael Johnson, MD
    • UHS Hospitalist
  – Crystal Franco-Martinez, PharmD
    • Clinical Pharmacist, Anticoagulation
  – Carla McDaniel RN
    • Sr. Analyst, Q&PI, Data Abstractor
  – Bonnie Jones, RN BC
    • RN Educator, 9th General Medicine
  – Elizabeth Wilson, RN BSN
    • Admin. Dir., 9th General Medicine
  – Carol Mancinas, MHA
    • Sr. Analyst, Q&PI, Data Support

• **Facilitator**
  – Amruta Parekh, MD MPH
# Project Milestones

- **Team Created**: Jan 21, 2011
- **AIM statement created**: Feb 4, 2011
- **Weekly Team Meetings**: Jan 28 – Mar 4, 2011
- **5 Additional Team Meetings**: Mar 25 – May 27, 2011
- **Background Data, Workflow, Fishbone, and Brainstorming**: Jan 24 - Mar 4, 2011
- **Interventions Implemented**: Mar 18/21 (Initial) - Ongoing
- **Data Analysis**: Jan 24 – May 27, 2011
  - Weekly x 9wks, then Bi Weekly
- **CS&E Presentation**: June 24, 2011
Background

• **VTE adopted by CMS as a Core Measure**
  – Voluntary participation: Began 4th Qtr 2009
  – Required participation: Anticipate ~Jan 2012
  – Linked to Pay for Performance (P4P)
  – Posted publicly on the Internet w/other Core Measures

• **What Cases are Reviewed?**
  – Hospitals accepting CMS “dollars” contract through a CMS approved vendor.
  – Cases selected by vendor and not by the facility
  – Based on ICD-9 and CPT coding at discharge
  – Each case does not always meet criteria for all measures
    • Meets criteria for VTE prophylaxis at admission but not at d/c
Core Measure Objectives

• Improve Quality of Patient Care
  – Utilization of Best Practice
  – Positive Patient Outcomes
  – Reduce Re-Admissions
  – Provide Care in the most Cost Effective Manner

• Information Provided Publicly on the Internet
  – Provide consumers with quality of care information
  – Provide consumers in making more informed decisions about their healthcare
VTE Core Measures

- **VTE-1** VTE Prophylaxis *(focus of the project)*
- **VTE-2** Intensive Care Unit VTE Prophylaxis
- **VTE-3** VTE Patients with Anticoagulation Overlap Therapy
- **VTE-4** VTE Patients Receiving Unfractionated Heparin with Dosages/Platelet Count Monitoring by Protocol
- **VTE-5** VTE Discharge Instructions
- **VTE-6** VTE Incidence of Potentially-Preventable VTE

Note: Additionally, there are two VTE measures included in the SCIP Core Measure *(Surgical Care Improvement Project)*
Components of VTE-1 Measure

• **Numerator Statement**
  Patients who received VTE prophylaxis OR have documentation why no VTE prophylaxis was given
  --- **Medicine Patients**.....by the end of day 2 from admission (Day 1 is admission date)
  --- **Surgery Patients**.....based on the correlation between the date of surgery and the admission date.

• **Denominator Statement**
  All patients selected for the review
Included Population

• Patients age 18 and over
• Length of Stay
  – greater than 24 hours \textit{and}
  – less than 120 days
• Discharged with at least one of the eligible ICD 9 Codes

Quality Net. Venous Thromboembolism National Hospital Inpatient Quality Measures.  
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228754600169
### Incidence of DVT/PE and Deaths

<table>
<thead>
<tr>
<th>Annual</th>
<th>Surgeon General Call to Action 2008</th>
<th>John Heit Data (Mayo Clinic) 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>United States</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidence of DVT/PE Deaths (Mortality)</td>
<td>350,000 – 600,000 100,000</td>
<td>900,000 300,000</td>
</tr>
<tr>
<td><strong>Texas</strong> (# 2 in the nation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidence of DVT/PE Deaths (Mortality)</td>
<td>27,335 - 46,860 7,810</td>
<td>70,290 23,430</td>
</tr>
</tbody>
</table>

The Facts

• Over one year, a 300 bed hospital that lacks a systematic approach to VTE prevention can expect roughly 150 cases of hospital-acquired VTE.

• Approx. 5 of those will die from potentially preventable pulmonary embolism.

• Each hospital acquired DVT represents a incremental inpatient cost of $10K, while each PE represents a $20K price tag.
Why Did We Choose This Project?

UHS Overall VTE 1 Venous Thromboembolism Prophylaxis (Oct 09-Oct 10)
Two Opportunities to PASS the Measure
Flow Diagram
Page 2 of 2

Five Opportunities to FAIL the Measure
Physician

- No Risk Assessment Done
  - Choose "DVT Screen" instead of "DVT PPX screen"

- Lack of Education
  - Indications for PPX
  - Process for ordering

- No every patient is presented to attending daily
  - Finite time

- VTE ppx not discussed on every patient
  - DVT PPX not most important issue

Nursing

- Lack of accountability
  - Residents not disciplined
  - For lack of order

- Lack of empowerment to address missing PPX
  - Unsure of indications for PPX
  - MD's not receptive of nursing input
  - Lack of knowledge of process

- No consistency in the admissions process
  - Different order sets used

- Lack of communication with team
  - Don't round with team on every patient

- Many tasks/falls to bottom of list
  - Time constraints
  - Increased patient load

- VTE ppx not ordered

IT

- Multiple orders with similar names ("DVT ppx screen" and "DVT screen")
  - Lack of hard stops
  - Easy to bypass risk assessment in admission order sets
  - Lack of risk assessment on all admission order sets

Administration

- "DVT Screen" does not include risk assessment
  - Unaware of ordering problem
  - No policy or guidelines on DVT ppx
    - Lack of education of CMS guidelines
Brainstorming Ideas

Find out why attending and residents don’t buy-in to tool
  – Solicit input
  • Education program for housestaff and attending
    – Multiprong approach
      • Conferences
      • E-mail
      • Target night float (8p-7a)
      • Pamphlets
      • 5-minute sessions
      • 1-on-1 for fallouts
      • Screen saver
      • Flyers in call rooms
      • Memo at opening of SR – on log-in screen
      • Let MDs know that the nurse will be calling if screening not done
    – Include nursing
      • Empower to talk to MDs
      • Flash ad
      • Include criteria for understanding and follow-up of high, medium and low risk on screening
  • Push “Low Risk” on screening into a Sunrise location so the nurse can see it
  • Create a Sunrise alert if screening is not done by end of Day 2 or within 12 hours of admission
  • Add a hard stop on the admission order
  • Incorporate into Medicine template note
  • Establish nursing guideline for what to do if no orders – need concrete actions
  – Charge nurse can look at admission orders to see if screening done and let MD know if needed (second look)
  – Patient’s nurse looks at admission orders to see if screening done and calls MD if screening is not done
  – Add question to RN assessment (or somewhere) that asks “Has DVT prophylaxis been addressed?”
    – If No, RN is to call MD
    – RN to document when called
    – Roll out as a pilot
  – Nurse should write an ERAF when MD is verbally abusive (include in education)
  – Staff should wear SCDs to visually remind MDs
  – Buttons for staff
  – Make this important to administration by tying to
    – Core measures
    – Money
    – Reassessment
    – Find a champion (Mary Ann Mote, Dr. Alsip, or Nancy Ray)
  – Add as a responsibility to case managers (CM doesn’t change for patient)
Most Creative Idea.....

Staff should wear SCDs to visually remind the MDs
Achievable Ideas

• **Solicit Input**
  – Why isn’t it used by attending and/or residents (Buy In?)

• **Education**
  – Physician: Awareness and utilization of the tool
  – Nursing: Awareness of low, medium, high risk patients with recommended treatments
  – Other: Email, Pamphlets, Flash Ad’s, Podcast, Posters

• **Nursing Empowerment**: contact MD, charge nurse review of admit orders

• **Executive Buy In**: Core Measures and Reimbursement
Action plans

• Educational program given to faculty and house staff
  – Focused on utilization of risk assessment tool
• Educational program for nurses
• Direct feedback to failures
• Nurse managers empowered to call providers if no screen done
• Flyers made for call rooms
The DVT Prophylaxis Screen

Developed by Dr. Michael Johnson and Crystal Franco-Martinez
<table>
<thead>
<tr>
<th>Order Items</th>
<th>Activity</th>
<th>Vitals</th>
<th>Dietary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Admit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bed Status Request</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVT Prophylaxis Screening</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity - Ambulate as tolerated</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity - Bedrest w/ Bathroom Privileges</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity - Ambulate with assistance</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vitals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vital signs - Every 8 hours</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vital signs - Every 4 hours</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation Precautions - Standard</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I &amp; O - Strict I/O's.</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I &amp; O - Every Shift</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood glucose monitoring Before Meals At Bedtime</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dietary</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Regular Diet</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800 Calorie Carb-Controlled Diet</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400 Calorie Carb-Controlled Diet</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Liquid Diet</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Sodium Diet</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal Failure Diet</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not order “double portions” as this will double the potassium, phosphorous, and protein load.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver Failure Diet (Low Na) - Continue Prior Dietary Orders: No</td>
<td>T Routine</td>
<td></td>
<td></td>
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<tr>
<td>Cardiac Diet (Low Fat, NAS)</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal Hemodialysis (OP) Diet Order</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not order “Double Portions”. Will double K, Protein, PO4 load.</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPO</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPO after midnight</td>
<td>T Routine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### High Risk Criteria
- **Height (inches):** 72
- **Height (cm):** 182.9
- **Weight (lb):** 160
- **Weight (kg):** 72.6
- **BSA:** 1.94

### Low Risk Criteria
- **Creatinine Clearance (Actual):**
- **Creatinine (mg/dL):**
- **Creat Clear (actual):**
- **Actual:**
- **Estimated:**

### Anticoagulant Contraindications
- **Age:** 57y
- **BMI:** 21.7

### DVT Prophylaxis - Moderate Risk Options
<table>
<thead>
<tr>
<th>Order</th>
<th>Dose</th>
<th>UOM</th>
<th>Route</th>
<th>Frequency</th>
<th>Administration Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑</td>
<td>40</td>
<td>mg</td>
<td>Subcutaneous</td>
<td>Once Daily</td>
<td></td>
</tr>
<tr>
<td>☑</td>
<td>2.5</td>
<td>mg</td>
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### DVT Prophylaxis - High Risk Options
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<td></td>
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</tbody>
</table>
NOTE: All patients are presumed to be at MODERATE RISK unless you select a contraindication to DVT prophylaxis OR indicate that the patient meets high or low risk criteria.

**Does Patient Meet High Risk Criteria?**

- No

- **High Risk Criteria**
  
  High Risk Level is Reserved for: Hip, pelvic or severe lower extremity fractures OR lower extremity arthroplasty OR major trauma (lower extremity, head, fractures, face, chest, abdomen) OR acute spinal cord injury, paraplegia OR abdominal/pelvic surgery for cancer.

- **Height (inches) 72**
  - **Height (cm) 182.9**
  - **Weight (lb) 160**
  - **Weight (kg) 72.6**
  - **BSA 1.94**

**Does Patient Meet Low Risk Criteria?**

- No

- **Low Risk Criteria**
  
  Low Risk Level is Reserved for: Ambulatory patients without additional risk factors OR ambulatory patients with expected length of stay less than 3 days OR same day / minor surgery patients OR no pharmacologic prophylaxis agent necessary.

**Anticoagulant Contraindications**

- General Surgery within the next 24 hour
- Already receiving IV Heparin or other anticoagulant
- Platelets <50,000, Coagulopathy (INR >1.5)
- Active hemorrhage from wounds, drains, or lesions
- Recent intracranial, intracranial or spinal surgery
- Suspected intracranial hemorrhage
- End-stage liver disease
- Bleeding risk
- Hospice

**Patients < 50 kg or 75 yrs old - 1 item(s)**

- **Heparin Sodium... 5,000 Units**
  - **Administration Instructions**
  - **Subcutaneous**
  - **Every 12 Hours**

- **Enoxaparin Inj... 30 mg**
  - **Administration Instructions**
  - **Subcutaneous**
  - **Every 8 Hours**

- **Patients < 50 kg or 75 yrs old - 1 item(s)**

- **Heparin Sodium... 5,000 Units**
  - **Administration Instructions**
  - **Subcutaneous**
  - **Every 12 Hours**

**DVT Prophylaxis - High Risk Options**

<table>
<thead>
<tr>
<th>Order</th>
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<tbody>
<tr>
<td>Heparin Sodium...</td>
<td>5,000</td>
<td>Units</td>
<td>Subcutaneous</td>
<td>Every 12 Hours</td>
<td></td>
</tr>
<tr>
<td>Enoxaparin Inj...</td>
<td>30</td>
<td>mg</td>
<td>Subcutaneous</td>
<td>Every 8 Hours</td>
<td></td>
</tr>
<tr>
<td>Fondaparinux Inj...</td>
<td>2.5</td>
<td>mg</td>
<td>Subcutaneous</td>
<td>Once Daily</td>
<td></td>
</tr>
</tbody>
</table>

**Order Set Summary - TEST1, ADAM**

**DVT Prophylaxis Screening** [2 orders of 14 are selected] - TEST1, ADAM
### DVT Prophylaxis Screening

<table>
<thead>
<tr>
<th>Patients w/ BMI &gt; 40</th>
<th>1 item(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin Inj</td>
<td>40 mg</td>
</tr>
<tr>
<td>Patients w/ CrCl &lt; 30</td>
<td>2 item(s)</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>5.000 Units</td>
</tr>
<tr>
<td>Enoxaparin Inj</td>
<td>30 mg</td>
</tr>
<tr>
<td>Patients &lt; 50 kg or 75 yrs old</td>
<td>1 item(s)</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>5.000 Units</td>
</tr>
</tbody>
</table>

### DVT Prophylaxis - High Risk Options

<table>
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<th>Order</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin Inj</td>
<td>30</td>
<td>mg</td>
<td>Subcutaneous</td>
<td>Every 12 Hours</td>
<td></td>
</tr>
<tr>
<td>Fondaparinux Inj</td>
<td>2.5</td>
<td>mg</td>
<td>Subcutaneous</td>
<td>Once Daily</td>
<td></td>
</tr>
<tr>
<td>Patients w/ BMI &gt; 40</td>
<td>1 item(s)</td>
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<td></td>
</tr>
</tbody>
</table>

### Target INR 2-3 - 1 item(s)

- Warfarin Tab
  - mg
  - Oral
  - Once Daily-At 5 PM
  - Always check INR before giving dose; if INR is greater...

### SCD Contraindication

* (Checkmark)

### Nonpharmacologic DVT Prophylaxis

<table>
<thead>
<tr>
<th>Order</th>
<th>Device</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous...</td>
<td>Pneumatic Compression Device</td>
<td>Every 8 hours</td>
</tr>
</tbody>
</table>

### Screening Orders (No Action Needed)

- DVT Screen

---

**Drug Info**

- Internet...
- TEST1, ADAM...
### DVT Prophylaxis Screening - TEST1, ADAM

| Patients w/ BMI > 40 - 1 item(s) | Enoxaparin Inj | 40 | mg | Subcutaneous | Every 12 Hours |
| Patients w/ CrCl < 30 - 2 item(s) | Heparin Sodium... | 5,000 | Units | Subcutaneous | Every 8 Hours |
| Patients < 50 kg or 75 yrs old - 1 item(s) | Enoxaparin Inj | 30 | mg | Subcutaneous | Once Daily |
| Patients < 50 kg or 75 yrs old - 1 item(s) | Heparin Sodium... | 5,000 | Units | Subcutaneous | Every 12 Hours |

### DVT Prophylaxis - High Risk Options

<table>
<thead>
<tr>
<th>Order</th>
<th>Dose</th>
<th>UOM</th>
<th>Route</th>
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</tr>
</thead>
<tbody>
<tr>
<td>High Risk Prophylaxis - 2 item(s)</td>
<td>Enoxaparin Inj</td>
<td>30</td>
<td>mg</td>
<td>Subcutaneous</td>
<td>Every 12 Hours</td>
</tr>
<tr>
<td>Fondaparinux Inj</td>
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<td></td>
</tr>
<tr>
<td>Patients w/ BMI &gt; 40 - 1 item(s)</td>
<td>Enoxaparin Inj</td>
<td>40</td>
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</tr>
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<td>Patients w/ BMI &gt; 40 - 1 item(s)</td>
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<td></td>
</tr>
<tr>
<td>Target INR 2-3 - 1 item(s)</td>
<td>Warfarin Tab</td>
<td>mg</td>
<td>Oral</td>
<td>Once Daily-At 5 PM</td>
<td>Once Daily</td>
</tr>
</tbody>
</table>

### SCD Contraindication

None

### Nonpharmacologic DVT Prophylaxis

<table>
<thead>
<tr>
<th>Order</th>
<th>Device</th>
<th>Frequency</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonpharmacologic DVT Prophylaxis - 1 item(s)</td>
<td>Venous...</td>
<td>Pneumatic Compression Device</td>
<td>Every 8 hours</td>
</tr>
</tbody>
</table>

### Screening Orders (No Action Needed)

- **DVT Screen**

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Educational program

- Presentation given to Hospitalist group
- Presentation given to Internal Medicine Residents
- Distribution of educational handouts
- Emails sent to faculty and house staff
- Feedback given directly to physicians
- Nursing education given to 9th floor nurses
DON’T ADMIT WITHOUT IT!

DR. C.M.S. DO-WRITE

DVT SCREEN
Data Collection

• Weekly audits of new admissions to 9th floor (changed to biweekly)

• Monitored for ordering of DVT prophylaxis (or documented contraindications) and use of DVT screen

• “Failed Measures” reviewed and physicians contacted
Percentage of Admissions with Screening Tool Utilized

Preintervention data

Time Period:
- Week 1
- Week 2
- Week 3
- Week 4
- Week 5
- Week 6
- Week 7
- Week 8

Postintervention data

Time Period:
- Week 9
- Week 11
- Week 13
- Week 15
- Week 17

Percentage of Admissions with Screening Tool Utilized with UCL, CL, and LCL values.
Return on Investment

• It’s Not About What We Make…. but what we lose…..
  – Patient and Family Trust
  – Increased Risk of Chronic Health Issues and/or Loss of Life
  – Potential Loss of Reimbursement with Re-admission
    • DVT Diagnosis $10,000
    • PE Diagnosis $20,000

• Cost of Prophylaxis
  – 80 kg male, moderate to high risk for DVT, 5 day LOS
  – SCD’s and Lovenox at approximately $750.00

UHS 2010 Average
(Inpatient Visit)
DVT: $9,505 PE: $18,163

University Health System. Information provided by Carmen Sanchez.
Future plans

• Rollout to entire hospital
  – Cooperation with other services
  – Corporate endorsement

• Podcast for usage of DVT screen

• Working with IT and other services to make DVT screen required
References


Preventing Hospital-Acquired Venous Thromboembolism A Guide for Effective Quality Improvement. Society of Hospital Medicine, website

