

Navigating Program Development



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Brigham & Women's Hospital
February 4, 2006

Objectives

- Review literature regarding alerts in computerized physician order entry (CPOE) systems and house staff behavior
- Identify goals of program development for enhanced venous thromboembolism (VTE) alert screens
- VTE alert improvements

CPOE

- Many hospital admissions are attributed to preventable medication errors
- After the IOM report and studies at BWH CPOE, informatics, and computerized alerts have become the new buzz words
- Beginning to critically assess CPOE systems

Bates DW et al. JAMA 1995;280:1311-16.

CPOE

Friend or Foe?

- Salt Lake City VA Medical Center which employs bar code scanning during administration reported:
 - 74% of medication errors occur during prescribing compared to 11% during administration and 0% during transcription
 - Concluded that their systems are working as designed

Nebeker JR et al. Archives of Internal Medicine 2005;165:1111-16.

CPOE Alerts

- A study conducted at BIDMC primary care facilities reported that 94.2% of computerized alerts were overridden
- Of the 189 rules studied, reviewers concluded that 36.5% of the rules were invalid and agreed with the physician's decision 97.9% of the time

Weingart SN et al. Archives of Internal Medicine 2003;163:2625-31.

Saving CPOE from Extinction

- CPOE must evolve to keep up with the growing demand for medical informatics and technology solutions
- Next steps are utilizing algorithms that take into account patient specific factors and generate prescribing recommendations to providers

First Generation Computerized Alerts for VTE prevention

- Utilization of computer generated alerts to house staff reduced the incidence of VTE by 41%
- VTE prophylaxis was prescribed in 33.5% of patients in the intervention group

Kucher N, Koo S, Quiroz R, et al. Electronic alerts to prevent venous thromboembolism among hospitalized patients. NEJM. 2005;352:969-977.

Enhancing the BWH VTE Alerts

- Multi-disciplinary approach
- Goals:
 - Engage the house officer with an interactive alert to increase acceptance and gain feedback
 - Update the DVT prophylaxis template to meet current practice guidelines
 - Provide real-time knowledge links

Interactive Techniques

- Provide objective data to the house officer that this alert positively impacts patient outcome
- Create opportunity to capture rationale for declining alert
 - Hypothesized that many physicians fear a risk of bleeding with anticoagulation
- Provide a final opportunity to order mechanical prophylaxis

Physician Notification of Alerts

BICS Terminal Emulator - qmabics2.partners.org

Dtm

Alerts

You are None, M.D. ↓

There are new alerts on these patients. Mark one and <Enter> to deal with it now, or <Esc> to skip them all.

09:11 AM 10/28	Rxtest, M	DVT HIGH RISK
09:11 AM 10/28	Rxtest, J	DVT HIGH RISK

<F1> Info. <Esc> Cancel.

OK Cancel

DVT Alert Screen

Time: 03:24 AM Dec 4, 2002 Alert #1014346 14B phone: x7905
Alert: Patient is at high risk for deep vein thrombosis, according to BWH guidelines.

Reason: Total DVT risk assessment score is 4.
Patient does not have any active Anti-Embolism orders.
Patient is currently NOT on a drug from ANTICOAGULANTS drug family.

Relevant medications and lab results: [<alert Details>](#)
Study at BWH published in NEJM 2005;352:969-977 demonstrated a 41% decrease in incidence of VTE using computer generated alerts to House Staff physicians

Act- [IA Order set: DVT PROPHYLAXIS TEMPLATE.
ions:[IB Partners Handbook: VTE Guidebook 4th edition
[IC Exit to order entry

Covering M.D.: Bp#
<dOne>

<Not my patient>

<pAge W.D.>

<coMments>

< Logic >



QA

Rule Logic – Alert Details

Time: 03:22 AM Nov 2, 2004 Alert #1740559 7A phone: x7695

Details for alert #1740559

Rule: Patient is at high risk for deep vein thrombosis, according to BWH guidelines.

The following risk factors were found to be positive (score applied):

Patient is overweight: BMI >29 kg/m² (1)

has history of deep vein thrombosis or pulmonary embolism (3).

-and-

Patient does not have any active Anti-Embolism orders.

-and-

Patient is currently NOT on a drug from ANTICOAGULANTS drug family.

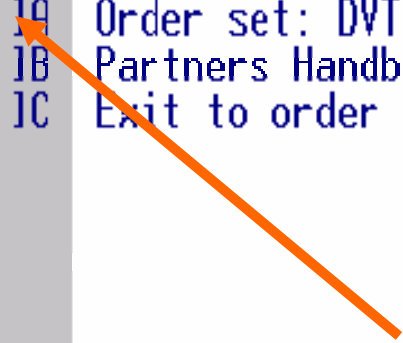
Option A

Time: 03:24 AM Dec 4, 2002 Alert #1014346 14B phone: x7905
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Act- [1A Order set: DVT PROPHYLAXIS TEMPLATE.
ions: [1B Partners Handbook: VTE Guidebook 4th edition
[1C Exit to order entry



Covering M.D.: Bp#
[<dOne>](#)

[<Not my patient>](#)

[<pAge M.D.>](#)
[<coMments>](#)

[< Logic >](#)



ViewOrders PtLookup Feedback Help Goodbye

OETEST,CLOVIS 32F 11489945

Adm: 11/01/91 Room: 17A-444

DVT Prophylaxis Order Set Page 1

Consider combined pharmacological and mechanical prophylaxis in high-risk patients.

MECHANICAL PROPHYLAXIS

Select one or more.

- A Anti-embolism - TED stockings KNEE HIGH
- B Anti-embolism - TED stockings THIGH HIGH
- C Anti-Embolism - Pneumatic Compression - CALF ONLY
- D Anti-Embolism - Pneumatic Compression - CALF and THIGH

PHARMACOLOGICAL PROPHYLAXIS

Select only one.

- E ENOXAPARIN 40 MG SC QD
- F ENOXAPARIN 30 MG SC QD for patients with renal impairment
- G HEPARIN 5,000 UNITS SC TID
- H HEPARIN 5,000 UNITS SC BID
- I FONDAPARINUX 2.5 MG SC QD
- J FONDAPARINUX 2.5 MG SC QOD For patients with renal impairment

OK

Cancel

Option B

Time: 03:24 AM Dec 4, 2002 Alert #1014346 14B phone: x7905

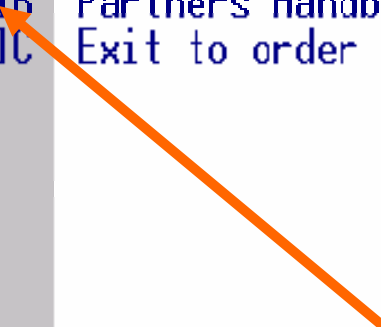
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[JC Exit to order entry



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[<pAge M.D.>](#)
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QA

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  My links
  Modify my links
  Help

Venous Thromboembolism Guidebook 4th Edition

Introduction

Brigham and Women's Hospital.

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Last updated: June 2003

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sgoldhaber@partners.org

Introduction

This Venous Thromboembolism Guidebook incorporates evolving contemporary concepts in diagnosis and management of pulmonary embolism (PE) and deep venous thrombosis (DVT) into a user-friendly menu. The purpose of this document is to provide a literature-based review of the current clinical approach to venous thromboembolism as well as up-to-date references for further study in this important topic.

PE Support Group

Table of Contents

➤	Introduction
	Risk Factors for Thromboembolism
Diagnosis	
	Diagnosis of PE
	Diagnosis of DVT
	Risk Stratification of PE
Management of PE and DVT	
	Management of PE
	Management of DVT
Therapy of DVT and PE	
	Anticoagulation
	IVC Filters
	Thrombolysis
	Embolectomy
Prevention	
	BWH Venous Thromboembolism Guidebook - PDF

Option C or “Done”

Time: 03:24 AM Dec 4, 2002 Alert #1014346 14B phone: x7905

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[< Logic >](#)



QA

View PtLookup

Reason for Declining VTE Prophylaxis

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Provide Reason for Declining VTE Prophylaxis

- Patient already receiving anticoagulants
- Risk of bleed outweighs benefit of anticoagulant therapy
- Patient is "Comfort Measures Only"
- Scheduled procedure
- Other

Other reason (minimum of 15 characters)

|

|

Done



Mechanical DVT Prophylaxis Page 1

There is not an increased risk of bleed with mechanical prophylaxis such as graduated compression stockings or intermittent pneumatic compression devices. Consider ordering one or more of the following mechanical prophylaxis orders.

Select one or more:

- A Anti-embolism - TED stockings KNEE HIGH
- B Anti-embolism - TED stockings THIGH HIGH
- C Anti-embolism - Pneumatic boots CALF ONLY
- D Anti-embolism - Pneumatic boots CALF AND THIGH

Edit

OK

Cancel

[DEV]

Quality Assurance

- Plan to utilize weekly reports
- Allows core team to review all aspects of the alerts including type of action taken, rate of overrides, and reasons for declining the alerts

Conclusions

- Multi-disciplinary team needed
- Over-alerting and “noise” are real issues
- Designing “smart alerts” that recommend therapy to house staff works
- Need to engage providers and obtain feedback
- Quality assurance is an ongoing dynamic process