Why do VTE risk scores fail to prevent VTE?

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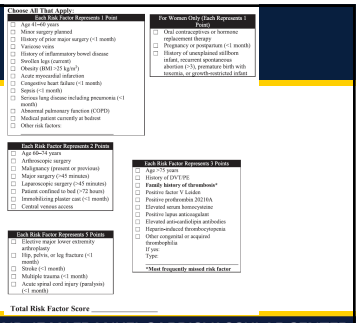
DISCLOSURES:
None

Overview

- VTE risk assessment
- Is VTE prophylaxis effective?
- Mechanisms of failure of VTE prophylaxis
- Potential strategies

VTE Risk Score

Caprini risk score



VTE Risk Score

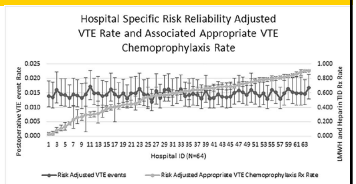
IMPROVE Score

VTE Risk Factors	
☐	Previous VTE
☐	Thrombophilia
☐	Lower limb paralysis
☐	Current cancer
☐	Immobilization ≥7 days
☐	ICU/CCU stay
☐	Age >60 years
The incidence of asymptomatic VTE is ≈10 times greater than the incidence of symptomatic disease.	

Bleeding Risk Factors	
☐	Gastroduodenal ulcer
☐	Bleeding prior 3 months
☐	Admission platelets <50×109
☐	Hepatic failure
☐	ICU/CCU stay
☐	Cardiovascular catheter
☐	Rheumatic diseases
☐	Current cancer
Sex:	Female
Age:	<40
GFR:	≥60 mL·min^{-1}·m^{-2}

Low to Moderate Risk Non-orthopedic Surgical Patients Do Not Benefit From VTE Chemoprophylaxis

- Large CQI registry General, Vascular, Gyn pts
- 2013 - 2017
- N = 32,856
- 80% of practitioner's reported they did formal risk assessment
- VTE rate = 1.46%



Ann Surg 2022;276:e691–e697

Low to Moderate Risk Non-orthopedic Surgical Patients Do Not Benefit From VTE Chemoprophylaxis

TABLE 3. Postpropensity Matched Cohort Weighted VTE Risk Scores With VTE Rate Comparisons for Low, Moderate, and High-risk Patients Without and With VTE Chemoprophylaxis

Weighted VTE Risk Score	None (N = 8586) No (%) VTE Rate (%)	UFH/LMWH (N = 8586) No (%) VTE Rate (%)	*P*-value
Low			
0	300 (3.49%) 0.67%	374 (4.36%) 1.34%	0.4695
1–<3	40 (0.47%) 0.00%	47 (0.55%) 0.00%	
Moderate			
3–<6	7450 (86.77%) 0.97%	7362 (85.74%) 1.01%	0.8115
High			
6–<8	630 (7.34%) 2.54%	667 (7.77%) 3.15%	0.6861 0.09
>8	166 (1.93%) 4.22%	136 (1.58%) *P* =.09 3.68%	

Ann Surg 2022;276:e691–e697

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Low to Moderate Risk Non-orthopedic Surgical Patients Do Not Benefit From VTE Chemoprophylaxis

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Factors associated with VTE in those chemo-prophylaxed

TABLE 4. Multivariable Analysis of Predictors of Postoperative VTE in Those With Appropriate Prop$hylaxis

Predictors of Postoperative VTE		
Variables	**OR (95% CI)**	***P* value**
Days in hospital	1.09 (1.08–1.11)	<0.001
Personal history of DVT	2.37 (1.82–3.09)	<0.001
Age	1.02 (1.01–1.03)	<0.001
Intraoperative transfusion	1.55 (1.11–2.15)]	0.010
Postoperative transfusions	1.47 (1.08–2.01)	0.014
Peripheral vascular disease	0.64 (0.45–0.90)	0.009
Dialysis	0.38 (0.15–0.96)	0.042

ASA indicates American Society of Anesthesiologists; DVT, deep venous thrombosis; VTE, venous thromboembolism.

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Call to Action to Prevent Venous Thromboembolism in Hospitalized Patients

A Policy Statement From the American Heart Association

Circulation. 2020;141:e914–e931

Table 3. Areas of Further Research to Inform Policy Development and Clinical Guidance

Determine what should constitute preventable VTE across medical and surgical patients.
Compare chart-abstracted VTE rates with *ICD-10* code rates in all US hospitals to assess precision and completeness.
Evaluate EMRs as a system to automatically provide risk assessment and suggest an appropriate level of VTE prophylaxis.
Define the effect of surveillance bias on VTE rates; consider a study of indications and triggers for VTE diagnostic studies and potential standardization of these across clinicians and hospitals/institutions.
Evaluate the best methods to disseminate VTE risk assessment and prophylaxis education to practitioners and VTE risks to patients and families.
Compare the VTE risk scoring prospectively against specific pharmacological and mechanical prophylaxis.
Evaluate and test best methods to prevent missed prophylaxis dosing and to improve compliance.

EMR indicates electronic medical record; *ICD-10, International Classification of Diseases, 10th Revision*; and VTE, venous thromboembolism.

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The Thresholds of Caprini Score Associated With Increased Risk of Venous Thromboembolism Across Different Specialties

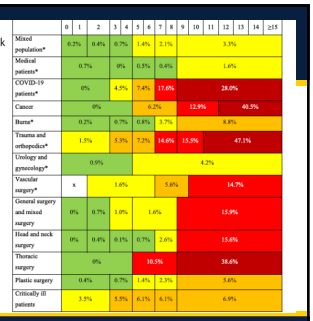
A Systematic Review

An issue of over prescription of VTE prophylaxis

In most patient groups, should have Caprini score > 8

May lead to not focusing prophylaxis efforts on those most likely to benefit

(*Ann Surg* 2023;277:929–937)



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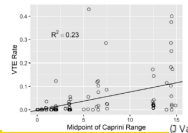
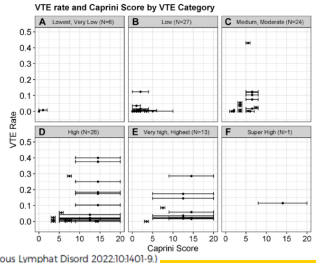
Systematic review of venous thromboembolism risk categories derived from Caprini score

48 cohort studies; 7 case series; 2 cross sectional
PO and medical pts





J Vasc Surg Venous Lymphat Disord 2022;10:401-9.)

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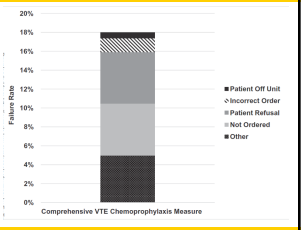
Multi-institution Evaluation of Adherence to Comprehensive Postoperative VTE Chemoprophylaxis

Annals of Surgery • Volume 271, Number 6, June 2020

- 36 hospital QI collaborative with review of novel chemoprophylaxis process measure in colectomy patients
- Defect free chemoRx failed in 18%
- Less failure at non-safety net hospitals and Magnet designated hospitals



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Just What the Doctor Ordered

Missed Ordering of Venous Thromboembolism Chemoprophylaxis Is Associated With Increased VTE Events in High-risk General Surgery Patients

- NSQIP data with 19,578 pts, of which 4252 high risk
- Modified Caprini score > 5
- 'perfect' vs non 'perfect' VTE prophylaxis ordered
- Associated with OR = .50 (.3 - .8, P < .05) reduction in VTE at 30d

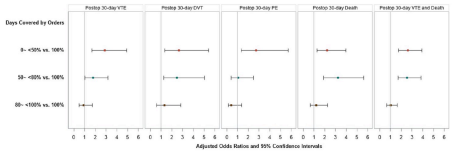


FIGURE 1. Association of days-covered-by-orders with outcomes, after adjustment for confounding factors.

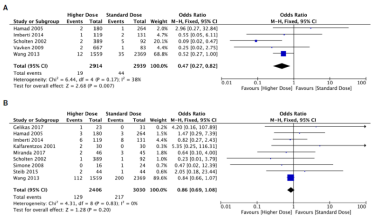
(*Ann Surg* 2023;278:e614-e619)

Is it simply underdosing of chemo-Rx?

NMA Systematic Review
PUBLISHED 08 March 2023
DOI 10.3389/fendo.2023.1084511

Strategies involving low-molecular-weight heparin for the treatment and prevention of venous thromboembolism in patients with obesity: A systematic review and meta-analysis

- Higher LMWH dose with less VTE and no increase in bleeding OR = 0.47; 95% CI =0.27 – 0.82; p = .007



Best practices to reduce VTE breakthrough in post-op patients

- Risk assessment of all patients, to allow risk v harms assessment for chemo-Rx and mechanical Rx
- Each hospital should have system for tracking defect free VTE prophylaxis
- Define and reduce patient refusal, nursing lapses, MD lapses for orders
- Re-assess VTE risk of patient if complicated course
- ? Standard indicators for Duplex scanning?

Thank you!