

VTE as Hospital Quality Indicator

VTE Consensus Conference

Ajai K Malhotra, MD FACS

Professor and Chief, Division of Acute Care Surgery

Department of Surgery, University of Vermont

Trauma Medical Director, Level-I Trauma Center

University of VT Medical Center

VTE Facts

- VTE (DVT and PE) in the US: ~600,000 events/year
 - >100,000 dying annually
 - ~30% DVT develop post-phlebitic syndrome
 - ~5% PE develop chronic pulmonary HTN
- ~50% VTE: ~ 90 days of hospitalization/surgery
- Majority preventable *with* appropriate prophylaxis

Can VTE prophylaxis and/or event rates serve as a hospital quality metric

Ideal Quality Metric – *characteristics*

- **Meaningful measure**
- **Directly impacts outcomes**
- **Minimal potential for unintended consequences**
- **Not ‘gamable’**
- **Objective**
- **Consistently collected or easily collectable**
- **Risk adjusted – on patient and acuity**

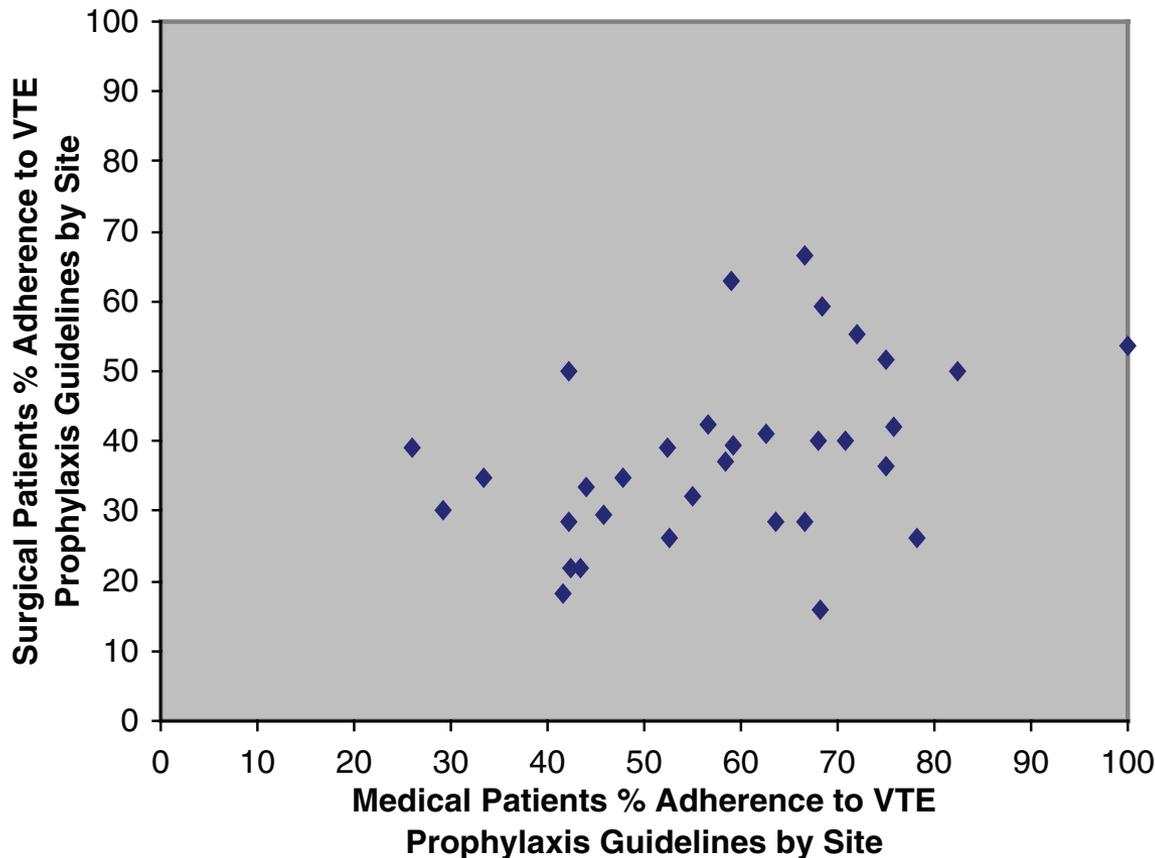
VTE as Quality Metric – *widely used*

- **Care quality commission (UK)**
- **Australian commission on safety... (Australia)**
- **Agency for healthcare research and quality (USA)**
- **Joint commission (USA)**
- **Center for Medicare and Medicaid services (USA)**
- **American College of Surgeons (USA)**
- **And many more**

VTE related quality metrics are often utilized in pay for performance programs

Prophylaxis rates – *highly variable*

UHC study of 33 US academic medical centers



Medical: 59%
[26-100]

Surgical: 39%
[16-67]

VTE Prophylaxis – *elements*

Effective VTE prophylaxis: a multi-step process

Individualized VTE *risk* assessment



Prophylaxis *prescription* based on risk



***Administration* of the prescribed prescription**



Patient *acceptance* of the administration

VTE Prophylaxis – *effectiveness*

- Which element(s) should be considered as metric?
 - All have to work for *effective prophylaxis*
- Wide variation among agencies

Agency	Assessment	Prescription	Administration
CQUIN (UK)	Required	-	-
QUM (Australia)	Required	Required	-
AHRQ (USA)	-	Partial	-
TJC (USA)	-	Partial	Partial
CMS (USA)	-	Partial	Partial

Process vs Outcome

- VTE prophylaxis rates measure *process*
 - **Assumption: Improved process = Improved outcomes**
- Quality (value) = Outcomes/Cost

Why not measure outcome – VTE rate – as quality metric?

Devil (very often) is in the Detail

- Unintended consequences
 - VTE: *'the more you look, the more you find'*
 - *Dis-incentivizes* hospitals to find and treat VTE
- Surveillance

To surveil or not to surveil?

Piotrowski JJ, Alexander JJ, Brandt CP, McHenry CR, Yuhas JP, et al. (1996) Is deep vein thrombosis surveillance warranted in high-risk trauma patients? *Am J Surg*

172 Meyer CS, Blebea J, Davis K Jr, Fowl RJ, Kempczinski RF (1995) Surveillance venous scans for deep venous thrombosis in multiple trauma patients. *Ann Vasc Surg* 9:

10 Major KM, Wilson M, Nishi GK, Farber A, Chopra R, et al. (2003) The incidence of thromboembolism in surgical intensive care unit. *Am Surg* 69: 857-861

Spain DA, Richardson D, Polk HC, Bergamini TM, Wilson MA, et al. (1997) Venous

Schwartz TH, Quick RC, Minion DH, Kearney PA, Kwolek CJ, et al. (2001) Enoxiparin treatment in high-risk trauma patients: does the utility of surveillance venous duplex

Satiani B, Falcone R, Shook L, Price J (1997) Screening for major deep vein thrombosis in seriously injured patients: a prospective study. *Ann Vasc Surg* 11:

Cipolle MD, Wojcik R, Seislove E, Wasser TE, Pasquale MD (2002) The role of surveillance duplex scanning in preventing venous thromboembolism in trauma

pa Spinal Cord Injury Thromboprophylaxis Investigators (2003) Prevention of venous thromboembolism in the acute treatment phase after spinal cord injury: a

ran Napolitano LM, Garlapati VS, Heard SO, Silva WE, Cutler BS, et al. (1995) Asymptomatic deep venous thrombosis in the trauma patient: Is an aggressive

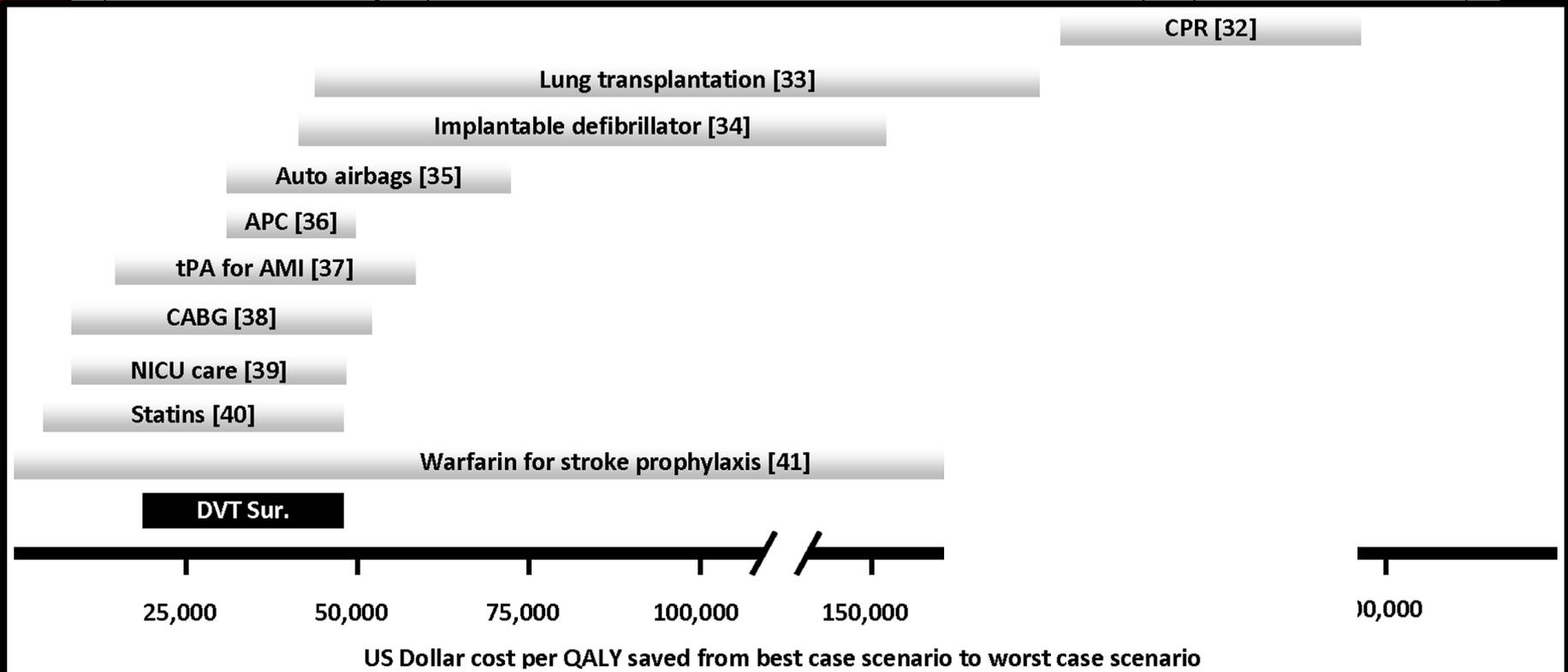
cor Adams RC, Hamrick M, Berenguer C, Senkowski C, Ochsner G (2008) Four years of aggressive prophylaxis and screening for venous thromboembolism in a large trauma population. *J Trauma*. 65: 300-308

CDC Consensus Conference – *surveillance*

- **Improved utilization...,(of) proven-effective preventive measures is critical to reducing VTE disease burden**
- **Systematic surveillance is critical...to provide...data on the prevalence and annual incidence of VTE in the U.S.**
- **...systematic surveillance will be important to enhance prevention efforts**
- **The CDC should convene a second group of experts to advise the agency in detail on the strengths, weaknesses, and feasibility of possible approaches to systematic surveillance for DVT and PE**

Surveillance vs No Surveillance

DVT/PE: Impact of surveillance



[0.26-0.90]

0 1 2 3 4 5

Surveillance Bias – *impact*

- Systemic review of ten VTE studies:
 - 9/10: positive correlation of VTE with imaging intensity

Chen et al, Am J Med Qual, 2017

Hospitals with higher quality scores had higher VTE prophylaxis rates but worse risk-adjusted VTE rates.

Increased hospital VTE rates were associated with increasing imaging rates. Surveillance bias limits the usefulness of the VTE quality measure for hospitals working to improve quality and patients seeking to identify a high-quality hospital.

Bilimoria et al, JAMA, 2013

Surveillance Bias – *impact*

- Patient Safety Indicator (PSI) 90
 - Hospital VTE rate a component of PSI 90
 - Widely used in federal ‘pay for performance’ programs
- 3,203 hospitals: PSI with *and* without VTE
 - 17% improved; 21% worse; 62% unchanged
- Hospitals that improved
 - Larger; Academic; More technology; Sicker patients

VTE rate as quality metric penalizes larger, academic centers with more sick patients

Summary

- VTE has a high societal burden
- Most VTE during/post hospitalization/surgery
- Majority of peri-hospitalization VTE preventable
- VTE prophylaxis is highly variable
- VTE prophylaxis and VTE event rates can serve as important hospital quality metrics *with* caveats
 - Role of surveillance is unclear
 - Utilizing VTE event rates as metric unfairly penalizes large academic centers treating the sicker patients
- Improving VTE prophylaxis *may* have a halo effect

Thank you