Venous thromboembolism risk documentation, prescribing rates and appropriateness of prophylaxis: a prospective, multisite audit

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Background

VTE (venous thromboembolism) is a major cause of morbidity and a preventable cause of in-hospital death. (1, 2) VTE accounts for 7% of all deaths in Australian hospitals, and costs the Australian health system $1.72 billion annually. (3)
In 2016, the Eastern Health National Inpatient Medication Chart (NIMC) audit reported that VTE risk assessment was documented for only 9% of patients and 70% of patients had either mechanical of pharmacological prophylaxis prescribed. (4) This data represents poor documentation of risk but does not assess appropriateness of prescribed VTE prophylaxis against current practice guidelines (5), prompting a more detailed review of VTE prophylaxis at Eastern Health.

Research Question

Primary question: What percentage of adult inpatients at Eastern Health are prescribed VTE prophylaxis appropriate to their level of risk? (National QUM Indicator 1.2) (1)
Secondary question: What percentage of adult inpatients at Eastern Health are assessed for risk of VTE? (National QUM Indicator 1.1) (1)

Table 1. **Sample size**

Total inpatient beds at EH	Beds that fulfil inclusion criteria: Age≥18, LOS≥1	Sample size
1252	889	240

Method

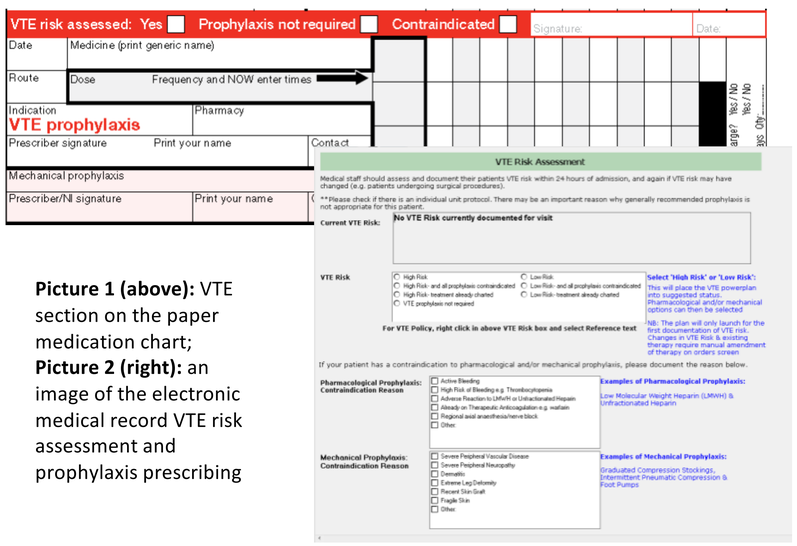
A prospective audit of VTE prophylaxis was undertaken by five pharmacy interns at five sites of a large metropolitan hospital network. The inclusion criteria was adult patients (aged ≥18 years) with a length of stay of ≥1 day. 240 of a possible 889 patients were identified between 13/6/18 and 3/7/17 and were randomly selected by choosing approximately every 3rd occupied bed number until quotas were filled.
NIMC, electronic medical records (EMR) and progress notes were reviewed to determine:

- VTE risk documentation by treating medical program (Not assessed/Low risk/High risk)
- Type of mechanical or pharmacological prophylaxis prescribed
- Appropriateness of prophylaxis according to Eastern Health guidelines (Appropriate/Not appropriate)

Current Eastern Heath guidelines for VTE prophylaxis indicate whether pharmacological and/or mechanical prophylaxis should be prescribed depending on patient factors. (5) A survey tool was created using Microsoft Excel which, using the data collected and the guidelines, was able to determine:
Creatinine clearance

- Level of VTE risk (according to parameters set out in the Eastern Health guidelines)
- Appropriate VTE prophylaxis (according to the Eastern Health guidelines)

The intended sample size was 269 which would allow results to be extrapolated to the eligible inpatient population of approximately 889 with a confidence interval of 0.05. Data was only collected on 240 patients which allows us to extrapolate the results to the approximately 889 eligible inpatients with a confidence interval of 0.054. (Table 1)



Picture 1 (above): VTE section on the paper medication chart;
Picture 2 (right): an image of the electronic medical record VTE risk assessment and prophylaxis prescribing

Results

Risk documentation
The audit found documentation of VTE risk to be 31.7%. Documentation was significantly better at sites using EMR (40.3%) compared to paper NIMC (1.85%).

Table 2. **Percentage of adult inpatients at Eastern Health assessed for risk of VTE** (National QUM Indicator 1.1) (1)

	Total Patients	VTE risk documented - n (%)
MH (paper)	46	1 (2.2)
BHH (EMR)	111	39 (35.1)
AH (EMR)	35	21 (60)
WH (EMR)	18	4 (22.2)
PJC (paper+EMR)	30	11 (36.7)
ALL SITES	240	76 (31.7)

Prescribing
Using the Eastern Health guidelines, the audit found 70% compliance, which means 30% of patients were not prescribed pharmacological and/or mechanical prophylaxis that was appropriate to their level of risk. 15% of patients were not prescribed mechanical and/or pharmacological prophylaxis that was indicated, 10% of patients were prescribed mechanical and/or pharmacological prophylaxis that was not indicated or contraindicated, 5% of patients were prescribed pharmacological prophylaxis at the wrong dose. (Figure 4)

Table 3. **Percentage of adult inpatients at Eastern Health prescribed VTE prophylaxis appropriate to their level of risk** (National QUM Indicator 1.2) (1)

	TOTAL Patients	Appropriateness of VTE Prophylaxis – n (%)		
		Pharmacological	Mechanical	Overall
MH (paper)	46	39 (84.8)	42 (91.3)	38 (82.6)
BHH (EMR)	111	71 (63.9)	96 (86.5)	66 (59.5)
AH (EMR)	35	28 (80)	31 (88.6)	26 (74.3)
WH (EMR)	18	16 (88.9)	12 (66.7)	15 (83.3)
PJC (paper+EMR)	30	23 (76.7)	30 (100)	23 (76.7)
ALL SITES	240	177 (73.8)	211 (87.9	168 (70)

Prescribing of VTE prophylaxis was more compliant with guidelines on paper NIMC (82.6%) than on EMR (67%). (Figure 1)

Figure 1. **Proportion of Patients with VTE Risk documented (by chart type)**

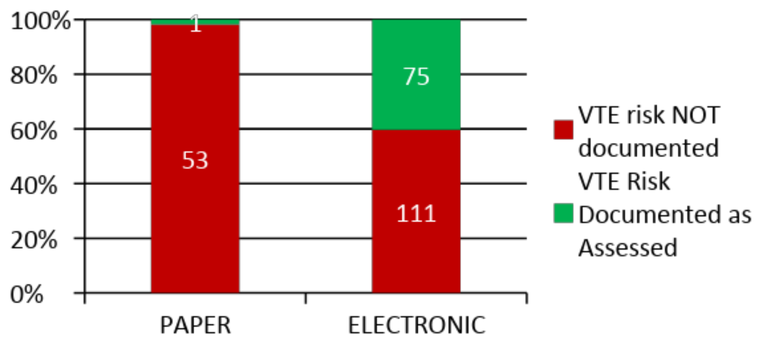
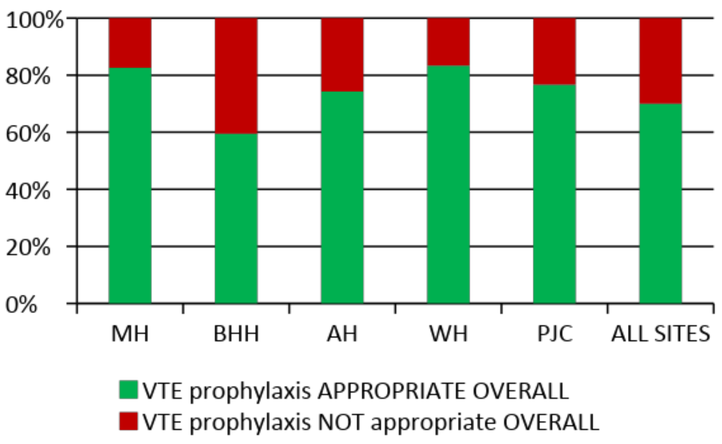
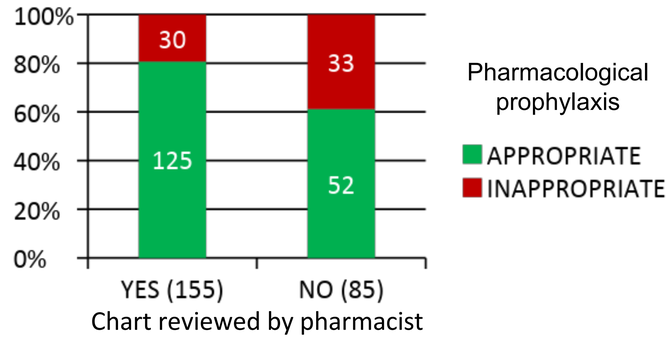


Figure 2. **Proportion of Patients with appropriate prophylaxis for VTE Risk (by chart site)**



Pharmacist review
The results demonstrated that proportion of patients with appropriate VTE prophylaxis was greater where a pharmacist had reviewed the medication chart (80.6% compared to 61.2%). (Figure 3)

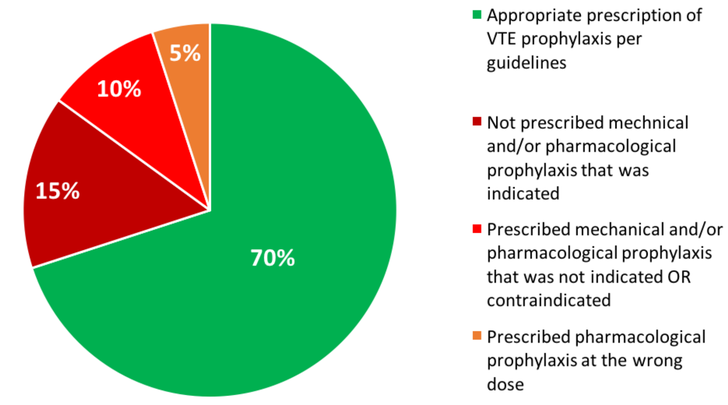
Figure 3. **Appropriateness of Pharmacological Prophylaxis (by pharmacist review status)**



Conclusions

The audit found that the use of EMR improved risk documentation compared to paper drug charts, possibly due to a "pop up" which prompts prescribers to document risk. (Picture 2) However, prescribing was more compliant with guidelines on paper charts, possibly due to formatting of the VTE prophylaxis section and prominent position near the top of the drug chart. (Picture 1) Pharmacist chart review was associated with an improvement in compliance with guidelines (Figure 3), this strengthens the argument that pharmacists could be involved in documenting VTE risk on admission.

Figure 4. **Compliance with VTE prophylaxis guidelines**



Implications

Following the audit, the Eastern Health VTE guidelines were reviewed so that they were up to date with evidence-based-practice. The formatting of the guidelines changed to make them easier to follow. Results of the audit were used as part of discussion with the VTE working group and used in education for doctors, nurses and pharmacists. Follow-up data shows compliance rates with guidelines are improving (90% compliance achieved July 2018) and VTE risk documentation rates have increased (to 63% at EMR sites and 26% at paper-based sites in July 2018).

Assessment of VTE risk was documented 31.7% of the time. (Table 1)

Appropriate VTE prophylaxis was prescribed for 70% of patients. (Figure 4)

The use of EMR improved documentation of VTE risk assessment. (Figure 1)

Pharmacist chart review was associated with increased compliance with guidelines. (Figure 3)

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