Venous thromboembolism (VTE) 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 or 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.

**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 or 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 QIM Indicator 1.2) (1)  
**Secondary question:** What percentage of adult inpatients at Eastern Health are assessed for risk of VTE? (National QIM Indicator 1.1) (1)

**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 ≥21 days. 240 of a possible 889 patients were identified between 13/6/18 and 31/7/18 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)

**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 (18.5%).

**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 inappropriate to their level of risk. 15% of patients were not 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)

**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. (Figure 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. (Figure 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.

**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 compared to paper drug charts, possibly due to “pop up” which prompts prescribers to document risk). (3)

**References**

**Table 1. Sample size**

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

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

<table>
<thead>
<tr>
<th>VTE risk documented by EMR (%)</th>
<th>Total Patients</th>
<th>MH (paper)</th>
<th>BHH (EMR)</th>
<th>AH (EMR)</th>
<th>WH (EMR)</th>
<th>PJC (paper+EMR)</th>
<th>ALL SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTE risk documented - n (%)</td>
<td>46</td>
<td>12 (2.2)</td>
<td>39 (8.5)</td>
<td>21 (6.0)</td>
<td>42 (8.5)</td>
<td>10 (19.2)</td>
<td>76 (31.7)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Appropriateness of VTE Prophylaxis - n (%)</th>
<th>TOTAL Patients</th>
<th>Pharmacological</th>
<th>Mechanical</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH (paper)</td>
<td>46</td>
<td>39 (8.4)</td>
<td>49 (9.1)</td>
<td>38 (8.2)</td>
</tr>
<tr>
<td>BHH (EMR)</td>
<td>111</td>
<td>73 (63.9)</td>
<td>96 (86.6)</td>
<td>66 (59.5)</td>
</tr>
<tr>
<td>AH (EMR)</td>
<td>35</td>
<td>28 (80)</td>
<td>31 (88.6)</td>
<td>26 (74.3)</td>
</tr>
<tr>
<td>WH (EMR)</td>
<td>18</td>
<td>16 (88.9)</td>
<td>12 (66.7)</td>
<td>15 (83.3)</td>
</tr>
<tr>
<td>PJC (paper+EMR)</td>
<td>30</td>
<td>23 (76.7)</td>
<td>30 (100)</td>
<td>23 (76.7)</td>
</tr>
<tr>
<td>ALL SITES</td>
<td>240</td>
<td>177 (73.8)</td>
<td>211 (87.9)</td>
<td>168 (70)</td>
</tr>
</tbody>
</table>

**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)**

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

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

**Figure 5. Assessment of VTE risk was documented 31.7% of the time. (Table 1)**

**Figure 6. The use of EMR improved documentation of VTE risk assessment. (Figure 1)**

**Figure 7. Appropriate VTE prophylaxis was prescribed for 70% of patients. (Figure 4)**

**Figure 8. Pharmacist chart review was associated with increased compliance with guidelines. (Figure 3)**