BACKGROUND

The Modified Early Warning Score (MEWS) was implemented at Jefferson in June 2017 to identify hospitalized patients who are experiencing clinical deterioration early. Although an early warning score is recommended for all in-patients, there is more data on validation of outcomes in medical patients compared to surgical patients.

AIMS

1. To identify characteristics of patients who trigger a red MEWS alert and to determine if these characteristics differ in medical versus surgical patients
2. To determine if there is a significant difference in outcomes (in-hospital mortality, discharge to hospice, hospital LOS, RRT, ICU transfer, intubation) for patients who receive a red alert as a medical versus surgical patient when accounting for age, sex, and race
3. To describe the rate of outcomes over time since MEWS implementation with medical and surgical patient subgroup analysis

METHODS

Data: Vizient database of all patients who received a Red MEWS alert during admission and discharged between June 2017-March 2018 (n=812).

AIM 1: Patient Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Medical Patients (n=563)</th>
<th>Surgical Patients (n=249)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex: female, n (%)</td>
<td>370 (45.6)</td>
<td>253 (44.9)</td>
<td>0.589</td>
</tr>
<tr>
<td>Age: 18-20, 21-29, 30-39, 40-49, 50-64, 65+</td>
<td>62.4 (16.1, 17.98)</td>
<td>62.4 (16.2, 18.98)</td>
<td>0.226</td>
</tr>
<tr>
<td>Race: White, n (%)</td>
<td>504 (62.1)</td>
<td>345 (61.3)</td>
<td>0.487</td>
</tr>
<tr>
<td>Other race, n (%)</td>
<td>308 (37.9)</td>
<td>218 (38.7)</td>
<td>0.361</td>
</tr>
<tr>
<td>Source of Admission, n (%)</td>
<td>345 (61.3)</td>
<td>218 (38.7)</td>
<td>0.487</td>
</tr>
<tr>
<td>Alarms</td>
<td>268 (43.0)</td>
<td>196 (34.8)</td>
<td>0.099</td>
</tr>
<tr>
<td>Non-Facility</td>
<td>544 (67.0)</td>
<td>367 (65.2)</td>
<td>0.316</td>
</tr>
<tr>
<td>Insurance Category</td>
<td>485 (59.7)</td>
<td>318 (56.5)</td>
<td>0.005</td>
</tr>
</tbody>
</table>
| Commercial/Commercial
| Medicare/Medicare (categorical variables) | 485 (59.7) | 318 (56.5) | 0.005   |
| All Other Payers (include Dual Enrolled) | 327 (40.3) | 245 (43.5) | 0.229   |
| Alerts per Patient (c.d., range) | 1.89 (1.6-1.17) | 1.85 (1.5-1.17) | 0.316   |

• Surgical patients were younger than medical patients by approximately 2.7 years (95% CI: 0.329-5.124).
• Being a surgical patient increased the odds of having Commercial/Medicare/Commercial+Medicare insurance by 56.9% (95% CI: 1.148, 2.144).

AIM 2: Differences in Outcomes

In-Hospital Mortality: 137/169 (80.9%) vs 101/179 (56.6%), p=0.002, OR=2.470 (1.572, 3.870)
RRT Post-Alert: 87/107 (81.3%) vs 63/112 (56.2%), p=0.086, OR=1.504 (1.097, 1.598)

Length of Stay: days; median (IQR), range
Medical Patients: 14 (12.7, 17), range 13 (7.7, 12.0)
Surgical Patients: 17 (15.1, 20.1), range 14 (10.3, 40.9)
P=0.000, Effect Size=2.470

ICU Transfer: 258/318 (81.3%) vs 163/290 (55.8%), p=0.011, OR=1.504 (1.097, 2.062)

Intubation Post-Alert: 39/148 (26.3%) vs 19/34 (55.9%), p=0.005, OR=2.470 (1.289, 4.732)

Survived to discharge: 146/160 (91.0%) vs 92/137 (67.2%), p<0.001, OR=1.284 (1.069, 1.537)

Each additional year of age increased the odds of in-hospital mortality by 3.0% in the total study population and discharge to hospice by 4.6% in those who survived to discharge.

Being identified as White increased the odds of having an RRT call after alert by 71.5%.

AIM 3: Outcomes over Time

• Most differences between medical and surgical patients who receive red MEWS alerts are not statistically significant or indicate that surgical patients, while younger and more likely to have Commercial and/or Medicare insurance, have higher odds of having poor outcomes (longer length of stay, ICU transfer, and intubation post-alert).
• This evidence supports MEWS score implementation for both medical and surgical in-patients at Jefferson.
• Further research:
  - Examination of outcomes directly related to alert, such as intubation and ICU transfer within 2 hours of alert
  - Validation of outcomes by comparing patients with a red MEWS alert against a control group.
  - Examination of differences in follow-up actions and their effect on patient outcomes
  - Follow-up of alerted patients and their outcomes for a longer period of time

DISCUSSION & LIMITATIONS

• Applies ethical principles in accessing, collecting, analyzing, using, maintaining, and disseminating data and information
• Identifies gaps in data
• Describes how evidence is used in decision-making
• Conveys data and information to professionals and the public using a variety of approaches
• Describes the diversity of individuals and populations in a community
• Describes the value of a diverse public health workforce
• Retrieves evidence from print and electronic sources to support decision making
• Contributes to the public health evidence base

CORE COMPETENCIES

ACKNOWLEDGEMENTS

Rebecca Jaffe, MD, Chair
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