Adoption of the National Early Warning Score: a survey of hospital trusts in England, Northern Ireland and Wales

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Improving Patient Safety - studying an evolving IT system
PI: Professor Jamie Coleman

“The research (was funded by and took place) at the National Institute for Health Research (NIHR) Collaborations for Leadership in Applied Health Research and Care based in Birmingham and Black Country.”
Prescribing Information and Communication System

1998 - renal medicine
2008 - used in all inpatient areas
2009 - eObs

The deteriorating patient

What contributes to a worsened prognosis for ward patients?

- Increased acuity on wards – complex care, older patients and shorter medical stays
- System failures in recognising and responding to acute deterioration – triad of failure:
  1. Vital signs recording and monitoring
  2. Response to deterioration
  3. Competence of the responder

Interventions to improve the detection of patient deterioration

*adopted from the Chain of Prevention © Gary Smith
Electronic observation form - eObs

Education

Recognition

Monitoring

Response

Call for help

Alerts to doctors and nurses based on severity of SEWS

Ready access to electronic data capture

Messages to the Critical Care Outreach

*adopted from the Chain of Prevention © Gary Smith
Impact of the eObs form at UHB

2010/2011

Transparency

Different levels of completeness of obs sets in initial wards:

- Pilot study - 49.3% to 92.0%
- Trust audit data: ave. baseline of 79%

2011/2012

Monitoring

Data added to Clinical Dashboard

Target setting

91% of all inpatients obs to be a complete set

2012/2013

Incentives

CQUIN: Completion of observation sets is one of Trust’s quality improvement priorities

Continued improvement

The Trust goal for 2013/14 was to achieve at least 98% for completion of obs
### The Early Warning Scoring System

<table>
<thead>
<tr>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>&lt;40</td>
<td>41 - 50</td>
<td>51 - 100</td>
<td>101 - 110</td>
<td>111 - 130</td>
<td>&gt;130</td>
</tr>
<tr>
<td>BP</td>
<td>&lt;70</td>
<td>71 - 80</td>
<td>81 - 100</td>
<td>101 - 199</td>
<td>&gt;200</td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>&lt;8</td>
<td>9 - 14</td>
<td>15 - 20</td>
<td>21 - 29</td>
<td>&gt;30</td>
<td></td>
</tr>
<tr>
<td>TEMP</td>
<td>&lt;35.0</td>
<td>35.1 - 36.5</td>
<td>36.6 - 37.4</td>
<td>&gt;37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNS</td>
<td>A</td>
<td>V</td>
<td>P</td>
<td>U</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Alert)</td>
<td>(Responds to voice)</td>
<td>(Responds to pain)</td>
<td>(Unconscious)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Developed in 1997 by Morgan, Williams and Wright
- Based on five physiological parameters: SBP / Pulse / Respiratory rate / Temperature / AVPU – level of consciousness
- 1999 - MEWS added urine output (Stenhouse et al)

Plus oxygen saturation / urine output / pain / age
Early Warning Scores

2007 - review found 25 distinct track and trigger warning systems

2008 - review found 33 unique but similar systems with AUROC 0.657 – 0.782
Development of NEWS

- **2007**: RCP’s Acute Medicine Task Force report “Acute medical care: the right person, in the right setting – first time”

- **2009**: RCP commissioned a multidisciplinary group to develop NEWS

- Evaluations based on VitalPAC datasets and EWS (ViEWS) - AUROC of 0.873*
  - able to discriminate patients at risk of the combined outcome of cardiac arrest, unanticipated ICU admission or death within 24 h of a NEWS value better than 33 other EWSs

- **2012**: recommendations released – score / standard charts / e-learning / escalation policy (linked to local systems).

National Early Warning Score

Advantages:
- Education and training
- Staff relocation
- Patients move
- Communication

Aims

• to elicit the uptake of National Early Warning Score (NEWS) in hospitals in England, Wales and Northern Ireland

• To elicit the adoption of EHR/eObs in general acute wards in NHS hospitals
Methods: selection of hospitals

- Hospitals were members of a regional critical care network and submitted data to the Case Mix Programme audit (ICNARC) and had an adult general critical care unit.

- In 2014, 95% of adult, general critical care units participated in the CMP

- The CMP launched in 1994, now 1.8 million admissions

- Scotland - Scottish Intensive Care Society Audit Group (SICSAG) Database
Methods: survey

Survey was sent to 223 identified hospitals in July 2014 using the Freedom of Information Act (2000).

Hospitals were asked:

i. How many adult critical care beds do you have in your hospital (or hospital trust)?

ii. In your non-ICU wards, do you have computerised health records?

iii. Are your vital signs recorded and/or monitored using paper charts or computerised records?

iv. Do you use early warning scores on your wards to monitor patients?

v. Which one (s)?

vi. Do you plan to use the National Early Warning Score (by the RCP) if you do not already use it?
# Results

<table>
<thead>
<tr>
<th>Hospitals with EHR in non-acute wards</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59 (27.2%)</td>
<td>158 (72.8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of hospitals recording vital signs on eObs form</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45 (20.7%)</td>
<td>172 (79.3%)</td>
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</table>

<table>
<thead>
<tr>
<th>No. of hospitals using an EWS</th>
<th>Y</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>216 (99.5%)</td>
<td>1</td>
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</table>

<table>
<thead>
<tr>
<th>No. of hospitals using NEWS</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>120 (55.5%)</td>
<td>96 (44.5%)</td>
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<table>
<thead>
<tr>
<th>Plans to implement NEWS (n=96)</th>
<th>Y</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>41 (with EHR rollout 16)</td>
<td>42</td>
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</table>
Which EWS are in use?

<table>
<thead>
<tr>
<th>Early Warning Score</th>
<th>n=216 of 223 surveyed</th>
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<tbody>
<tr>
<td>NEWS</td>
<td>120 (55.5%)</td>
</tr>
<tr>
<td></td>
<td>(with 6 adapted for local use)</td>
</tr>
<tr>
<td>MEWS</td>
<td>38 (17.6%)</td>
</tr>
<tr>
<td>EWS</td>
<td>17 (7.9%)</td>
</tr>
<tr>
<td>PAR/PARS/PART</td>
<td>16 (7.4%)</td>
</tr>
<tr>
<td>ViEWS</td>
<td>11 (5.1%)</td>
</tr>
<tr>
<td>Others</td>
<td>14 (6.5%)</td>
</tr>
</tbody>
</table>
Why hospitals were not planning to use NEWS

Absence of urine output (8 hospitals):

“MEWS is used as it incorporates urine output”

“Rejected as no urine output recorded”

“Local EWS includes urine.”

“… waiting to see if a revised version will include urine output”

“NEWS trialled but felt the exclusion of urine output adversely impacted its utility.”

“We currently do not have any plans to use ‘NEWS’. NEWS does not allow assessment of urinary output as an assessment of critical illness and risk factor of Acute Kidney Injury. Also there is no adaption to BTS guidance for oxygen therapy for COPD.”
Why hospitals were not planning to use NEWS

Other reasons:

Use of ViEWS linked with VitalPAC eObs form (8 hospitals)

*EWS in use is similar to NEWS (2 hospitals)*

Use a modified version of NEWS/MEWS

*NEWS in A&E and local version used on the wards*

Not aware of NEWS
Strengths and limitations

- Freedom of Information Act (2000) - legal requirement to reply in 20 working days
- High response rate of 97%

BUT

- FOI - administrative department in most hospital trusts so response can come from a variety of sources and can therefore vary.

Survey – quick snap shot that doesn’t explore actual implementation strategies and organisational safety culture behind EWS use within hospitals.
Future work

- Repeat of the survey is planned this summer
- Results will form the basis of qualitative study in hospitals in the South-East (KSS) who belong to a regional patient safety collaborative
  - Organisational patient safety culture
  - Configuration of response mechanisms
  - Use of EHR and eObs
  - Impact of NEWS to workload and workflows (as trigger threshold is more sensitive).
Conclusions

- Steadily increasing level of acceptance of NEWS.
- The increased use of electronic health records appears to have helped some hospitals to adopt NEWS.
- Still some contention as to the best parameters in an EWS – e.g. urine output
- A small number of hospitals have adapted NEWS which is a threat to the standardisation intended.
- Future work to explore decisions behind the uptake of NEWS (or not)
Finally…

The successful implementation of NEWS will be challenging to organisations and will not in itself necessarily change the outcomes for patients unless all other components of the ‘Chain of Prevention’* are present, and work efficiently and effectively.


Thank you!

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