Paediatric Early Warning Scores

An individual’s issue
A national problem

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Paediatric Emergency Medicine
Leicester Academic
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EM3
East Midlands
Emergency Medicine
Educational Media
DANGER
THIN ICE
How do we define?
How do we define?

“Perfect”
How do we define?

“Perfect”

“Early Warning”
How do we define?

“Perfect”

“Early Warning”

“Children”
Problem 1: It is not just a (or ‘the’) score

(1) Symptoms and signs of deterioration ("calling criteria") occur and are recognized by ward personnel;

(2) The ward personnel are empowered to call for assistance without delay, circumventing established hierarchies if necessary;

(3) A readily available urgent response occurs; and

(4) This response, along with associated interventions, improves outcomes

Problem 2: Observations are often abnormal

Table 2  Frequency of abnormal vital signs in children with serious, intermediate and minor infections

<table>
<thead>
<tr>
<th></th>
<th>Serious infection (n = 108)</th>
<th>Intermediate infection (n = 205)</th>
<th>Minor infection (n = 339)</th>
<th>Not infection (n = 48)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (%)</td>
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</tr>
<tr>
<td>Temperature ( \geq 39.0^\circ \text{C} )</td>
<td>33/106 (31.1)</td>
<td>49/202 (24.3)</td>
<td>48/335 (14.3)</td>
<td>0/47 (0)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Tachypnoea</td>
<td>62/95 (65.3)</td>
<td>79/163 (48.5)</td>
<td>127/292 (43.5)</td>
<td>19/45 (42.2)</td>
<td>p = 0.002</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>67/107 (62.6)</td>
<td>124/200 (62.0)</td>
<td>148/334 (44.3)</td>
<td>12/48 (25.0)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>CRT &gt;2 seconds</td>
<td>6/61 (9.8)</td>
<td>9/119 (7.6)</td>
<td>1/193 (0.5)</td>
<td>0/19 (0)</td>
<td>p &lt; 0.001*</td>
</tr>
<tr>
<td>O₂ sats ( &lt;94% )</td>
<td>31/105 (29.5)</td>
<td>27/195 (13.8)</td>
<td>22/327 (6.7)</td>
<td>5/45 (11.1)</td>
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*Fisher’s exact test.
CRT, capillary refill time; O₂ sats, oxygen saturations.

Minor infection—conditions from which the child was expected to recover without sequelae

How well do vital signs identify children with serious infections in paediatric emergency care Arch Dis Child 2009;94:888–893
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Minor infection—conditions from which the child was expected to recover without sequelae.

How well do vital signs identify children with serious infections in paediatric emergency care Arch Dis Child 2009;94:888–893
Problem 3: Normal sets of observations may be abnormal

Table 1  Numbers of abnormal sets of observations during whole admission in patients without an adverse outcome or before adverse outcome

<table>
<thead>
<tr>
<th>No of sets of abnormal observations</th>
<th>No of patients</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>No adverse outcome</td>
</tr>
<tr>
<td>0</td>
<td>174</td>
</tr>
<tr>
<td>1</td>
<td>221</td>
</tr>
<tr>
<td>2-5</td>
<td>453</td>
</tr>
<tr>
<td>6-10</td>
<td>87</td>
</tr>
<tr>
<td>11+</td>
<td>49</td>
</tr>
<tr>
<td>Total</td>
<td>984</td>
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Problem 4: PEWS may generate work

“....the review activations might have generated an extra 7060 min of additional workload...”

O’Leary F and Chayan G. Predicting the impact on workload with the application of inpatient clinical review criteria into a paediatric emergency department. Emergency Medicine Australasia (2011) 23, 748–753
Problem 5: ...or that work may not get done

The data in the EWS:
heart rate, systolic blood pressure, capillary refill time, respiratory rate, respiratory effort, transcutaneous oxygen saturation and oxygen therapy

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The data in the EWS:
heart rate, systolic blood pressure, capillary refill time, respiratory rate, respiratory effort, transcutaneous oxygen saturation and oxygen therapy

.....was not collected uniformly

in the 23288 hours studies only 5.1% of patients had all seven items recorded

What’s new?

“When users want what's not best for them”

Christofidisa M, Hill A, Horswill M, Watsona M A human factors approach to observation chart design can trump health professional prior chart experience Resuscitation 84 (2013) 657–66
The Future

• What have we got?

• What do we want?

• How do we get there?