The Children’s Early Warning Tool

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Objective

• To design a suite of tools to meet the needs of bedside clinicians
  • Observation chart
  • Reference ranges for age
  • Early warning score
  • Clinical escalation
  • Tool to assess interventions
  • Triage tool
  • Customisable
Design

- Blank canvas
- What observations predict deterioration?
  - Normal ranges for age?
  - Single point vs. cumulative score? (both…?)
  - Weighting of observations
- What observations – pragmatic
- Human factors approach to design
<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Respiratory rate</th>
<th>Respiratory distress</th>
<th>SaO₂</th>
<th>Temperature</th>
<th>Heart rate</th>
<th>Blood pressure</th>
<th>Score systolic BP</th>
<th>Document mean BP as x required</th>
<th>Capillary refill time</th>
<th>Level of consciousness</th>
<th>Total CEWT Score</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**CEWT Score**

- If an observation moves into one of the shaded areas, add up the patient's full CEWT score and take action as described in the Actions box below.

**Actions**

<table>
<thead>
<tr>
<th>CEWT Score</th>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Obtain a full CEWT score, carry out appropriate interventions as prescribed, increase frequency of observations, manage anxiety / pain / fever, initialise oxygen.</td>
</tr>
<tr>
<td>4-5</td>
<td>Ward doctor to review, notify shift coordinator, obtain a full CEWT score after interventions, note when review requested over page, any reviewing doctor to complete CEWT review over page, any reviewing doctor to complete CEWT review over page</td>
</tr>
<tr>
<td>6-7</td>
<td>Registrar to review patient - response within 15 minutes, registrar to ensure consultant is notified, ward doctor to attend, any reviewing doctor to complete CEWT review over page</td>
</tr>
<tr>
<td>8+</td>
<td>Place emergency call, registrar to attend, ensure consultant is notified</td>
</tr>
</tbody>
</table>

Place emergency call if any of the following:

- "Clinical concern"
- "Always threat"
- "Bleeding (major)"

**CEWT**

- Place emergency call immediately
- Place emergency call
Validation

- **Retrospective**
  - All patients admitted PICU from ward in 2007
  - CEWT detected patients before PICU admission

- **Prospective**
  - Twelve pilot sites (tertiary / regional / rural)
  - Two month trial
  - Phased roll-out

- **Semi-qualitative implementation study**
Retrospective validation

ICU admissions

- Red: bronchiolitis n=20
- Blue: pneumonia n=5
- Orange: reactive airways n=4
- Black: sepsis n=14

CEWT score vs time (hours)
CEWT – Bronchiolitis

ICU admissions: bronchiolitis

CEWT score vs. time (hours)
CEWT – Bronchiolitis controls
Prospective trial

• Approximately two thousand patients
• Currently data entering
  • Optimise physiological weighting
  • Optimise action box (for different institutional capabilities)
• Impression is that scoring seems appropriate
• Two critical incidents
  • Patients had respiratory arrests
  • In both cases, CEWT had been overruled by registrar
Maximum CEWT score

n = 1436

82%
Children's Early Warning Tool - Respondents

- Paed Nurse <3 yr
- Paed Nurse >3 yr
- Adult / Paed Nurse
- Paed resident
- Paed registrar
- Paed consultant
- GP

n = 115
What impact has CEWT had on your ability to care for children in hospital?
How difficult was the CEWT chart to use?

- Very easy
- Very hard

[Chart showing difficulty levels for different settings]
How did you rate the educational material and support?

- Excellent
- Acceptable
- Poor
What next…

- Complete prospective analysis
- Optimise CEWT
- Design state-wide implementation
- Work collaboratively across borders
- Further projects
  - Other charts
  - Computers
  - Retrieval study
  - Telemedicine
Acknowledgements

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