The Implementation of a Paediatric Early Warning Tool for use within the Emergency Department and on Acute Paediatric wards

SN Nicola Adshead
SN Raynie Thomson
Aims:

• To introduce the concept of PEWS
• To highlight the evidence
• To demonstrate SHH approach to choosing, implementing and evaluating a PEWS
• To discuss the challenges
• To propose plans for the future
Stockport NHS Foundation Trust.
National Recommendations

- **NICE (2007)** Acutely Ill Patients in Hospital: *NICE guidance*
- **NPSA (2007)** Safer care for the acutely ill patient: *learning from serious incidents.*
- **CEMACH (2008)** Why Children Die: *A pilot Study*
  - Failure to recognise
  - Failure to act
An Early Warning Score is a set of simple algorithms relating to the findings of physiological parameters. These parameters are given numbers depending on the range of severity within which they fall into, the total number added at the end of the observations taken is the score given.

(Sterling 2002)
“Basic” Observations

**Airway**
- Respiratory rate and effort of breathing

**Breathing**
- Oxygen saturations
- Heart rate
- Blood pressure and/or capillary refill time

**Circulation**
- Conscious level
- Temperature

**Disability**

**Exposure**

Resuscitation Council (2005)
Meningitis Research Foundation (2007)
NICE (2007)
Royal Collage of Nursing (2007)
Literature Review: Key Findings

- PEWS is fairly new phenomenon
- Little robust evidence
- PEWS is not a modification of adult EWS
- Limited number of validated PEWS (especially within the ED)
- Relationship between PEWS and Critical Care outreach teams
Benefits of PEWS

- Ensure a full set of Observations are recorded and repeated as necessary
- Empower staff
- Aid recognition of sick/deteriorating children
- Documented trends of patient improvement or deterioration
- Reduce the amount of unexpected PICU admissions.
- Reduce the number or ‘unexpected’ (undetected) Cardiorespiratory arrests
PEWS Project Group

- Interdepartmental
- Multidisciplinary
- Representative from all paediatric areas
Ideal SHH PEWS Tool

- Validated
- Ease of Use
- Practical
- Generic
- One Document
- Tailored to each Department
Validation

• Sensitivity
  • Ability to detect disease when it is present
    • true +ve

• Specificity
  • Ability to identify non-disease in healthy individuals
    • true −ve
Ideal SHH PEWS Tool

- Validated
- Ease of Use
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- One Document
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Finding the RIGHT TOOL

- Monaghan, A (2005)
  • Used in conjunction with Critical Care Outreach – Validation in progress

  • Criteria for activation of a MET – No validation

  • 78% Detection of deterioration and 5% false +ve

  • Claims 100% sensitivity

  • Sensitivity of 70% and a specificity of 90%
Implementation Decisions

• Who needs a PEWS?
  • Pragmatic approach

• Who will the PEWS affect?
  • Assess impact prior to introduction

• Which tool meets our needs?
  • Basic assessment of physiological parameters
## Brighton Paediatric Early Warning Score

<table>
<thead>
<tr>
<th>Respiratory (R)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Within normal parameters AND • No recession or tracheal tug.</td>
<td>• RR &gt;10 above upper limit of normal OR • Accessory muscle use OR • 30%+ FiO2 or 4+ L/min.</td>
<td>• RR &gt;20 above upper limit of normal OR • Recessing OR • Tracheal tug • 40%+ FiO2 or 6+ L/min.</td>
<td>• RR 5 below lower limit of normal with sternal recession, tracheal tug or grunting OR • 50% FiO2 or 8+ litres/min.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cardiovascular (C)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>• Pink AND • Capillary refill 1-2 seconds</td>
<td>• Pale OR • Capillary refill 3 seconds</td>
<td>• Grey OR • Capillary refill 4 seconds OR • Tachycardia of 20 above normal rate.</td>
<td>• Grey &amp; mottled OR capillary refill ≥5 seconds OR • Tachycardia of 30 above normal rate OR bradycardia.</td>
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</tbody>
</table>

<table>
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<tr>
<th>Behaviour (B)</th>
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<tbody>
<tr>
<td>Playing AND Appropriate AVPU</td>
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Score 2 extra for 1/4 hourly nebulisers, persistent vomiting following surgery

Monaghan (2005) The Royal Alexandra Children's Hospital, Brighton
# PAEDIATRIC EARLY WARNING SCORE TOOL

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<th>Name</th>
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## How to use PEWS in ED and The Treehouse

**In ED**
- All Children Triaged R1, O2 or Y3 using MTS must have a PEWS calculated (exclude isolated limb problems)
- Prior to transfer the PEWS should be calculated and the Treehouse informed of a score which triggers and any actions taken
- Children with a score that "triggers" an orange or red response **MUST NOT** be transferred until a senior clinician has reviewed the child
- A repeat PEWS should be calculated prior to discharge and reported to the assessing clinician

**In the Treehouse**
- Calculate a PEWS on admission
- Calculate the PEWS each time you undertake routine vital signs or earlier if you have concerns

**Use of PEWS**
- In each category the child will score between 0-3
- To score "0" **ALL** the criteria in each category must be met. For all other scores only 1 criteria is required
- Record the total score on the vital signs chart
- Follow escalation pathway for the total score
- The PEWS should be repeated according to the escalation pathway as a minimum
- If you are unable to obtain a full set of observations repeat within 30 mins and document the reasons in the notes
- A clear action plan must be documented by the assessing clinician when the child is reviewed indicating what actions are to be taken if the PEWS fails to improve or deteriorates further

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Page 1 of 4

PEWS 2008 (v5 final)
Adapted from Brighton PEWS Tool (2009)
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Score 2 extra for 1/4 hourly nebulisers, persistent vomiting following surgery

(Adapted from APLS, 2007)

<table>
<thead>
<tr>
<th>AGE</th>
<th>Respiratory Rate</th>
<th>Heart Rate</th>
<th>Systolic BP mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate (&lt;4 weeks)</td>
<td>40-60</td>
<td>120-160</td>
<td>&gt;60</td>
</tr>
<tr>
<td>Infant &lt; 1 year</td>
<td>30-40</td>
<td>110-160</td>
<td>70-90</td>
</tr>
<tr>
<td>Toddler 1-2 years</td>
<td>25-35</td>
<td>100-150</td>
<td>75-95</td>
</tr>
<tr>
<td>Preschool 3-4 years</td>
<td>25-30</td>
<td>95-140</td>
<td>80-100</td>
</tr>
<tr>
<td>School 5-11 years</td>
<td>20-25</td>
<td>90-120</td>
<td>90-110</td>
</tr>
<tr>
<td>Adolescent 12-16 years</td>
<td>15-20</td>
<td>60-100</td>
<td>100-120</td>
</tr>
</tbody>
</table>

### PEWS Escalation Pathway

**Children with a PEWS of 0 should have PEWS rechecked prior to discharge or if there is nurse concern.**

- Repeat PEWS in 30 mins
- Inform Co-ordinator
- Consider need for further assessment
- Re-assess Triage Score

- Repeat PEWS in 15 mins
- Check BP and SPO2
- Inform Co-ordinator
- Implement any 1st line intervention
- Doctor to see in 10 mins
- Inform Senior Doctor
- Management plan agreed and documented

- Senior Doctor to review in 10 mins
- Continuous observations
- Move to recovery
- Inform Co-ordinator
- Consider Paediatric (NHS 1098, 1st on 1469, 1444 after 5pm)
- Management plan agreed and documented

- Senior Doctor to review immediately
- Move to recovery
- Inform Co-ordinator
- Consider Paediatric (Reg 1098, 1st on 1469, 1444 after 5pm)
- Consider Anaesthetic support (1214)
- Management plan agreed and documented
# PEWS Observation Chart

<table>
<thead>
<tr>
<th>Name</th>
<th>DOB</th>
<th>Hospital Number</th>
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</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>DATE</th>
<th>TIME</th>
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<td>10</td>
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<td></td>
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<td>&lt;10</td>
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</tbody>
</table>

### BREATHING
- **Respiratory Rate**
- % O₂ saturation
- O₂ concentration
- Mode of delivery
  - Headbox (H), Mask (M), Nasal Prongs (NP)
- Effort of Breathing
  - M-intubated, L-intercostal recession, S-subcostal recession, A-accessory muscles

### PEWS Score for Respiratory

<table>
<thead>
<tr>
<th>CIRCULATION</th>
<th>Heart Rate/Blood Pressure</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Score Systolic BP</td>
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<tr>
<td></td>
<td>Document in &quot;time&quot; column if not carried out and why</td>
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<table>
<thead>
<tr>
<th>Capillary Refill Time (CRT)</th>
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### PEWS Score for Circulation

<table>
<thead>
<tr>
<th>Temperature</th>
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### BEHAVIOUR AVPU

<table>
<thead>
<tr>
<th>Behaviour</th>
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<tbody>
<tr>
<td>AVPU</td>
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### PEWS Score for Behaviour

<table>
<thead>
<tr>
<th>Blood Sugar</th>
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### TOTAL PEWS SCORE R+C+B

<table>
<thead>
<tr>
<th>Pain Score 9/10</th>
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<tbody>
<tr>
<td>Wound Site</td>
</tr>
<tr>
<td>Sensation</td>
</tr>
<tr>
<td>Movement</td>
</tr>
</tbody>
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**Practitioners Initial**
PAEDIATRIC NEUROLOGICAL OBSERVATION ASSESSMENT
(use if AVPU assessment V, P or U)

Date

Time

Initial

Pre-verbal response is in brackets:

- Spontaneously
- To Speech
- To Pain
- None

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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COMA SCALE

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TOTAL GCS

<table>
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<tr>
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<th>4</th>
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PUPILS

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<th>Left</th>
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<th>Left</th>
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LIMB MOVEMENT

<table>
<thead>
<tr>
<th>Size</th>
<th>Arm</th>
<th>Leg</th>
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<tbody>
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</table>

LIMITATION IN USE OF GCS:

- Explain the need for frequent observations (even through the night) to the child and parents.
- Neurological assessment should be performed by 2 nurses at hand over to ensure agreement about GCS.
- Painful stimuli should only be used if there is no response to other stimuli. Use supra orbital pressure. Take into account any fractures or skin damage.
- Observe for any fitting (document type and duration) plus CSF loss from nose or ears.
- Frightened children may be uncooperative, use parent/caregivers in the assessment.
- If you are in any doubt about a child's condition contact the senior nurse or doctor.
Implementation

- Publicise introduction of tool
  - Raise awareness
  - Address any concerns
- Teaching sessions
  - Use of real case studies
- Launch 1st September 2008
- Clinical Support
  - Project group representatives
- Continual feed back
Initial Ambitions and the Future

- Validate the tool for ED/In patient use
- Greater Manchester Children's Network
  - Development of regional PEWS tool
  - Validation for DGH use
  - Ensure reliability for DGH patient group
- Conduct local audit
  - Full sets of observations
  - Right children
  - Following the escalation pathway
Final Thought

- Improved integrated paediatric care
- Improved departmental communications and working relations
- Empowered staff
- Positive experience
Reference list

• Haines C (2005) Acutely ill children within ward areas-care provision and possible development strategies. British Association of Critical Care Nurses, Nurisng in Critical Care. vol 10.(2)
Reference list

• NICE (2007) *Acutely Ill patients in Hospital: Recognition of and response to acute illness in adults in hospital*. London. NICE
• Resuscitation Council (UK) (2005) 'Resuscitation Guidelines.' London. RC.
• Royal College of Nursing (2007) 'Standards for Assessing, Measuring and Monitoring Vital Signs in Infants Children and Young People.' London. RCN.
The Focus Group

Emergency Department
- Paula Bennett – Nurse Consultant
- Lesley Watson – ED Paediatric Consultant
- Raynie Thomson – RN Adult
- Nicola Adshead – RN Adult
- Gemma Watkins – RN Child
- Nicola Davies – RGN
- Catherine Manion – RN Child
- Claire Williamson – RN Child

Treehouse
- Jane Kilpatrick – Nurse Clinician
- Jane Connell – Paediatric Consultant
- Natalie Cudlow – RN Child
- Karen Vernon – RN Child
- Francine Douglas – RN Child
- Janet Sidebottom – RN Child
- Paul Capey – RN Child