Achievements and Challenges of the deteriorating paediatric patient

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PACE
PATIENT WITH ACUTE CONDITION FOR ESCALATION
What is PACE?

It is an emergency response system that was introduced in early 2005 in an effort to intervene early in the treatment of the deteriorating patient.

It consists of a two tiered trigger/response system for patients with signs of clinical deterioration: PACE Tier 1 and Code BLUE (PACE Tier 2)
Cardio-Respiratory arrest

- Deterioration prior to resp arrests occurs in 50 - 80% of Paediatric cases
- Follows a period of slow & progressive deterioration of physiological values over 8-72 hours before arrest
- Involves unrecognised hypoxemia & hypo perfusion
The desired outcomes of PACE are:

• Early detection and timely intervention in the treatment of deteriorating patients
• Reduction in numbers of unplanned ICU admissions
• Improved inter-disciplinary communication
• Improved documentation including existence of comprehensive medical management plans
PACE Rollout in SESIAHS

Phase 1 – January 2009
- Prince of Wales hospital
- Royal Hospital for Women
- The Sutherland Hospital
- St Vincent's Hospital
- Shoalhaven & Rural Health

Phase 2 – July 2009
- Sydney Children's Hospital
- Sydney Hospital/Sydney eye Hospital
- St George Hospital
- The Wollongong hospital
- Shell Harbour Hospital
Who is PACE for?

• PACE is designed to cover general inpatient ward areas.

It EXCLUDES

• Emergency Departments
• Intensive Care Units and ICU managed High Dependency Units
• Theatre and Recovery Units
Paediatric PACE

• Many differences between adult and paediatric deteriorating patients
• 12 month working group
• Multi disciplinary
• Trends are more important than a scoring system for which there is little evidence
Paediatric PACE

- Implemented across SESIAHS
- Aligned with adult PACE
- 90% of staff educated
- Challenges of secondment network
- Face to face and e-learning
How a PACE Tier 1 works

Step 1
• Trigger - A patient meets **one or more** of the ‘PACE Calling Criteria’

Step 2
• Response - A PACE Tier 1 is called:

  State “PACE Tier 1”
  Give details of:
  » Admitting Team registrar
  » Ward
  » Bed number

Step 3
• Responder – The Admitting team registrar and resident
How Code BLUE (PACE Tier 2) works

Step 1
- **Trigger** -
  - Patients condition is immediately life threatening
  - Patient not reviewed within 30 mins of a PACE Tier 1 call
  - Patient meets PACE Tier 1 criteria AND has a pre-existing cardiac condition OR is post operative

Step 2
- **Response** -
  A Code BLUE is called (PACE Tier 2)

  **State** “Code BLUE”

  **Ward**

  » **Bed number**

Step 3
- **Responder** - Code BLUE Team responds
## Paediatric PACE Calling Criteria

<table>
<thead>
<tr>
<th>Clinical Signs</th>
<th>PACE Tier 1</th>
<th>Code Blue (PACE Tier 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory</strong></td>
<td>• Respiratory rate too fast OR too slow • Worsening trend in respiratory rate • Increasing work of breathing (e.g. grunting, nasal flare, recession, head bobbing) • Increase in O2 requirements &gt;20%</td>
<td>• Imminent airway obstruction • Worsening stridor • Any oxygen requirement with stridor • Exhaustion or poor colour in the presence of respiratory distress</td>
</tr>
<tr>
<td><strong>Cardiovascular</strong></td>
<td>• Heart rate too fast OR too slow • Worsening trend in heart rate • Worsening perfusion (e.g. colour, temperature, capillary refill) • Hypotension</td>
<td>• Circulatory collapse (e.g. capillary refill &gt;6 sec, thready pulse)</td>
</tr>
<tr>
<td><strong>Neurological (CNS)</strong></td>
<td>• Any deterioration in mental state (e.g. increasing drowsiness, agitation or combativeness) • Any changes in parental perception of neurological status</td>
<td>• Prolonged seizure activity • Fall in GCS by &gt;2 points • AVPU – PU response only</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>• Staff or parent concern that may indicate serious illness</td>
<td></td>
</tr>
</tbody>
</table>
Call Code Blue (PACE Tier 2) if:
• Patients condition is IMMEDIATELY life threatening
• Patient not reviewed within 30 minutes of PACE Tier 1 call
• Patient meets PACE tier 1 calling criteria AND has pre-existing cardiac condition OR is post-operative

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight</th>
<th>Heart Rate</th>
<th>Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30 days</td>
<td>3.5</td>
<td>110-160</td>
<td>30-60</td>
</tr>
<tr>
<td>6 months</td>
<td>7</td>
<td>100-160</td>
<td>30-40</td>
</tr>
<tr>
<td>1 year</td>
<td>10</td>
<td>100-150</td>
<td>30-40</td>
</tr>
<tr>
<td>2 years</td>
<td>12</td>
<td>95-140</td>
<td>25-30</td>
</tr>
<tr>
<td>4 years</td>
<td>16</td>
<td>95-140</td>
<td>25-30</td>
</tr>
<tr>
<td>6 years</td>
<td>20</td>
<td>80-120</td>
<td>20-25</td>
</tr>
<tr>
<td>8 years</td>
<td>24</td>
<td>80-120</td>
<td>20-25</td>
</tr>
<tr>
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<td>30</td>
<td>80-110</td>
<td>15-20</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>40+</td>
<td>60-100</td>
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</tr>
</tbody>
</table>

Expected systolic blood pressure = 80+(age in yrs x 2)mmHg
# PAEDIATRIC PACE NOTIFICATION FORM

This is not a clinical record. Please make an appropriate clinical entry and follow local facility process for PACE data collection. Left side to be completed by ward staff. Right side to be completed by most senior member of responding team that attends. Please complete a new form for each PACE activation.

## ACTIVATOR
- **Date**: __________
- **Time call**: __________
- **Name**: __________
- **Designation**: __________
- **Location**: __________

### Response requested
- [ ] Tier 1 [ ] Tier 2 [ ] Cardiac Arrest

### Time Responder arrived:

### Admission Diagnosis:

### Reason for Activation (Tick as many as apply. Specify value where applicable)

<table>
<thead>
<tr>
<th>Reason for Activation</th>
<th>Code Blue (PACE Tier 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resp rate (too fast)</td>
<td></td>
</tr>
<tr>
<td>Resp rate (too slow)</td>
<td></td>
</tr>
<tr>
<td>Worsening trend in resp rate</td>
<td></td>
</tr>
<tr>
<td>Work of breathing</td>
<td></td>
</tr>
<tr>
<td>O2 requirements &gt; 20%</td>
<td></td>
</tr>
<tr>
<td>Heart rate (too fast)</td>
<td></td>
</tr>
<tr>
<td>Heart rate (too slow)</td>
<td></td>
</tr>
<tr>
<td>Worsening trend in heart rate</td>
<td></td>
</tr>
<tr>
<td>Worsening perfusion</td>
<td></td>
</tr>
<tr>
<td>Hypoxia</td>
<td></td>
</tr>
<tr>
<td>Deterioration in mental state</td>
<td></td>
</tr>
<tr>
<td>Parental perception change in neurological status</td>
<td></td>
</tr>
<tr>
<td>Staff or parent concern</td>
<td></td>
</tr>
<tr>
<td>IMS/Riskman</td>
<td></td>
</tr>
<tr>
<td>Patient’s condition is IMMEDIATELY life threatening</td>
<td></td>
</tr>
</tbody>
</table>

## RESPONDER
- **Name**: __________
- **Designation**: __________
- **Time Depart**: __________

### Problem(s) Identified:

### Interventions (Tick as many as apply)
- [ ] Nil
- [ ] Oxygen
- [ ] Non-Invasive Ventilation
- [ ] Airway Manipulation
- [ ] Intubation
- [ ] IV Fluids
- [ ] IV Medication
- [ ] Chest tube
- [ ] CPR
- [ ] Defibrillation
- [ ] Invasive Monitoring
- [ ] Non-Invasive Monitoring
- [ ] Diagnostic tests
- [ ] Prescribed modified calling criteria
- [ ] ICU Consult
- [ ] Other

### PACE Disposition (Tick as many as apply)
- [ ] No change in location
- [ ] Transfer to non ICU area
- [ ] Transfer to ICU
- [ ] Transfer to OT
- [ ] Transfer to another facility
- [ ] Not for escalation of care (select below)
  - [ ] Not for PACE
  - [ ] Not for CPR
  - [ ] Documented on “No CPR” Form
- [ ] Death

### Responder comments:

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**PACE**

**NSW HEALTH**

**SESIAHS**

**FAMILY NAME**

**MRN**

**GIVEN NAMES**

| [ ] MALE | [ ] FEMALE |

**D.O.B**

| [ ] M.C. |

**ADDRESS**

**LOCATION**

**COMPLETE ALL DETAILS OR AFFIX PATIENT LABEL HERE**
Modification Form

Senior medical officers may choose to modify the PACE calling criteria to more appropriate parameters given the patient medical history and situation.

e.g. Acceptable saturations of 80-85% in a patient with pre-existing cardiac condition

Asthmatic on salbutamol with tachycardia

PACE parameters need to be considered before discharge to the wards!!
# Prescribed Modifications to Paediatric PACE Calling Criteria

This document is to be completed by a Registrar, in consultation with the AMO/Consultant paediatrician, where modification to PACE calling criteria is required for a specific patient. Once signed, the prescribed modified parameters take priority over PACE calling criteria. Fill current version of this document in the front of the patient's observation chart.

## Normal Ranges

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight (Kg)</th>
<th>Heart Rate (/min)</th>
<th>Respiratory Rate (/min)</th>
</tr>
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<tr>
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Expected Systolic Blood Pressure = 80 + (age in years x 2) mmHg

## Paediatric PACE Calling Criteria

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<th>Respiratory</th>
<th>Prescribed Calling Criteria Modifications (please specify)</th>
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<tbody>
<tr>
<td>Work of breathing</td>
<td></td>
</tr>
<tr>
<td>SpO₂</td>
<td></td>
</tr>
<tr>
<td>O₂ Requirements</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td></td>
</tr>
<tr>
<td>Heart rate</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td></td>
</tr>
<tr>
<td>Neurological (CNS)</td>
<td></td>
</tr>
<tr>
<td>Seizure Activity/Sudden decrease in LOC/Altered mentation</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

Notes

Signature: Date: Review Date:
Paediatric Between The Flags
PAEDIATRIC Between the Flags

- Once in a generation opportunity
- Currently a NSW state wide working group
- GP, ambulance, nursing, regional, metro and tertiary Paediatricians
- Go live March 2010
- Collaboration with Queensland, Victoria, ACT and ACQSHC
Challenges Ahead

• Ideal is for a single system across NSW
• Challenge of introducing a single system that caters for GP solo practice to tertiary hospitals
• Neonates?
• 16-18 year olds in children’s wards?
Observation Charts

- Essential component of Paediatric BTF
- Under development
- Based on Queensland experience
- Age based - 5 different age options
- 2 tier medical response system based on different colours
- Orange is tier 1
- Red is tier 2
Questions