WebEx Quick Reference

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• Train your middle managers to effectively lead quality improvement initiatives.

• Enhance your strategic planning with customized whole systems data and selected benchmarking information.

  . . . and much, much more for $5,000 per year!

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What is an Expedition?

ex•pe•di•tion (noun)
1. an excursion, journey, or voyage made for some specific purpose
2. the group of persons engaged in such an activity
3. promptness or speed in accomplishing something

Where are you joining from?
Kathy Duncan, RN

Kathy D. Duncan, RN, Faculty, Institute for Healthcare Improvement (IHI), is co-leader of IHI’s National Learning Network and coordinates the Improvement Map support care processes. Previously she co-led the 5 Million Lives Campaign National Field Team and was faculty for the Improving Outcomes for High Risk and Critically Ill Patients Innovation Community. Ms. Duncan was responsible for the Prevention of Pressure Ulcers and Deployment of Rapid Response Teams content areas for the 5 Million Lives Campaign. She is a member of the Scientific Advisory Board for the AHA NRCPR, NQF’s Coordination of Care Advisory Panel, and NDNQI's Pressure Ulcer Advisory Committee. She has served in a variety of staff and management positions, including director of critical care for a large community hospital, where she led an initiative to decrease ICU mortality and morbidity by reducing ventilator-associated pneumonia and ICU length of stay.

Chris McMullan, MPA

Chris McMullan, MPA, is the Director of Continuous Quality Improvement at Stony Brook University Medical Center. She serves as an adjunct faculty member at the Harriman Business School and School of Professional Development at Stony Brook University. She was a co-faculty member of the Hospital Association of New York State's 2007 learning collaborative to prevent ventilator associated pneumonia. Ms. McMullan has held a variety of managerial positions in quality improvement and human resources.
# Schedule of Calls

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 6, 2011</td>
<td>12:00</td>
<td>Introduction, Objectives, Expedition Overview</td>
</tr>
<tr>
<td>April 21, 2011</td>
<td>12:00</td>
<td>Tools used to identify “at risk” patients</td>
</tr>
<tr>
<td>May 5, 2011</td>
<td>12:00</td>
<td>Developing process for assessment</td>
</tr>
<tr>
<td>May 19, 2011</td>
<td>12:00</td>
<td>Developing process for assessment</td>
</tr>
<tr>
<td>June 2, 2011</td>
<td>12:00</td>
<td>Standardizing and testing process</td>
</tr>
<tr>
<td>June 15, 2011</td>
<td>12:00</td>
<td>Determining success, next steps</td>
</tr>
</tbody>
</table>

# Expedition Objectives

- Describe the role of the early warning scoring system as a precursor to the Rapid Response Team
- Identify missed opportunities to rescue patients
- Develop an early warning scoring tool and an assessment tool to evaluate functionality
- Implement a reliable process for application of an early warning scoring system in your hospital
How To Get the Most From This Expedition

• “All Teach, All Learn” philosophy
• Join and participate on all calls
• Participate in the listserv discussion
• Select a unit ready for change, willing to test
• Solicit leadership support
• Test, test, test- Small tests of change- (one tool, one event, etc)
• Do your homework – Assignment with each call
• Create success stories.
• Share what you’ve learned (failures as well as successes)

Survey Responses

• 65 respondents (By 3/31)
• 61 have rapid response
• 81% have clinical criteria for calling a rapid response team (1-12 criteria)
• 12 have an early warning system *(BTW, we want to hear from you!)*

Thank you!
Survey Numbers

51 (79%) Identified Missed Opportunities of Recognition

- **Clinical** - $\uparrow$BP, $\uparrow$R, $\uparrow$HR, volume overload, sepsis,
- **Social/cultural**
  - Nurses fearful to call,
  - waiting too long to call,
  - ED pts being admitted to inappropriate unit,
  - ED pts deteriorating,
  - lack of pulling everything together,
  - RNs not rounding frequently enough,
  - staff reluctant to call, being told not to call, staff feels the primary team is “handling the situation”
Expectations of Expedition

- Learn ways to increase our number of rapid response calls, to decrease codes
- Learn more about value of rapid response
- Resources/tools to help med surg nurses
- Improve our Rapid Response System
- Learn about EWSS and implementation
- Learn how to incorporate EHR dynamics into what rapid response does
- To see what others are doing

Model for Improvement

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What change can we make that will result in improvement?

Aim of Improvement

Measurement of Improvement

Developing a Change

Testing a Change

Principles & Guidelines for Testing

- A test of change should answer a specific question
- A test of change requires a theory and prediction
- Test on a small scale
- Collect data over time
- Build knowledge sequentially with multiple PDSA cycles for each change idea
- Include a wide range of conditions in the sequence of tests
Repeated Use of the PDSA Cycle

Sequential building of knowledge under a wide range of conditions

Hunches Theories Ideas

Very Small Scale Test

Follow-up Tests

Wide-Scale Tests of Change

Implementation of Change

Spread

Changes That Result in Improvement

Aim: Implement Rapid Response Team on non-ICU unit

Cycle 1: ICU nurse responds to rapid response team calls on one unit, one shift for one day

Cycle 2: Repeat cycle 1 for three days

Cycle 3: Have Respiratory Therapist attend rapid response calls with ICU Nurse

Cycle 4: Expand coverage of RRT on unit to one unit for one shift for five days

Cycle 5: Have Nurse Practitioner respond to calls in addition to RT and RN

Cycle 6: Expand rounds to one unit for one shift seven days a week
Developing Your Team

• Who should lead the team?
• Identify composition of the team – bedside nurse, nurse assistant, physician, respiratory therapist, pharmacist, senior leaders
• Identify frequency and duration of team meetings

Developing Your Aim Statement

• What are we trying to accomplish?
  – What is our numerical goal/target?
  – When do we intend to meet our goal?
  – What is the defined location/population?
The Case for Early Recognition

- 70% (45/64) arrests with evidence of respiratory/neurological deterioration with 8 hours (Schein, Chest 1990; 98: 1388-92)
- 66% (99/150) of patients show abnormal signs and symptoms within 6 hours of arrest and MD is notified in 25% (25/99) of cases. [Franklin C, Mathew J.. Crit Care Med. 1994;22(2):244-247.]
- Majority of in-hospital cardiac arrests were potentially avoidable and 100% of these received inadequate prior treatment. (Hodgetts TJ, Kenward G, Vlackonikolis I. Et al. Incidence, location and reasons for avoidable in-hospital cardiac arrest in a district general hospital. Resuscitation. 2002;54(2):115-123.)

Can Early Intervention Make a Difference?

For each 17 MET calls, one less cardiac arrest occurs
- Jones, Bellamo, et a. Critical Care 2005:9 R808-815
50% reduction in non-ICU arrests
Reduced post-operative emergency ICU transfers (58%) and deaths (37%)
Reduction in arrest prior to ICU transfer (4% vs. 30%)
So? What can we do?

- Studies Evaluating the Effects of an Early Warning Score (EWS) or Patient at Risk Score (Anesthesia: Goldhill et al, 1999; Stenhouse et al, 2000 – surgical population)

- High Modified EWS (MEWS) Associated with Increased Risk of Death or Admission to ICU or Higher Level of Care Setting (Subbe, et al QJ Med 2001; 94:521-526)
  - Death – Overall Risk 5.4
  - ICU or HDU admission – OR: 14.2

Rapid Response System

1. Event Detection and Response triggering
2. Crisis response component
3. Process Improvement Component
4. Governance/Administrative Structure

DeVita, et al; Findings of the First Consensus Conference on Medical Emergency Teams: Critical Care Medicine June, 2006, Volume 34, No. 9 2463-2478
Rapid Response System

1. Event Detection and Response triggering
2. Crisis response component
3. Process Improvement Component
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DeVita, et al; Findings of the First Consensus Conference on Medical Emergency Teams: Critical Care Medicine June, 2006, Volume 34, No. 9 2463-2478

Early Warning System

- Simple, practical methods of using routine physiological measurements to identify patients at risk irrespective of their location.
- The Goal: Timely attendance to all such patients, once identified, by those possessing appropriate skills, knowledge and experience.
Early Warning System

- Aggregate weighted scoring system
  - Using periodic observation of selected basic vital signs.
  - When total score exceeds a previously agreed threshold.
  - A predefined action is taken.

Single Parameter Systems

- Using periodic observation of selected basic vital signs.
- When one or more extreme observational values.
- A predefined action is taken.
Example of Single Parameter System – Adult RRT Criteria

- **Staff member is worried about the patient**
- Acute change in heart rate <40 or >130 bpm
- Acute change in systolic BP <90 mmHg
- Acute change in RR <8 or >28 per min or threatened airway
- Acute change in saturation <90% despite O₂
- Acute change in conscious state
- Acute change in UO to <50 ml in 4 hours

Multiple Parameter Systems

- Using periodic observation of selected basic vital signs.
- When **two or more** observational values are slightly altered.
- A predefined action is taken.
### Example of Multi Parameter Early Warning System

- **Systolic Blood Pressure**: <101 >200
- **Respiratory Rate**: <9 >20
- **Heart Rate**: <51 >110
- **Saturation (room air)**: <90%
- **Urine Output**: <1ml/kg/2 hours
- **Conscious Level**: Not fully alert

- If a patient fulfils two or more of the above criteria OR you are worried about his/her condition, page the resident from the admitting team and the RRT.
- These two parties MUST review the patient within thirty minutes.

### Stony Brook UMC “Story”

- March 2007 attended Cincinnati Children’s Hospital PEWS presentation at NICHQ’s conference
- April 2007 obtained approval for testing at SBUMC
- May 2007 developed PEWS tool
- June 2007 testing occurred in general pediatric unit
  - July 2007 hypotension and hypertension criteria added to the scoring grid
  - Resident to Resident bedside handoff for orange/red patients
  - Posted white boards with color magnets to graphically display unit scores
- September 2007 testing spread to pediatric hematology/oncology unit
Pediatric Early Warning System

Pediatric Early Warning Score (PEWS)
Color and Number Coding PEWS

<table>
<thead>
<tr>
<th>BEHAVIOR</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriately Quiet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irritable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lethargic/Confused</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR Reduced response to pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARDIO-VASCULAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink or Capillary refill 1-2 seconds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse or Capillary refill 4 seconds OR Tachycardia of 20 above normal rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure 100mm Hg above or below age-appropriate limit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESPIRATORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within normal parameters, no retractions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 10 above normal parameters, using accessory muscles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 20 above normal parameters with retractions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 below normal parameters with retractions and/or grunting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Age-appropriate limits for hypotension

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Systolic Blood Pressure, mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn − 30 days</td>
<td>≤ 60</td>
</tr>
<tr>
<td>1 mo − 1 yr</td>
<td>≤ 70</td>
</tr>
<tr>
<td>&gt; 1 year− 10 yrs</td>
<td>≤ 70 + 2x (age in years)</td>
</tr>
<tr>
<td>≥ 10 yrs</td>
<td>&lt; 90</td>
</tr>
</tbody>
</table>

Watchful Eye Algorithm: Pediatric Early Warning Score

Patient Admitted to Pediatrics

Patient Assessed by RN

PEWS Score Assigned

PEWS Score 0-2

Reassess with vital signs

Yes

No

PEWS Score 3

Notify T&R/Charge RN assesses patient

Primary RN calls resident, resident responds

Resident notifies Senior Resident and Attending

Action Taken

Primary RN calls code Rapid Response, and notify T&R/Charge RN

Plan is collaborated with Rapid Response Team and primary care team

Action Taken

Resident, Senior Resident and Attending respond and collaborate together

Primary RN calls resident (Resident notifies Senior Resident and Attending)

T&R/Charge RN calls resident, documents in progress notes and reassesses within 1 hour

Action Taken

Documentation is recorded in progress notes, Primary RN reassesses within 1 hr

STONY BROOK UNIVERSITY MEDICAL CENTER

STONY BROOK UNIVERSITY MEDICAL CENTER

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Assessing for Accuracy

<table>
<thead>
<tr>
<th>MEWS Tool Assessment</th>
<th>11/13/2007</th>
<th>1/22/2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>67.6%</td>
<td>66.2%</td>
</tr>
<tr>
<td>Yellow</td>
<td>28.2%</td>
<td>30.3%</td>
</tr>
<tr>
<td>Orange</td>
<td>4.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Red</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Frequency of Tension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>61.6%</td>
<td>29.8%</td>
</tr>
<tr>
<td>Ht</td>
<td>8.1%</td>
<td>7.6%</td>
</tr>
<tr>
<td>SBP</td>
<td>11.3%</td>
<td>7.6%</td>
</tr>
<tr>
<td>ABP</td>
<td>2.5%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Temp</td>
<td>11.0%</td>
<td>11.6%</td>
</tr>
<tr>
<td>Autonomic Tension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine</td>
<td>0.0%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Meds-admin</td>
<td>20.0%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Fluids given</td>
<td>12.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other fluids</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Intubated</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Ventilated</td>
<td>23.6%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Pressure &lt; 60</td>
<td>9.0%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Progression to Code</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>On Code</td>
<td>52.6%</td>
<td>47.8%</td>
</tr>
<tr>
<td>Intubated</td>
<td>3.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Ventilated</td>
<td>8.0%</td>
<td>23.6%</td>
</tr>
<tr>
<td>Pressure &lt; 60</td>
<td>23.6%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Total</td>
<td>37.1%</td>
<td>24.8%</td>
</tr>
</tbody>
</table>

Spread to Adult Floors

- July 2007 began to develop adult tool
  - Modified tool obtained at IHI Critical Care Collaborative meeting
- August 2007 tested adult tool
- September 2007 slowly rolled out to one medicine unit
- Gradually rolled out to all general medicine and surgery units one unit at a time
- Modified tool for OB population
### Modified Early Warning System (MEWS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Respiratory rate per minute</th>
<th>Heart rate per minute</th>
<th>Systolic blood pressure</th>
<th>Conscious level (AVPU)</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Less than 9</td>
<td>40-50</td>
<td>Less than 70</td>
<td>Unresponsive</td>
<td>Less than 95 F &lt;35.6°C</td>
</tr>
<tr>
<td>2</td>
<td>9-17</td>
<td>51-100</td>
<td>81-100</td>
<td>Responds to pain</td>
<td>36.55-37°C</td>
</tr>
<tr>
<td>1</td>
<td>18-20</td>
<td>101-110</td>
<td>101-119</td>
<td>Responds to voice</td>
<td>36.55-37°C</td>
</tr>
<tr>
<td>1</td>
<td>21-29</td>
<td>111-129</td>
<td>160-193</td>
<td>Alert</td>
<td>36.55-37°C</td>
</tr>
<tr>
<td>2</td>
<td>More than 30</td>
<td>More than 130</td>
<td>More than 200</td>
<td>Agitation or confusion</td>
<td>More than 101.4 F &lt;38.5°C</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>New onset of agitation or confusion</td>
<td>More than 101.4 F &lt;38.5°C</td>
</tr>
</tbody>
</table>

**Colors**
- Green = 0-1 Score
- Yellow = 2-3 Score
- Orange = 4-5 Score
- Red = ≥6 Score

### Watchful Eye Algorithm: Modified Early Warning Score

1. **MEWS Score Assigned and documented in Center**
2. **MEWS Score 0-1**
   - Patient Admitted to Floor
   - Patient Assessed by RN
3. **MEWS Score 2-3**
   - T&R IV/Change RN Assess Patient
   - Nurse Reassess
   - Primary RN provides intervention and documents intervention in progress notes
4. **MEWS Score 4+**
   - Primary RN calls code Rapid Response, and notify T&R IV/Change RN
   - Resident notifies Senior Resident and Attending
   - T&R IV/Change RN calls resident (Resident notifies Senior Resident and Attending)

**Plan is collaborated with Rapid Response Team and primary care team**

**Action Taken**

- Primary RN reassess every hour until patient is stable 4 consecutive hours (not requiring further intervention)
- Primary RN enters vital and MEWS score into Center
- Primary RN assesses primary team and RRT, informing them of patient’s vital signs
- Primary RN assesses primary team and RRT, informing them of patient’s vital signs during 4 hour assessment period
- Primary RN makes code Rapid Response if patient’s status declines or is not consistently stable during 4 hour assessment period
OB EWS (OB Early Warning System) 8 08

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate per minute</td>
<td>≤ 17</td>
<td>18-27</td>
<td>28-37</td>
<td>38 or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart rate per minute</td>
<td>≤ 39</td>
<td>40-49</td>
<td>50-99</td>
<td>100 or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>≤ 90</td>
<td>91-109</td>
<td>110-149</td>
<td>150 or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure</td>
<td>≤ 60</td>
<td>61-79</td>
<td>80-99</td>
<td>100 or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consciousness level</td>
<td>Unresponsive or responds by physical stimulation</td>
<td>Responds to voice</td>
<td>Alert</td>
<td>Agitation or confusion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>36.5°C or lower</td>
<td>36.6-36.9°C</td>
<td>37.0-37.9°C</td>
<td>38.0 or higher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine output (Foley pts)</td>
<td>≤ 30 ml/hr or ≤ 100 ml/4 hrs</td>
<td>&gt; 30 ml/hr or &gt; 100 ml/4 hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal HR tracing</td>
<td>Not reassuring FHR tracing for gestational age</td>
<td>Reassuring FHR tracing for gestational age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine activity</td>
<td>Antepartum - preterm or placenta previa: 3 or less contractions in 1 hour</td>
<td>Term patient - no uterine activity, preterm patient - no uterine activity, postpartum - moderate to strong contractions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bleeding</td>
<td>Antepartum - no active bleeding</td>
<td>Postpartum - moderate to strong contractions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep tendon reflexes (patients on magnesium sulfate)</td>
<td>Deep tendon reflexes (abnormal)</td>
<td>Deep tendon reflexes (diminished, but not abnormal)</td>
<td>Deep tendon reflexes (normal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Urine - 1 score
Yellow - 2 or 3 score
Orange - 4 or 5 score
Red - 6 or 7 score

OB EWS (OB Early Warning System) 8 08

February 2008 electronic documentation into Cerner
What We Learned

• Observed decreased ALOS and mortality in pediatric patients post implementation

• PEW/MEWS/OB-EWS board with color magnets was a great tool
  — Simple, quick visual of the unit acuity level
  — Modify staffing assignments
  — Residents to round on orange/red patients first
### Pediatric Early Warning Score – PEWS

<table>
<thead>
<tr>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Score</strong></td>
<td><strong>0</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

#### Behavior
- 0: Lethargic, Confused, or Reduced Pain Response
- 1: Irritable or Agitated and Not Consolable
- 2: Sleeping, Irritable and Consolable
- 3: Playing, Appropriate for pt.

#### Cardiovascular
- 0: Grey or CRT ≥ 5 or Tachycardia 30 above OR Bradycardia for age
- 1: CRT 4 seconds or Tachycardia of 20 above normal parameters
- 2: Pale or CRT 3 Seconds
- 3: Pink, CRT 1-2 Seconds

#### Respiratory
- 0: 5 below normal with retractions and/or ≥50% FiO2
- 1: >20 above normal, using accessory muscles or 40-49% FiO2 or ≥3 LPM
- 2: >10 above normal, using accessory muscles or 24-40% FiO2 or ≤2 LPM Any initiation of O2
- 3: WNL for Age No Retractions

*Add 2 points for frequent interventions (suction, positioning, O2 changes) or multiple IV attempts.*

**TOTAL**

**Most Critical**
- Score ≥ 7 Assmt. q 30 mins.

**Stable**
- Score 6 Assmt. every 1 hour
- Score 5 Assmt. every 1-2 hours
- Score 0-4 Assmt. q 4 hours

---

**What can we do?**

- Adapt Vital Sign Documentation sheet to highlight trigger points
- If any one of the following six vital signs falls in to a red zone, the nurse is prompted to determine a EWSS score for the patient:
  - Respiratory rate
  - Heart rate
  - Systolic blood pressure
  - Conscious level
  - Temperature
  - Hourly urine output
Vital Sign Documentation Tool
### NEW symptoms

<table>
<thead>
<tr>
<th>Concern</th>
<th>Chest pain</th>
<th>AAA Pain</th>
<th>SOB</th>
<th>Physiology</th>
</tr>
</thead>
</table>

### Concern

- NEW symptoms: 4 3 2 1 0 1 2 3 4
- Concern: NEW

### Chest pain

- NEW

### AAA Pain

- NEW

### SOB

- NEW

### Physiology

<table>
<thead>
<tr>
<th>Pulse</th>
<th>&lt;45</th>
<th>45 - 49</th>
<th>50 - 54</th>
<th>55 - 60</th>
<th>90 - 99</th>
<th>100 - 119</th>
<th>120 - 139</th>
<th>&gt;139</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp-core</td>
<td>&lt;34</td>
<td>34.0 - 34.5</td>
<td>34.6 - 35.0</td>
<td>35.1 - 35.9</td>
<td>38.5 - 39.9</td>
<td>40.0 - 40.4</td>
<td>&gt;40.4</td>
<td></td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>&lt;8</td>
<td>8 - 9</td>
<td>10 - 11</td>
<td>21 - 25</td>
<td>26 - 30</td>
<td>31 - 36</td>
<td>&gt;36</td>
<td></td>
</tr>
<tr>
<td>SpO2 (O2)</td>
<td>&lt;88</td>
<td>88 - 91</td>
<td>92 - 95</td>
<td>Rises by 20 - 29</td>
<td>Rises by 30 - 40</td>
<td>Rises by &gt;40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SpO2 (Air)</td>
<td>&lt;85</td>
<td>86 - 89</td>
<td>90 - 93</td>
<td>94 - 96</td>
<td>Pulse pressure narrows 10</td>
<td>Pulse pressure narrows &gt;10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Level of consciousness

- GCS < 13
- GCS 13 - 14

#### Urate output

- <10mls/hr for 2 hrs
- <20mls/hr for 2 hrs
- >250mls/hr

#### Biochemistry

<table>
<thead>
<tr>
<th>K+</th>
<th>&lt;2.5</th>
<th>2.5 - 3.0</th>
<th>5.6 - 6.2</th>
<th>&gt;6.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na+</td>
<td>&lt;120</td>
<td>120 - 125</td>
<td>126 - 129</td>
<td>146 - 147</td>
</tr>
<tr>
<td>pH</td>
<td>&lt;7.21</td>
<td>7.21 - 7.25</td>
<td>7.26 - 7.30</td>
<td>7.31 - 7.34</td>
</tr>
<tr>
<td>pCO2 (acute changes)</td>
<td>&lt;3.5</td>
<td>3.5 - 3.9</td>
<td>4.0 - 4.4</td>
<td>6.1 - 6.9</td>
</tr>
<tr>
<td>SBE</td>
<td>&lt;5.9</td>
<td>5.9 - 6.8</td>
<td>-3.8 - -4.8</td>
<td>10 - 11</td>
</tr>
<tr>
<td>pO2 (acute change)</td>
<td>&lt;9.0</td>
<td>9.0 - 9.4</td>
<td>9.5 - 9.9</td>
<td>10 - 11</td>
</tr>
</tbody>
</table>

#### Creatinine

- <80 | 80 - 89 | 90 - 100 |

#### Urea

- <2 | 2.0 - 2.4 | 7.6 - 20 | 21 - 30 | 31 - 40 | >40 |

**UK Royal Centre for Defense*"
Assignment

- Using MEWS
  - Review 10-20 code blue charts (or unscheduled transfers to the ICU).
  - Determine EWS for each patient 12 hrs, 8 hrs, 4 hrs and immediately prior to arrest
  - Identify physiologic conditions that would flag "at risk" patients

Example: CHOA - First Look

- Modifying the PEWS to capture a few of our 'problem areas.'
- There are 7 areas with three points each.
- Tested it on charts of patients that we knew deteriorated.
- Guess what ?! Kids will show signs of deterioration 6-8 hours before an event!

![PEW score at 4 Hour Increments Prior to Significant Event](chart.png)
Homework

- Using MEWS
  - Review 10-20 code blue charts
  - Determine and EWS for each patient 12 hrs, 8 hrs, 4 hrs and immediately prior to arrest
  - Identify physiologic conditions that would flag “at risk” patients
  - Bonus: spotcheck pts on one unit – at one time (demonstrates that this is manageable)
**Bonus**

Using MEWS—Bonus: spotcheck pts on one unit at one time (demonstrates that this is manageable)
Next Call……

• April 21 – 12-1p ET
  — Review assignment outcomes/experiences from session one
  — Special Guest: Carmen Ferrell, St. Joseph’s Hospital
  — Develop a process for identifying “at risk” patients
• Follow-up note
  — Tools, Presentations, Reference List, Recording

Expedition Communications

• If you would like additional people to receive session notifications please send their email addresses to ImprovementMap@ihi.org.
• We have set up a listserv for the Expedition to enable you to share your progress. To use the listserv, address an email to EarlyWarningExpedition@ls.ihi.org.