Kathy Duncan, RN, Director
Christine McMullan, MPA, Faculty

These presenters have nothing to disclose

WebEx Quick Reference

• Welcome to today’s session!
• Please use Chat to “All Participants” for questions
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When Chatting…

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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.
Agenda

• Homework review
• OhioHealth Rapid Response Teams and Implementation of the MEWS
  —Barbara Moore RN, Mary Jo Morgan RN
  Sheri Southworth, MS RN CPHQ
• Expedition key points
• Expedition Wrap-up

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.
Homework

• Choose Algorithm
  — Modify for your culture/organization
  — Test on a small scale with your EWS tool

• Results:
  — Describe your testing of the algorithm (one patient, one nurse, one unit, etc.)?
  — Changes made to the algorithm?
  — Describe results for patients identified at risk:
    ➢ Was the right staff brought to the bedside at the right time?
    ➢ Did the intervention result in a de-escalation?

Lakeland Regional Medical Center
St. Joseph, MI

• Choose Algorithm
  — We adapted the Children’s Healthcare of Atlanta PEWS algorithm with the Stony Brook University Medical Center MEWS scoring system.
  — The algorithm was adapted to the following MEWS Actions:

<table>
<thead>
<tr>
<th>Score</th>
<th>Color</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>Green</td>
<td>Rescore with routine V.S.</td>
</tr>
<tr>
<td>2-3</td>
<td>Yellow</td>
<td>Rescore in 4 hrs. Notify RRT for score of 3 in any single category</td>
</tr>
<tr>
<td>4-5</td>
<td>Orange</td>
<td>Notify RRT, intervene and rescore q 30 minutes until improved</td>
</tr>
<tr>
<td>6 or &gt;</td>
<td>Red</td>
<td>Notify RRT, Intervene, rescore Q 15” until improved</td>
</tr>
</tbody>
</table>

— Algorithm Modifications: Numerical scores, colors, and actions were modified to reflect our adult condition. Scores were increased in range per parameter, colors were changed to green, yellow, orange, and red, actions VS rechecks were increased in frequency to accommodate the adult population.
— Mews Modifications: RR altered, Critical Level Lab values and new symptoms added.
Results:

- We tested the algorithm on 100 patients on one unit over four 12 hr. shifts.
- The results for patients identified at risk:
  - 5 of the patients scored 3. (2 of the patients rescored with increased frequency until improved, medications & labs ordered.)
  - 3 of the patients scored 4. (RRT notified, medications ordered with improvement.)
  - 1 pt. scored 5,6,& 8 respectively. (RRT notified, medications, labs ordered with stabilization to a Mews range of 2-3.)
  - The intervention did result in a de-escalation of the patients.

Modified Early Warning Score

<table>
<thead>
<tr>
<th>Score</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Nervous System</td>
<td>Confused or agitated</td>
<td>Alert</td>
<td>Responds to Voice</td>
<td>Responds to Pain</td>
<td>Unresponsive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory Rate (breath/min.)</td>
<td>&lt; 8</td>
<td>8 to 20</td>
<td>21 - 30</td>
<td>&gt; 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Rate (beats/min)</td>
<td>&lt; 40</td>
<td>40 - 50</td>
<td>51 - 100</td>
<td>101 - 110</td>
<td>111 - 130</td>
<td>&gt; 130</td>
<td></td>
</tr>
<tr>
<td>Systolic Blood Pressure (mm/Hg)</td>
<td>&lt; 70</td>
<td>71-80</td>
<td>81 - 100</td>
<td>101-180</td>
<td>181 - 200</td>
<td>201-220</td>
<td>&gt; 220</td>
</tr>
<tr>
<td>Temperature C</td>
<td>&lt; 34</td>
<td>34.0 - 35.0</td>
<td>35.1 - 37.5</td>
<td>37.6 - 38.5</td>
<td>38.6 - 40.0</td>
<td>&gt; 40</td>
<td></td>
</tr>
<tr>
<td>O2 Sat w/appropriate oxygen</td>
<td>&lt; 90 %</td>
<td>91 - 93%</td>
<td>94 -100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Actions/Interventions

- 1 to 2 Green: Rescore using routine vital. Observe every 4 hours
- 3 to 4 Yellow: VS and reassess in 1 hour. For scores of 3 in a single category call the covering service or the RRT
- 5 to 6 Orange: VS and reassessment minimum every 1/2 hour. Call covering service and RRT. Possible ICU consult
- > 6 Red: Continuous monitoring. Notify RRT and covering service. Consider ICU Consult
Sinai-Grace Hospital

- Sinai Grace Hospital – Detroit, MI
  - Modified the revised Atlanta Children’s Hospital algorithm
  - Decreased the scoring in the first level to 1-2
  - Second level scoring was 3-4
  - Changed the colors to traffic signals colors
    - Green, yellow, orange & red are universally familiar
  - Algorithm tested on one telemetry patient
  - MEWS = 5
    - RR = 26, HR = 116 and temp = 38.6 C
  - Describe results for patients identified at risk:
    - RRT & internal medicine resident notified
    - Critical Care consulted
    - Patient transferred to ICU with a possible pulmonary emboli

Brookwood Medical Center

Summary of Modified Pilot Findings

- Three levels of action improved tool sensitivity (capture of declining conditions earlier than pilot)
- Earlier escalation resulted in lower mean scores to trigger the supervisor and/or RRS activation
- Scores conducted every 4 hours with standard vital signs indicated >90% compliance with scoring (20% improvement from pilot)
- Potential adverse outcomes or increased patient acuity avoided (as indicated by mean score comparison)
- Allowed tailoring unit-specific EWS educational plans for housewide implementation (data identified fluctuations in scores relative to timing of day and care plan activities of patients)
Brookwood Medical Center

Future Directions

• Pilot modified tool on at least 2 more med-surg areas to increase sample size (to validate reliability, sensitivity and generalizability of the modifications)

• Roll out data comparatives with RRT and code blue dashboards to evaluate changes in call volume, acuity levels, LOS, complications, escalations, etc.

• Complete pilot by fall and complete housewide planning, implementation and evaluation

OhioHealth Rapid Response Teams and Implementation of the MEWS: Barbara Moore RN, Mary Jo Morgan RN Sheri Southworth, MS RN CPHQ
OhioHealth Healthcare System

OhioHealth: a regional healthcare system located in central Ohio

- 6 Hospitals
- Riverside Methodist Hospital:
  - Flagship hospital of OhioHealth system
  - Average daily census of 800
  - Level II Trauma center
  - 96 critical care beds
  - 2000 + Registered Nurses
  - 1500+ Physicians
  - Magnet recertification 2010

OhioHealth System Project 2010

Rapid response standardization:

- Goals:
  - Intervene before a code occurs by bringing the critical care expertise to the bedside
  - Decrease codes/safety events outside of critical care

- Objectives:
  - Evaluate the effectiveness of our RRTs
  - Standardize RRT processes and metrics by implementing use of MEWS to identify patients at risk of deterioration
  - Expedite the proper resources to intervene
Measures of Success

- Identify missed opportunities for calling RRTs
- Decrease the number of codes outside of critical care where patient demonstrated signs of deterioration but RRT was not called
- Number of codes outside of critical care per 1000 discharges

Ohiohealth Project Initiative

- System initiative to decrease preventable codes
- Process Steps:
  - Review of literature
  - Analyzed baseline data
  - MEWS tool
  - 3 hospitals trialed tool on a designated unit
  - Specific metrics to monitor and report
  - Trial date 9/20/2010- 12/15/2010
  - Education developed for the system
  - Physician buy in and support
  - Feedback & monitoring (at first reading, what to do with subsequent elevated scores)
## Mews Criteria

<table>
<thead>
<tr>
<th>Score</th>
<th>HR</th>
<th>Systolic BP</th>
<th>RR</th>
<th>Temp</th>
<th>CNS - LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>101-110</td>
<td>81-100</td>
<td>&lt;8</td>
<td>&lt;95</td>
<td>Alert</td>
</tr>
<tr>
<td>1</td>
<td>101-110</td>
<td>81-100</td>
<td>9-14</td>
<td>95-101.2</td>
<td>Responds to voice/new confusion/restlessness</td>
</tr>
<tr>
<td>2</td>
<td>111-129</td>
<td>&gt;200</td>
<td>15-20</td>
<td>&gt;101.3</td>
<td>Responds to pain</td>
</tr>
<tr>
<td>3</td>
<td>130</td>
<td>&gt;30</td>
<td>21-29</td>
<td>Unresponsive</td>
<td></td>
</tr>
</tbody>
</table>


## Action Algorithm

<table>
<thead>
<tr>
<th>MEWS</th>
<th>Inpatients/Observation Patients – Action (Excludes DNRCC/Hospice patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 2</td>
<td>Continue routine/ordered monitoring</td>
</tr>
<tr>
<td>3</td>
<td>Primary RN to:</td>
</tr>
<tr>
<td></td>
<td>✓ Increase VS frequency to q2 hours x 3, calculate MEWS each time.</td>
</tr>
<tr>
<td></td>
<td>✓ Inform charge nurse.</td>
</tr>
<tr>
<td></td>
<td>✓ Is end-of-life discussion with patient/family indicated?</td>
</tr>
<tr>
<td>4</td>
<td>At first reading, inform:</td>
</tr>
<tr>
<td></td>
<td>✓ Attending/Service physician</td>
</tr>
<tr>
<td></td>
<td>✓ Unit Charge nurse</td>
</tr>
<tr>
<td></td>
<td>✓ Rapid Response RN to assess patient</td>
</tr>
<tr>
<td></td>
<td>Assign RN to:</td>
</tr>
<tr>
<td></td>
<td>✓ Increase VS frequency with calculated MEWS each time to q2 hours x 3;</td>
</tr>
<tr>
<td></td>
<td>include pulse ox,</td>
</tr>
<tr>
<td></td>
<td>✓ Strict I&amp;O, call if UO &lt;100ml/4hrs; if foley, observe for UO&lt; 30 ml/hr.</td>
</tr>
<tr>
<td></td>
<td>If MEWS score remains 4 for three consecutive calculations:</td>
</tr>
<tr>
<td></td>
<td>✓ Inform Attending/Service physician</td>
</tr>
<tr>
<td></td>
<td>✓ Request order for possible telemetry or transfer to a higher level of</td>
</tr>
<tr>
<td></td>
<td>care.</td>
</tr>
<tr>
<td></td>
<td>✓ Is end-of-life discussion with patient/family indicated?</td>
</tr>
</tbody>
</table>
### Action Algorithm cont.

<table>
<thead>
<tr>
<th>≥5</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first reading:</td>
</tr>
<tr>
<td>✓ Call Rapid Response Team</td>
</tr>
<tr>
<td>✓ Designated physician to respond with RRT call and evaluate patient</td>
</tr>
<tr>
<td>✓ Inform Attending/Service physician.</td>
</tr>
<tr>
<td>✓ Is end-of-life discussion with patient/family indicated?</td>
</tr>
</tbody>
</table>

**Assign RN to:**

| ✓ Implement RRT physician’s orders |
| ✓ Increase VS frequency with calculated MEWS each time to q1 hours x 3; include pulse ox. |
| ✓ Strict I&O, call if UO <100ml/4hrs; if foley, observe for UO< 30 ml/hr. |

After implementation of RRT physician orders and next MEWS calculation, if MEWS score remains 5 or greater:

| ✓ Call Rapid Response Team |
| ✓ Request order for possible transfer to higher level of care. |

The RN may call a RRT any time there is a concern, regardless of MEWS score.

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### HED Documentation and Reports

![HED Documentation and Reports](image-url)
Pilot Statistics

September 20th – December 15th

Ohiohealth System Results:
RRT calls Pre-Pilot and During Pilot

Number of RRT calls Pre-Pilot and During Pilot

<table>
<thead>
<tr>
<th>RRT calls Pre-Pilot</th>
<th>RRT Calls During Pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>124</td>
</tr>
</tbody>
</table>

Total call/trial units
Percent of RRT Calls requiring Interventions

- 76%

Code Blue Events on trial units: Pre-Pilot and During Pilot

- Grady Memorial: Pre-Pilot - 2, During Pilot - 4
- GrMC: Pre-Pilot - 2, During Pilot - 4
- RMH: Pre-Pilot - 0, During Pilot - 0
Riverside Methodist Hospital 7 Orange MEWS Trial Update

- Average Daily census on trial unit approx 28 patients
- # of RRT calls for MEWS 4 or ≥ 29 (time frame 09/20/10 thru 12/15/10)
  - 72.4% (21/29) pts assessed with score of 4
  - 27.5% (8/29) pts assessed with score of ≥ 5
- Outcomes
  - 82.7% (24/29) received interventions & stayed in room with present level of care
  - 17.2% (5/29) transferred to higher level of care
  - 11.6% (4/29) status changed to DNR-CC after pt/family discussion

Riverside Methodist Hospital MEWS Trial Update

- 100% Compliance with completion of the MEWS score by RNs
- Very positively received/embraced by nurses
- Zero codes occurred on unit during trial
- Zero safety events related to failure to rescue
- Staff on trial unit wanted to continue use of MEWS beyond trial date!
Riverside Methodist Hospital
MEWS Trial
Sept 20, 2010-Dec 15, 2010

Results of MEWS score > 4
N= 29
- Patients status changed to DNR-CC, 4, 12%
- Pts trans to critical care, 5, 15%
- Pts who received interventions, 24, 73%

Results of system trial
- The MEWS improves patient safety by providing a more objective interpretation of vital signs
- Provides the nurse a tool to evaluate subtle signs that predict the patient risk of deterioration
- Provides the nurse with an early trigger to activate the RRT
- Empowers nurses & increased confidence when discussing clinical assessments with physicians
- Provides physicians with timely information about changes in a patient’s clinical status
**House wide Implementation process**

- CNO approval
- Education module for RNs on identified units
  - Specific documentation process in electronic MR
- Education for Attending Physicians & House staff
- Implemented on 2-3 units q 2 weeks
- Monitor process
- Feedback to stakeholders

**Success of Project**

- *Dedicated process in place:*
  - Rapid Response Team RN
  - Physician is identified through Chain of Command
  - Respiratory Care Practitioner
- Staff engagement
- Share successes!
- Have back up plan/resources identified
  - ICU/CICU/NCC Charge RN
Next Steps

• Implement MEWS system wide
  ➢ Goal is by July 1, 2011
  ➢ Develop a system policy for Rapid Response Team

• Research
  ➢ Working with Internal Review Board to complete a system research project

Questions
EWS Expedition Key Points

• Identify what it is you want to accomplish
• Keep your EWS tool and algorithm simple
• Don’t reinvent the wheel – steal shamelessly!
• Test on a small scale and build slowly on its success

EWS Expedition Key Points

• Measure reliability and outcomes
  — Reliability in process
    ➢ Assessment (timeliness, accuracy, etc.)
    ➢ Following algorithm
  — Outcomes
    ➢ # of RRT calls
    ➢ # of Code Blue calls outside the ICU
    ➢ Observed to expected mortality
Expedition Wrap-up

• The listserv will remain active. To use the listserv, address an email to EarlyWarningExpedition@ls.ihi.org.

• A manual with instructions to receive Continuing Education Credits will be sent with the follow-up email for today's session.

• Please take 5 minutes to complete the Expedition evaluation survey.