MultiCare Health System: Using a Modified Early Warning System (MEWS) to Improve Patient Safety

HIMSS Innovation Community

November 2, 2012
Our TEAM!

Madelene Bohnert, Application Analyst III
Brenda Bowles, RN, Manager, Nursing Informatics
Matt Eisenberg, MD, Medical VP, Clinical Informatics
Matt Davis, MD, MIS Hospitalist/Informatics Physician Lead
Sharon Hansen, RN, Good Samaritan Critical Care Educator
Kristine Lundeen, RN, Outcomes Analyst
Aaron Mills, RN, Good Samaritan Nurse Manager
Jennifer Ocker, RN, Clinical Informatics Analyst II
Christal Pittman, RN, Tacoma General ICU ANM
Sanjay Subramanian, MD, Critical Care MGSH
James Taylor, MD, Critical Care TG/AH
MultiCare “By the Numbers” for 2011

» 1 Pediatric and 3 Adult Hospitals (Soon to be 4)
» 882 Licensed Beds
» 2 Multi-Specialty Medical Centers
» 7 Outpatient Surgery Centers
» 7 Urgent Care Centers
» 2 MultiCare Express Retail Clinics
» Occupational Health
» Home Health/Hospice
» 9,537 Employees
» 547 Employed providers (471 FTE)
» Annual Net Revenue of over $1.5 billion
» 3 Foundations

» Hospital Admissions: 39,566
  ▪ Good Samaritan 16,898
  ▪ Tacoma General 14,992
  ▪ Mary Bridge 4,366
  ▪ Allenmore 3,310
» 5,153 Newborns
» 161,451 ED Visits
» 5,727,090 Total OR Minutes
» 149,050 Urgent Care Visits
» 519,683 MultiCare Medical Associates/Group Clinic Visits
» Epic 2010 (since Oct 2011)
  ▪ First Epic install 1998
  ▪ Using most everything except Stork, Cardiant, Anesthesia
Session Objectives

» What is MEWS?
» How does it relate to Rapid Response Teams or Outreach Teams?
» Why would anyone use it?
» Does it work? What’s the evidence?
» How did MultiCare design and implement MEWS?
» How do you build it?
» What other tools are available?
» What have we learned?
Early Warning Systems: Scorecards That Save Lives

For the past few years, the Institute for Healthcare Improvement (IHI) has challenged hospitals across the United States to reduce cardiac arrests and other sudden, life-threatening events in patients on general medical floors by implementing a system of Rapid Response Teams. Such a system involves empowering staff nurses, and in a small but growing number of hospitals a family member, to summon a designated group of clinicians to a patient’s bedside to critically and quickly evaluate signs of a worsening condition. Steps can then be taken to head off the worst, including transferring the patient to an intensive care unit if necessary.

As part of IHI’s 100,000 Lives Campaign some 1,500 hospitals are now actively using and/or implementing Rapid Response Teams. Cardiac arrest rates, mortality rates, and lengths of stay in the intensive care unit (ICU) are dropping, and hospitals with Rapid Response Teams are moving their cultures toward a team-based approach to clinically challenging situations.

Currently, most Rapid Response Teams in the United States are triggered by one parameter at a time, and that parameter often represents a significant change in a particular vital sign. For example, a significant change in blood pressure might trigger a call to the Rapid Response Team, or a significant change in skin color might trigger a call. In some cases, a general feeling that something is not right might lead to a call. Many teams report that approximately 40 percent of calls to the Rapid Response Team are generated because the caller feels there is “something just not right” with the patient.

While a single-parameter approach has been effective, what if organizations could identify at-risk patients even before a significant vital sign change? What if a system were created that could respond to multiple parameters at the same time and identify at-risk patients at the first sign of a subtle change in vital signs? Such as Early Warning...
### MEWS (Modified Early Warning System)

<table>
<thead>
<tr>
<th></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>Respiratory Rate per minute</td>
<td>Less than 8</td>
<td>9-14</td>
<td>15-20</td>
<td>21-29</td>
<td>More than 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Rate per minute</td>
<td>Less than 40</td>
<td>40-50</td>
<td>51-100</td>
<td>101-110</td>
<td>111-129</td>
<td>More than 129</td>
<td></td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>Less than 70</td>
<td>71-80</td>
<td>81-100</td>
<td>101-199</td>
<td>More than 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscious level (AVPU)</td>
<td>Unresponsive</td>
<td>Responds to Pain</td>
<td>Responds to Voice</td>
<td>Alert</td>
<td>New agitation</td>
<td>Confusion</td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>Less than 35.0</td>
<td>35.1-36</td>
<td>36.1-38</td>
<td>38.1-38.5</td>
<td>More than 38.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hourly Urine For 2 hours</td>
<td>Less than 10mls / hr</td>
<td>Less than 30mls / hr</td>
<td>Less than 45mls / hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Early Warning Scoring System for Detecting Adult Patients Who Have or Are Developing Critical Illness**

*Is the score for your patient 1-2? Perform 2 hourly observations and inform nurse in charge.*

*Is the score for your patient 3? Perform 1-2 hourly observations and inform nurse in charge.*

*If the MEWS score is deteriorating: The ward S.H.O. or duty doctor must attend.*

*Is the score for your patient 4 or more? Perform observations at least 1/2 hourly. Ensure medical advice is sought and contact outreach team (see below).*

**Outreach Bleep No: 4495: Contact for MEWS Advice / Assistance**

Ymddiriedolaeth GIG Siroedd Conwy a Dinbych
Conwy & Denbighshire NHS Trust

http://www.ihi.org/knowledge/Pages/ImprovementStories/EarlyWarningSystemsScorecardsThatSaveLives.aspx
Literature Search of Effectiveness


» Author’s Conclusions: “The evidence from this review highlights the diversity and poor methodological quality of most studies investigating outreach. The results of the two included studies showed either no evidence of the effectiveness of outreach or a reduction in overall mortality in patient receiving outreach. The lack of evidence on outreach requires further multi-site RCT’s to determine potential effectiveness.”

» The larger part of the available research evidence on outreach is based on before and after designs which either lack randomization or use historical controls.
Early Warning Systems

Daphne Georgaka, RN, Maria Mparmparousi, RN, Michael Vitos, RN

INTRODUCTION

Currently, medical general wards tend to have a higher number of severely sick patients with a long period of critical illness. In addition, there is a growing recognition that several indicators of acute deterioration are being missed by both nurses and doctors. The consequences of these are an increase in the number of adverse events, such as cardiac arrest\(^1\) and in the number of patients admitted or readmitted in critical care units,\(^2\) contributing undoubtedly to higher mortality rates. As a result, many initiatives
Our MultiCare MEWS “Journey”

- We identified a need for early recognition of patient deterioration to help improve clinical outcomes
- Devise a way to “automate” Rapid Response Team initiation, reduce Code Blues, reduce unanticipated/urgent ICU transfers and reduce hospital mortality
- We reviewed MEWS designs/publications from several other organizations:
  - University of Washington, Carle Foundation, Iowa Health, IHI recommendations
- We developed an MHS specific scoring algorithm & an operational action workflow which was validated with our clinical staff
- We built and tested our design
- We launched a limited pilot at a single hospital to validate our approach
- We revised our workflow, completed training and implemented across the enterprise
- We track our outcomes
What MEWS “IS” and what it is “NOT”

► A system/algorithm that uses a physiologic score to improve time to recognition of a patient who may be clinically deteriorating due to a variety of etiologies

► MHS Score ranges from ZERO to 18 (Being a “zero” is ideal)

► Common hospital based conditions associated with rapid deterioration include worsening heart failure, excessive sedation, cardiac arrhythmias, sepsis, alcohol withdrawal and airway obstruction

► The MEWS is NOT SPECIFIC FOR ANY UNDERLYING CONDITION, including SEPSIS (There are other condition specific scoring systems- SIRS criteria)

► The MEWS does NOT replace clinical judgment but helps identify trends that may go unnoticed
AN ELECTRONIC HEALTH RECORD (EHR) BASED TOOL TO AID IN THE PREVENTION OF POTENTIALLY AVOIDABLE DEATHS IN NON-ICU HOSPITAL PATIENTS

Barry Aaronson MD, David Stone, Dorthea McMahon RN MN, Matthew Schaff, Laura Nelson RN, Debbie Young RN
University of Washington Medical Center, Seattle, Washington

Background

Many hospitals have instituted Rapid Response Teams (RRT) to prevent potentially avoidable deaths in general medical-surgical units. However, studies to date have not found consistent improvement in clinical outcomes as a result of these RRTs. This may be due to RRT activation relying primarily upon recognition of critically abnormal vital signs by the patient’s nurse, a process that is not always reliable. As a result, some patients may not receive timely life saving interventions resulting in potentially avoidable deaths.

Purpose

The purpose of our EHR innovation is to ameliorate the problem of under-detection of potentially critically ill hospital patients. This goal is achieved by implementing an Early Warning System (EWS) that improves RRT awareness of patients with critically abnormal vital signs by displaying the EHR in a real time list of these patients.

Early Warning System with EHR

The system is piloted at our 450 bed urban university based teaching hospital in addition to the affiliated 413 bed university operated county hospital.

Sample MEWS Calculation

The list is viewed by nurses that staff the RRT. Physician and Charge Nurses also have access to the list. When the RRT nurse sees a patient on the list that he or she is concerned about, the nurse will usually contact the patient’s primary nurse to gather more data and make subsequent management decisions.

Conclusion

The EWS system has been enthusiastically accepted by the RRT teams at both hospitals since they believe it has significantly improved their ability to proactively identify deteriorating general ward patients. Formal evaluation is underway to determine if this improved awareness of deteriorating patients results in improved clinical outcomes. The efficacy of the system is limited by the frequency that the RRT nurses are able to view the EWS. A pocket based device carried by the RRT nurses that displays the EWS may improve its efficacy.

Contact information

Barry Aaronson MD FACP-FHM
Hospitallist
Associate Medical Director of Clinical Informatics
Virginia Mason Medical Center
National Library of Medicine Post-Doc Medical Informatics Research Fellow
University of Washington
Seattle, Washington
aaronson@u.washington.edu (206) 588-5873
IOWA HEALTH SYSTEM – MEWS

<table>
<thead>
<tr>
<th>Respiratory Rate per minute</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 8</td>
<td></td>
<td></td>
<td>9-14</td>
<td>15-20</td>
<td>21-29</td>
<td>More than 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Rate per minute</td>
<td>Less than 40</td>
<td>40-50</td>
<td>51-100</td>
<td>101-110</td>
<td>111-129</td>
<td>More than 129</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>Less than 70</td>
<td>71-80</td>
<td>81-100</td>
<td>101-199</td>
<td>More than 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscious Level (AV/PU)</td>
<td>Unresponsive</td>
<td>Responds to Pain</td>
<td>Responds to Voice</td>
<td>Alert</td>
<td>New Agitation Confusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>Less than 35.0</td>
<td>35.1 – 36</td>
<td>36.1 – 38</td>
<td>38.1 – 38.5</td>
<td>More than 38.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MEWS | INPATIENTS – ACTION (excludes Do Not Resuscitate – Comfort Care/Hospice patients)
--- | ---
0-2 | Continue routine/ordered monitoring.
3 | Increase VS frequency to q 2 hours x 3, calculate MEWS each time.
4 | At first reading, inform charge nurse. Charge nurse to assess patient.
| Increase VS frequency to q 2 hours x 3; include pulse oximetry, calculate MEWS each time. Strict I&O, call if urinary output < 100 ml/4 hours; if foley, observe for urinary output < 30 ml/hr.
5 | Call MET; inform physician and call family.
| Increase VS frequency to q 1 hour, include pulse oximetry. If patient remains “5” for three consecutive readings, request order for possible transfer to higher level of care. Is end-of-life discussion with patient/family indicated?
6 | Call MET and physician STAT. Recommend transfer to higher level of care. Is end-of-life discussion with patient/family indicated?
## Carle Foundation Hospital version of MEWS

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Rate per minute</strong></td>
<td>&lt; 4</td>
<td>4 - 7</td>
<td>8 - 9</td>
<td>10 - 16</td>
<td>17 - 20</td>
<td>21 - 29</td>
<td>&gt;30</td>
</tr>
<tr>
<td><strong>Heart Rate per Minute</strong></td>
<td>&lt;30</td>
<td>30 - 40</td>
<td>41 - 50</td>
<td>51 - 100</td>
<td>101 - 110</td>
<td>111 - 129</td>
<td>&gt;129</td>
</tr>
<tr>
<td><strong>Systolic Blood Pressure</strong></td>
<td>&lt; 70</td>
<td>71 - 80</td>
<td>81 - 100</td>
<td>101 - 160</td>
<td>161 - 200</td>
<td>&gt;200</td>
<td></td>
</tr>
<tr>
<td><strong>Cog/Percep/Neuro Level of Consciousness</strong></td>
<td>Coma</td>
<td>Obtunded</td>
<td>Confused</td>
<td>WDL</td>
<td>Delirious</td>
<td>Stupor/semi-coma</td>
<td>Un-responsive</td>
</tr>
<tr>
<td><strong>LOC (cont.)</strong></td>
<td></td>
<td>Lethargic/somnolent</td>
<td>Alert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>&lt;34.5</td>
<td>34.5 - 35.0</td>
<td>35.1 - 36</td>
<td>36.1 - 38</td>
<td>38.1 - 38.5</td>
<td>&gt; 38.6</td>
<td>40.6</td>
</tr>
</tbody>
</table>
## MultiCare Modified Early Warning Score - mMEWS

<table>
<thead>
<tr>
<th>MultiCare - Modifying the MEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
<tr>
<td><strong>RR</strong></td>
</tr>
<tr>
<td><strong>HR</strong></td>
</tr>
<tr>
<td><strong>SBP</strong></td>
</tr>
<tr>
<td><strong>LOC</strong></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
</tr>
<tr>
<td><strong>Urine mL/kg/hr</strong></td>
</tr>
</tbody>
</table>

Urine output considerations: **Because the urine output score is a calculation based on urine output, weight, and the last 8 hours of output, there are several impacts to the score for the 8 hours applied in the calculation**
- When the initial weight is entered, the score will initially become a 3
- As urine output values are entered, the score will adjust accordingly
- After the initial 8 hours, the score will accurately reflect the MEWS score.
Piloting our Initial Build

» Allenmore Hospital Pilot July 27, 2011 – August 31, 2011: Smaller community hospital with larger elderly patients and limited population under age 18

» Monitor Tech in ICU monitored mMEWS scores for 2 West/2 East (Medical/Surgical units ONLY)

» We excluded any patient receiving “comfort care”

» Monitor Tech “ran the list” EVERY 2 hours by reviewing the System Lists with PAF columns added

» Monitor Tech documented changes in scoring on a paper log

» Monitor Tech notified primary nurse/charge nurse IF specific criteria were met – Clear action plan based on score and score change

» Nurses educated about program and told to notify attending based on change in score, but be ready to discuss clinical significance

» Stopped using the tool on August 31, 2011 and reviewed outcomes
## PILOT mMEWS Scoring Action Plan

<table>
<thead>
<tr>
<th>Score</th>
<th>Follow Up</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or lower</td>
<td>Monitor Tech Continues Q2 review</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Monitor Tech Calls Floor Nurse and shares score. Nurse asked to reassess patient and recheck VS in 2 hours</td>
<td></td>
</tr>
<tr>
<td>4 or more</td>
<td>Monitor Tech Calls Floor Nurse and shares score. Floor Nurse asked to reassess patient recheck VS in 1 hour</td>
<td>Floor Nurse to contact Charge Nurse, consider provider review, consider RRT</td>
</tr>
<tr>
<td>Any increase of 2 or more points</td>
<td>Monitor Tech Calls Floor Nurse. Floor Nurse asked to reassess and review case</td>
<td>Floor Nurse to contact Charge Nurse, consider provider review, consider RRT</td>
</tr>
</tbody>
</table>
Epic view of mMEWS monitoring screen

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Room/Bed</th>
<th>MEWS Score</th>
<th>MEWS Score Changed</th>
<th>MEWS Time Since Reviewed</th>
<th>MEWS BP Score</th>
<th>MEWS Pulse Score</th>
<th>MEWS RR Score</th>
<th>MEWS Temp Score</th>
<th>MEWS LOC Score</th>
<th>MEWS Urine Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adt, Pualani</td>
<td>2204/2204-1</td>
<td>5</td>
<td>2</td>
<td>0 Hrs 4 Mins</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Avery, Stan</td>
<td>2213/2213-2</td>
<td>4</td>
<td></td>
<td>0 Hrs 4 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Test, Catherine</td>
<td>2214/2214-2</td>
<td>6</td>
<td>3</td>
<td>0 Hrs 4 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Test, Papaya</td>
<td>2206/2206-2</td>
<td>3</td>
<td></td>
<td>0 Hrs 3 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Test, Patricia</td>
<td>2211/2211-2</td>
<td>0</td>
<td>3</td>
<td>0 Hrs 3 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Test, Patricia #700137 (CSN: 1597) (21 year old F) (Adm. 05/12/11) Inpatient

Last edited by Bowles, Brenda, RN on 11/15/11 at 2147

Patient Scoring

MEWS SCORING:

- Respirations: 0 points - [Last updated: 11/15/11 2150]
- Heart Rate: 0 points - [Last updated: 11/15/11 2150]
- Systolic BP: 0 points - [Last updated: 11/15/11 2150]
- LOC: 0 points - [Last updated: 11/15/11 2150]
- Temperature: 0 points - [Last updated: 11/15/11 2150]
- Urine: 0 points (Down 3 points since last review) - [Last updated: 11/15/11 2150]

MEWS Score

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>MEWS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/15/11 2147</td>
<td>3</td>
</tr>
<tr>
<td>11/15/11 2140</td>
<td>7</td>
</tr>
<tr>
<td>11/15/11 2136</td>
<td>9</td>
</tr>
</tbody>
</table>
Allenmore Baseline (Pre Pilot) Statistics

- Baseline “control” / before period: January 1, 2011 to June 30, 2011

- Transfers from Med/Surg unit to ICU
  - 2 East → ICU = 15 patients (0.61/100 patient days)
  - 2 West → ICU = 55 patients (1.67/100 patient days)

- Rapid Response Team calls
  - 2 East = 3 patients (0.12/100 patient days)
  - 2 West = 4 patients (0.12/100 patient days)

- Code Blues
  - 2 East = 1 patient (0.04/100 patient days)
  - 2 West = No qualifying events during pre pilot period
Allenmore Pilot Statistics

- Pilot time period July 27, 2011 – August 31, 2011
- Transfers from Med/Surg to ICU (August 2011)
  - 2 East → ICU = 6 patients (1.55/100 patient days)
  - 2 West → ICU = 5 patients (1.19/100 patient days)
- Rapid Response Team calls
  - 2 East = 1 (0.26/100 patient days)
  - 2 West = 1 (0.03/100 patient days)
- Code Blue
  - No qualifying events during the pilot period
Overview of Transfers, RRT, and Code Blue

- **Transfers**
  - 2 East 254% increase
  - 2 West 29% decreased

- **RRT**
  - 2 East increased 216%
  - 2 West decreased 75%

- **Code Blue**
  - No qualifying events during pilot period
  - 2 East (Surgical) versus 2 West (PCU/Medical) - opposite results and we don’t know why
    - Different staffing ratios and level of training
    - Different patient populations - 2 East is mostly elective surgical cases with surgical specialty attending rather than hospitalists
    - Different use of the MEWS information
  - Code Blue events at AH too low to be a useful outcome measure
Results and Analysis

<table>
<thead>
<tr>
<th>Event</th>
<th>Pre Pilot</th>
<th>Pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfers (2E)</td>
<td>0.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Transfers (2W)</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>RRT (2E)</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>RRT (2W)</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Code Blue (2E)</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Code Blue (2W)</td>
<td>0.02</td>
<td>0.02</td>
</tr>
</tbody>
</table>

# per 100 patient days
Lessons Learned from the Pilot

- Monitor Techs “running the list” to review scores and changes remained within their scope of practice
- Charge nurse notification to validate scoring offered a “second set of eyes” for the floor nurse
- Notification of provider with clinical specifics suggestive of deterioration (rather than just a SCORE) helped clinical decision making- we use SBAR report format
- Visual representation of MEWS score for quick reference was helpful
- Algorithm and Action Plan was too sensitive – a “3” often alerted staff about patients that were not truly deteriorating
- To support tracking of MEWS trend, nursing staff needed to select “File” from the system list report- which is an atypical workflow and often forgot to do it [Key training element]
- Some nursing staff didn’t see the value in the MEWS score
- Anecdotal experience: e.g. patient with post op pain control
Inclusion/Exclusion Criteria

- Inclusion Criteria
  - Adult Med/Surg and Progressive Care Populations
  - Adult ED Patients with admit order to floor (holding in ED)

- Exclusion Criteria
  - OB units
  - ED (with no admission orders)
  - Critical Care Patients
  - Pediatrics - need separate calculators (PEWS)
  - Comfort Care Patients
## Final mMEWS Scoring Action Plan

<table>
<thead>
<tr>
<th>Score</th>
<th>Follow Up</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or lower</td>
<td>Monitor Tech Continues Q2 review</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Monitor Tech contacts Floor Nurse. Floor Nurse asked to reassess patient and recheck VS in 2 hours</td>
<td></td>
</tr>
<tr>
<td>5 or more</td>
<td>Monitor Tech contacts Floor Nurse. Floor Nurse asked to reassess patient and recheck VS in 1 hour</td>
<td>Contact Charge Nurse, consider provider review, consider RRT</td>
</tr>
<tr>
<td>Any increase of 2 or more points</td>
<td>Monitor Tech contacts Floor Nurse. Nurse reassesses, case review</td>
<td>Contact Charge Nurse, consider provider review, consider RRT</td>
</tr>
</tbody>
</table>
Training and Education

Filing MEWS Score

- If the MEWS score is not “Filed”, the score will be “lost” when new vital sign information is entered.
- To save the score, you MUST click on “File”.
  You can file from My List, the System List or the Kardex.

File must be clicked to populate the vital doc flow sheet

Score will be saved to the Vitals/Pain Flowsheet
Marking as Reviewed

- Mark as Reviewed can be done from a system list or my list by double clicking in the desired MEWS Time Since Reviewed cell.

1. You can mark as reviewed from the time since reviewed cell by double clicking on the cell.

2. Click accept.
Changes in the MEWS Score at a Glance

- Red Arrow going upward indicates an increase in the score.
- Green Arrow going downward indicates a decrease in the score.
- Equal sign indicates no change from previous score.
- Blue “man” indicates that scores have not been reviewed.

- Once a set of vitals is entered on the doc flow sheet a score will display.
- MEWS score change symbols will appear with the next data entry and will be compared to the last MEWS score.
Effective Use of the MEWS System

- Remember, the MEWS is a visual tool to assist in identifying when a patient’s status is potentially changing. It does not replace critical thinking, but serves to trigger a closer look at trends and not just isolated numbers and assessments.

- Question “Why” to changes — below are some examples
  - Why is the patient’s respiratory rate increasing or decreasing?
    - Is the patient oxygenating and ventilating effectively?
    - Is it related to the patient trying to compensate or is it due to medication?
  - Why is the patient’s heart rate increasing or decreasing?
    - How is the patient tolerating the rate change?
    - Is it related to the patient trying to compensate or is it due to medication?
    - Do we need to see if the rhythm has changed?
Effective Use of the MEWS System

- Why is there a change in the patient’s Level of Consciousness?
  - Could the patient be having a stroke?
  - Is it a response to infection?
  - Is it medication related?

- Is my patient Septic?
  - The MEWS score will increase if the patient is septic, but the score itself is not an inclusive Sepsis screening tool. Remember to refer to the SIRS Criteria.
  - It is a trigger to gather more information about your patient.
<table>
<thead>
<tr>
<th>Room/Bed</th>
<th>Patient Name</th>
<th>MEWS Score</th>
<th>MEWS Score Changed</th>
<th>MEWS Time Since Renewed</th>
<th>MEWS BP Score</th>
<th>MEWS Pulse Score</th>
<th>MEWS RR Score</th>
<th>MEWS Temp Score</th>
<th>MEWS Loc Score</th>
<th>MEWS Urine Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>601/601-01</td>
<td></td>
<td>6</td>
<td>3</td>
<td>52 Hrs 57 Mins</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>602/602-01</td>
<td></td>
<td>1</td>
<td>1</td>
<td>10 Hrs 29 Mins</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>603/603-01</td>
<td></td>
<td>2</td>
<td>1</td>
<td>45 Hrs 9 Mins</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>604/604-01</td>
<td></td>
<td>2</td>
<td>2</td>
<td>61 Hrs 41 Mins</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>605/605-01</td>
<td></td>
<td>3</td>
<td>1</td>
<td>9 Hrs 12 Mins</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>606/606-01</td>
<td></td>
<td>1</td>
<td>2</td>
<td>51 Hrs 54 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>607/607-01</td>
<td></td>
<td>2</td>
<td>2</td>
<td>9 Hrs 12 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>608/608-01</td>
<td></td>
<td>1</td>
<td>1</td>
<td>9 Hrs 12 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>609/609-01</td>
<td></td>
<td>2</td>
<td>2</td>
<td>9 Hrs 12 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>610/610-01</td>
<td></td>
<td>6</td>
<td>4</td>
<td>5 Hrs 49 Mins</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>611/611-01</td>
<td></td>
<td>3</td>
<td>2</td>
<td>5 Hrs 9 Mins</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>612/612-01</td>
<td></td>
<td>4</td>
<td>3</td>
<td>10 Hrs 17 Mins</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>614/614-02</td>
<td></td>
<td>1</td>
<td>1</td>
<td>5 Hrs 49 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>615/615-02</td>
<td></td>
<td>1</td>
<td>1</td>
<td>13 Hrs 12 Mins</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Where are we now?

- All 3 adult hospitals monitoring MEWS scores real time
- Workflow varies by unit but standards are set system-wide
  - “Run the list” q2 hours
  - “File” and “Mark as reviewed”
  - Follow mMEWS Scoring Action Plan
  - Escalate as needed
- We are tracking Code Blue events retrospectively to validate the mMEWS score and see if the action plan was followed or not
Outcomes - RRT

Tacoma General Hospital – RRT
2011 – 5.46/1000 discharges
2012 – 5.68/1000 discharges

Good Samaritan Hospital – RRT
2011 – 8.97/1000 discharges
2012 – 6.69/1000 discharges
MHS Annual All Cause Risk Adjusted Mortality

Change in MHS % Discharged by ROM Score & Mortality Rate by ROM Score
2008 to 2011
Source: HPM

% Discharged by ROM Score (bars)

Mortality Rate by ROM Score (lines)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% ROM 1</td>
<td>% ROM 2</td>
<td>% ROM 3</td>
<td>% ROM 4</td>
</tr>
<tr>
<td>Mort ROM 1</td>
<td>Mort ROM 2</td>
<td>Mort ROM 3</td>
<td>Mort ROM 4</td>
</tr>
</tbody>
</table>

November 13, 2012
Adult Septicemia Mortality Rates
MultiCare Health System
Patient Admit Age > 17 and Discharge Disposition of Death (Code 20) per Total Discharges, 2011 vs. 2012 with Principal Diagnosis Code Beginning 038
Source: EDW

Septicemia Mortality Rates range from 14 - 20% nationally

June Data Updated as of 7/16/12
"What's the takeaway on all this?"
Lessons Learned

» It’s never about IT, but rather it’s about Patient Safety and Quality

» “It Takes a Village”: Organize your multidisciplinary team and identify clinician champions

» It’s the Workflow stupid!: Develop a standardized workflow that is adaptable at all locations and based on staffing models

» Don’t let “perfect be the enemy of the good”: Select your MEWS content/algorithym and build/test/deploy

» Effective training and education are critical
Questions?

Harold Moscho, Vice President, Information Technology
Email: Harold.Moscho@multicare.org

Brenda Bowles, RN, Manager Nursing Informatics
Email: Brenda.Bowles@multicare.org