

## Automated Modified Early Warning System (MEWS) Early Detection of Patient Deterioration

### • **Definition:**

The Modified Early Warning System (MEWS) is a simple, validated physiological scoring system that identifies high risk patients. The score is calculated based on data already charted by nurses. Physiological parameters include heart rate; blood pressure; respiratory rate; temperature; and central nervous system status.<sup>1</sup> These values are measured routinely in hospitalized patients, and the score enables nurses and physicians to identify patients who are deteriorating and who need urgent intervention. The MEWS score is also incorporated into existing protocols for utilizing the Rapid Response Team.

### • **Purpose and Background:**

The purpose of implementing MEWS is to identify patients at the earliest signs of deterioration so that interventions can be implemented and Code Blues can be avoided. A chart review of Code Blues occurring on the med/surg/tele units in 2007 was conducted. We applied the MEWS score retrospectively to the documented vital signs in the 24 hrs prior to the code and found that 60% of those patients could have possibly been identified an average of 6.6 hours earlier had we been using the scoring system at that time. Our intent was to reduce variability on when to call the Rapid Response Team (RRT) and to facilitate timelier nurse-physician communication. MEWS scoring has been used in Great Britain as a way of providing objective and systematic data to support the Rapid Response Team or physician call. Nurses may hesitate to call physicians at first sign of deterioration. Also, many Rapid Response Teams also report that 40% of RRT calls are generated because the caller feels that ‘something is not right.’<sup>2</sup> Early detection of significant changes is important to quantify the level of deterioration, and deterioration might be recognized earlier if multiple factors are taken into account at one time.

The MEWS system is widely used in the United Kingdom, and its use has shown significant decreases in cardiac arrests and crash team calls. A study of 2,974 patients over three years at the Royal Cornwall Hospital revealed a strong relationship between the probability of death and the MEWS score.<sup>3</sup> OSF St. Joseph Medical Center in Illinois implemented a printed Risk Assessment Report in 2005. As a result, the average number of codes per month outside the ICU decreased from 2.2 in the first 12 months to 1.3 during the last 12 months. Total codes at the facility also decreased.<sup>4</sup> In Wales, after all the doctors and nurses at the Ysbyty Glan Clwyd hospital were using the MEWS score, the hospital decreased its crash call rate in half.<sup>5</sup>

### • **Goals:**

The goals are to decrease deaths and arrests, to decrease Code Blues outside the ICU, increase calls to the RRT, and decrease length of time from beginning of deterioration to intervention.

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<sup>1</sup> Subbe, C.P. et al. Validation of a modified early warning system in medical admissions. *Q J Med* 2001, 94:521-526.

<sup>2</sup> Institute for Healthcare Improvement: Early Warning Systems Scorecards That Save Lives.

<http://www.ihl.org/IHI/Topics/CriticalCare/IntensiveCare/ImprovementStories/FSEarlyWarningSystemsScorecardsThatSaveLives.htm>. Retrieved on September 19, 2007.

<sup>2</sup> Ibid.

<sup>3</sup> Carle C. et al. Use of a modified early warning system to predict outcome in patients admitted to a high dependency unit. *Critical Care* 2007, 11(Suppl 2):P479. Retrieved September 19, 2007 from <http://ccforum.com/content/11/S2/P479>.

<sup>4</sup> Whittington J. et al. Using an automated risk assessment report to identify patients at risk for clinical deterioration. *Joint Commission Journal on Quality and Patient Safety* September 2007, Volume 33 Number 9.

<sup>5</sup> IHI, op.cit.

- **Process:**

At the **beginning of each 12-hour shift**, or more frequently as indicated, the nurses calculate MEWS scores based on vital sign parameters as indicated in Table 1. When the nurse calls the physician to report a patient issue, she/he may refer to the MEWS score when describing the situation.

- **Scoring:**

Each vital sign element is given a score based on the current reading. The score is then tallied for an overall MEWS score.

Score:	3	2	1	0	1	2	3
<b>HR</b>		≤ 40	41–50	51–100	101–110	111–129	≥ 130
<b>SBP</b>	≤ 70	71–80	81–100	101–199		≥ 200	
<b>RR</b>		≤ 8		9–14	15–20	21–29	≥ 30
<b>Temp. (°F)</b>		< 95		95-101.2		≥ 101.3	
<b>CNS – Level of Cons</b>				Alert	Responds to Voice/ New confusion/ Restlessness	Responds to Pain	Unresponsive

Table 1

**EXAMPLE:**

Patient's Vital Signs	MEWS
Heart Rate: 112	2
Blood Pressure: 98/70	1
Resp Rate: 18	1
Temp: 100.2	0
LOC: Alert	0
Total:	4

- **Action:**

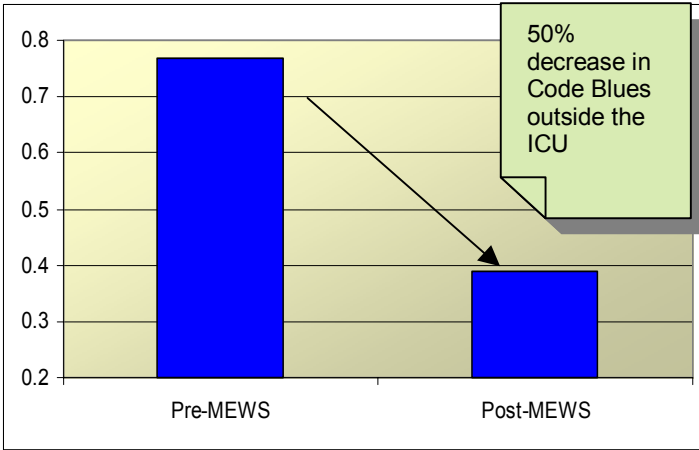
Based on the MEWS score, the nurse does the following:

MEWS Score	INPATIENTS - ACTION (excludes DNR/Hospice patients)
<b>0-2</b>	Continue routine/ordered monitoring
<b>3</b>	Increase VS frequency to q 2 hours X 3, calculate MEWS score each time. Inform charge nurse.
<b>4</b>	At first reading, inform physician, charge nurse, and Clinical Administrator Clinical Administrator to assess patient. Increase VS frequency; include pulse ox, to q 2 hours X 3, calculate MEWS score each time. Strict I&O, call if UO < 100cc/4 hrs; if Foley, observe for UP <30cc/hr.
<b>5</b>	Call RRT; inform physician. Increase VS frequency to q 1 hour, include pulse ox. 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?
<b>≥ 6</b>	Call RRT and physician STAT. Recommend transfer to higher level of care. Is end-of-life discussion with patient/family indicated?

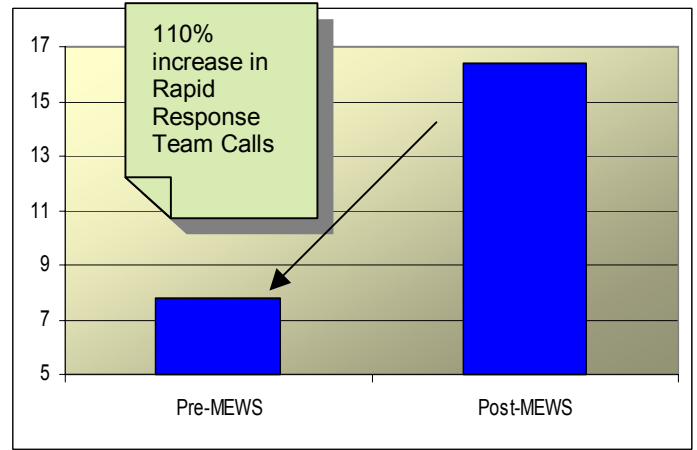
**REMEMBER: Never hesitate to call RRT if you feel something is “just not right”**

• **Results:**

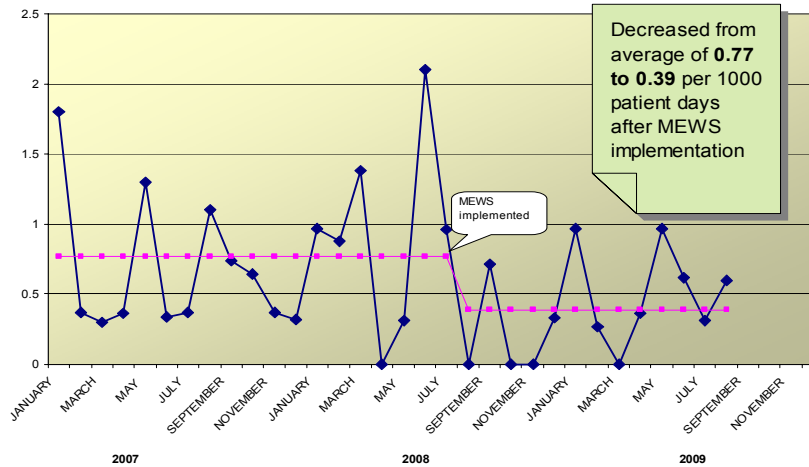
**Code Blues per 1000 Patient Days**



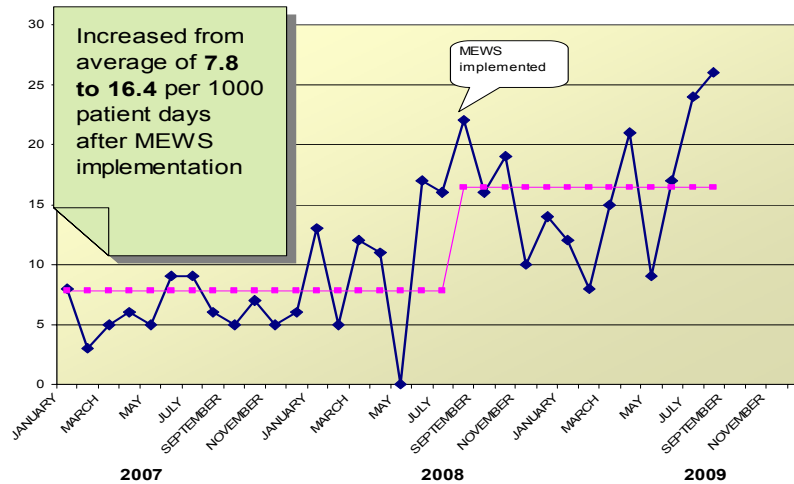
**Rapid Response Team Calls per 1000 Patient Days**



**Code Blues per 1000 Patient Days**



**RRT Calls per 1000 Patient Days**



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