Modified Early Warning Score (MEWS)

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MEWS

- **Simple physiological scoring system.**
- **Validated in the surgical and medical units as a tool for identifying patients at risk of deterioration.**
- **Based on 5 bedside parameters: SBP, HR, RR, temperature, and level of consciousness (assessed by the AVPU or RASS score).**

MEWS

	3	2	1	0	1	2	3
Systolic BP (mmHg)	<70	71-80	81-100	101-199		>200	
Heart rate (bpm)		<40	41-50	51-100	101-110	111-129	>130
Respiratory rate		<9		9-14	15-20	21-29	>30
Temperature (℃)		<35		35-38.4		>38.5	
AVPU score/ RASS score				**A**lert +3 to 0	Reacting to **V**oice -1 to -3	Reacting to **P**ain -4	**U**nresponsive -5

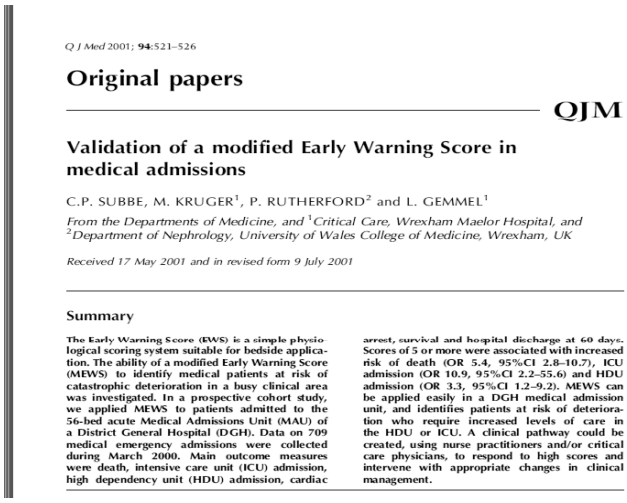
Evidence Based

- **MEWS has been shown to predict:**
  - **Hospital mortality**
  - **ICU admission within 72 hours**
  - **Cardiac arrest**
  - **RRT call within 72 hours**

Why is MEWS being Implemented?

- Most adverse events are usually preceded by early warning signs of clinical instability.
- Early signs are more often subtle changes in multiple parameters rather than a dramatic change in an isolated value.
- More informative “vital signs” could prevent failure to recognize early deterioration.

Clinical Trials



Q J Med 2001; **94**:521–526

Original papers

QJM

Validation of a modified Early Warning Score in medical admissions

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Summary

The Early Warning Score (EWS) is a simple physiological scoring system suitable for bedside application. The ability of a modified Early Warning Score (MEWS) to identify medical patients at risk of catastrophic deterioration in a busy clinical area was investigated. In a prospective cohort study, we applied MEWS to patients admitted to the 56-bed acute Medical Admissions Unit (MAU) of a District General Hospital (DGH). Data on 709 medical emergency admissions were collected during March 2000. Main outcome measures were death, intensive care unit (ICU) admission, high dependency unit (HDU) admission, cardiac arrest, survival and hospital discharge at 60 days. Scores of 5 or more were associated with increased risk of death (OR 5.4, 95%CI 2.8–10.7), ICU admission (OR 10.9, 95%CI 2.2–55.6) and HDU admission (OR 3.3, 95%CI 1.2–9.2). MEWS can be applied easily in a DGH medical admission unit, and identifies patients at risk of deterioration who require increased levels of care in the HDU or ICU. A clinical pathway could be created, using nurse practitioners and/or critical care physicians, to respond to high scores and intervene with appropriate changes in clinical management.

Q J Med 2001; 94:521 - 526

Study Design

- Prospective cohort study.
- MEWS score collected for patients admitted to the general medical unit.
- Data on 673 admissions collected.
- ICU, CCU and PCU excluded.

Study design

- Physicians were blinded to MEWS value.
- Primary end point: death, ICU admission, PCU admission, CPA, survival and hospital discharge at 60 days.

Study Results

- **Median score on admission was 1.**
- **MEWS ≥ 5 was associated with an increased risk of death (OR 5.4), ICU admission (OR 10.9) and PCU admission (OR 3.3).**

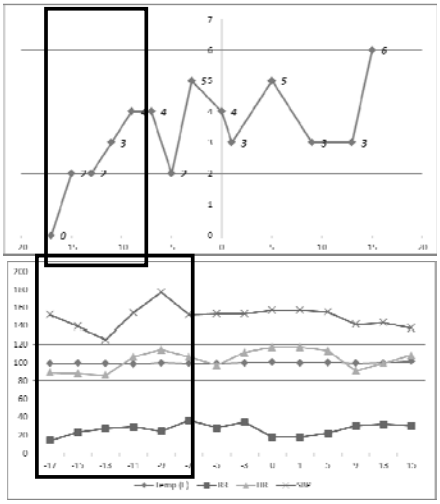
Relative Risk Ratios

Table 3 Relative risk ratios (RR) for patients with scores of 1, 2 and 3 on admission, compared to patients with a score of 0

	3	2	1	0	1	2	3
Systolic blood pressure	<70	71–80	81–100	101–199		⩾200	
RR (95%CI)	8.6 (0.5–139)	5.7 (0.9–35)	2.1 (0.8–5.5)			0.5 (0.7–4.1)	
Heart rate		<40	41–50	51–100	101–110	111–129	⩾130
RR (95%CI)		NA	NA		1.6 (0.7–3.2)	1.5 (0.7–3.4)	3.0 (0.9–9.5)
Respiratory rate		<9		9–14	15–20	21–29	⩾30
RR (95%CI)		NA			1.6 (0.4–7.3)	4.4 (1.0–19)	7.9 (1.5–42)
Temperature		<35		35–38.4	⩾38.5		
RR (95%CI)		5.9 (1.8–19)			0.9 (0.2–3.8)		
AVPU score				Alert	Reacting to Voice	Reacting to Pain	Unresponsive
RR (95%CI)					2.0 (0.9–4.8)	5.2 (1.5–18.1)	NA

Q J Med 2001; 94:524

Comparison of the behavior of MEWS score and Individual Vital Signs



Q J Med 2001; 94:521 - 526

Clinical Trials

Journal of Critical Care (2012) 27, 424.e7–424.e13

Journal of Critical Care

Identification of deteriorating patients on general wards; measurement of vital parameters and potential effectiveness of the Modified Early Warning Score☆

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Keywords:
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Modified Early Warning Score/MEWS;
Rapid response system;
Vital signs

Abstract
Background and Purpose: Clear and detectable signs of deterioration have been shown to be present in many patients multiple hours before undergoing a serious life-threatening event. To date, few studies are available describing normal practice and the possible effectiveness of structured tools regarding recognition of deteriorating patients. The aim of this study was to describe the current practice in measurement and documentation of vital signs and the possible usefulness of the Modified Early Warning Score (MEWS) to identify deteriorating patients on hospital wards.
Methods: A retrospective observational study of medical and surgical patients from 2007 with a severe adverse event including cardiopulmonary arrest, unplanned intensive care unit admission, emergency surgery, or unexpected death was performed. We studied all vital parameters that were collected and documented in the 48 hours before these events, and the MEWS was retrospectively calculated.
Results: Two hundred four patients were included. In the 48 hours before the event, a total of 2688 measurements of one or more vital signs were taken. Overall, 81% of the patients had an MEWS value of 3 or more at least once during the 48 hours before their event. Recordings of vital signs were mostly incomplete. Even when the MEWS was 3 or more, respiratory rate, diuresis, and oxygen saturation were documented in only 10% to 66% of assessments.
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1. Introduction

Most critically ill patients who are admitted to the intensive care unit (ICU) or have a cardiopulmonary arrest

☆ No conflict of interest declared.

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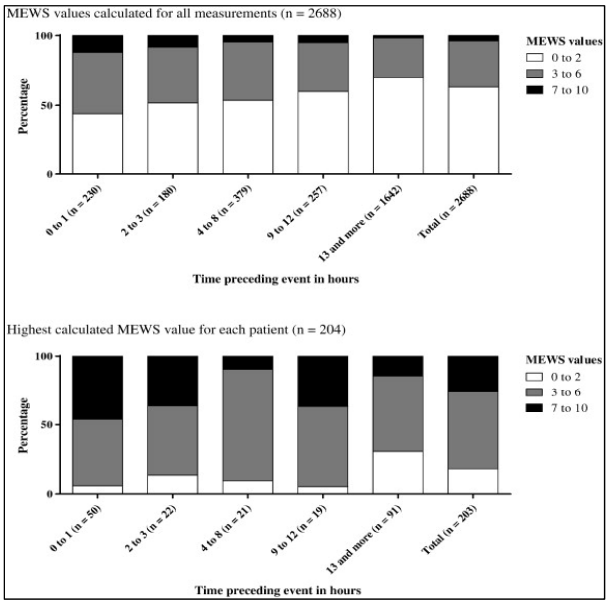
Study Design

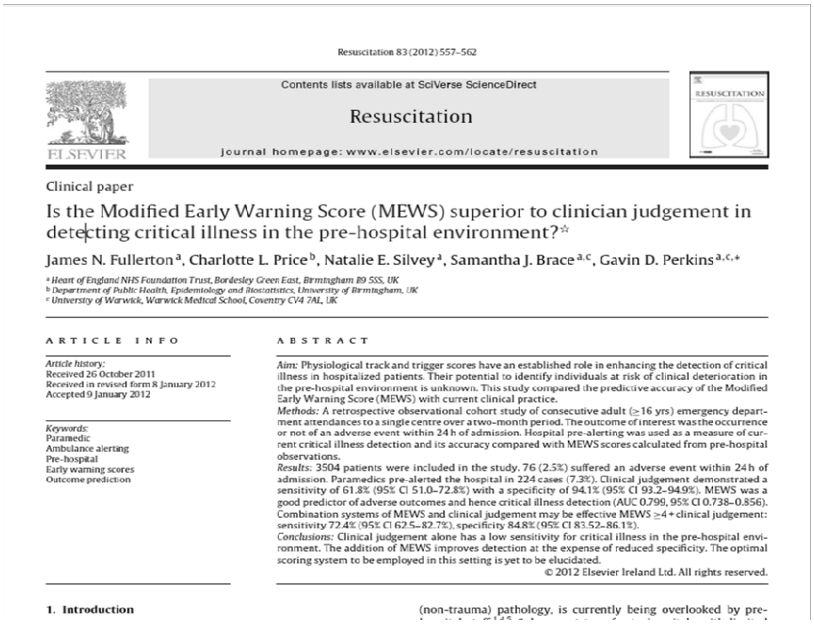
- **Retrospective observational study of 204 medical and surgical patients who had an adverse clinical event.**
- **Adverse event: cardiopulmonary arrest, unplanned ICU admission, emergency surgery, or unexpected death.**

MEWS score in the hours preceding a clinical event



Journal of Critical Care (2012) 27, 424.e11

Clinical Trials



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Clinical paper

Is the Modified Early Warning Score (MEWS) superior to clinician judgement in detecting critical illness in the pre-hospital environment?☆

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ABSTRACT

Aim: Physiological track and trigger scores have an established role in enhancing the detection of critical illness in hospitalized patients. Their potential to identify individuals at risk of clinical deterioration in the pre-hospital environment is unknown. This study compared the predictive accuracy of the Modified Early Warning Score (MEWS) with current clinical practice.

Methods: A retrospective observational cohort study of consecutive adult (≥16 yrs) emergency department attendances to a single centre over a two-month period. The outcome of interest was the occurrence or not of an adverse event within 24 h of admission. Hospital pre-alerting was used as a measure of current critical illness detection and its accuracy compared with MEWS scores calculated from pre-hospital observations.

Results: 3504 patients were included in the study. 76 (2.5%) suffered an adverse event within 24 h of admission. Paramedics pre-alerted the hospital in 224 cases (7.3%). Clinical judgement demonstrated a sensitivity of 61.8% (95% CI 51.0–72.8%) with a specificity of 94.1% (95% CI 93.2–94.9%). MEWS was a good predictor of adverse outcomes and hence critical illness detection (AUC 0.799, 95% CI 0.738–0.856). Combination systems of MEWS and clinical judgement may be effective MEWS ≥4+ clinical judgement: sensitivity 72.4% (95% CI 62.5–82.7%), specificity 84.8% (95% CI 83.52–86.1%).

Conclusions: Clinical judgement alone has a low sensitivity for critical illness in the pre-hospital environment. The addition of MEWS improves detection at the expense of reduced specificity. The optimal scoring system to be employed in this setting is yet to be elucidated.

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1. Introduction

(non-trauma) pathology, is currently being overlooked by pre-

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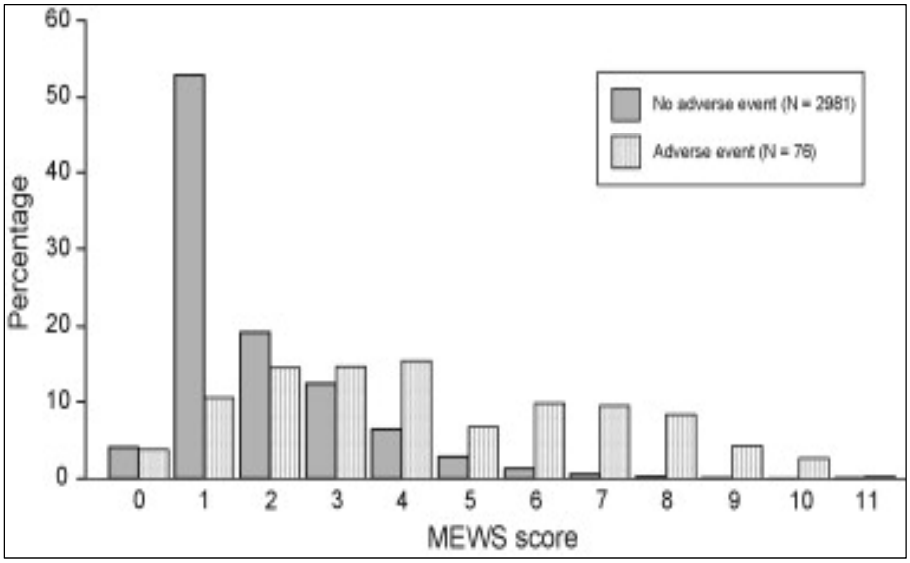
Study Design and Results

- **Retrospective observational study.**
- **3504 patients who suffered an adverse event within 24 hours of admission.**
- **Clinical judgment demonstrated a sensitivity of 61.8% (95% CI 51-72.8%).**
- **Combination-MEWS with a cut-point of 4 or more resulted in a sensitivity of 72.4% (95% CI 62.5-82.7%) and specificity of 84.8% (95% CI 83.5-86.1%).**

MEWS distribution for patients who suffered a clinical event



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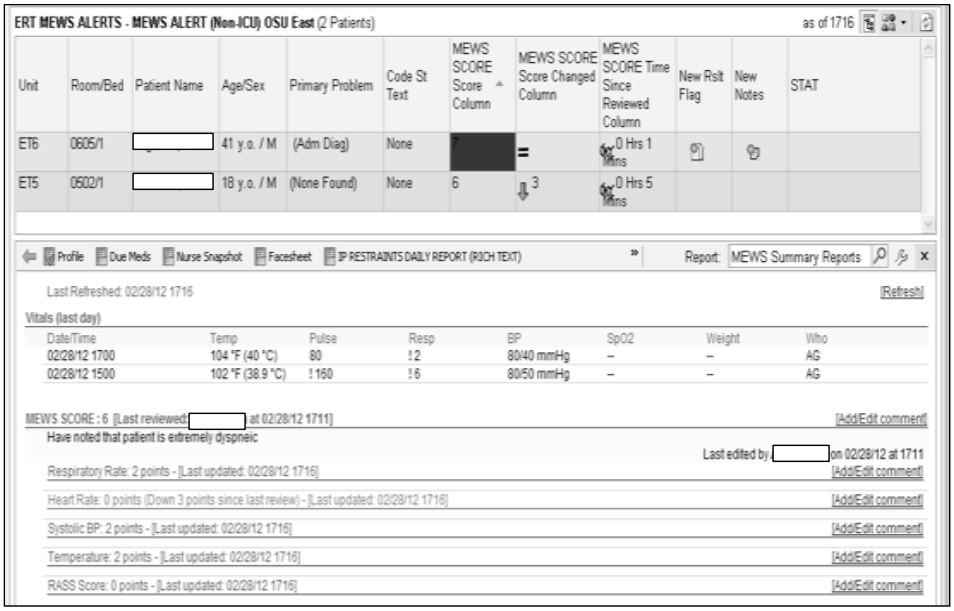
MEWS Implementation

- Nurses are being educated to review the "MEWS Summary Report" in IHIS at 9am and 9pm.
- This score is automatically updated after vital signs are entered.

MEWS report on IHIS



MEWS Implementation

- **The score is not meant to replace Nursing judgment, but if there is clinical concern we recommend:**
  - **MEWS= 4, call covering clinician, consider increase clinical monitoring (VS)**
  - **MEWS >4, call covering clinician, consider increase clinical monitoring (VS), consider ERT as needed.**

Proposed guided MEWS response for Nursing

		Notify			
MEWS Score	Usual Care	Charge RN	Primary responder	ERT team	Associated care
1	x				
2	x				
3	x	x			Consider increased clinical monitoring
4	x	x	x	*Consider*	Consider increased clinical monitoring
5	x	x	x	*Recommend*	Consider increased clinical monitoring
6	x	x	x	*Recommend*	Consider increased clinical monitoring
≥7	x	x	x	*Recommend*	Consider increased clinical monitoring

Implications for Physicians

- **Minimal change in workflow**
- **If you desire, you can review the "MEWS summary Report" as you wish.**
  - **Data only updates as often as vitals are entered.**
- **Be aware that nurses may call to alert you for changes in MEWS as a clinical concern.**
- **Give us feedback so that the alert thresholds and recommendations can be specific to your patients and their conditions.**