

## Modified Early Warning Score (MEWS)

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## 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 (°C)		<35		35-38.4		>38.5	
AVPU score/ RASS score				Alert +3 to 0	Reacting to Voice -1 to -3	Reacting to Pain -4	Unresponsive -5

## 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).

## 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.

## 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.

## 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 Medical Acute Medical Admissions Unit (MAAU) of a District General Hospital (DGH). Data on 673 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 2 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 2.2-53.5) and HDU admission (OR 3.2, 95%CI 1.2-8.2). MEWS can be applied easily in a DGH medical admissions 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

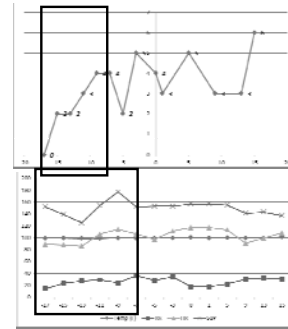
## Study design

- 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  $\geq 5$  was associated with an increased risk of death (OR 5.4), ICU admission (OR 10.9) and PCU admission (OR 3.3).

# Comparison of the behavior of MEWS score and Individual Vital Signs



Q J Med 2001; 94:521 - 526

# 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			$\geq 200$
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		$\leq 40$	41-50	51-100	101-110	111-129	$\geq 130$
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	$\geq 30$
RR (95%CI)		NA		1.6 (0.4-7.0)	4.4 (1.0-19)	7.9 (1.5-42)	
Temperature		<35		35-38.4	$\geq 38.5$		
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

# Clinical Trials

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

## Identification of deteriorating patients on general wards; measurement of vital parameters and potential effectiveness of the Modified Early Warning Score<sup>1</sup>

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**Keywords:**  
 Deteriorating patients;  
 Modified Early Warning Score (MEWS);  
 Rapid response system;  
 Vital signs

**Abstract**  
**Background and Purpose:** Changes and abnormal signs of deterioration have been shown to be present in many deteriorating patients before they are admitted to the intensive care unit (ICU). The aim of this study was to describe the characteristics of deteriorating patients on general wards and to evaluate the effectiveness of the Modified Early Warning Score (MEWS) in identifying deteriorating patients. **Methods:** A retrospective observational study of medical and surgical patients from 2007 with a severe deterioration leading to admission to ICU. **Results:** In total, 100 patients were included in the study. The MEWS score was significantly higher in patients who were admitted to ICU compared to those who were not. **Conclusion:** The MEWS score is a useful tool to identify deteriorating patients on general wards. **Keywords:** Deteriorating patients; Modified Early Warning Score (MEWS); Rapid response system; Vital signs

### 1. Introduction

Abstract keywords: All patients who are admitted to the intensive care unit (ICU) or have a cardiovascular arrest

# 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.

# Clinical Trials

Resuscitation 83 (2012) 557–562

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Clinical paper

Is the Modified Early Warning Score (MEWS) superior to clinician judgement in detecting critical illness in the pre-hospital environment? <sup>2b</sup>

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ARTICLE INFO

ABSTRACT

**AIM:** Pre-hospital triage and triage scores have an established role in identifying the detection of critical illness in hospitalised patients. They are used to identify individuals at risk of clinical deterioration in the pre-hospital environment. In addition, they may also be used to identify patients at risk of clinical deterioration in the hospital environment. This study compares the accuracy of the Modified Early Warning Score (MEWS) with current clinical practice.

**METHODS:** A retrospective observational cohort study of consecutive adult (>16 years) emergency department attendances in a single centre over a two-month period. The outcome of interest was the occurrence or non-occurrence of an adverse event within 24 h of admission. Hospital pre-arriving was used as a measure of non-critical illness detection and its accuracy compared with MEWS scores calculated from pre-hospital observations.

**RESULTS:** 1024 patients were included in the study. 26.7% (n = 273) suffered an adverse event within 24 h of admission. Clinicians pre-arrived the hospital in 73.6% (n = 755). Clinical judgement demonstrated a sensitivity of 61.8% (95% CI 51.0–72.8%) with a specificity of 61.1% (95% CI 58.2–64.0%). MEWS with a cut-point of 4 or more demonstrated a sensitivity of 72.4% (95% CI 62.5–82.7%) and specificity of 84.8% (95% CI 83.5–86.1%).

**CONCLUSION:** Clinical judgement alone has a low sensitivity for critical illness in the pre-hospital environment. The addition of MEWS to current practice has the potential to improve the pre-hospital screening accuracy of critical illness. MEWS scores calculated from pre-hospital observations were superior to clinical judgement in identifying patients at risk of clinical deterioration in the pre-hospital environment.

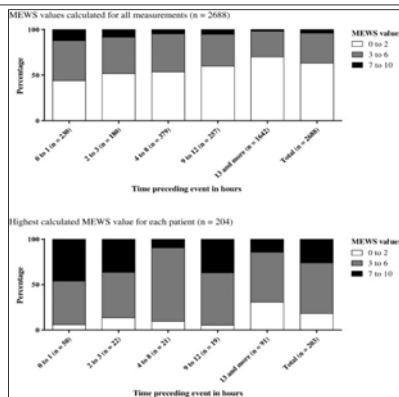
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1. Introduction

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

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## MEWS score in the hours preceding a clinical event

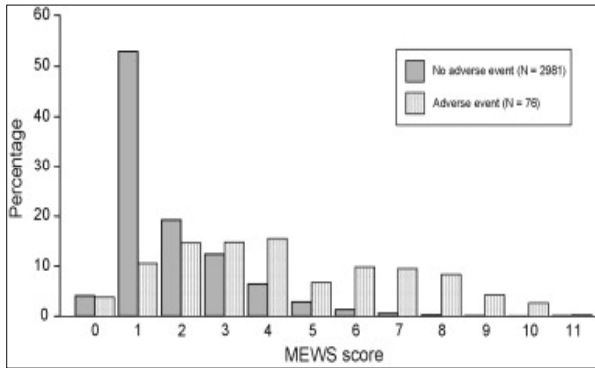


Journal of Critical Care (2012) 27, 424.e11

## Study Design and Results

- Retrospective observational study.
- 3504 patients who suffered an adverse event within 24 hours of admission.
- Clinical judgement 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 report on IHIS

ERT MEWS ALERTS - MEWS ALERT (Non-ICU) OSU East (2 Patients) as of 1716

Unit	Room/Bed	Patient Name	Age/Sex	Primary Problem	Code St	MEWS SCORE Score Column	MEWS SCORE Score Changed Column	MEWS SCORE Time Since Reviewed Column	New Risk Flag	New Notes	STAT
ET6	0005/1	[Redacted]	41 y.o. / M	(Adm Diag)	None	[Redacted]	[Redacted]	0 Hrs 1 Mins	[Redacted]	[Redacted]	[Redacted]
ET5	0002/1	[Redacted]	18 y.o. / M	(None Found)	None	6	3	0 Hrs 5 Mins	[Redacted]	[Redacted]	[Redacted]

[Profile](#) [Due Meds](#) [Nurse Snapshot](#) [Facsheet](#) [P RESTRAINTS DAILY REPORT \(RICH TEXT\)](#) [Report: MEWS Summary Reports](#)

Last Refreshed: 02/28/12 1716 [Refresh](#)

Vitals (last day)

Colo/Time	Temp	Pulse	Rr/Sp	BP	SpO2	Weight	I/Ho
02/28/12 1700	104 °F (40 °C)	80	12	80/40 mmHg	--	--	AG
02/28/12 1500	102 °F (38.9 °C)	110	16	80/50 mmHg	--	--	AG

MEWS SCORE: 6 (Last reviewed: [Redacted] at 02/28/12 1711) [Add/Edit comment](#)  
 Have noted that patient is essentially asymptotic [Add/Edit comment](#) Last edited by [Redacted] on 02/28/12 at 1711 [Add/Edit comment](#)

Respiratory Rate: 2 points - (Last updated: 02/28/12 1716) [Add/Edit comment](#)  
 Heart Rate: 0 points (Down 3 points since last review) - (Last updated: 02/28/12 1716) [Add/Edit comment](#)  
 Systolic BP: 2 points - (Last updated: 02/28/12 1716) [Add/Edit comment](#)  
 Temperature: 2 points - (Last updated: 02/28/12 1716) [Add/Edit comment](#)  
 RASS Score: 6 points - (Last updated: 02/28/12 1716) [Add/Edit comment](#)

## 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 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

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