

# A Reduction in Adverse Events Through the Modified Early Warning System

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## Background

Poor early recognition of a deteriorating patient can lead to an increased chance of an adverse event. In the acute care setting, there is an interdisciplinary team responsible for coordinating and providing a patient's care. One mode to avoid an adverse event is early detection of a deteriorating patient. Several different tools, assessments, and algorithms have been created to assist medical professionals in this process. One example of an algorithm is the Modified Early Warning Score (MEWS). Implementation of the MEWS can increase early recognition of a clinically declining patient and decrease the number of adverse events in the acute care setting. Based on the results of the evidence search and developing best practice research, the use of the MEWS has shown to decrease adverse events in the acute care setting.

## Objectives

The purpose of this project was to systematically analyze existing literature on the use and effectiveness of the MEWS to reduce adverse events in non-critical care areas.

## Results

- ❖ Rapid Response Codes increased in every study while adverse events decreased after implementation of the MEWS
- ❖ There was variation in how the MEWS functioned. MEWS that were calculated through the EHR showed greater significance in decrease of adverse events
- ❖ The MEWS was found to identify a deteriorating patient, on average, hours before cases in which no MEWS was implemented
- ❖ Each study found that the effectiveness of the MEWS relied on vital signs being documented correctly and timely

## Methods

- ❖ Literature search was completed using PubMed and CINAHL databases
- ❖ Search key words used were *MEWS, Modified Early Warning Score, adverse event, OR cardiac arrest*
- ❖ Inclusion criteria: clinical trials, randomized control trials, free full text, published in the last seven years, English, human subjects, adults 19+ years. This search yielded 12 articles.
- ❖ Exclusion criteria: non-peer reviewed articles
- ❖ Titles and abstracts were reviewed for relevance to purpose statement
- ❖ Five studies were included in the final literature review

## Figures

MEWS (Modified Early Warning System)							
	3	2	1	0	1	2	3
Respiratory Rate per minute		Less than 8		9-14	15-20	21-29	More than 30
Heart Rate per minute		Less than 40	40-50	51-100	101-110	111-129	More than 129
Systolic Blood Pressure	Less than 70	71-80	81-100	101-199		More than 200	
Conscious level (AVPU)	Unresponsive	Responds to Pain	Responds to Voice	Alert	New agitation Confusion		
Temperature (°C)		Less than 35.0	35.1-36	36.1-38	38.1-38.5	More than 38.6	
Hourly Urine For 2 hours	Less than 10mls / hr	Less than 30mls / hr	Less than 45mls / hr				

## Bibliography

- Brewer, C., Anthony, H., & Lockhart, L. &. (2015). *The News About MEWS*. Retrieved from Nursing Made Incredibly Easy [https://journals.lww.com/nursingmadeincrediblyeasy/Citation/2015/09000/The\\_news\\_about\\_MEWS.4.aspx](https://journals.lww.com/nursingmadeincrediblyeasy/Citation/2015/09000/The_news_about_MEWS.4.aspx)
- The Johns Hopkins Hospital/ Johns Hopkins University School of Nursing. (2017). Evidence Level and Quality Guide. Retrieved from Johns Hopkins [https://www.mghpcs.org/EED/EBP/Assets/documents/pdf/2017\\_Appendix%20D\\_Evidence%20Level%20and%20Quality%20Guide.pdf](https://www.mghpcs.org/EED/EBP/Assets/documents/pdf/2017_Appendix%20D_Evidence%20Level%20and%20Quality%20Guide.pdf)
- Vincent, J. L. (2018). Improving Detection of Patient Deterioration in the General Hospital Ward Environment. *European Journal of Anesthesiology*, 325-333.

## Conclusions

- ❖ The evidence reviewed is promising in the effectiveness of using the MEWS to decreased adverse event on medical floors
- ❖ The articles included in the literature review lacked external validity in that they were all single-centered studies
- ❖ There has been a limited number of studies in the United States with large sample sizes
- ❖ Numerous lower-level studies are available, primarily quality improvement projects or quasi experimental studies
- ❖ Further studies are needed in the United States that are multi-centered and on all medical floors instead of specialty medical floors
- ❖ Future studies would need to include years of nursing experience as a factor in the reduction of adverse events. Further evidence is needed that the MEWS is effective regardless of years of clinical experience.

## Technology

The MEWS is one of the first Early Warning Systems (EWS) created. The MEWS utilizes what has been determined as a normal range for vital signs or assessment findings, if there is a finding outside of the established range, then, points are allocated based on the degree outside of the established range. If a score is calculated to be above that threshold, certain measures are triggered. The MEWS assigns a scale from zero to three for: respiratory rate, heart rate, systolic blood pressure, temperature, level of consciousness, and hourly urine output (Brewer, Anthony, & Lockhart, 2015)

## Key Terms

- ❖ Early Warning System- Communication systems and comprises sensors, event detection and decision subsystems
- ❖ Modified Early Warning System- calculation of vital signs and level of consciousness to determine if a patient requires medical attention
- ❖ Adverse Event- An event that resulted in an undesirable outcome that caused a need for more frequent interventions, monitoring, or injury to the patient
- ❖ Critical –Care Areas- areas in an acute care facility in which advanced monitoring and certifications are necessary to care for patients