

# The Association of Modified Early Warning Score on Patient Outcomes in Medical Surgical Units in an Academic Medical Center.

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## Background

A nationwide problem that has been often overlooked is poor recognition of deteriorating patients. Failure to recognize this physiological change can lead to increased severity of illness. One way to avoid adverse events is to detect early clinical deterioration with the use of patients' vital signs via Early Warning Score (EWS) or a Modified Early Warning Score (MEWS). Every year, inpatient cardiac arrest is determined to happen in more than 200,000 hospitalized patients across the nation and there is evidence that about 80% of these events are preceded by one or more instability in vital signs with the use of MEWS. However, the majority of the hospitals across the United States are not utilizing this scoring system. MEWS implementation will minimize or reverse severe adverse events in hospitalized patients by early recognition. Early recognition may lead to early intervention and minimize the length of patients' hospitalization, reduced hospital mortality and maximized patients' outcomes.

## Objectives

This quality improvement project attempted to answer the following question: Does utilization of the Modified Early Warning Score (MEWS) reduce the number of adverse events preventing patient's clinical deterioration in Medical Surgical Units?

- 1) What is the association of MEWS and cardiopulmonary arrest?
- 2) What is the association of MEWS and unplanned ICU admission?
- 3) What is the association of MEWS and unplanned surgery?
- 4) What is the association of MEWS and unexpected death?

The aim of this quasi-experimental quality improvement project is to reduce the number of adverse outcomes by implementing the Modified Early Warning Score (MEWS).

## Method

**EBP Translation Model:** The IOWA Model was used for this quality improvement project. The Model provided framework for healthcare practitioners to improve outcomes, strengthen the nursing practice, and monitor healthcare cost.

**Design:** Quasi-experimental design with retrospective chart review.

**Setting:** 385 beds, inner city level one trauma academic medical center.

**Sampling and Sample Size:** Convenience sampling was used. The sample size N=281 was the total number of RRT and Code Blue activations during a period of five consecutive months in 2016 and 2018. For the pre-MEWS implementation n=102, and the post-MEWS n=179.

**Measurement:** Electronic Medical Record (EMR) was used to collect the demographic data along with MEWS scores and outcomes of RRT and Code Blue activation.

**Analysis:** Data was analyzed using MedCalc statistical software for method of comparison to study the association between Pre and Post MEWS and the patients' outcomes. The two-proportions z-test was used to compare the observed proportions

## Results

Variable	Pre-MEWS N (%)	Post-MEWS N (%)	Diff %	95% CI %	Chi-Squared	p-value
Stayed in the Unit	52 (50.98)	95 (53.07)	2.09	-9.8806 to 14.0392	0.113	0.7363
Transferred to ICU	48 (47.06)	67 (37.43)	9.63	-2.2640 to 21.3821	2.483	0.1150
Unplanned Surgery	1 (0.98)	1 (0.56)	0.42	-2.2435 to 4.8094	0.161	0.6878
Cardiac Arrest	1 (0.98)	16 (8.94)	7.96	-2.4502 to 13.1109	7.173	0.0072
Death	0 (0)	0 (0)	N/A	N/A	N/A	N/A

## Results

Out of n=179 sample in the post-MEWS implementation, RRT activations increased which accounted for 88.9% while RRT upgraded to Code Blue and Code Blue activations accounted for 11.1%. The proportion of patients who stayed in the general wards pre-MEWS and post-MEWS after RRT activations increased from 50.98% to 53.07%. Even though it was not statistically significant (p value of 0.7363) there was a decreased number of patients that required higher level of care which can be explained by early recognition of deterioration and provided a timely intervention. However, the study showed a statistically significant for patients who had cardiac arrest Post MEWS implementation.

## Conclusions

MEWS implementation showed a reduction of unnecessary ICU admissions which means the patients stayed in general wards and did not require a higher level of care. Although it's not statistically significant, early activation of RRT provided early recognition, treatment and intervention before the patient deteriorated. However, this study showed a statistically significant finding for patients who had cardiac arrest in general care post-MEWS implementation which is considered a failure to rescue and a plan of action is already in place.

## Recommendations

Since MEWS is not being utilized by all hospitals across the U.S., it is recommended by the authors that the DOH and The Joint Commission make it a mandatory monitoring tool. A proposed policy should be implemented and provide all hospitals a deadline that by 2022, all U.S. hospitals will implement MEWS as part of their assessment tool. The recommended future study would be to review the outcome of those patients who were transferred to ICU and those who had cardiac arrest. Lastly, a follow-up study is recommended at the end of 2019 to review June to October 2019 data to compare the improvement of MEWS implementation.

## References

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2. Stewart, J., Carman, M., Spegman, A., & Sabol, V. K. (2014). Evaluation of the Effect of the Modified Early Warning System on the Nurse-Led Activation of the Rapid Response System. *Journal of Nursing Care Quality*, 29(3), 223-229. doi:10.1097/NCQ.0000000000000048