

Rapid Emergency Medicine Score (REMS) As a Predictor of Early Mortality in the Setting of Emergency Department

Early warning scales (EWS) in an emergency department (ED) may supplement triage protocols for escalating medical care for patients at risk of early deterioration. Primarily developed for and applied in critical care units, there is a constant drive to extend and customize their application in the EDs for apparent reasons.

Physiologic EWS scales exploit vital functions and major organs dysfunction as surrogate markers of patients' distress in their challenge against life-threatening conditions. The Acute Physiology and Chronic Health Evaluation (APACHE) scale, primarily introduced in 1981 to predict patients' survival in the critical care units,¹ was a forerunner EWS. Then in 1992, the Systemic Inflammatory Response Syndrome (SIRS) scale was developed for sepsis prediction.² That followed by other EWS tools such as National Early Warning Score (NEWS),³ Sequential Organ Failure Assessment (SOFA),⁴ and quick SOFA (qSOFA).⁵

EDs typically admit patients with a wide range of acuity levels, diverse clinical conditions, and undifferentiated or uncertain diagnoses. Accurate anticipation of the in-hospital outcome of ED patients is essential for proper preparation, resource allocation, and early management, though the paucity of medical information available in real-time for sound clinical decision-making is a tough hurdle. Standard ED triage protocols aim at categorizing patients according to their initial anticipated level of care. They offer structured guidance to match a wide range of clinical presentations and estimate the required level of care at the cross-section. Those protocols, however, were not originally designed to prospect patient survival. Tools with the capability of survival prediction have add-on values and may support clinical decisions and provide information for family-centered discussions.

Most EWS tools, such as APACHE, SIRS, and SOFA scales, require laboratory indices as inputs for calculation. The qSOFA tool is an exception, as it is very concise and uses established cut-off points for systolic blood pressure, Glasgow Coma Scale, and respiratory rates.

The Rapid Emergency Medicine Score (REMS),⁶ which was developed in 2003, is an EWS that has been optimized for ED use. It is a laboratory-independent scale that is sensitive to patient age and relies on easily accessible clinical data. The latter parameter, which is known as a strong independent predictor of mortality for ED patients, confers a potential advantage to REMS over qSOFA.

In the current issue of the Iranian Journal of Medical Sciences, Gaffarad and colleagues presented a meta-analysis on cross-sectional and cohort studies published up to 2020, assessing the REMS tool to predict in-hospital mortality of non-surgical patients admitted to the EDs. They applied a classic screening procedure to all retrieved studies and finally retained 29 articles to access a remarkable pool of 550,966 patients.⁷

In a subgroup analysis of 22 articles, in which details allowed extraction of the effect size, the power of mortality prediction for REMS was good or high in two-thirds of the studies and low in the remainder. Interestingly, age per se had a significant impact on short-term mortality. Those aged above 60 years had a roughly 2% increase in the absolute mortality rate, highlighting the importance of age status in models for mortality prediction.

The varied mortality rates among included studies, ranging from 0.008% to 57%, are due to applying different inclusion criteria. Mortality risk in critical conditions, such as complicated sepsis, is remarkably higher than what is expected in the general ED population. From the statistical point of view, the event rate affects the predictive value of prognostication tools, and low event rates attenuate their predictive power. In line with this notion, Gaffarad and others found that the pooled predictive power of REMS was higher in studies with higher mortality rates.⁷ That means that extrapolating the results of this meta-analysis to the real-world practice, where mortality rates are substantially much lower than the majority of studies included in this meta-analysis, should be done with caution.

In summary, Gaffarzad and colleagues found REMS to effectively predict in-hospital mortality in non-surgical ED patients in different study settings. Much work is needed to optimize and validate this EWS tool in general ED settings as well as to integrate its use in clinical pathways of patients' care.

Conflict of Interest: None declared.

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