

## Real Time Early Warning System Using Machine Learning



Delayed recognition of haemodynamic and respiratory deterioration in hospitalised patients is linked to increased morbidity and mortality. Measures have been developed to improve the recognition of acute deterioration and reduce the occurrence of major adverse events like all-cause mortality and unplanned ICU admission. One such measure is the implementation of Early Warning Scores (EWS), including widely used systems like the National and Modified Early Warning Scores (NEWS and MEWS). These scores utilise single-point observations of vital signs to generate aggregate scores and are incorporated into automated computerised systems.

The Between The Flags (BTF) alerting system is employed in hospitals across New South Wales, Australia. It follows a two-tiered alert system that triggers alerts based on single-point observations of vital signs. If any vital sign falls outside the normal reference range, it prompts a review by nursing or medical staff. The goal is to facilitate timely identification and response to signs of deterioration in hospitalised patients.

A study assessed the impact of an Artificial Intelligence (AI) intervention on inpatient outcomes in a local EWS monitoring system. Study researchers implemented an AI-based intervention and evaluated the effects on patient outcomes.

A previous study developed a Deterioration Index (DI) using logistic regression, incorporating demographic information, vital signs, and laboratory results at multiple time points. It aimed to predict major adverse events (MAEs) such as all-cause mortality, ICU admission, or medical emergency team activation. The current study in Australia is a pre-post study conducted in a single hospital. It compared the DI in combination with the existing BTF system to the use of only BTF. The study collected data from all eligible inpatients aged 16 years and above admitted for at least 24 hours in general non-palliative wards.

The study included 28,639 patients with a median age of 73 years. The intervention and control groups were similar in most aspects, except for a slightly lower rate of admissions through the emergency department in the intervention group (40.4% compared to 41.6% in the control group). The risk of experiencing an MAE was lower in the intervention group compared to the control group. The intervention group had a significantly shorter length of hospital stay, with an average of 3.74 days, compared to the control group, with an average of 3.86 days.

Implementing the DI showed some positive effects on patient outcomes. However, further validation is necessary through future randomised controlled trials (RCTs) to confirm these findings.

Source: [Resuscitation](#)

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