

What vital sign has the highest predictive value for detecting early deterioration in hospitalized patients?

Among traditional vital signs, **respiratory rate has the highest predictive value for detecting early deterioration in hospitalized patients**. Multiple studies and systematic reviews of early warning scores consistently identify respiratory rate as the most sensitive single vital sign for impending clinical deterioration, including events such as cardiac arrest, ICU transfer, and death. Respiratory rate abnormalities often precede other vital sign changes and are heavily weighted in widely used early warning systems such as the National Early Warning Score (NEWS) and Modified Early Warning Score (MEWS).^[1-2]

Machine learning models and trend-based analyses further reinforce the primacy of respiratory rate, often in combination with heart rate, as the strongest predictors of adverse outcomes. For example, models using only respiratory rate and heart rate (with or without age) perform comparably or better than more complex models for early detection of deterioration.^[3-5]

In summary, while all vital signs contribute to risk stratification, respiratory rate is the most valuable single predictor for early detection of clinical deterioration in hospitalized patients.^{[1][3]}

1. [Early Warning Scores for Detecting Deterioration in Adult Hospital Patients: Systematic Review and Critical Appraisal of Methodology.](#)

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2. [Risk Stratification of Hospitalized Patients on the Wards.](#)

Churpek MM, Yuen TC, Edelson DP. Chest. 2013;143(6):1758-1765. doi:10.1378/chest.12-1605.

3. [Less Is More: Detecting Clinical Deterioration in the Hospital With Machine Learning Using Only Age, Heart Rate, and Respiratory Rate.](#)

Akel MA, Carey KA, Winslow CJ, Churpek MM, Edelson DP. Resuscitation. 2021;168:6-10. doi:10.1016/j.resuscitation.2021.08.024.

4. [Improved Inpatient Deterioration Detection in General Wards by Using Time-Series Vital Signs.](#)

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5. The value of vital sign trends for detecting clinical deterioration on the wards

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[Resuscitation 102 \(2016\) 1–5](#)