

Study: Modelling At-Risk Sepsis Patients in the ED



A model using five parameters has sufficient sensitivity and an acceptable false positive rate to identify patients presenting to the emergency department (ED) with sepsis.

A group, led by [Samuel M. Brown, MD](#), of Intermountain Medical Center, Utah, developed a probabilistic model to identify septic patients presenting to the emergency department (ED) - within 90 minutes of arrival.

See Also: [Early Warning for Sepsis](#)

The model was developed using retrospective data for 132,428 ED encounters from January 2006 to December 2008. Charts were reviewed manually to identify patients with severe sepsis or septic shock, who required intensive care unit (ICU) admission. The aim was to develop a system that demonstrated sensitivity >80% with a clinically tolerable false positive rate of fewer than 15 alerts per day (approx. 7.2% in the ED concerned). The model was then evaluated for accuracy in 93,733 ED encounters from April 2009 to June 2010. The model performed adequately in this validation cohort, and the authors suggest that the model can be generalised.

Results

In the validation phase, patients with sepsis tended to be older, with lower blood pressure, higher heart rate and higher white blood count.

The final model includes mean arterial pressure, temperature, age, heart rate, respiratory rate and white blood cell count, and achieved sensitivity of 76%. The alert time was extended from 1 hour to 90 minutes to allow for elevated white blood count. The authors note that this modification enhance communication with clinicians.

The authors conclude that this approach offers an “opportunity for solid, stable augmentation of diagnostic processes relevant to the early detection of sepsis in the ED.” They note that the ability to tune alerting thresholds may facilitate balancing local goals and tolerances for error.

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