**The Use of a Machine Learning Algorithm for Early Detection of Sepsis Can Reduce Occupancy Rates, Save Lives, and Reduce Costs for US Hospitals**


## ABSTRACT

**Objectives**: Use of a machine learning sepsis prediction algorithm for early detection of sepsis (NAVOY CDS™) has been shown to improve patient outcomes, decrease mortality, and reduce hospital length of stay (LOS) in Sweden and the UK. NAVOY CDS™ uses variables routinely collected at intensive care units such as vital parameters and laboratory values to predict sepsis. This research aims to evaluate what impact NAVOY CDS™ would have on occupancy rate, hospital costs, and lives saved per year for a representative hospital in the US.

**Methods**: The US version of the health economic model is an extension of the published model for Sweden and the UK. The US version aggregates hospital LOS per patient to a representative hospital in the US while also able to conduct analyses for individual states and hospitals. Data were taken from a randomized, prospective clinical evaluation from literature sources and local price lists. The model base case (BC) assumes that with earlier clinical decision-making, time to treatment coincides with time to detection and the algorithm predicts sepsis three hours prior to onset. Clinical practice method for sepsis detection is SOFA.

**Results**: In the model BC, compared to SOFA, NAVOY CDS™ results in 9 saved lives, 5.3 percentage points reduction in occupancy rate and cost savings of $888,521 per hospital and year. When comparing NAVOY CDS™ and NEWS-2, results showcase 10 saved lives, 6.5 percentage points reduction in occupancy rate and cost savings of $1,241,753. Outcomes were more favorable for hospitals with higher occupancy rates (>80%). A three-hour faster detection in the model BC resulted in 46,493 lives saved per year in the US depending on current practice method for sepsis detection.

**Conclusions:** NAVOY CDS ™ will have substantial cost and lifesaving impact for health systems in the US, particularly in hospitals with high occupancy rates.



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**Poster presentation:** ISPOR–The Professional Society for Health Economics and Outcomes Research, November 2022, Boston, MA.