

## **Title: Impact of a Host-Response Test Implementation on Sepsis Mortality in Patients Presenting to the ED**

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**Introduction:** Sepsis is a serious and potentially life-threatening condition, and one of the leading causes of death in the USA (Kochanek, 2017). The majority of cases present to the Emergency Department (ED), where early recognition is difficult (Kraus, 2023). A rapid diagnostic may improve the efficiency of sepsis care and decrease the morbidity and mortality associated with the disease. In August 2023 Our Lady of the Lake Regional Medical Center implemented a process for sepsis care including a novel sepsis diagnostic (IntelliSep) in the ED. As a component of our Sepsis Learning Health Program, we evaluated the rate of sepsis-associated mortality over the course of 1-year following the implementation.

**Methods:** The FDA-cleared rapid (< 10 minute) cellular host-response test, which generates an Index based on the state of immune activation stratified into 3 interpretation bands (Band 1-Band 3) of increasing sepsis likelihood (O'Neal 2023), was integrated into an existing triage-based nurse-driven protocol ED for patients presenting to the ED with suspected infection. An IntelliSep Band 3 result is a critical value, initiating a sepsis pathway. Data was collated from Vizient© Clinical Database for Sepsis MS-DRGs (870, 871, 872) between 2023-Q2 and 2024-Q2 for the index evaluation.

**Results:** Between 2023-Q2 and 2024-Q2, on average 594 cases with an ultimate sepsis MS-DRGs presented to the ED per quarter. Over this studied period, we observed a decrease in sepsis-associated patient deaths from 7.81% to 4.96%, respectively. However, the expected patient deaths during this period remained stable (8.48% vs. 7.89%). As a result, the Mortality Index associated with sepsis DRGs decreased from 0.92 to 0.63. The reduction in the Mortality Index was observed to be independent of race. Similarly, an overall reduction of 30-day readmission rate was observed from 13.3% in 2023-Q2 to 11.3% in 2024-Q2.

**Conclusions:** This study's findings suggest that integration of a cellular host-response test into a rapid sepsis diagnosis protocol improves risk stratification and early identification of sepsis patients presenting to the ED with a resultant decrease in sepsis-associated mortality.