

Title: Moving toward EHR Integration of a Late-Onset Sepsis Screening Tool in a Level IV Newborn Intensive Care Unit: Preliminary Data from a Quality Improvement Initiative

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Background: Sepsis screening tools identify at-risk patients in intensive care units (ICU) and are associated with decreased mortality. Other units in our children's hospital use an electronic health record (EHR)-based pediatric sepsis screening tool. In July 2017, our newborn ICU (NICU) started a quality improvement (QI) initiative to improve recognition and management of late-onset neonatal sepsis with a paper-based NICU sepsis screening tool (NSST). There are currently few examples of sepsis screening tools for use in level IV NICUs, and none have been robustly validated.

Aim/Objective: Our overall aim is to improve reliability and detection rate of sepsis screening in our level IV NICU. The Aim of this project phase is to improve screening tool use from 60% to 90% of screening opportunities by December 2022.

Planning/studying the intervention: To evaluate current operational reliability of NSST implementation since the last sustainment audit (2018), we completed a retrospective review of NSST use from August 2–October 10, 2021. To guide potential tool design prior to testing EHR integration, we retrospectively compared identification rates of the NSST and our hospital's EHR-based pediatric sepsis tool for all (n=37) positive blood cultures in the NICU in 2021. Identification rates were compared using Fisher's exact test. Future PDSA cycles will address implementation of an EHR-integrated sepsis tool focusing on data sourcing within the EHR, alert mechanism and frequency, and EHR-end user interface integration into bedside workflows.

Measures: The detection rate for patients with positive blood cultures is the primary outcome measure, however the outcome is relatively rare. Accordingly, process measures including screening completion rate and the clinical impact of responses to screening results take a central role in driving improvement in our ongoing project.

Analysis/Outcomes/Results: A Laney corrected p-chart was used to analyze the fraction of completed screening opportunities over time. NSST completion rate ranged from 40-81% in the initial intervention and follow-up phases.

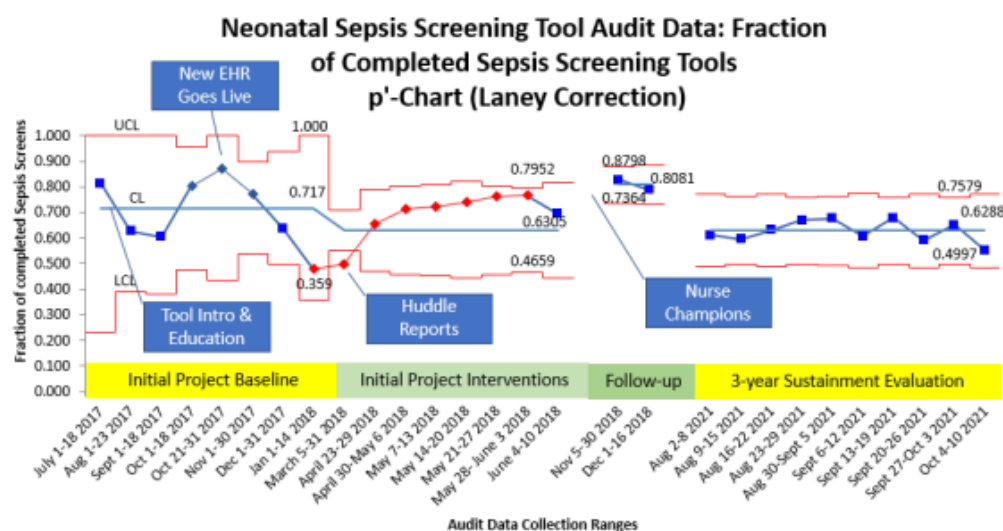


Figure 1.

retrospectively applied. The EHR-based pediatric sepsis tool retrospectively identified fewer culture positive cases than the NSST (19% vs 73%, $p < 0.001$).

Summary/Discussion: Our sustainment evaluation revealed a system in reasonable control, though not delivering the desired results likely in part due to non-sustainable implementation of the paper tool despite prior QI successes. EHR integration of sepsis screening tools have been shown to improve screening tool completion rates and could address multiple drivers identified during Key Driver development. As the EHR-based pediatric sepsis screening tool performed poorly in our retrospective evaluation, we plan to integrate and test the NSST logic in our EHR as our QI team's next intervention to improve early sepsis detection and management in our NICU.

Improvements occurred after targeted education, initiation of nurse champions, and weekly reporting of tool completion rates. The fraction of completed screenings declined following project completion and was steadily around 63% in late 2021. With 63% reliability of implementation, the NSST prospectively identified 14/37 cases (38%) compared to 27/37 cases (73%) when the tool was