Clinical Impact of a Pediatric Sepsis Quality Improvement Collaborative: Interim Analysis

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Background

Recent studies demonstrate an association between mortality and the timely identification and treatment of severe sepsis and septic shock (SS) in children.

The Children's Hospital Association's Improving Pediatric Sepsis Outcomes (IPSO) quality improvement collaborative, formed in 2016, includes 54 children's hospitals to date.

Objective

To reduce SS-related morbidity and mortality through early identification and timely interventions in children with, or at risk for developing SS.

Methods

IPSO hospitals implement standard definitions and care bundles in emergency departments, general care, intensive care, and cancer/transplant units to identify and treat children with or at risk for developing SS (IPSO SS). A subset of critically ill patients (IPSO Critical SS) is identified based on pressor use, bolus administration and treatment.

Key process measures include:

- % of episodes in which a screening tool is used
- % of episodes in which a clinical huddle is activated
- % of episodes in which an order set is used
- time to first fluid bolus
- time to first IV antibiotic (abx)

Outcomes include 3-day and 30-day sepsis-related mortality and mean days per SS episode.

We use statistical process control charts to assess change in process and outcomes measures over time in sepsis episodes; centerlines are shifted if 8 consecutive points occur on the same side of the previous centerline.

Results

Through 2/2019, 40 centers reported complete data on 25,551 IPSO SS episodes; 9,504 (37.2%) were identified as IPSO Critical SS.

Combined use of recognition and diagnostic bundle elements increased from 58.5% to 68.6% resulting in concomitant increases in IPSO SS identification rates (per 1,000 hospitalizations). Time to first bolus, time to first IV antibiotics, days per SS episode, 3-day and 30-day sepsis-related mortality all decreased in the IPSO SS cohort while only time to first IV antibiotics decreased in the IPSO Critical SS cohort.

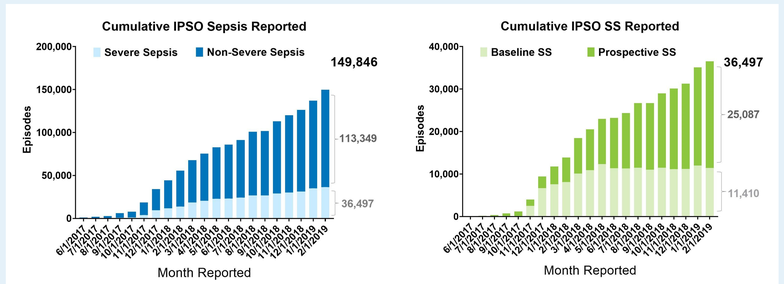

Figure 1. Cumulative sepsis episodes submitted by 47 sites.

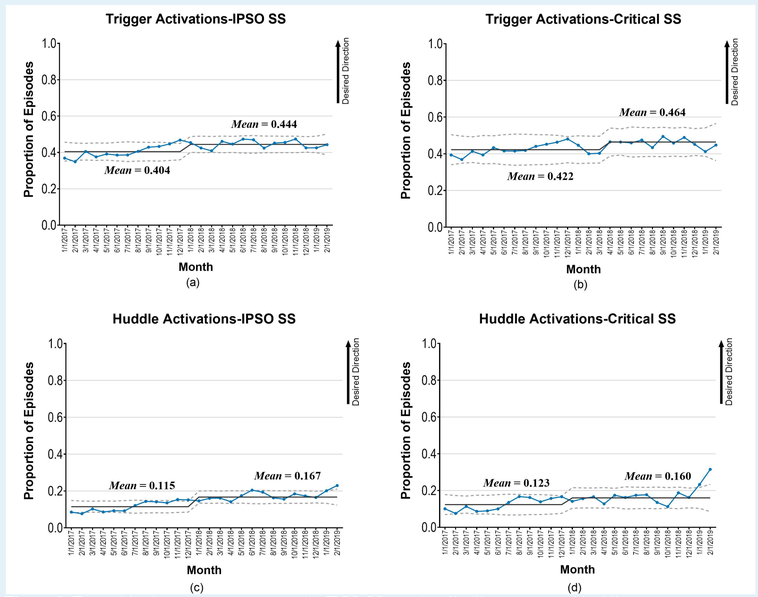

Figure 2. Two of five key process measures for IPSO SS vs critically ill (triggers and huddles)

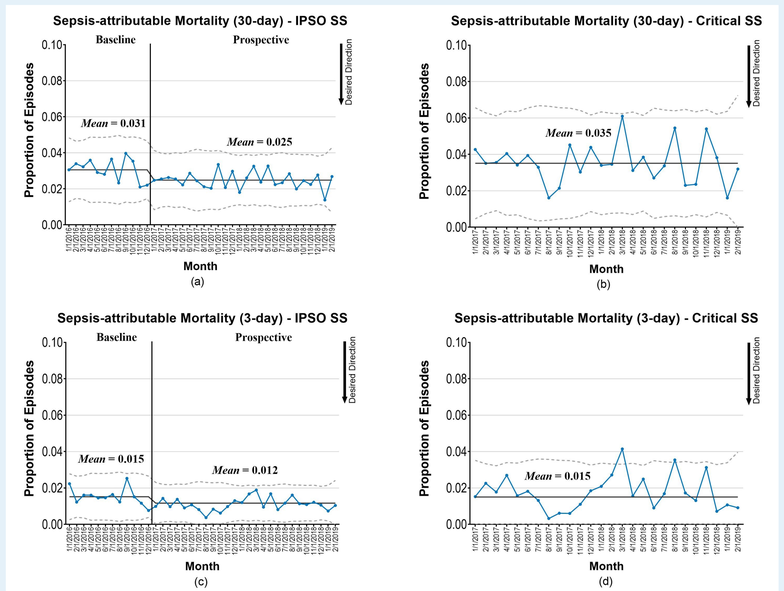

Figure 3. Interim outcomes for IPSO SS vs critically ill (3-day and 30-day mortality)

Conclusion

Increased use of recognition and diagnostic bundle elements is associated with increased identification of children at-risk for SS. To date, improved recognition has not changed outcomes in the IPSO Critical SS cohort. Further improvement in compliance with treatment interventions is needed to clinically improve IPSO Critical SS outcomes. Sites are continuing expansion of improvement work related to key process measures.

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