1 DRIVING TEAM-BASED CRITICAL THINKING USING AN EMERGENCY DEPARTMENT (ED) PEDIATRIC ASSESSMENT TOOL

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Background Missing signs of sepsis can result in delayed diagnosis, treatment and complications. We have introduced an ED-based Children At High Risk(CAHR-AT) tool to improve recognition, team critical thinking, and patient outcomes. Delayed recognition and poor nurse-provider communication were identified as common challenges in timely treatment of children at high-risk for infection-related decompensation.

A simplified Key Driver Diagram with only major interventions listed is shown below.

Abstract 1 Figure 1 CAHR key driver diagram

Abstract 1 Figure 2 CAHR project timeline and stoplight activation algorithm (Training video link attached)

This g-chart shows the number of days between unanswered CAHR alerts. 12/04/18 was the last unanswered ED CAHR alert. The annotations show the major interventions.

Abstract 1 Figure 3 Number of CAHR alerts between dyad (MD/RN) unanswered alerts

Initially, we started with paper documentation of the pit stop for 9 weeks which occurred after the initial firing. This then moved to an electronic version and associated nursing task in December 2018.

Percent CAHR+ Patients with Completed Initial Pit Stop

Abstract 1 Figure 4 Compliance of initial pit stop (Huddle) completion (p-chart)

Shows the association with the 3M Corporation Severity of Index score with CAHR-AT Score ≥ 5 .

Based on 61,617 Cases During 11/12 - 12/12, 08/14 - 01/15, and 01/17 - 06/17

* Number of cases with the indicated CAHR score range

Abstract 1 Figure 5 Association of CAHR-AT score and severity of illness

*Number of cases with the indicated CAHR score range (excludes cases in range 11-12 due to very low "N")

Abstract 1 Figure 6 Association of CAHR-AT score with incidence of acute kidney injury (AKI) among admitted patients within 48 hrs of arrival

Abstract 1 Figure 7 Differences in length of stay (LOS in days) between CAHR+ patients who received the bundle (IVF and IV antibiotics) vs. those who did not

Objectives This stand-alone urban children's hospital ED aims to improve team-based care, situational awareness, and patient outcomes through team huddles and associated interventions (figure 1).

Methods Development of the CAHR-AT utilized vital signs data of $>1 \times 10^6$ patients to derive standards. Logistic

regression and 'machine-learning(AI)' identified factors showing the highest association with gold-standard sepsis cases and applied weights to each factor for optimum sensitivity. A nursing assessment form was added to the dyad assessment process and visual redesign of the tool interface went into effect using a stoplight approach with red, yellow, and green lights indicating patient acuity and resources needed (figure 2).

Results It has been over 239 days (934 alerts) since the last unanswered alert by the provider/nurse dyad (figure 3). The average percent of CAHR patients with a completed initial huddle increased from 9.3% to 45.3% (figure 4). Higher CAHR-AT scores were associated with higher severity-of-index (SOI) and acute kidney injury (AKI) within 48 hrs of arrival (figures 5 and 6). Preliminary data show CAHR-AT patients with a score ≥ 8 who received the bundle (IV-fluid bolus and IV-antibiotics) significantly shorter length of stays (figure 7).

Conclusions CAHR-AT predicts physiologic decompensation and AKI. Its processes promote team-based critical thinking and improve patient outcomes. Next steps include prescriptive order sets for both red/yellow stoplight activations and spread to inpatient units.

2 IMPROVING THE TIMELINESS OF CARE FOR CHILDREN WITH TESTICULAR TORSION IN THE PEDIATRIC EMERGENCY DEPARTMENT

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Background Early diagnosis and timely surgery are critical to treat children with testicular torsion. Only 33% of patients met the hospital goal of 'critical diagnosis to operating room time of 60 minutes or less [CDOR60]' prior to starting the QI project.