

Recognizing Deteriorating Patients and Escalating Care: How do we work together as a team to provide the best care?

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**18TH BIENNIAL ELIZA FERNIE PEDIATRIC CRITICAL CARE
SYMPOSIUM**

APRIL 20TH, 2022



Children's Hospital Colorado
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Disclosures

- I have no personal or financial conflicts of interest to disclose
- I am honored to be asked to contribute to our collective improvement

Land Acknowledgement



Personal Acknowledgment



Professional Acknowledgment



Halden Scott MD,MSCE

Objectives

- Engage the audience in a discussion on the challenges of care escalation and methods to improve communication

Rory Staunton

- In 2013, New York state passed “Rory’s Regulations,” mandating that every hospital have sepsis protocols and report metrics to the state.



An Infection, Unnoticed, Turns Unstoppable

SUNDAY REVIEW

The Boy Who Wanted to Fly

Rory Staunton always aimed for the stars. Before a strep infection, discovered too late, cut his life short, the 12-year-old from Queens soared.

By Maureen Dowd

NEW YORK

Death of a Boy Prompts New Medical Efforts Nationwide

The case of Rory Staunton, 12, who died after being released from NYU Langone with a deadly infection, has inspired a second look at hospital procedures.

By Jim Dwyer

NEW YORK

One Boy's Death Moves State to Action to Prevent Others

New York health officials are poised to make their state the first in the nation to require that hospitals aggressively look for sepsis in patients so treatment can begin sooner.

By Jim Dwyer

NEW YORK

Parents' Fight Against Sepsis Reaches C.D.C.

After their son died, Claran and Orlaith Staunton began pushing for hospitals nationwide to adopt techniques for early identification and treatment.

By Jim Dwyer

NEW YORK

Cuomo Plans New Rules in Fight Against Sepsis

Gov. Andrew M. Cuomo will announce in his State of the State Message this week that all New York hospitals must adopt aggressive procedures for identifying sepsis in patients.

By Jim Dwyer

Professional Acknowledgment



Halden Scott MD,MSCE

ORIGINAL RESEARCH CONTRIBUTION

The Utility of Early Lactate Testing in Undifferentiated Pediatric Systemic Inflammatory Response Syndrome

Halden F. Scott, MD, Aaron J. Donoghue, MD, MSCE, David F. Gaieski, MD, Ronald F. Marchese, MD, and Rakesh D. Mistry, MD, MS

Presented at the Pediatric Academic Societies Annual Meeting, Denver, CO, May 2011; and the Society of Academic Emergency Medicine annual meeting, Boston, MA, June 2011.

Effectiveness of physical exam signs for early detection of critical illness in pediatric systemic inflammatory response syndrome

Halden F Scott^{1*}, Aaron J Donoghue^{2,3}, David F Gaieski^{4,5}, Ronald F Marchese² and Rakesh D Mistry¹



The Prevalence and Diagnostic Utility of Systemic Inflammatory Response Syndrome Vital Signs in a Pediatric Emergency Department

Halden F. Scott, MD, Sara J. Deakyne, MPH, Jason M. Woods, MD, and
Lalit Bajaj, MD, MPH

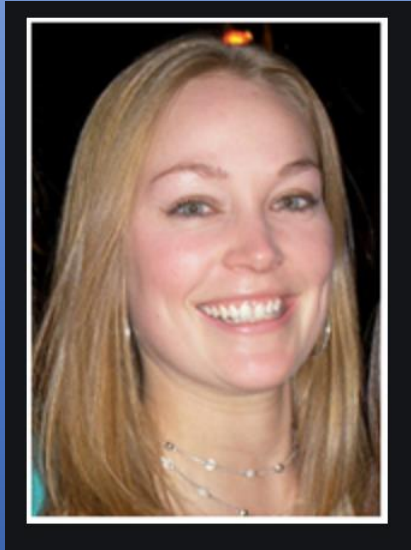
Among SIRS vital signs patients, 5,064 (82.7%) were discharged from the ED; 71 of these had IV therapy in the ED at the index visit or readmission to the hospital within 72 hours. This left 4,993 (81.6%) SIRS vital signs patients discharged from the ED without IV therapy and without 72-hour readmission.

Lactate Clearance and Normalization and Prolonged Organ Dysfunction in Pediatric Sepsis

Halden F. Scott, MD^{1,2}, Lina Brou, MPH², Sara J. Deakyne, MPH¹, Diane L. Fairclough, DrPH^{3,4}, Allison Kempe, MD, MPH^{1,4,5}, and Lalit Bajaj, MD, MPH^{1,2}

The current study demonstrated that lactate normalization is associated with a decreased risk of prolonged organ dysfunction at 48 hours in ED patients with suspected sepsis and organ dysfunction.

Another Professional Acknowledgment



Sara Deakyne – Davies, MPH
Director of Research Informatics & Data Science

Association Between Early Lactate Levels and 30-Day Mortality in Clinically Suspected Sepsis in Children

Halden F. Scott, MD; Lina Brou, MPH; Sara J. Deakyne, MPH; Allison Kempe, MD, MPH; Diane L. Fairclough, DrPH; Lalit Bajaj, MD, MPH

Figure 3. Clinical Utilization Outcomes by Initial Venous Lactate Level

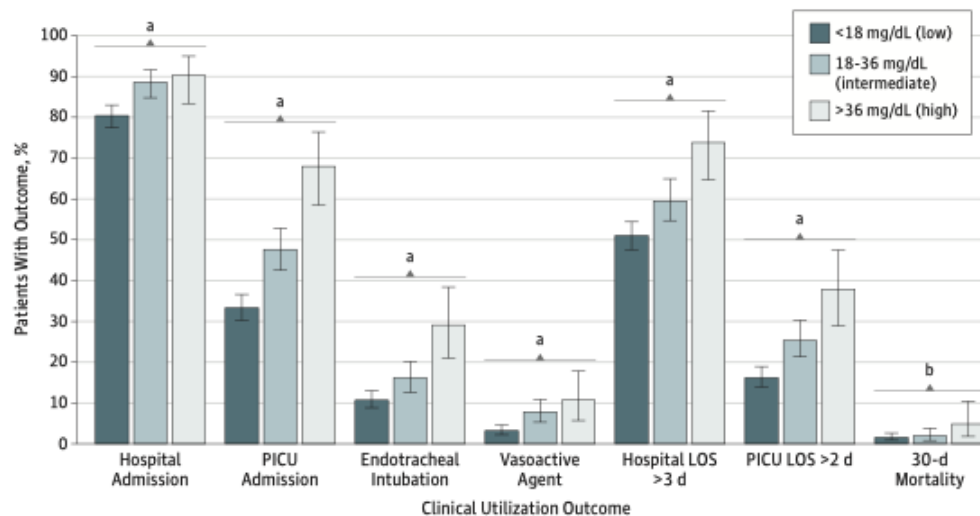
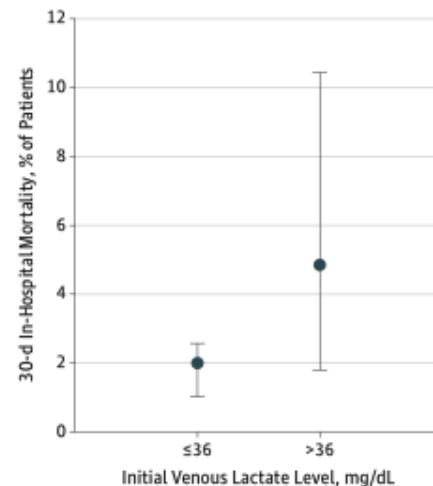


Figure 2. 30-Day Mortality Rate by Lactate Level



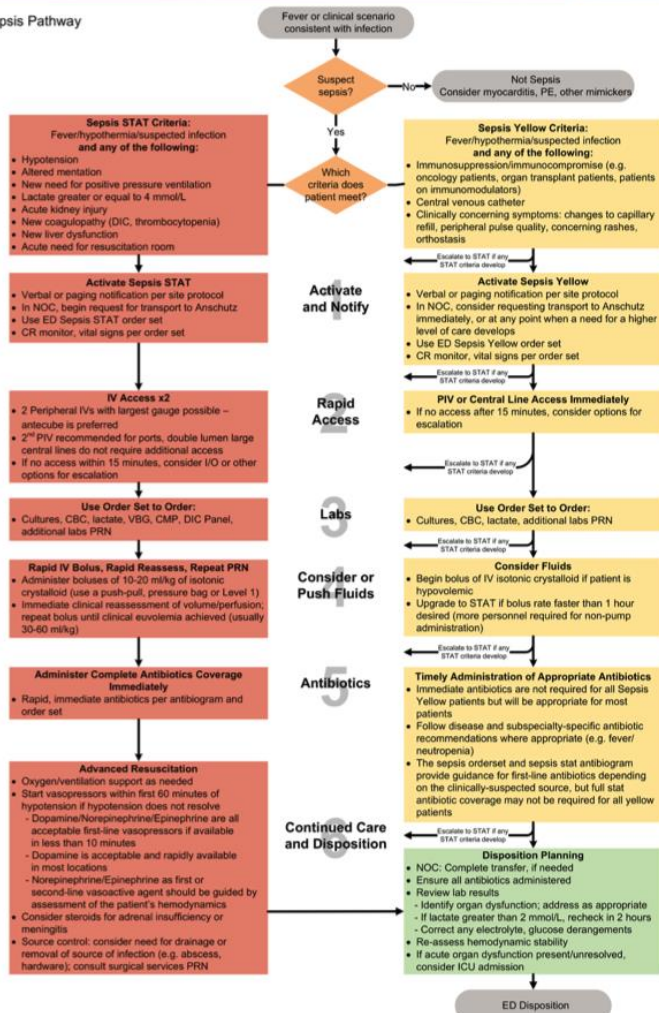
Data points indicate median; error bars, 95% CI.



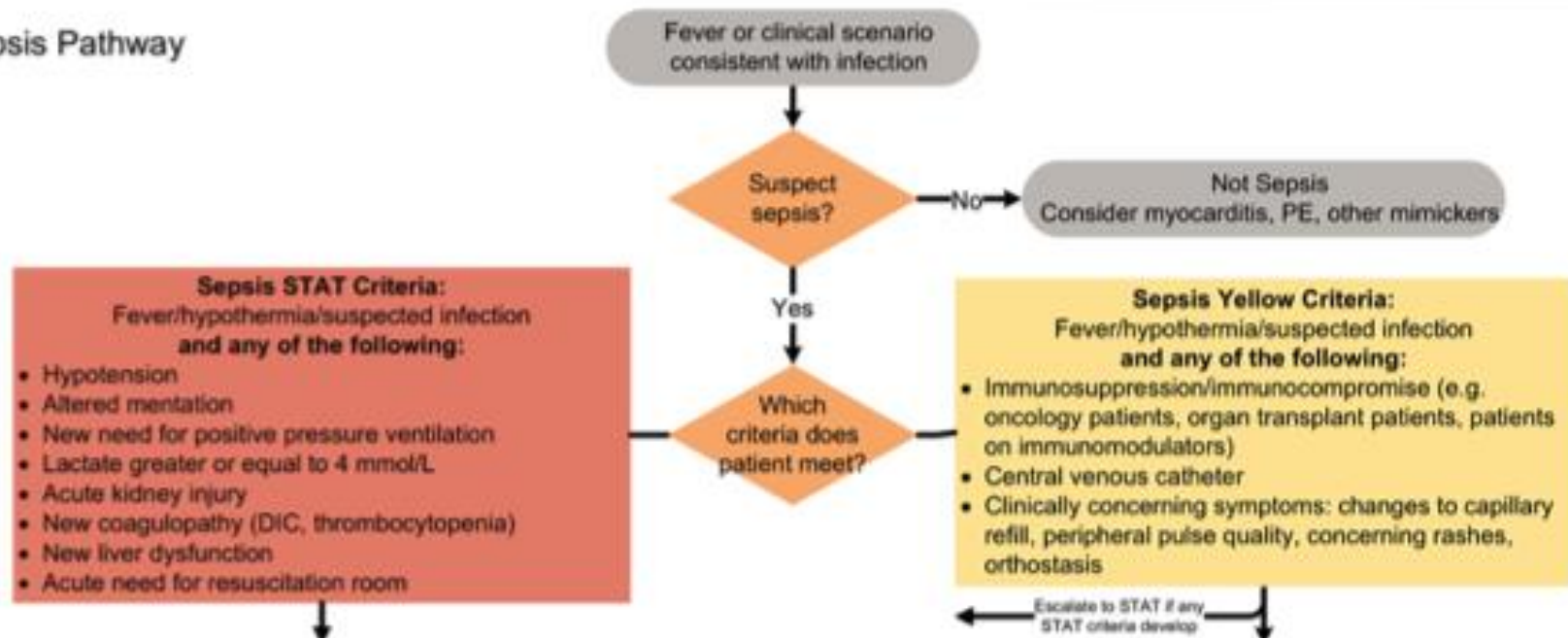
Managing Diagnostic Uncertainty in Pediatric Sepsis Quality Improvement with a Two-Tiered Approach

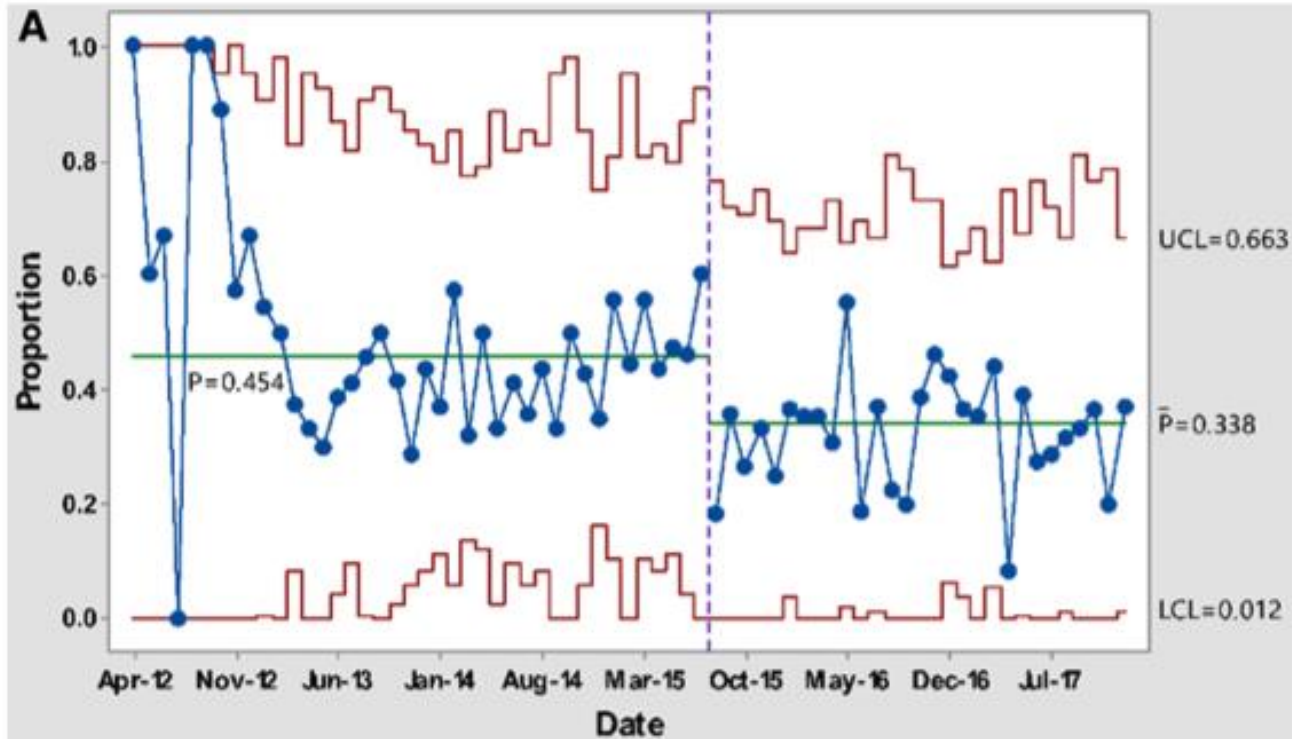
Halden F. Scott, MD, MSCS†; Allison Kempe, MD, MPH*‡; Sara J. Deakyne Davies, MPH§;
Paige Krack, MBA, MS¶; Jan Leonard, MSPH*†; Elise Rolison, RRT-NPS¶; Joan Mackenzie, MS, CPNP†;
Beth Wathen, MSN, PNP¶; Lalit Bajaj, MD*†¶*

ED Sepsis Pathway



ED Sepsis Pathway





The proportion of severe sepsis patients requiring ICU care in the first 24 hours

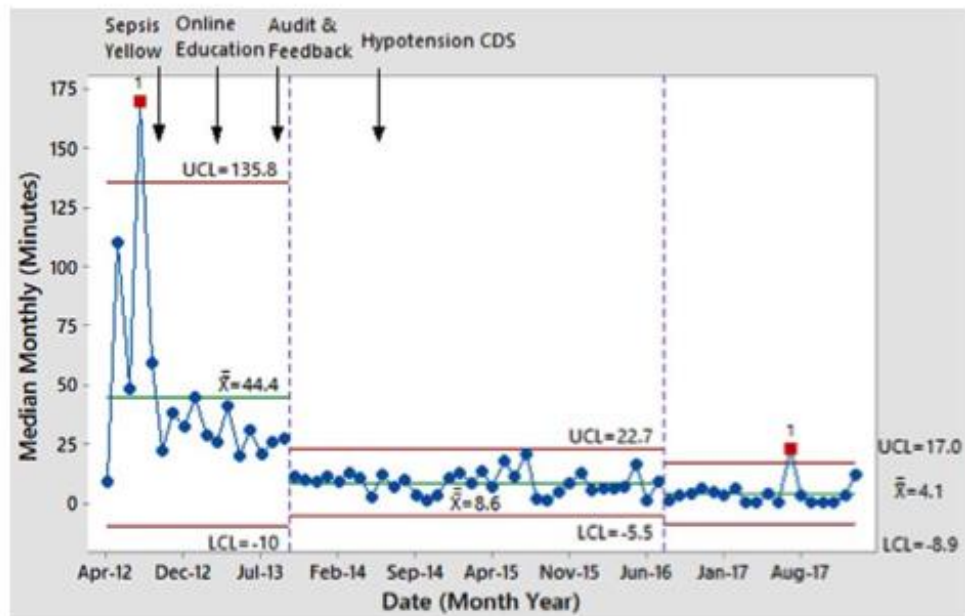


Fig. 4. Time from ED arrival to sepsis recognition in patients with severe sepsis.

**Are We
THERE Yet?**

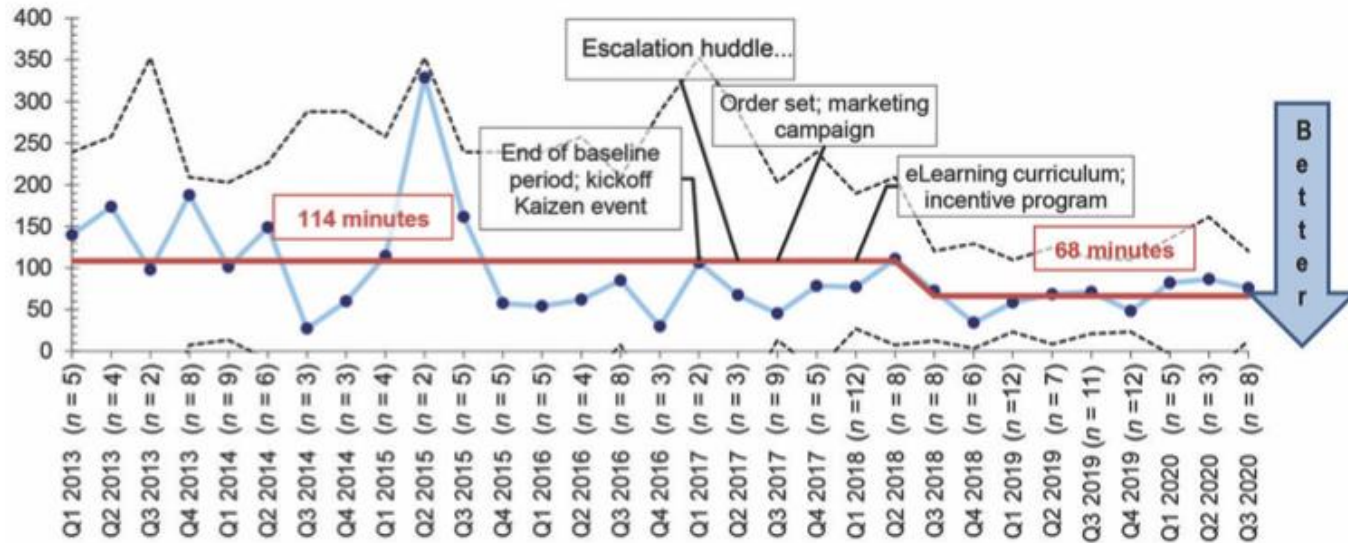
271 x 121

RESEARCH ARTICLE

An Acute Care Sepsis Response System Targeting Improved Antibiotic Administration

Justin M. Lockwood, MD, MSCS,^a Halden F. Scott, MD, MSCS,^b Beth Wathen, MSN, CCRN-K,^c Elise Rolison, RRT-NPS,^d Carter Smith, BS,^d Jane Bundy,^d Angela Swanson, MS,^d Sarah Nickels, PhD, MSW,^d Leigh Anne Bakel, MD, MSc,^{a,d} Lalit Bajaj, MD, MPH^{b,d}

Quarterly Average Initial Antibiotic Order-to-Administration Time for Acute Care Sepsis Cases (X-Bar Chart)

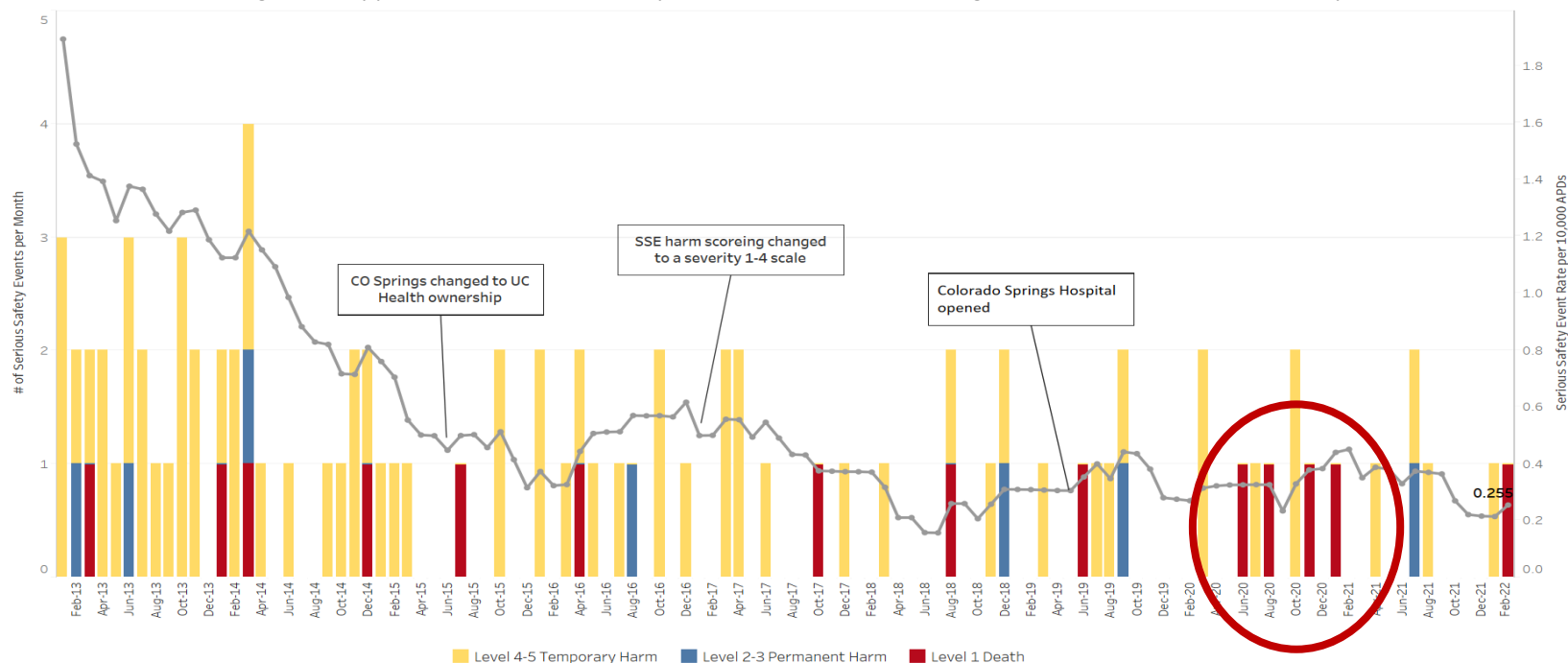


CHCO System Serious Safety Event Rate (SSER)

SSER is Expressed as a Rolling 12 Month Rate per 10,000 Adjusted Patient Days (APD)



Goal (Pending Board Approval): Achieve Serious System Event 12 Month Rolling Rate (SSER) of 0.217 or below by 12/31/22



This is Quality Management information relating to the evaluation or improvement of health care services, and is part of a Quality Management program as described in 42 U.S.C.A. 299, et seq., 42 C.F.R. 3.206 et seq., C.R.S. § 25-3-109 et seq., and C.R.S. § 12-30-204 et seq. It is confidential and protected under C.R.S. § 12-30-204 et seq., C.R.S. § 25-3-109 et seq., 42 U.S.C.A. 299, et seq., and 42 C.F.R. 3.206 et seq., and is to be used for Children's Hospital Colorado purposes only. The material relates to Children's Hospital Colorado's quality assurance, risk management, peer review and/or quality management functions as described in Children's Hospital Colorado's Quality Plan.



Audience participation!

- What are some of the factors contributing to the delayed identification of deterioration and need for escalation on inpatients?
- Please enter your thoughts into the chat

What is coming next? Can the EHR help us?



Development and Validation of a Predictive Model of the Risk of Pediatric Septic Shock Using Data Known at the Time of Hospital Arrival

Halden F. Scott, MD, MSCS^{1,2}, Kathryn L. Colborn, PhD³, Carter J. Sevick, MS⁴, Lalit Bajaj, MD, MPH^{1,2,5},
Niranjan Kissoon, MBBS, FRCPC^{6,7}, Sara J. Deakyne Davies, MPH⁸, and Allison Kempe, MD, MPH^{1,4}

This model strongly discriminated the risk of early hypotensive septic shock, in training and separate temporal and geographic test sets.

This model added predictive value to initial clinician suspicion for sepsis, and it may improve early identification of patients at high risk for hypotensive septic shock, at the first moment when a clinician has an opportunity to intervene to prevent deterioration.

Development and Validation of a Model to Predict Pediatric Septic Shock Using Data Known 2 Hours After Hospital Arrival

This model used routine EHR data to predict septic shock risk in children with suspected infection 2 hours after arrival, a critical time for treatment and transfer decisions. The threshold for considering patients high-risk could be customized to the clinical context. It demonstrated good discrimination and calibration in validation test sets within a regional pediatric care system, that included nontertiary care sites.

Halden F. Scott, MD, MSCS^{1,2}

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Lalit Bajaj, MD, MPH^{1,2,5}

Sara J. Deakyne Davies, MPH⁶

Diane Fairclough, DrPH^{3,4}

Niranjan Kissoon, MB BS, FRCPC^{7,8}

Allison Kempe, MD, MPH^{1,4}

Machine Learning at the Clinical Bedside— The Ghost in the Machine

Joseph J. Zorc, MD, MSCE; James M. Chamberlain, MD; Lalit Bajaj, MD, MPH

National Collaboration

Development of a Quality Improvement Learning Collaborative to Improve Pediatric Sepsis Outcomes

Gitte Y. Larsen, MD, MPH,^a Richard Brilli, MD, MCCM,^b Charles G. Macias, MD, MPH,^d Matthew Niedner, MD,^a Jeffery J. Auletta, MD,^c Fran Balamuth, MD, PhD,^f Deborah Campbell, MSN, RN-BC,^e Holly Depinet, MD, MPH,^h Meg Frizzola, DO,ⁱ Leslie Hueschen, MD,^j Tracy Lowerre, BSN, MS,^k Elizabeth Mack, MD, MS,^l Raina Paul, MD,^m Faisal Razzaqi, MD,ⁿ Melissa Schafer, MD,^o Halden F. Scott, MD,^p Pete Silver, MD, MBA,^q Beth Wathen, APRN, CCRN,^r Gloria Lukasiewicz, RN, MS,^{s,t} Jayne Stuart, MPH,^{s,t} Ruth Riggs,^{s,t} Troy Richardson, PhD,^{s,t} Lowrie Ward, MPH,^{s,t} W. Charles Huskins, MD, MSc,^u ON BEHALF OF THE IMPROVING PEDIATRIC SEPSIS OUTCOMES COLLABORATIVE INVESTIGATORS

What can we do together?

- Ask the question...
- Is this sepsis? Asking the question can save a life.

