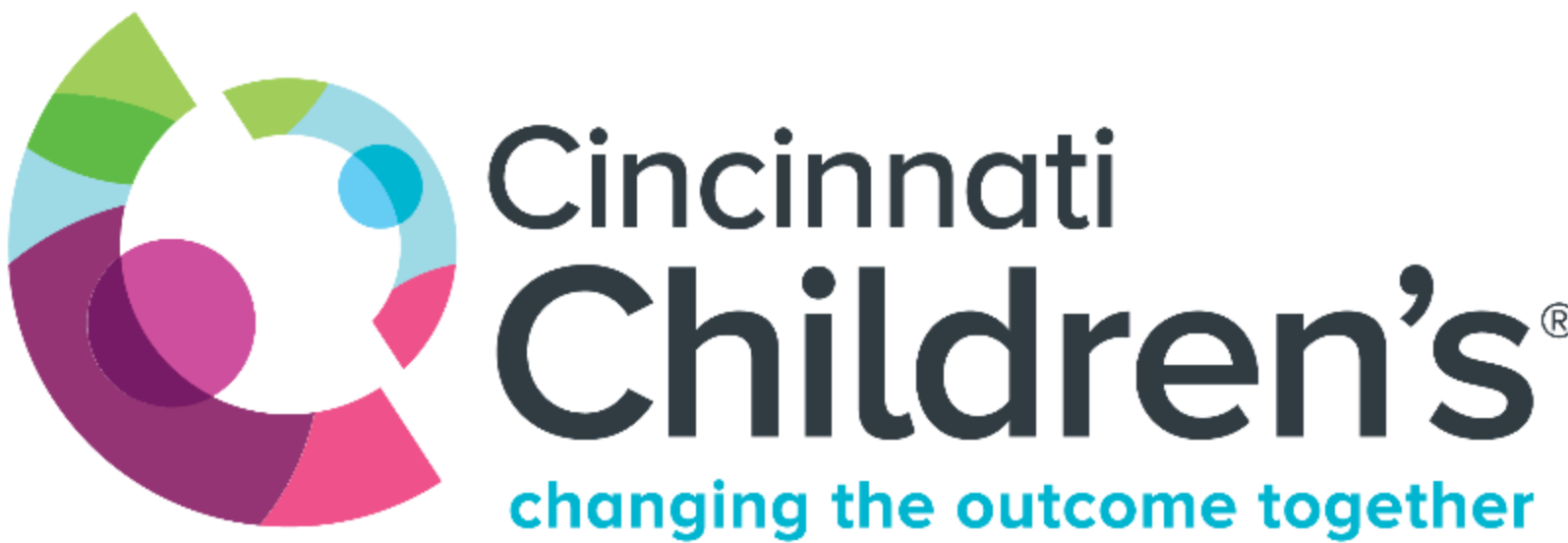


Understanding Physician Interaction with Automated Sepsis Alerts in the Pediatric Emergency Department

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Background

Pediatric sepsis is rare but carries a significant risk of morbidity and mortality.



Timely sepsis identification in children is challenging in the pediatric emergency department (PED) because of the large number of common febrile illnesses and the ability of children to compensate until the late stages of shock are present.

Automated electronic health record alerts have been utilized by pediatric emergency departments across the country to facilitate early recognition of sepsis. Use of these alerts has increased sepsis recognition and early treatment compared to physician judgement alone.

However, the physician must decide to either accept or reject the alert. There are a limited number of studies that explore physician interaction with these automated alerts in the pediatric emergency department.

It is not well understood how physicians interact with these alerts and if they significantly impact clinical decision making in the pediatric emergency department.

Objective

We aimed to understand what factors impacted the physician response to sepsis alerts in the PED and whether those factors changed over the course of the patient encounter.

Methods

Setting: large, quaternary-care, academic children's hospital emergency department with an average annual patient volume of 170,000

Time Frame: July - October 2018

Data Collection: qualitative study using "pulse interviews"

Pulse interviews are short interviews to capture brief reflections (i.e., the 'pulse') in real-time. We targeted patient encounters where an electronic sepsis alert was activated by the triage nurse initially evaluating the patient.

Pulse interviews were conducted at the patient's bedside by trained clinical research staff at two separate time points during the same clinical encounter:

- 1) The first interview occurred immediately after the physician exited the patient room, following the initial sepsis huddle.
- 2) The second interview took place about 1-2 hours later, when possible.




Follow-up questions focused on whether the patient was now believed to have sepsis based on the physician's most recent assessment and following initial interventions in the 1-2 hours preceding the follow up interview.

Data Analysis: We used a thematic analysis approach to code the interview transcripts. Three researchers iteratively coded, categorized, and synthesized patterns in the data to develop the themes.

Results

Sample: N = 125 interviews (72 patient encounters)

Three Main Themes Identified:

 <p>(1) PRIORITIZATION OF PHYSICIAN CARDIOVASCULAR/ PERFUSION ASSESSMENT IN DETERMINING CLINICAL SUSPICION OF SEPSIS</p> <p>"I do suspect sepsis for this patient because she is febrile, tachycardic, she has a capillary refill of 4 to 5 seconds, and [she has] cool extremities."</p> <p>"While he is febrile and tachycardic, he has a lot of increased work of breathing on exam and is coarse on exam, so I think most of his problems are respiratory related and his tachycardia is likely more due to his fever. He has normal cap refill, normal perfusion, normal blood pressure, which is why I have a lower suspicion for sepsis."</p>	 <p>(2) THE IMPACT OF A PATIENT'S COMPLEX PAST MEDICAL HISTORY IN RISK STRATIFICATION FOR PEDIATRIC SEPSIS</p> <p>"She has a complex medical history, Spinal Muscular Atrophy, febrile today, and she is still working pretty hard to breathe, she is tachypneic to the 40s, she is tachycardic to the 150s and 160s, and her capillary refill is about 3 seconds. All those things combined and her being higher risk with her past medical history, I would be more worried about [sepsis]."</p> <p>"He was recently admitted and had a UTI growing numerous multidrug resistant organisms, multiple days of fever. That, plus his complex medical history and hardware, I think his risk of sepsis is higher than other kids"</p>	 <p>(3) IMPORTANCE OF TIME AND REASSESSMENT IN THE PED TO DETERMINE IF SEPSIS IS A TRUE CLINICAL CONCERN</p> <p>"I think sepsis is unlikely, he looks much better now after just a single fluid bolus, his perfusion has improved, his fever has improved, and he may have an infection somewhere, but I wouldn't call him sepsis."</p> <p>"I have less concern about sepsis for this patient because she is overall well appearing and has had improvement of her tachycardia, her cap refill time has improved with improvement of her fever and her fluids, and her labs are coming back overall reassuring"</p>
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Nearly all the respondents prioritized the cardiovascular assessment (evaluation of heart rate, blood pressure, perfusion/capillary refill, extremity warmth) in their determination of whether the patient had sepsis or not.

Additionally, in about half of the interviews conducted, physicians identified the patient's complex past medical history as a significant factor that influenced their clinical decision making.

About one third of interviewees reported decreased concern for sepsis during their subsequent/follow up interview compared to their initial evaluation of the patient.

Conclusions

There are a limited number of studies that examine how physicians interact with automated sepsis alerts and what factors play into a clinician's decision to accept or reject the diagnosis and treatment of presumed sepsis

Our results highlight the important intersection of physician clinical judgement with automated electronic alerts for sepsis identification in the pediatric emergency department.

Through thematic analysis, we found three key themes that impact physician clinical decision making when prompted by automated sepsis alerts.

More studies are needed to assess the accuracy of physician judgement when coupled with automated sepsis alerts in pediatric emergency department.