Pediatric Septic Shock Care Pathways in General Emergency Departments

A Qualitative Study Targeting How to Really Make it Work

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Objectives: Many academic pediatric emergency departments (PEDs) have successfully implemented pediatric septic shock care pathways. However, many general emergency departments (GEDs), who see the majority of pediatric ED visits, have not. This study aims to compare the workflow, resources, communication, and decision making across these 2 settings to inform the future implementation of a standardized care pathway for children with septic shock in the GED.

Methods: We used the critical incident technique to conduct semistructured interviews with 24 ED physicians, nurses, and technicians at one PED and 2 GEDs regarding pediatric septic shock care. We performed a thematic analysis using the Framework Method to develop our coding schema through inductive and deductive analyses. We continued an iterative process of revising the schema until we reached consensus agreement and thematic saturation.

Results: We identified the following 6 themes: (1) functioning like a "well-oiled machine" may be key to high performance; (2) experiencing the sequence of care for children with sepsis as invariant and predictable may be essential to high-quality performance; (3) resilience and flexibility are characteristic of high levels of performance; (4) believing that "the buck stops here" may contribute to more accountability; (5) continuous system learning is essential; and (6) computerized clinical decision support may not be optimized to drive decision-making at the point of care. Commentary from GED and PED participants differed across the 6 themes, providing insight into the approach for standardized care pathway implementation in GEDs.

Conclusions: Pediatric septic shock workflow, decision making, and system performance differ between the PED and GEDs. Implementation of a standardized care pathway in GEDs will require a tailored approach. Specific recommendations include (1) improving shared situation awareness; (2) simulation for knowledge, skill, and team-based training; and (3) promoting a culture of continuous learning.

Key Words: sepsis, septic shock, care pathway, implementation science

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Rapid recognition and treatment of pediatric septic shock are critical to improving outcomes.[1] High-quality, evidence-based emergency department (ED) care that adheres to the surviving sepsis pediatric guidelines has been achieved in many pediatric EDs (PED) within tertiary care children's hospitals through successful implementation of care pathways.[2–4] Tertiary care hospitals are characterized by substantial resources, highly trained staff and clinicians, and deep experience with treating pediatric sepsis. However, most children seeking ED care first present to a general hospital ED (GED) where readiness for pediatric care varies substantially.[5,6] General hospital EDs may be less prepared to care for pediatric emergencies compared with PEDs, and barriers to guideline implementation significantly contribute to lower pediatric readiness.[7] General hospital EDs are less likely to have implemented care pathways for pediatric sepsis and less likely to recognize and appropriately treat pediatric sepsis.[8–11] Importantly, mortality from pediatric sepsis is significantly higher among children presenting to a GED compared with those presenting to a PED.[12]

The objective of this study is to better understand the clinical and electronic health record (EHR) workflows, resource structures, communication patterns, culture, and clinical decision making surrounding pediatric septic shock across PED and GED settings. Our ultimate goal is to design and plan effective interventions appropriate for different healthcare settings (Fig. 1). We undertook a qualitative analysis of pediatric septic shock care both in a PED with an established, mature, high-performing, pediatric septic shock program[4,13] and 2 GEDs without such programs. Because of inherent differences between PEDs and GEDs, care pathways designed for a PED are unlikely to be successful in the GED unless they are adapted to specific settings and available resources. We aimed to compare and contrast the settings to inform the future implementation of a standardized care pathway for children with septic shock in the GEDs throughout a large healthcare system.

METHODS

Design

We conducted a qualitative study using the critical incident technique—a structured interview methodology that asks participants to recall a specific event in a 3-step process.[14] First, the participants recalled a child who presented to the ED in septic shock. Next, they summarized and described the event at a high level, followed by a more detailed timeline. Finally, they answered

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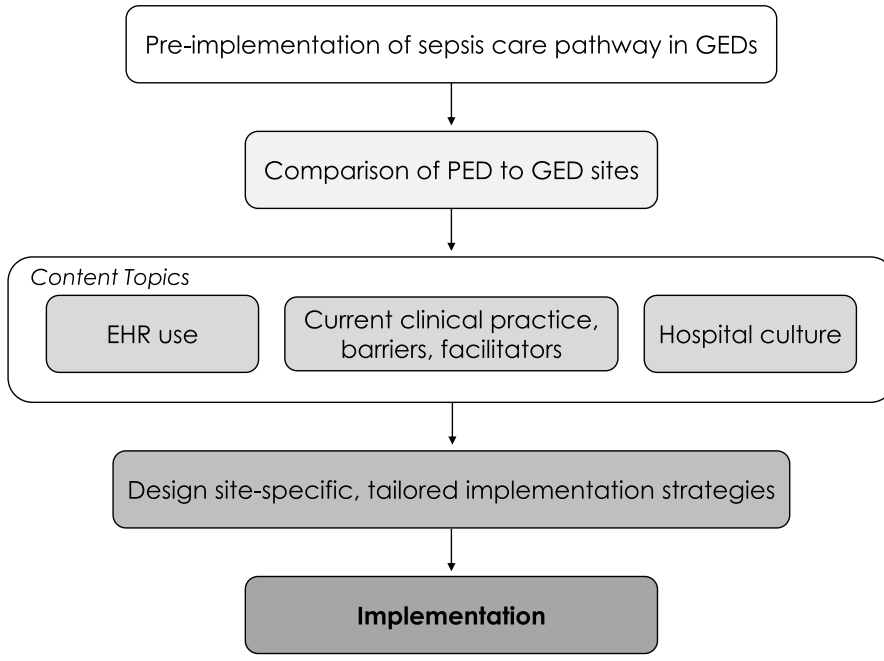

FIGURE 1. Conceptual model representing the approach to designing a standardized pediatric sepsis care pathway for the general emergency department in the context of a large healthcare system with an existing, mature sepsis program in the system's flagship PED.

questions regarding specific goals, staff issues, and other barriers. Also included were nonspecific questions about "the way it is generally done." Recalling a real event stimulates memory, minimizes bias from the interviewer, and allows a more accurate retrieval of contextual and generalizable aspects.[15] We report our approach following the Consolidated Criteria for Reporting Qualitative research.[16]

Participants

A total of 24 interviews were conducted with ED physicians, nurses, and technicians, including 10 at the PED and 14 at the GEDs. Leadership from each ED assisted with participant recruitment using email and face-to-face approaches. Participants were selected using convenience sampling. One interview from a GED participant was not recorded. Ultimately, we analyzed 23 transcripts from 11 physicians, 8 nurses, and 4 technicians. Participants were 43% female.

Setting

The 3 hospitals included a tertiary care children's hospital with dedicated PED (average 40,000 PED visits annually) and 2 nonacademic general hospitals (each with average 8000 PED visits annually). All 3 hospitals are part of a large healthcare system composed of 22 acute care hospitals, a specialty orthopedic hospital, and dozens of clinics and urgent care centers.

Procedure

This study was approved by the institutional review board of the University of Utah. An interview script (see document, Supplemental Digital Content 1, http://links.lww.com/PEC/B56, which provides the interview script) and procedures were piloted with 2 interview participants from the PED. One study team member (J.W., a female pediatric critical care physician) conducted one-on-one, face-to-face interviews with ED care team members at their respective work sites. Most study participants had not previously met the interviewer (J.W.); however, the physicians interviewed from the PED had experience working clinically with J.W. in the care of shared patients. Participants were given a brief synopsis of the research before starting the interview, including the goal of ultimately implementing a standardized care process for pediatric septic shock in the hospital system's GEDs. Each interview was audio recorded and transcribed verbatim for subsequent analysis. Median interview time was 26 minutes. Participants were interviewed only once; they were not given copies of their interview transcript.

Analysis

We used the Framework Method to perform a qualitative content analysis, which follows a systematic, staged approach to analysis of qualitative data.[17–19] The stages include (1) interview transcription, (2) familiarization with the interview, (3) coding, including both deductive (based on theoretical constructs) and inductive or "open coding" techniques, (4) development of a working analytical framework (or codebook), (5) mapping the analytical framework to the theoretical constructs through further discussion, and (6) interpreting the data.[17] To begin, all 3 study team members reviewed the transcripts independently, monitoring for any bias in addition to reviewing for thematic content. After review of each interview, we met, discussed, and revised the coding schema. We developed the coding protocol through an iterative process of group discussion following both inductive and deductive approaches, revision, and ultimately consensus agreement (see Table, Supplemental Digital Content 2, http://links.lww.com/PEC/B57, codebook). We continued thematic analysis until thematic saturation was reached. We used NVivo software (QSR International) for all analyses.

RESULTS

The following 6 themes emerged from our analysis: (1) functioning like a "well-oiled machine" may be key to high performance; (2) experiencing the sequence of care for children with sepsis as invariant and predictable may be essential to high-quality performance; (3) resilience and flexibility are characteristic

of high levels of performance; (4) believing that "the buck stops here" may contribute to more accountability; (5) continuous system learning is essential; and (6) computerized clinical decision support (CDS) may not be optimized to drive decision making at the point of care (Table 1).

Theme 1: Functioning Like a Well-Oiled Automatic Machine May Be Key to High Performance

In the PED, comments reflect a fully implemented pediatric sepsis protocol that deeply saturates the system, including individual's workflow, internalized roles, the tools and resources in the environment, and a sense of being part of a team (Table 2). Comments reflected both significant shared situation awareness (SA) and transactive memory. In contrast, the GEDs' narrative reported high effort and significant dependence on who was present and their level of skill. Some GED comments reflect the sense of a solid team (though not a "well-oiled machine"), while other comments suggested that team coherence was missing and a limited awareness of protocols. Physicians in the GEDs described the common problem of having to oversee many details of care unlike the narrative from physicians at the PED.

Theme 2: Experiencing the Sequence of Care for Children With Sepsis as Invariant and Predictable May Be Essential to High-Quality Performance

Pediatric emergency department comments described a well-known sequence of steps that was systematic, structured, and could be anticipated by every member of the team (Table 2). The sepsis care pathway was described as thoroughly integrated, allowing the team to provide continuous feedback and feedforward correction of performance, anticipation of next steps, and early recognition when patients were not following the expected course. While intravenous (IV) access is a pivotal point, in the PED, it is just the first step performed. In contrast, at the GED, IV access was reported as a substantial hindrance and depended heavily on individuals' skills. In addition, GED communication methods between providers were described as more variable and less systematic (overhead announcements, informal communication between nurse and physician). Some narratives suggested that these variations resulted in a higher probability of unintentional delays. In general, GED provider comments often described variable and unpredictable sequences of events.

Theme 3: Resilience and Flexibility Are Characteristic of High Levels of Performance

This theme reflects the degree to which systems and care providers are able to use their intuition and experience to adjust to variations in patient load and patient acuity. In the PED, provider comments described a system that is nimble and resilient to busyness within the ED as well as to individual patient complexities (Table 2). Available resources were referenced as substantial and redundant. In the GED, the system was described as more vulnerable to the increased workload of a sick child or to variation in staffing. Because there were often few team members with pediatric-specific skills such as IV placement, the system was less able to adjust and compensate when a sick child required attention, potentially pulling resources away from other GED patients and needs.

Theme 4: Believing That "The Buck Stops Here" May Contribute to More Accountability

Providers at the PED understand that they are the final and ultimately responsible group of clinicians. In the GEDs, interviewees did not report the same sense of ultimate responsibility. The GED interviewees report a more complex decision process as care decisions were intertwined with judgments about the available skills and resources to care for a patient versus the need to initiate a patient transfer.

Theme 5. Continuous System Learning Is Essential

Providers in the PED describe an organizational culture of self-learning, self-monitoring, and self-correction, based on routine data collection and feedback (Table 2). This culture was noted to have extensive support and commitment from institutional leadership. Interviewees reported that learning and educational opportunities were common and available to new team members. Reviews of care processes were described as frequent and corrective discussions focused on process, not blame. In the GEDs, team members were interested in improvement, but resources and structure (such as dedicated time) were less available. The interviewees

TABLE 1. Six Themes Identified From Thematic Analysis

Theme	Description
Well-oiled machine	A fully implemented pediatric sepsis protocol deeply saturates the system, including individual's workflow, internalized roles, the artifacts in the environment, and a sense of being part of a "well-oiled" machine.
Sequence is predictable	For the EDs that have a well-developed and deeply implemented protocol for pediatric sepsis, the sequence of steps is known and anticipated by every member of the care team and don't have to be specified.
Resilience	The degree to which systems and care providers are able to use their intuition and experience to adjust to variations in patient load, patient acuity. Highly resilient systems are nimble in the face of challenges.
"The buck stops here"	Providers at the PED have internalized the reality that they are the final and ultimately responsible group of clinicians. In the general hospital EDs, there is not this same sense of ultimate responsibility, and the decision for care is intertwined with the decision to transport.
Continuous learning	The academic PED reports having a continuous learning and improvement culture with extensive support by leadership. Events are reviewed immediately and everyone avoids a "gotcha" mentality. Substantial expertise is available for regular educational opportunities.
Computerized CDS	The usefulness of computerized decision support varies by the type of institution. The implementation of a protocol goes beyond having it in the computer, having individuals know where it is, and knowing how to apply it. In the PED, where the sepsis protocol is so well internalized and timeliness is critical, computerized decision support plays a minor role in performance, despite having pediatric-specific sepsis tools for both recognition (sepsis alert) and treatment (clinical pathway, order set).

TABLE 2. Representative Quotes Comparing the Children's Hospital Emergency Department to the General Hospital Emergency Department

Theme	Pediatric Emergency Department	General Emergency Department
1. Well-oiled machine	*... We do the same thing for every septic patient. And so it just is kind of built-in you, from the moment you start in the ED. This is what you do for sepsis and you're going to do it a lot. And it's just kind of now a part of me and a part of my job.* (Nurse participant) *They have a shared mental model, and they know it has to happen quickly. And there's a lot of very kind of rapid.—people aren't freaked out about it, and they move very fast. It's a great dance to watch.* (Physician participant)	*And that one came in through our triage and got walked back, and nobody told anybody that there was a kid back there that wasn't breathing. I happened to walk past the room, and I saw a nurse panicking around the room, and I went in and that's how we got that one going.* (Physician participant) *I was doing my part and ordered all these things, but there was a little bit of delay in there because I don't think we comprehended that urgency.* (Physician participant) *I think we have a general idea of where we want to go, but the process to get there could maybe be a little more streamlined* (Nurse participant)
2. Sequence of care	*We just get in and do it. I think that everyone knows that they need to respond to a red room. And just, at that first hearing it, you know it's on. You need to go. You need to be ready. And if they call sepsis, then you really—it's just, go. And everybody does what they can to make the team flow because everybody knows, now we're on the clock and we need to get these things done as soon as we can. And it becomes the priority of that room, of that nurse, of that tech, of that doctor. And we just work together to make sure that things are happening in the time that they need to happen.* (Technician participant) *And no matter what—the only thing that varies is where you're going to find a good vein… If they're a heart patient, if they're a chronic kid, if they're a quadriplegic, a paraplegic, you know your veins are going to be a little bit different… so it's not that complicated.* (Technician participant)	*I think we have different priorities for getting different things done… some people are like, "Can you just give them the Tylenol? Can you just give them the Tylenol?" Well, really, we need to do a airway first here.* (Physician participant) *To me, the biggest problem was delays.—one, the comprehension of, "Drop everything else. Let's dedicate ourself to the kid." Two, delay in the IV. Three, and this part's probably mine, maybe I should've realized that we weren't getting as much of ongoing vital check on the kid as we needed to… And that was, I think, one of the things that came out when they looked at him and said, "You needed to have more vitals done on this kid." And then lastly, the delay in trying to get upstairs.* (Physician participant)
3. Resilience and flexibility	*But we have mechanisms in place where we're fortunate where we can bring over extra nursing from our rapid treatment unit. Or we can have the attending on the other side… come over and help cover patients…* (Nurse participant) *We're super fortunate… there's abundance of help and knowledge. And as a physician, there's other docs around that you can grab and get help on some of these—if these kids are really, really sick and they need to be—their airway needs to be managed, or whatever. So, we have a ton of support. It's one of the fortunate things about being in a children's hospital.* (Physician participant) *If it's not your patient, then you would hear over Vocera, and you would know as a nurse in the department, Oh, maybe I should just walk by. See if they need anything. Maybe I should check the other patients of that nurse that is now in the septic protocol, so I can help the floor run well.* (Nurse participant)	*We did have trouble establishing an IV, and we eventually had to do a scalp IV. Looking back on that, I think we should have done an IO… I think there was hesitancy on my part, probably.* (Physician participant) *And similar to like a trauma activation and that's something that I think would be ideal here for anyone who's sick, adult, kid, whatever, because sometimes getting those resources or helping other people to recognize the acuity is sometimes difficult.* (Physician participant) *At the community hospitals, our resources are limited. And if we have a sick kid, and they show up, our nurses are still tied to that room. Our techs are still tied to that room.*
4. "The buck stops here"	*… everyone knows their job. And it's best if they don't look to the doc to define it… So it's very important to know where my job stops.* (Physician participant) *… literally, at our staff meeting, sepsis is a line item in the agenda. And Dr. X, is kind of our sepsis guru and has been the driver of kind of a process in the ER for years. And she and Dr. Y take it seriously, our leader, because basically, it is kind of a standard discussion point at every staff meeting. And so people just know, and the expectation is pretty clear.* (Physician participant)	*… we didn't have many sets of vital signs on him, we didn't really follow him as closely as we should have.* (Nurse participant) *I think we were too focused on getting him out of here, and this is before stabilizing him and addressing his needs.* (Nurse participant) *I wanted the baby out of there, someplace else [laughter] so I could think about my other patients.* (Physician participant)

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TABLE 2. *(Continued)*

Theme	Pediatric Emergency Department	General Emergency Department
5. Continuous learning	*So I think it's really easy to learn here because it's part of the culture.* (Nurse participant) *… at least in my department, we all talk about, "Hey, how'd that go?" or, "Hey, that didn't go very well." or, "We should have done this." or, "I was thinking this." I mean, the teamwork is unreal.* (Nurse participant) *If I ever am questioning anything, I feel like I can approach the team and ask them what's going on… And then, going back and talking to the fellow and the doc and saying, "How can we work on better communication for the next patient?"* (Technician participant) *There's a lot of feedback, there's a lot of communication and you have to really be open to people coming and challenging the decisions that you made and try not to be offended when you've made the wrong decision and you realize, "You're right, I could have done this better. I should have done this."* (Technician participant)	*On the QI, I've seen—I mean, people have asked me to write reports and things like that. I don't know that I ever see anything really get changed, and that's, I think, somewhat frustrating.* (Physician participant) *I feel like our pediatric liaison… she is fantastic about teaching us and she's a really great support, but she's a nurse. But besides that, I feel like she's our best resource, for sure. And then we have like the pediatric hospitalists who are really cool, really approachable, really ready to teach.* (Nurse participant) *I feel like there could be better training, like continuous training. Updating and refreshing memories and stuff like that… because we see sepsis quite a bit, but we don't really see pediatric sepsis enough that I'm not even sure if we have—we very well might have a completely different protocol in the sepsis bundle for it, but not that I'm aware of.* (Nurse participant) *… bad outcomes will change processes and stuff that way. But I think overall, yeah. I think there's a desire, and I think staff has a desire to get better.* (Physician participant)
6. Computerized CDS	*So we can click that. I usually can just tell the nurse like, "We're doing the whole thing." And the nurse also knows like what that means. And if someone's unfamiliar with it, then we can pull up the power plan.* (Physician participant) *But there is a sheet in the ED that's our septic workup sheet that I have seen fellows look at, or residents that come through that maybe are new to the process. We do have it printed out and available and. But in these moments, it mostly is by word-of-mouth.* *if they just click on the order set, it's going to do the right thing for the vast majority of people… I mean in the old days you'd forget to check all the blood culture and the HUC would say "Don't you want a blood culture with this?" And you'd say "Yeah."*	*I do know we have these protocols that used to be on paper, it was very easy. I would just open the drawer and grab them. Now they're in the computer, I'll be honest… it was easier for me just to pull them out of the drawer because I knew where they were… and I would do the checkmarks… and make sure that everything was covered.* (Physician participant) *I mean, it's hard because our [adult] sepsis alert fires for half the patients in the ER. But GI bleeds. There's seizures. There's people on drugs. There's a lot of people who have a sepsis alert, so it's—I don't know.*

HUC, Hospital Unit Clerk.

noted that the system collects data and provides feedback, but often only after a bad event.

Theme 6: Computerized Decision Support May Not Be Optimized to Drive Decision Making at the Point of Care

The implementation of a protocol goes beyond having it in the computer; individuals must know where it is and how to apply it. In the PED, where the sepsis protocol is internalized, CDS seemed to play a minor role, despite having pediatric-specific sepsis tools for both recognition (sepsis alert) and treatment (clinical pathway, order set). Teams are monitoring the flow of care but are not reliant on CDS to track progress; rather, decision support is available as a reference (Table 2). In the GED, team members expressed frustration as they were expected to use the available, but difficult to access, CDS and often experienced alert fatigue with the current adult sepsis alerting system. Both the PED and GED providers described the CDS systems as not fully supporting the needs of the unit or the individuals—but for different reasons.

DISCUSSION

In this study, we explored workflow and clinical decision making surrounding pediatric septic shock care between a PED with an established and successful pediatric septic shock program[4,20] and 2 GEDs with less directed work in this area to inform future implementation efforts. We focused our analysis both on what goes right and what goes wrong and highlighted the importance of the healthcare systems' approach to patient care.[21] Our results suggest that the PED's success relates to the system's deeply saturated workflow, commitment to supporting a standardized approach to sepsis care, layers of redundancy, flexibility of roles with substantial skill, and ample opportunity to practice both individual skills and coordinated teamwork in real time.

In addition to having the necessary skill and resources, effective pediatric sepsis care requires a high degree of both shared SA and transactive memory. Shared SA refers to how well all team members have the same understanding of their environment and the information necessary for completing each team member's goals.[22] Transactive memory is the combination of each individual's knowledge stores plus their understanding of other teammate's skills and expertise.[23,24] In other words, we often just need to remember who knows what, which relieves us of the need to learn all skills. A high degree of shared SA, transactive memory, and trust among team members have allowed automaticity to emerge in the PED. The shared SA and transactive memory in the highly practiced PED likely contributed significantly to its high reliability sepsis care.[4] This is consistent with reports demonstrating that improving SA can facilitate the recognition of deteriorating pediatric patients.[25–27] Because pediatric sepsis is a rare event, GEDs

have few opportunities to develop shared SA and transactive memory around pediatric sepsis care. Finally, the overarching culture within the PED supports continuous learning and support for ongoing improvement.

Although similarities in the structure and function of the PED and the GEDs exist, important differences must be considered in anticipation of implementation of a standardized pediatric septic shock care pathway. Pediatric septic shock is rare in individual GEDs. This leaves GED teams at risk for reinventing the care of septic children with each patient, particularly given that GEDs have varying levels of readiness for care of critically ill children, including those with sepsis.[10,28,29] The Surviving Sepsis Campaign guidelines are widely published[1]; however, successful adherence to guidelines requires a well-designed implementation plan tailored to the knowledge and practice barriers of the given environment.[30] The extensive resources and experience of the PED cannot and should not be replicated at every GED. Instead, innovative systems should be designed to facilitate high-quality care within the GED setting. Targeted implementation strategies to improve pediatric readiness for sepsis must match the specific characteristics of different settings.

Specific Recommendations

Based on our findings, we suggest 3 key concepts to consider when planning the implementation of a pediatric septic shock care pathway in the GED. First, we recommend facilitating shared SA to help achieve team functioning like a "well-oiled machine." Situation awareness with respect to ED care for pediatric septic shock encompasses (1) mutual awareness of who is working, their skill levels, and background; (2) an early and shared perception of the problem; and (3) a shared awareness at all times of where the child is in the care pathway.

Because GEDs are unlikely to see the volume of pediatric sepsis required for deep internalization of a care pathway, external prompts are critical to enhancing team awareness of the goals of care and real-time tracking of individual patients within the care pathway. Review of team skills and agreed-upon roles could be instituted as part of coming on shift during a shared team "huddle."[25–27,31] Audible alarms or "overhead" announcements could be used to alert the ED of a suspected pediatric sepsis case (eg, Code Blue). Low-cost, low-resource CDS tools like centrally placed dry-erase boards or paper-based visual prompts that guide sepsis resuscitation could effectively facilitate a shared mental model. These external prompts could also significantly reduce the cognitive load placed on team leaders who are tracking task completion.

Embedding CDS within the EHR can provide clinicians with just-in-time, patient-specific, evidence-based information at the point of care, potentially improving clinical decision making and quality of care. However, embedded CDS tools must be designed to decrease clinicians' cognitive burden as opposed to contributing to cognitive overload.[32] Traditional CDS displayed to an individual user is unlikely to contribute to shared SA across a busy ED; however, innovative designs might better facilitate team awareness. For example, completed tasks, time tracking, and tasks still "to do" could be captured by the computer via integration with the EHR and displayed on a large wall-mounted computer screen. Finally, using telehealth to provide remote leadership from tertiary centers could facilitate shared SA during resuscitations and improve quality of care.[33]

Second, we recommend increasing familiarity with recognition and treatment of pediatric septic shock through hands-on, team-based practice. Because pediatric septic shock is a rare event in the GED, exposure to septic shock care pathways could be increased through real-time practice rotating in PEDs, skills-based training, and simulation experiences. We suggest focusing efforts on simulation. Simulation successfully improves skill and team performance in the ED[34] and in the care of deteriorating patients in the pediatric intensive care unit, particularly related to shared mental models within a multidisciplinary team.[35] Team-based simulation can increase the mutual awareness of skills and knowledge within team members (transactive memory) that is characteristic of high functioning teams. In addition, cross training some skills across staff allows the workload to be adjusted to the current demands in a flexible way.

Third, we recommend routine evaluation of sepsis care processes so that each episode of care for a child with septic shock provides an opportunity for the team to learn and improve. Strategies include review of sepsis care metrics at regular intervals with all team members, formal debrief sessions after each event, and informal conversations between team members discussing opportunities for improvement. Fostering a continuous learning environment allows team members to cultivate a growth mindset, regardless of role, level of experience, or time spent in the care setting.

Limitations

Our study has several limitations. First, this study was conducted with ED team members from 3 hospitals (1 PED, 2 GEDs) within a single health system; thus, results are not generalizable to all hospital types and health systems. Second, although we attempted to include participants within each ED role with varying experience, our data may not be representative of the entire ED staff at each site. Third, interview participants may have recall bias, particularly with respect to experiences with heightened emotion such as the care of critically ill children. Finally, because the interview questions were specific to care of children with sepsis, we cannot comment on team function in the care of other patient populations or disease processes that may be more familiar to GED teams. However, our recommendations for implementation could be applicable to care pathways in any setting caring for a low prevalence disease.

CONCLUSIONS

Pediatric septic shock workflow, decision making, and system performance differ between the PED and GEDs. In GEDs, successful implementation of a pediatric septic shock care pathway will require tailoring the approach to reflect local resources and culture. Specific recommendations include (1) improving shared SA; (2) simulation for knowledge, skill, and team-based training; and (3) promoting a culture of continuous learning. Future research into different implementation strategies for a pediatric septic shock care pathway in the GED is warranted to improve care for children with septic shock.

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