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Development and Implementation of a Prehospital Paediatric Sepsis Screening Tool: Enhancing Early Recognition, Resuscitation, and Referral

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ABSTRACT

Background

Paediatric sepsis remains a leading cause of preventable morbidity and mortality, contributing to 11 million deaths annually, including 1.2 million children [1, 2]. Early recognition is critical, yet prehospital identification is hindered by subtle presentations, age-related physiological variability, and limited diagnostic capability [1, 3]. Currently, no validated prehospital paediatric sepsis screening tool exists. The aim of this project was to develop and implement an evidence-based prehospital paediatric sepsis screening tool for paramedics.

Methods

The development process included a targeted literature review and formal stakeholder engagement with Hamad Medical Corporation Ambulance Service (HMCAS) and Sidra Medicine. The iterative tool refinement was informed by international guidelines, aligned with Sidra Medicine pathways, and adapted to support HMCAS clinical practice guidelines. Age-specific physiological thresholds were calibrated using Advanced Paediatrc Life Support vital-sign parameters within the sepsis context. Implementation was supported by a blended educational model comprising 4 hours of online preparatory modules, 7 hours of face-to-face workshops, and simulation-enhanced active learning sessions.

Results

The final screening tool integrated infection-risk assessment, high-risk clinical criteria, age-specific vital-sign thresholds, and key physiological indicators, supported by an algorithm **(Figure 1)**. A corresponding prehospital sepsis care bundle **(Figure 2)** was incorporated to standardise timely recognition, intervention, and escalation, aligned with the "Sepsis Golden Hour" and "Sepsis 6" principles [1, 3]. Clinical validation and alignment were provided through expert review by paediatric sepsis specialists from Sidra Medicine. Case-based learning, deliberate practice, and simulations supported the application of the tool for operational practice.

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Conclusion

The Prehospital Paediatric Sepsis Screening Tool was successfully developed and implemented, supported by structured educational preparation to strengthen early recognition and clinical decision-making. By the end of Quarter 1, 2025, 1,513 HMCAS staff (89%) had completed the training. Future study with ongoing evaluation should examine the tool's impact on recognition accuracy, timeliness of intervention, and patient outcomes across the prehospital paediatric sepsis pathway.

Keywords

Paediatric sepsis; Screening tool; Early Recognition, Prehospital Sepsis Care; Paramedic Education

1	**Does this Patient have an infection?** **Is the Patient at risk of an infection?**	Meningitis Upper Respiratory infection Chest infection Urinary Tract infection Abdominal pain or distension An infected wound	Cellulitis Septic arthritis Indwelling medical device Chemotherapy <6 weeks ago Immunocompromised Recent organ transplant
	YES → **THINK SEPSIS**		
2	**High Risk conditions**	Age <3 months; Malignancy, Immunocompromised; Cardiac/Respiratory/ neuromuscular disease; Indwelling Medical Device; Recent Surgery/Hospitalization	
	Is this patient High Risk	Yes ☐ No ☐	

3	Vital signs		Indicate the correct age group					
	X ONLY IF ABNORMAL	Enter Patient Vital Signs	Age in Months		Age in Years			
			0-1m	1-12m	1y - 2y	3y - 5y	6y - 9y	>10y
	☐ Heart Rate	bpm	≤100 or ≥180	≤100 or≥189	≤90 or≥169	≤80 or≥139	≤75 or≥137	≤60 or ≥119
	☐ Resp Rate	rpm	≤30 or ≥60	≤30 or ≥60	≤22 or ≥50	≤20 or ≥45	≤18 or ≥35	≤12 or ≥30
	☐ Systolic BP	mmHg	<60	<70	< (Age x 2) +70			
	☐ RBS	mmol/L	< 2.6 mmol/l	< 4 mmol/l or > 7.7mmol/l				
	☐ Temp	°C	< 36°C or > 38°C					
	☐ SPO2	%	Low SpO2 < 94 %					
	☐ Mental Status	(A) (V) (P) (U)	Reduced level of consciousness, confused, drowsiness, floppiness, lethargy, decreased arousability					
	☐ Cap Refill	secs	Prolonged Capillary refill >2secs					
	☐ Skin / Rash		Petechiae , any purpura, mottled and cool, flushed					
	☐ Total number of boxes X		Patient Identified as High Risk ☐					
4	**High Risk patients + 1 or more criteria** **or** **Standard Patients - two or more criteria**		**Suspected Sepsis** ☐ ↓					
5	**Initiate Treatment** **Prenotification** **Rapid transport**		**Prehospital Sepsis Care Bundle** ☐					

FIGURE 1 - Hamad Medical Corporation Ambulance Service Prehospital Sepsis Screening Tool.

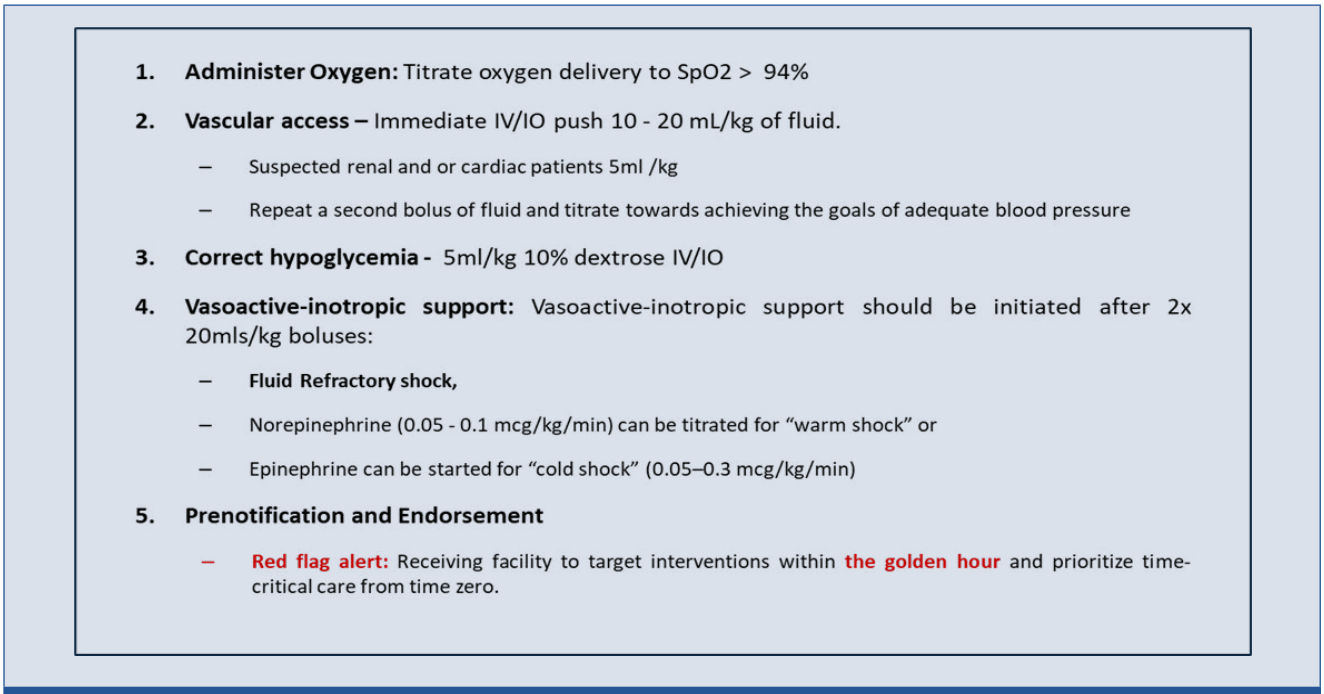

FIGURE 2 - Hamad Medical Corporation Ambulance Service Prehospital Sepsis Care Bundle.

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Author contributions

All authors contributed equally and validated the final version of record.

Declarations

Conflicts Of Interests

The Authors declare that there is no conflict of interest.

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Registration

No registration applicable.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethical approval

Ethical approval for this study was not required.

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