Team Resuscitation Assessment for Pediatrics (TRAP): Creation and Validation of a Real-World Pediatric Resuscitation Performance Tool

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Background

- Pediatric resuscitations are high-impact, low-frequency events requiring quality improvement review and team feedback to improve.

- Prior studies have demonstrated improved resuscitation quality metrics when real-time videography of actual patient encounters is used.

- No validated clinical team-based performance tool currently exists for video assessment of real resuscitations in the pediatric emergency department (PED).

Objective

Use consensus methodology to adapt a validated, simulation-based, resuscitation team performance tool for use in video review of team performance during real resuscitations in the PED.

Methods

- The Simulation Team Assessment Tool (STAT) is a validated tool to evaluate team performance in simulated pediatric resuscitations.

- We adapted the STAT for video review of real resuscitations using a consensus process.

- We divided the STAT into 3 subtools for management of 1) emergency airway, 2) cardiac arrest, and 3) team leadership.

- 12 geographically diverse pediatric resuscitation experts ranked elements as essential, important but not essential, and not necessary.

- We used critical values derived from Lawshe's Content Validity Index to retain or dismiss elements based on the proportion of experts deeming elements essential – this allowed for a 1-round survey model.

Task Group	Task	Proportion Marking Essential	Proportion Marking Important, but not Essential	Proportion Marking not Necessary
History & Physical	Performs primary survey (ABCDE) in first 2 minutes	1.00	0.00	0.00
Recognition	Recognizes urgent/emergent situation within 30 seconds of arrival or acute decompensation	1.00	0.00	0.00
Assessment	Assesses airway	1.00	0.00	0.00
	Assesses breathing	1.00	0.00	0.00
Basic Intervention	Performs airway maneuvers	1.00	0.00	0.00
	Provides supplemental oxygen	1.00	0.00	0.00
Bag-mask ventilation	Initiates BMV within 30 seconds of recognized need for respiratory support	1.00	0.00	0.00
	Assesses chest rise	1.00	0.00	0.00
Basics	Assesses pulses	1.00	0.00	0.00
CPR	Correct hand placement	1.00	0.00	0.00
	Minimizes interruptions in CPR	1.00	0.00	0.00
Arrhythmia	Initiates CPR <30 seconds after recognizes pulselessness	1.00	0.00	0.00
	Places pads correctly	1.00	0.00	0.00
	Delivers shock	1.00	0.00	0.00
	Continues CPR after shock delivered	1.00	0.00	0.00
	Doses meds appropriately	1.00	0.00	0.00
Patient Weight	Estimates/Obtains patient weight within 2 minutes	0.91	0.09	0.00
Monitors	Ensures cardiorespiratory and O2 monitors placed within first 60 seconds	0.91	0.09	0.00
Bag-mask ventilation	Bags at appropriate rate	0.91	0.09	0.00
	Uses proper BMV technique and positioning	0.91	0.09	0.00
Basics	Assesses heart rate	0.91	0.00	0.09
CPR	Correct rate of compressions	0.91	0.09	0.00
	Uses appropriate surface (backboard, floor)	0.91	0.09	0.00
	Uses appropriate ventilation : compression ratio	0.91	0.09	0.00
Arrhythmia	Recognizes abnormal rhythm <30 seconds from onset	0.91	0.09	0.00
	Recognizes need for electricity <30 seconds from onset	0.91	0.09	0.00
	Doses electricity correctly	0.91	0.09	0.00
	Reevaluates rhythm after 5 cycles of CPR	0.91	0.09	0.00
History & Physical	Solicits SAMPLE history (signs/symptoms, allergies, meds, past illness, last meal, events preceding)	0.82	0.18	0.00
Access	Obtains vascular access within first 60 seconds	0.82	0.18	0.00
	Attempts IO access if no IV access after 2 attempts	0.82	0.18	0.00
Management	Initiates volume resuscitation	0.82	0.18	0.00
	Selects isotonic fluid	0.82	0.18	0.00
	Ongoing fluid resuscitation as needed	0.82	0.18	0.00
Labs	Responds to lab results appropriately	0.73	0.27	0.00
Universal Precautions	Team uses appropriate universal precautions	0.73	0.27	0.00
Advanced Intervention	Uses appropriate advanced airway	0.73	0.18	0.09
Management	Initiates appropriate IV fluid dose	0.73	0.27	0.00
Arrhythmia	Clears patient appropriately (including oxygen)	0.73	0.27	0.00
	Follows PALS guidelines	0.73	0.27	0.00
X-rays/Studies	Responds to radiological study results appropriately	0.64	0.27	0.09
Basics	Assesses blood pressure	0.64	0.18	0.18
	Assesses distal perfusion (cap refill)	0.64	0.18	0.18
Basic Intervention	Uses appropriate adjunct airway	0.55	0.45	0.00
CPR	Assesses quality of pulse with CPR	0.55	0.36	0.09
History & Physical	Performs secondary survey (head to toe exam, including back) in first 8 minutes	0.36	0.45	0.18
Consults	Contacts appropriate consults	0.36	0.63	0.00
X-rays/Studies	Orders appropriate imaging	0.27	0.63	0.09
Labs	Orders appropriate lab testing within first 5 minutes	0.09	0.91	0.00

Cardiac Arrest Sub-Tool Retained (Green) and Dismissed (Red)

Results

- 65/101 (64%) total elements were deemed essential and were retained in the TRAP tool.

- 27/47 (57%) elements were retained in the airway assessment sub-tool.

- 34/49 (69%) elements were retained in the cardiac arrest sub-tool.

- 4/25 (16%) elements were retained in the team leadership sub-tool.

- Overall, experts utilized the survey options as follows:

  - Essential: 77% of the time
  - Important, but not essential: 21% of the time
  - Not necessary: 1.5% of the time.

- There was significant variation from expert to expert in their responses. One reviewer marked 93% of elements as essential, while another marked only 53% of elements as essential.

Conclusions

Modification of a pediatric resuscitation clinical performance tool from simulation-based to real-world-based is possible using consensus methodology.

Further Study

Future studies will assess reliability of the TRAP tool in the evaluation of team performance through video review of actual resuscitations in the PED.

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