

Evaluation of a Novel Simulation Rotation for Pediatric Residents to Teach Crisis Resource Management Skills

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BACKGROUND

Pediatric residents have little resuscitation experience and lack knowledge, skills and confidence to lead resuscitations.

OBJECTIVE

 To develop a simulation-based rotation for pediatric residents to improve capability and confidence in crisis resource management skills including leadership, airway and breathing support, circulation and arrhythmia management.

METHODS

- We created a 10-day simulation rotation for 2nd and 3rd year pediatric residents (Figure 1).
- Course facilitators developed most simulations, and some were adapted from previous publications.
- Residents completed a pre- and post-course survey that included a five-point Likert scale for self-perceived confidence and capability when approaching a patient needing resuscitation.
- Residents were evaluated with the Concise Assessment of Leader Management (CALM) instrument which evaluates leadership, communication, team management, and medical management (QR code).



Day 1	Day 2	Day 3	Day 4	Day 5
Orientation - Individual meetings to review goals - Pre-course survey - Skills and didactic session with pharmacy	 Tricyclic ingestion with ventricular tachycardia* Diabetic ketoacidosis* Ingestion with PEA* Septic shock with difficult IV access 	 Baclofen withdrawa Status asthmaticus and pneumothorax Traumatic brain injury* Anaphylaxis with distributive shock and PEA* 	Airway Day - Didactic session - Skills session - Status epilepticus* - Opioid overdose* - Hemolytic uremic syndrome*	Interdisciplinary Simulations (RTs, RNs, Pharmacy) - Bronchiolitis* - Transfusion reaction associated lung injury (TRALI) - Electrolyte abnormalities after transfusion* - Diarrhea with hypovolemic shock and hypokalemia*
Day 6	Day 7	Day 8	Day 9	Day 10
- Hypovolemic shock	- Ventricular	- Tumor lysis	Interdisciplinary Simula	tions - Individual
(RCDP)*	tachycardia with a	syndrome	(RTs, RNs, Pharmacy)	meetings to review
- Blunt abdominal	pulse*	- Upper airway	 Congenital adrenal 	goals and course
trauma and	 Prolonged QTc and 	obstruction	hyperplasia*	feedback
hemorrhagic shock	Torsades de	- Bradycardia from	- Drowning and bradyc	ardia* - Post-course survey
- Supraventricular	pointes*	heart block (RCDP)	- Endotracheal tube iss	ues*
tachycardia (RDCP)*	 Myocarditis* 	- Pulmonary	- PEA arrest with tension	on
- Ventricular	 Congenital heart 	hypertensive crisis	pneumothorax*	
fibrillation (RCDP)*	disease*			

Figure 1. Simulation Rotation Schedule The simulation rotation is offered twice per year and can accommodate six residents. Each rotation has a total of 31 high-fidelity simulations. * indicates simulation was developed by course facilitators.

RESULTS

- 25 residents completed the simulation rotation –10 were evaluated using the CALM tool and 17 completed the pre/post survey.
- There was significant improvement in the CALM score on the residents' last simulation as compared to their first simulation (median of 52, interquartile range [IQR] 49-53.5 vs median of 35, IQR 29-37.5, p-value <0.002, n=10; Figure 2) indicating improvement in leadership ability at the end of the course.
- Residents also reported significant improvement in self-perceived confidence (median 2 vs 4, p-value < 0.0002, n=17) and capability (median 2 vs 4, p-value < 0.0001, n=17) when approaching a patient needing resuscitation before and after the course.

Figure 2. CALM Scores of Pediatric Residents Ten residents were evaluated using the CALM instrument.





- A simulation-based rotation for pediatric residents improves leadership skills and self-perceived levels of capability and confidence when approaching a patient resuscitation.
- Future work should focus on assessment of competency and retention of resuscitation skills.