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The first five minutes: enhancing simulation education for first-year pediatric residents

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Background

Simulation is an underutilized resource in medical education within the Children's Hospital of Richmond (CHoR) at Virginia Commonwealth University's (VCU) pediatric residency program. Pediatric resuscitation events are rare. Of those pediatric patients manifesting duress, respiratory distress, shock, and impending cardiopulmonary arrest are common presentations.¹⁻² Adding to the limited exposure of pediatric trainees to such events is the restriction on duty hours, the changing patterns of health care delivery and patient safety, as well as the ever-growing number of medical trainees.³⁻⁴

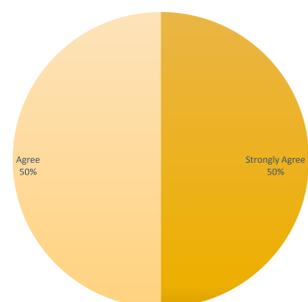
A survey conducted in June 2016 of PGY-1 residents at this program at the end of their first year in residency showed that of 18 respondents, 10 (55%) had not participated in a rapid response or code on the inpatient floor in the previous 11 months. While all had participated in at least one mock code in the simulation center, only 11 (61%) were able to be the designated team leader in a resuscitation scenario. This pattern has been shown elsewhere to persist outside of simulation education, with at least one survey showing only a small percentage of senior pediatric residents ever having led a resuscitation event in real-time.⁵ Furthermore, while all pediatric trainees at CHoR/VCU obtain PALS certification, studies have shown that retention of essential knowledge and skills obtained in these sessions deteriorates over time, indicating the need for frequent repetition.⁶

While there exists many examples of simulation education within pediatric residency programs, there is wide variability in content, audience, assessment methods, and sustainability models.⁷⁻⁹ Few have attempted to create a standardized curriculum for implementation across different pediatric residency programs.¹⁰ Based off proven need and off of existing examples, we have attempted to create a feasible simulation curriculum for our first-year pediatric residents aimed at providing instruction in effectively managing the first-five minutes of commonly encountered pediatric emergency scenarios.

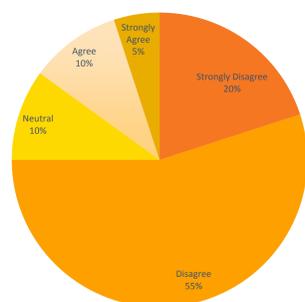
Results

A 12 question survey was sent out to each categorical and medicine/pediatric first-year resident to gauge attitudes towards resuscitation events and towards simulation education. We had 100% response rate. Each question utilized a 5-point Likert scale. Overall, the responses indicate a lack of comfort and preparedness for handling resuscitation events and indicated positive attitudes towards simulation education.

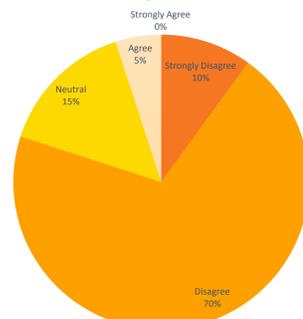
Lack of experience running an RRT or code is a barrier to my performance in an emergency resuscitation event



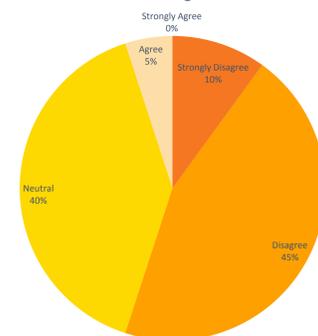
I am eager and willing to be the first person to arrive bedside during an RRT or code



I understand what various resources are available during a code event and can effectively utilize them



I can effectively organize a team and manage and distribute tasks during a resuscitation event



Objectives

- Increase the amount of simulation education experience
- Each learner would function as team leader twice per year
- Focus on the first five minutes of a resuscitation event
- Improve team communication skills during stressful events
- Evaluate how learners progress over the course of the year
- Gauge attitudes towards simulation education
- Gauge attitudes towards resuscitation skills

Methods and Materials

- Pre-simulation survey gauging attitudes
- 3-5 first year residents per session
- 9 sessions throughout PGY-1 year

Day of:

- Pre-briefing session
- 5-10 minute emergency scenarios
 - Bronchiolitis
 - Septic shock
 - Supraventricular tachycardia
 - Seizure
 - Anaphylaxis
- Debriefing
 - Advocacy/inquiry method
 - GTSC
- Mayo High Performance Teamwork Scale

Discussion

Each categorical pediatric PGY-1 resident was scheduled into two separate simulation sessions this year, achieving our main objective of increasing simulation exposure for first-year pediatric residents. Each resident's individual session was separated by at least two months, with most resident's first session occurring in the first half of the year and second session in the second half of the year. First-year medicine/pediatric residents were unable to be scheduled into any session given their increased schedule restrictions.

The first obstacle to implementing this new curriculum was writing novel simulation scenarios to capture the events that typically occur in the first five minutes of common pediatric emergency scenarios. The scenarios went through several revisions and test-runs before being implemented with our intended learners throughout the year. We easily complete up to five scenarios in a 3 hour session, leaving ample time for discussion and debriefing. The shorter 5-minute scenarios have been well-received and have frequently been reported as "realistic" and "reflective" of what is seen on the inpatient wards. Much of learner feedback occurs in real-time during debriefing, but also through an evaluation form completed at the end of each session. Further assessment of learner attitudes requires completion of an end-of-year survey.

Evaluating learner progression throughout the course of the simulation curriculum is challenging. Direct observation by instructors as learners navigate the scenarios is one means; however, this is subjective and comparisons over time are difficult. We attempted to measure completion rate of critical tasks as well as measure the time elapsed until accurate implementation of these tasks. This data was collected through video review of the recorded simulation sessions. Differences in the order of seconds within a five minute scenario may prove insignificant to measure learner acquisition of knowledge or skills. In terms of teamwork and communication, we are using the Mayo teamwork assessment scale and will be eager to gauge learner perception of these important objectives at the completion of this year.

Moving forward, we would like to expand simulation education to PGY-2 and 3 levels, creating scenarios tailored to the increased responsibilities of a senior resident. We would like to continue our focus on teamwork and communication and will be looking to use validated assessment methods and will inquire whether these assessments can accurately reflect quality in simulation education.

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