INDIANA UNIVERSITY
SCHOOL OF MEDICINE

Does Length of Emergency Medicine Training Matter for Leadership Skills in Pediatric Resuscitation? A Pilot Study

Kyle Schoppel MD[1], Ashley Keilman MD[2], Jabeen Fayyaz MBBS DCH MCPS FCPS MHPE[3], Patricia Padlipsky MD[4], Maria Carmen G. Diaz MD FAAP FACEP[5], Robyn Wing MD MPH FAAP[6], Mary Hughes DO[7], Marleny Franco MD,FAAP[8], Nathan Swinger MD[1], Travis Whitfill MPH MACE MPhil[9], Barbara Walsh MD[10]

[1]Indiana University School of Medicine/Riley Hospital for Children, [2]Seattle Children's Hospital, [3]The Hospital for Sick Children/University of Toronto, [4]Harbor-UCLA Medical Center, [5]Nemours Children's Hospital, Delaware, [6]Hasbro Children's Hospital, [7]Sparrow/Michigan State University, [8]Children's Hospital of Philadelphia, [9]Yale University, [10]Boston Medical Center

BACKGROUND

- Greater than 90% of pediatric patients in US are treated at community-based general emergency departments (GEDs) that are poorly prepared for pediatric emergencies.
- ↑ mortality critically ill/injured pediatric patients treated at GEDs with low pediatric readiness scores.
- Despite rotating at large academic tertiary/quaternary pediatric hospitals, Emergency Medicine (EM) residents care for small numbers of critically ill and injured pediatric patients and thus perform few pediatric resuscitations.
- Teamwork is critical to resuscitation team success. Current guidelines support leadership training during advanced life support courses.
- We hypothesized 4th-year residents might score higher than 3rd-year residents using CALM tool given fact that additional year of training allows for more patient encounters and more opportunities to lead real and simulated resuscitations

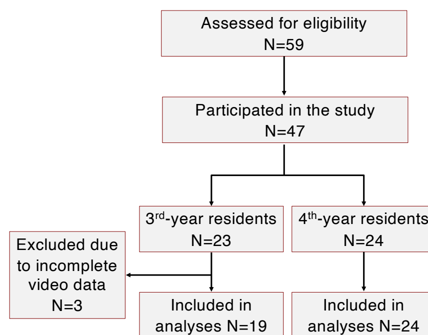
METHODS

- Prospective, six-site, multicenter, simulation-based cohort pilot study of graduating 3rd and 4th year senior EM resident physicians from EM residency programs.
- Compared leadership skills during 3 simulated pediatric critical resuscitations
  - Septic shock, seizure, cardiac arrest
  - Used validated leadership assessment tool, the Concise Assessment of Leader Management (CALM)
- Simulation videos scored by four blinded video reviewers using CALM tool.

RESULTS

- Fifty-nine residents eligible for participation, 47 were evaluated for data analysis, and 44 were included in the analysis:

Figure 1. Study design



- Interrater reliability calculated using intraclass correlation coefficients (ICC) for each case:
  - Sepsis: 0.870 (95% CI: 0.821, 0.908, p<0.001)
  - Seizure: 0.848 (95% CI: 0.792, 0.893, p<0.001)
  - Cardiac arrest: 0.843 (95% CI: 0.783, 0.889, p<0.001)

Table 1. Residents' demographics and Residency program characteristics

Resident characteristics	N=47 (%)
Year of residency	
PGY3	23 (49.1)
PGY4	24 (51.1)
Gender	
Male	31 (66.0)
Female	16 (34.0)
Residency characteristics	**N=6 (%)**
Geography	
Urban	4 (67.7)
Suburban	2 (33.3)
Length of residency	
3 years	3 (50.0)
4 years	3 (50.0)
Annual pediatric patient volume	
Medium: 1800-4,999	1 (16.7)
Medium high: 5,000-9,999	1 (16.7)
High: ≥10,000	4 (67.7)

RESULTS

- Total leadership score (TLS)
  - 3-year cohort = 46.2 [SD: 4.8]
  - 4-year cohort = 46.7 [SD: 4.5]
  - (p = 0.715)

Table 2. Self-efficacy rates by Residency Program type

Median score, % (IQR)	All N=43	3-year N=19	4-year N=24
"I can act as team leader in a pediatric resuscitation when a patient presents with…"			
Trauma	60 (50, 70)	60 (43, 70)	70 (50, 75)
Cardiogenic shock	50 (40, 60)	50 (43, 60)	50 (40, 70)
Distributive shock	60 (50, 70)	60 (50, 70)	60 (50, 70)
Hypovolemic shock	70 (60, 80)	70 (53, 80)	70 (60, 70)
Septic shock	70 (60, 80)	70 (60, 80)	70 (60, 70)
Respiratory failure	65 (50, 75)	63 (50, 79)	70 (50, 70)
Status epilepticus	60 (60, 70)	60 (60, 75)	60 (50, 70)

Table 3. Mean CALM Scores by Case (ILS and TLS, Total 66 points maximum)

Mean score out of 66 (SD)	All N=44	3-year program N=20	4-year program N=24	P-value
Sepsis	43.4 (5.5)	45.2 (5.2)	45.5 (5.8)	0.835
Seizure	46.5 (4.9)	46.8 (5.0)	46.4 (5.0)	0.807
Cardiac arrest	47.5 (4.5)	46.6 (4.7)	48.2 (4.3)	0.255
Total	46.5 (4.6)	46.2 (4.8)	46.7 (4.5)	0.715

ILS – Individual Case Leadership Score
TLS – Total Leadership Score (mean)

CONCLUSIONS

- Although not yet able to achieve power to show a statistically significant difference between the groups if one exists, this study is important to illustrate the feasibility of a larger proposed comparison between resident physicians graduating from 3 vs. 4-year EM residency programs.
- This pilot study provides basis of future work that will assess a larger multi-center cohort with the hope to obtain a more generalizable dataset.
- With a larger cohort, we hope to address additional secondary outcomes such as 1) comparing resident performance in 3 vs. 4-year EM residency programs, 2) correlating clinical performance and leadership ability, and 3) correlating clinical performance with actual pediatric EM didactic and clinical exposure as reported by residency program directors.

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Contact: Kyle Schoppel, kschoppel@iuhealth.org,