5-2022

Development, Implementation, And Evaluation Of A Simulation Based Educational Curriculum Targeted For Pediatric Hospitalists

Lisa Carney
Children's Mercy Hospital

Matt Hall

Kayla R. Heller
Children's Mercy Hospital

Chris Kennedy
Children's Mercy Hospital

Development, Implementation, and Evaluation of a Simulation Based Educational Curriculum for Pediatric Hospitalists

Pediatric Hospital Medicine & Pediatric Emergency Medicine - Children's Mercy Kansas City, MO

Lisa Carney, MD; Matthew Hall, PhD; Kayla Heller, MD; Chris Kennedy, MD

BACKGROUND AND OBJECTIVES:

Minimal published simulation based educational training exists for practicing pediatric hospitalists.

Our aim was to determine specific Pediatric Hospital Medicine (PHM) knowledge, skill and competency needs in alignment with our scope of practice and evaluate the impact of a simulation-based training curriculum.

DESIGN/METHODS (Figure 1):

- Needs Assessment/Baseline survey administered
  - Utilized self-ratings from Novice to Expert (5-point Likert scale) on published PHM competencies
  - Responses averaged into specific domain scores, bundled according to learning content needs
- Six targeted simulation sessions developed, piloted and implemented
  - Educational evaluations following each session rated learning objectives and methods from Very Poor to Excellent (5-point Likert scale)
- Post-training survey administered

Data Analysis:

- Participant deemed competent in a domain if mean score ≥3. Score analysis performed using Sign Rank and McNemar's Tests (Table 1)
- Determined if score changed for each domain based on experience or session attendance using Kruskal–Wallis tests
- Educational session evaluations compiled by ratings

Figure 1: Simulation-Based Training Curriculum Process

2015: Baseline Survey Performed	2015-16: Curriculum Developed, Creation of Six Sessions	2016-18: Curriculum Implemented	2018-19: Results Phase
• Needs assessment based on PHM competencies. • Completion Rate = 48/49 (98%)	• 3-hour sessions • Simulation scenarios • Skill stations • Brief didactics	• **Session 1:** Neurologic emergencies • **Session 2:** Medically complex technology dependent • **Session 3:** Cardiac emergencies • **Session 4:** Pain & sedation management/airway skills • **Session 5:** Communication/difficult conversations • **Session 6:** Multi-disciplinary code blue: Community site	• Educational session assessments • Post-training survey • Completion Rate = 41/48 (85%)

Figure 2: Post-Training Reflections (Y/N and free text)

Have you used knowledge or skills learned in the simulation when providing patient care? Yes=95% (39/41)	*"Its hard to feel you are maintaining skills, but simulations help keep critical thinking intact."* *"I appreciate the sim practice and feel it adds to my ability to calmly manage RRTs/codes."* *"I became more aware about resources available."*
Have you changed your patient care in some way as a result of simulations? Yes=88% (36/41)	*"More confident, broader differential diagnosis, better patient care."* *"Definitely had an impact on rapport and collaboration with the subspecialists."* *"More willing/less hesitant to call specialists with questions."*
Has your comfort level in caring for inpatients improved as a result of simulation? Yes=88% (36/41)	*"Going through scenarios in a controlled environment makes it much easier when they happen in real time and on real patients."* *"Regular practice of these skills increases confidence during real scenarios."* *"I feel more prepared for complications related to complex patients."*

Table 1: Mean Scores and Percent Competent Baseline & Post Training

(Novice = 1, Competent = 3, Expert = 5)	Baseline	Post	Change in Score		Baseline	Post	
	Mean (Std) Score:			p*	Competent N (%)	Competent N (%)	p**
1. Initial Assessment and Skills	3.6 (0.6)	4 (0.6)	0.32 (0.62)	0.001	40 (83.3)	39 (81.3)	0.782
2. Advanced Airway Management	2.8 (0.7)	3 (1)	0.2 (0.87)	0.161	18 (37.5)	24 (50)	0.109
3. Vascular Access & Medications	2.8 (0.7)	3.1 (0.9)	0.23 (0.76)	0.082	18 (37.5)	21 (43.8)	0.366
4. Code Cart	2.5 (0.7)	3.2 (0.9)	0.58 (0.95)	<.001	9 (18.8)	23 (47.9)	0.001
5. Dysrhythmia/Defib	3.3 (0.7)	3.5 (0.9)	0.15 (0.81)	0.198	34 (70.8)	31 (64.6)	0.467
6. Post Resuscitation Care (Stabilize & Transfer)	3.2 (1.1)	3.8 (0.8)	0.52 (0.94)	<.001	33 (68.8)	35 (72.9)	0.527
7. Team Skills/Communication - COMBINED	3.1 (0.7)	3.7 (0.8)	0.46 (0.71)	<.001	28 (58.3)	33 (68.8)	0.197
8. Complex Care	3 (0.6)	3.3 (0.7)	0.3 (0.69)	0.016	23 (47.9)	29 (60.4)	0.134
9. Core Competencies/Skills	3.6 (0.6)	3.8 (0.7)	0.16 (0.59)	0.232	41 (85.4)	38 (79.2)	0.366
** Sign-Rank test*					*** McNemar's test*		

RESULTS: Baseline survey response rate was 98% with 85% completing the post-training assessment. The median number of years of experience as an attending was 4. Areas with the lowest self-reported competency on the baseline assessment included medically complex care, code cart, vascular access & emergency medications, advanced airway management, and team communication (Table 1).

Post curriculum scores improved significantly for 5 of 9 domains and percent competent in one domain. Mean scores increased to ≥3 in all domains reaching the designated self-assessment competency threshold (Table 1). Change in scores was not associated with years of experience or increased session attendance. Figure 2 includes example responses to questions of perceived impact on clinical care. Overall, participants rated the educational sessions "good" or "excellent" at a rate of 98%.

CONCLUSIONS: Results from a baseline assessment were instrumental in designing a simulation-based faculty education curriculum. Post-training analysis revealed gains in multiple domains and identified future opportunities for targeted intervention to address persistent competency gaps. Hospitalists reported participation in simulation sessions positively impacted patient care and team communication.

As new subspecialists, pediatric hospitalists across the country may find value in a similar process to provide novel faculty education.

ACKNOWLEDGEMENTS: Data collected using Research Electronic Data Capture (REDCap), designed and administered by Kelli L Behr, Data Analyst, REDCap Project Administrator.
The QR Code to the right includes a demonstration of the surveys.