A Directed Core EPA 10 Curriculum Improves Medical Student Competencies and Entrustment Scores

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Financial Support: Society of Academic Emergency Medicine, Emergency Medicine Foundation, Education Research Grant, 2020-2022

Background

- In 2013, the Association of American Medical Colleges (AAMC) created 13 Core Entrustable Professional Activities (EPAs) for Entering Residency to define a common core set of behaviors expected of all medical students graduating from medical school.[1]
- EPA 10 outlines an objective for graduating medical students to: "recognize a patient requiring urgent or emergent care and initiate evaluation and management." Several studies suggest that there is limited exposure of medical students to emergent conditions during training.[2,3,4]
- Even when medical students are exposed to emergent conditions, students often take a peripheral role[4,5] which creates a gap between expected performance and observed performance of EPA 10 and limits opportunities for authentic workplace-based assessment.[6,7,8]
- Given the rarity of opportunities for medical students to primarily manage emergencies, and the difficulty in safely assessing this skill in the clinical setting, there is a need for additional educational opportunities that prepare medical students for this role prior to internship. Few studies have tested curricula and assessment methods for EPA 10, and most of these studies evaluated groups of students, rather than individuals or examined multiple EPAs simultaneously without a directed focus on Core EPA 10.[12,13,14]
- With the need for additional educational opportunities for students and the need for development of curricula and assessment methods to provide entrustment information to medical schools, we aimed to address this gap by developing a new curriculum and formative assessment tool for teaching and evaluating EPA 10 competencies and entrustment in medical students.

Objective

The goal of this study was to develop and evaluate a standardized curriculum and assessment tool for Core Entrustable Professional Activity (EPA) 10 competencies and entrustment scoring in a cohort of medical students in their emergency medicine (EM) clerkship.

Table 1: Modified Chen Entrustment Scale

1b	Student is allowed to observe the EPA, ex. "Watch me do this"
2a	Student is allowed to practice the EPA coactively with the supervisor, ex. "Let's do this together"
2b	Student is able to practice the EPA with the supervisor in the room, ex ."I'll watch you
3a	Student is able to practice the EPA with the supervisor immediately available and all findings double-checked, ex. "You go ahead, and I'll double-check all of your findings"
3b	Student is able to practice the EPA with the supervisor immediately available and only key findings are double-checked, ex."You go ahead, and I'll double-check key findings

Methods

- This is a prospective, pretest-posttest study of medical students during their emergency medicine (EM) clerkship.
- Using the Thomas and Kern curriculum framework, we created a curriculum of simulation cases on chest pain/cardiac arrest and respiratory distress, novel assessment checklists of critical action items, and instructional videos on recognizing and managing emergencies.
- Students were individually pretested on EPA 10 competencies using the simulation cases.
- Two reviewers scored students using standardized checklists of critical actions.
- Students then watched the instructional videos, underwent a posttest with the simulation cases, and were scored by the raters using the checklists.
- Differences between pretest and post-test scores were analyzed using paired t-tests and Wilcoxon signed-rank tests

Figure 1: Study Protocol

Figure 2: QR Codes for Educational Videos for Core EPA 10 Curriculum

General Approach to Emergent Patient

Approach to the Emergent Chest Pain Patient

Approach to the Pulseless Patient

Approach to the Emergent Respiratory Distress Patient

Results

- Of 85 eligible subjects, 76 completed baseline testing, and 73 completed baseline and post-testing. Due to incomplete video recording, 69 subjects had pretest and posttest scores from both raters for the chest pain/cardiac arrest case and 68 subjects for the respiratory distress case, and thus were included in the final analysis.
- Pre- and posttest mean scores for critical action items for the chest pain/cardiac arrest and respiratory distress simulation cases significantly improved from an average raw score of 14.8/19 (SD 1.91), to 17.1/19 (SD =1.00), t(68) =10.56, p <.001 and 8.5/13 (SD 1.79), to 11.1/13(SD 0.89), t(67) =11.15, p <.001, respectively (Figure 2 and 3).
- The kappa coefficient for the chest pain/cardiac arrest and respiratory distress critical action checklists were strong, 0.909(n=2698, p<0.001) and 0.931(n=1872, p<0.001), respectively.
- 47.8% of students (n=33/69) completed all five general critical action items at pretesting for the chest pain/cardiac arrest simulation case, and 100% (n=69/69) at posttesting. 23.5% of students (n=16/68) completed all five general critical action items at pretesting for the respiratory distress simulation case and 54.4% (n= 37/68) at postetsing with the most common general critical action missed as incorrectly dispositioning the patient to the floor instead of higher level of care (no student recommended sending the patient home).
- Median modified Chen entrustment scores improved from 1b (e.g., "Watch me do this") to 2b (e.g., "I'll watch you") for the chest pain/cardiac arrest case (p<0.001) and 1b/2a (e.g., "Watch me do this"/ "Let's do this together") to 3a (e.g. "You go ahead, and I'll double-check all of your findings" for the respiratory distress case (p<0.001).

Figure 3. Pret-test and Posttest Scores of Critical Action Items of Study Participants (N=69, N=68)

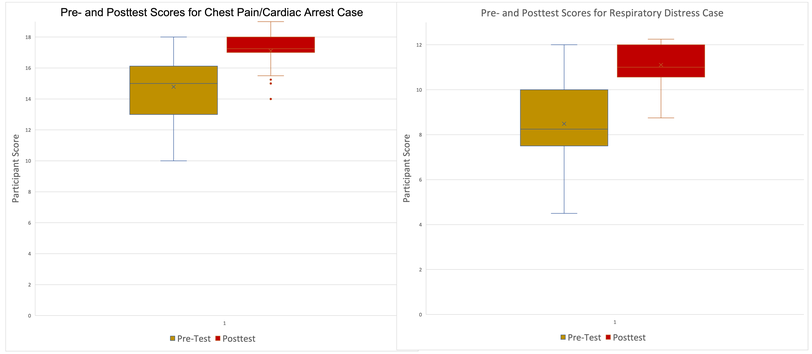

Table 2. Modified Chen Entrustment Scores of Study Participants (N=69, N=68)

Modified Chen Entrustment Score	Pretest Chest Pain Case n(%)	Post-test Chest Pain Case n(%)	Pretest Respiratory Case n(%)	Post-test Respiratory Case n(%)
1b	45 (65.2)	7 (10.1)	34 (50.0)	0 (0)
2a	11 (15.9)	8 (11.5)	14 (20.6)	1 (1.5)
2b	9 (13.0)	24 (34.8)	8 (11.8)	13 (19.1)
3a	3 (4.3)	18 (26.1)	11 (16.2)	25 (36.7)
3b	1 (1.5)	12 (17.4)	1 (1.5)	29 (42.6)

Discussion

- We developed a curricular framework for low-stakes, individualized formative assessments of EPA 10 competencies in the form of 10-minute simulation scenarios, which could be expanded to include clinical scenarios for all 10 emergent conditions outlined by the AAMC.
- By utilizing cases that are standardized and shareable, with objective performance checklists, it would be possible to build a national shareable EPA 10 curriculum to facilitate assessment and comparison of data among institutions
- By individually assessing students, our study also revealed two practical issues with regard to evaluating entrustment for EPA 10. First, as students perform differentially in the absence of a team, entrustment committees are faced with the challenge of developing curricula and standards for individualized assessment that may not account for the interdependence of teams in healthcare and the influence of team dynamics on entrustment scores. Second, the literature and this study suggests that the level of supervision may vary by EPA and clinical scenario, which entrustment committees must consider for this EPA.

Conclusion

A new directed curriculum of standardized simulation cases and asynchronous instructional videos improved medical student performance in EPA 10 competencies and entrustment scores. This study provides a curricular framework for formative assessments for making entrustment decisions.

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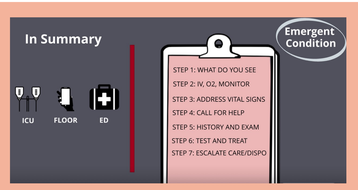

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