

Development, Implementation, and Evaluation of a Electronic Learning Curriculum on Evidence-Based Management of Emergent Pediatric Complaints

Residents: Jacqueline Fox and Gav Apfel

PROJECT PROPOSAL:

Introduction: The final year of medical school and first year of residency are variable in curricular content, leading to a wide range of preparedness to begin the practice of medicine. The application of knowledge to clinical reasoning, diagnostic skills, and evidence-based management are areas of particular focus for graduating medical students. These skills are especially critical to the practice of emergency medicine, a field that relies increasingly on clinical practice guidelines and evidence-based algorithms for the management of emergent complaints. However, these resources are often opaque or inaccessible to students and interns, who rely on variable experiential learning to develop and improve patient management skills. Broadly, there is an ongoing shift in medical education from lecture-based learning to a “flipped classroom” approach with emphasis on an interactive and problem-based multimedia approach that utilizes asynchronous and electronic learning resources. Such asynchronous and electronic learning resources have been shown to be acceptable, feasible, and effective in teaching approaches to clinical care within emergency and pediatric emergency medicine.

Goals and Objectives: The goal of this project is to develop, implement, and evaluate an electronic learning curriculum on the evidence-based management of emergent pediatric complaints for fourth-year medical students and first year residents, using the six-step approach to medical education curriculum of Kerns, Thomas, and Hughes including problem identification/general needs assessment, targeted needs assessment, goals/objectives, educational strategies, implementation and evaluation/feedback. Our objectives are to: (1) determine the learning needs of students with regards to evidence-based management of emergent pediatric complaints; (2) develop and implement an e-learning curriculum for management of select emergent pediatric complaints; and (3) evaluate the efficacy of the e-learning curriculum with respect to participants' content knowledge and self-rated confidence, curricular efficacy, and learning satisfaction, including over time.

Methods:

Problem Identification/General Needs Assessment: Study investigators identified the top ten insufficiently covered, most common emergent pediatric complaints by comparing the didactic schedule with USMLE content outlines. Study investigators utilized resources (i.e., CDEM, ACGME, COMSEP) to identify the top 10 most common pediatric emergent complaints for the needs assessment survey. From those top ten we asked students, first year residents, and PEM faculty to identify those they considered most important for a 4th year medical student to learn how to manage. The types of

asynchronous learning materials (i.e., chalk talk videos or interactive learning assessments or clinical case-based problems) preferred by students were included in the survey. Again students, first year residents, and PEM faculty were asked to rate their effectiveness using a 5-point Likert

Targeted Needs Assessment: Investigators began with a targeted needs assessment conducted among former VP&S students who have completed a sub-internship in either Pediatric Emergency Medicine or Emergency Medicine and among preceptors in Pediatric Emergency Medicine. The data from the needs assessment was utilized to develop 2 e-learning modules teaching evidence-based management of acute pediatric complaints, using Hewlett Packard Laptop and Articulate Storyline software.

Goals and Objectives: Based on the data collected from the targeted needs assessment, investigators will construct curricular goals and objectives. Broadly, this project has a primary goal to develop, implement, and evaluate an electronic learning (e-learning) curriculum on the evidence-based management of emergent pediatric complaints for fourth-year medical students. The project has been planned using the six-step approach to medical education curriculum of Kerns, Thomas, and Hughes as a framework. Specifically the project consists of problem identification/general needs assessment, targeted needs assessment, goals/objectives, educational strategies, implementation and evaluation/feedback. Our objectives are to: (1) determine the learning needs of students with regards to evidence-based management of emergent pediatric complaints based on their own self-assessment and the assessment of their preceptors; (2) develop and implement an e-learning curriculum for management of select emergent pediatric complaints; and (3) evaluate the efficacy of the e-learning curriculum with respect to participants' content knowledge and self-rated confidence, curricular efficacy, and learning satisfaction, including over time.

Educational Strategies: Chalk-talk style videos with interactive multiple choice and drag and drop as well as fill in the blank questions regarding management of a specific emergent pediatric complaint embedded within online learning module. There will be attachments to relevant seminal literature that management algorithms and clinical pathways are based on.

Implementation: The online learning modules including clinical case based problems, interactive learning assessments and “chalk-talk” style videos will be produced and uploaded to pediatrics course page they include supplemental materials such as seminal literature and clinical pathways for students to use to understand the foundation of the management of specific emergent pediatric complaints.

Future Directions:

Pilot evaluation: We will recruit students rotating through the PEM and EM sub-internships as well as EM and Pediatric residents rotating for their first time in the Pediatric Emergency room between October 2020 and June 2020 to participate in the pilot evaluation of the curriculum, including pre/post surveys assessing participant knowledge, self-rated confidence, and self-rated curricular efficacy. In addition, we will

attempt to attain attending physician evaluations of students and residents to supplement the self-evaluation and further examine the effect of our curriculum. The modules will then be edited and remodeled to respond to feedback of the pilot evaluation.

Formal Evaluation: Will be undertaken by future students and residents who will engage in similar surveys to those in the pilot evaluation including pre/post surveys assessing participant knowledge, self-rated confidence, and self-rated curricular efficacy. Additionally these students/residents will participate in a knowledge component that assesses the efficacy of the educational module with pre/post knowledge test that is then repeated at 6 months from the time of completion of the module to assess retention. This project has gained IRB approval.

Results:

Needs Assessment Evaluation: Data was collected from a student/resident group (n=24) and a faculty/preceptor group (n = 17). Faculty and students both identified anaphylaxis, fever in a baby less than one month, bronchiolitis, and status asthmaticus as the most important emergent pediatric complaints for 4th year medical students to learn how to manage. Faculty and students identified a blend of all three types of e-learning resources: digital chalk talk videos (similar to Khan Academy), interactive learning assessments, and clinical case based problems would be most effective. The students noted they would ideally spend less than 15 minutes or 15-30 minutes completing each module.

Conclusions

The fourth year medical students, first year residents, and faculty played a valuable role in problem identification, targeted needs assessment and innovative development of electronic learning curriculum. Continued data collection is needed to further characterize the effect of these modules on confidence, knowledge, and performance. The students will be asked to rate the videos and self-assessments in regard to their knowledge, confidence, and also the effectiveness of the modules as an educational tool.